

# QUALITY OF LOCAL LINKAGES AND THE TRADE-OFF BETWEEN LEARNING OPPORTUNITIES AND THE RISK OF SPILLOVER: INSIGHTS FROM DEVELOPED COUNTRIES

**Alessandra Perri**

Luiss Guido Carli University, Italy

**Ulf Andersson**

Copenhagen Business School, Denmark

**Phillip C. Nell**

Copenhagen Business School, Denmark

**Grazia D. Santangelo**

University of Catania, Italy

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### Abstract

This paper studies the industry-level and subsidiary-level conditions that foster the *quality* of local linkages in developed countries. Specifically, we investigate the patterns of linkages creation in situations when domestic actors are highly competitive and have absorptive capacity, which makes them desirable vertical partners, but simultaneously allow them to learn, use and disseminate the knowledge eventually spilling out through the local relationships. We try to explain the extent to which subsidiaries in developed countries build up *high-quality linkages*, as they represent the *potential benefits of local learning* as well as the *drawbacks of spillovers*. We contribute to the literature that investigates the relationship between linkages and spillovers, by explicitly accounting for the *double role* quality linkages play for subsidiary's competitiveness. Our results suggest that, given that quality linkages encompass a risk of spillover, subsidiaries adapt the investment in their local relationships to respond to the spillovers' threat.

## Introduction

An important consequence of foreign direct investment lies in the phenomenon of *local linkages*, i.e. non-equity relationships that subsidiaries develop with local firms within their host countries (Chen et al., 2004). The study of local linkages has recently given rise to a substantial strand of literature, driven by the belief that they act as a major mechanism through which the MNCs either diffuse their tacit and superior knowledge to local firms (Turok, 1993; Blomstrom and Kokko, 1998; Driffield, Munday and Roberts, 2002; Ghauri and Buckley, 2006), and learn from the domestic environment (Andersson et al., 2002; 2007). This strategic role has motivated scholars' attempts to characterize linkages' *attributes* (Scott-Kennel and Enderwick, 2004; Scott-Kennel, 2007; Giroud and Scott-Kennel, 2009), as well as their *antecedents* (Belderbos et al., 2001; Chen et al, 2004; Lall and Narula, 2004; Dunning, 2006; Giroud and Mirza, 2006; Jindra et al, 2009) and *consequences* (Andersson et al., 2002; Castellani and Zanfei, 2006; Spencer, 2008; Hansen et al., 2009). In particular, the literature on subsidiaries embeddedness (Forsgren et al. 2005) and, more recently, studies on linkages creation (Saliola and Zanfei, 2009; Giroud and Scott-Kennel, 2009) have widely accepted that not all the local relationships have the same potential for spillover and learning. Rather quality linkages, characterized by partners' interdependencies and extensive social interactions, are more powerful than arm's length relationships, when it comes to the enhancement of the local knowledge transfer processes. Quality of local linkages is about the *stability* and the *value* of inter-firm relationships, as those are linkages in which both the subsidiary and the local partner have invested a relevant amount of resources, and whose preservation they will strongly be committed to (Duanmu and Fai, 2007).

While the creation of linkages is relevant for subsidiaries, since it allows to access location-specific assets (Cantwell and Iammarino, 2003), to overcome the liability of foreignness (Chen, 2006), and to avoid the inefficiencies of pure-market relationships (Giroud and Scott-

Kennel, 2009), it also encompasses some drawbacks, in that it implies information gathering, managerial costs, and organizational adaptation (Chen et al., 2004). More importantly, *quality linkages* offer to foreign subsidiaries high-value *learning opportunities* from local partners, but they simultaneously expose their knowledge to the *risk of spillover* to the host-economy (Blomstrom and Kokko, 1998; Mudambi and Navarra, 2004, Santangelo, 2010).

Nonetheless, empirical evidence on the industry-level and subsidiary-level conditions that foster the *quality* of local linkages remains limited (Jindra et al., 2009; Scott-Kennel, 2007). Moreover, empirical research on the linkages' impact on host-countries has mainly focused on less advanced and developing economies (Moran et al., 2005; Hansen et al., 2009; Jindra et al., 2009; Santangelo, 2009). While this approach is consistent with the objectives of the related literature, i.e. the understanding of linkages' role for local firms' upgrading (Hoekman and Smarzynska Javorcik, 2006; Kugler, 2006), it prevents to predict the patterns of linkages creation in situations when domestic actors are highly competitive and possess absorptive capacity, which makes them desirable vertical partners, but simultaneously allow them to learn, use and disseminate the knowledge eventually spilling out through the local relationships.

We address these limitations trying to explain the extent to which subsidiaries in developed countries build up *high-quality linkages*, as they represent the *potential benefits of local learning* as well as the *drawbacks of spillovers*. To this aim, we answer to the research question: "*How do industry conditions and subsidiary characteristics affect the quality of local linkages in developed countries?*" We claim that, in such contexts: (1) subsidiaries look at local suppliers and customers not just as relevant business partners, from which to learn and improve their capabilities, but also as potential threats, through which their competitive advantage may indirectly reach host-country competitors; (2) the *local competitive pressure* and the level of the *subsidiary's capabilities* affect the trade-off between local learning opportunities and the degree to which the subsidiary might want to avoid potential spillovers

associated with quality linkages, thus influencing the extent of resources subsidiaries invest in their local relationships and, as a consequence, the *quality* of linkages itself. Our results suggest that, in developed countries, the *local competitive pressure* increases the quality of linkages up to a certain threshold, after which the investment in local relationships drops; in addition, the level of the subsidiary's capabilities negatively moderates such a curvilinear relationship, by affecting subsidiaries' incentive to link to local firms.

We contribute to the literature that studies the relationship between linkages and spillovers (Blomstrom et al., 2000; Javorcik, 2004; Santangelo 2009), shifting the focus of the analysis from the host-country to the subsidiary perspective on local linkages. We account for the possibility that subsidiaries choose the optimal level of resources to invest in local linkages, based on the assessment of the strategic consequences that close interaction with local firms will originate, either in terms of *learning opportunities* and in terms of *spillovers to host-country competitors*. Specifically, we suggest that, given that quality linkages encompass a risk of knowledge dissemination, subsidiaries *adapt the investment in their local relationships* to respond to the spillovers' threat.

The paper is organized as follows. In the next section, we review the existing research on local linkages' attributes and on their impact on host-countries and subsidiaries' characteristics. We then elaborate on the "trade-off" between local learning and knowledge dissemination associated with quality linkages. After, we identify industry-level and firm-level variables affecting such trade-off, and develop hypotheses. Finally, we present our model and discuss the empirical results.

## **Literature Background**

### ***Local Linkages Research***

The focus of this study is on the relationships a subsidiary develops with local suppliers and customers within its host-country, which are known in the International Business literature as

*local vertical linkages* (Scott-Kennel, 2007). Such supply-chain relationships include either *backward linkages* (i.e. upstream relationships with local suppliers) and *forward linkages* (i.e. downstream relationships with local customers).

The relevance of vertical contacts lies in the assumption that subsidiaries are the repositories of the MNCs' superior competitive assets (Javorcick, 2004; Scott-Kennel and Enderwick, 2005). Therefore, linkages represent the channels through which local firms may gain some insights on this valuable and unique source of knowledge, though many studies highlight the importance such relationships assume also for foreign firms, helping them to gain a better understanding of the local markets, and to access location-specific "pockets of expertise" and resources (Chen and Chen, 1998; Fosfuri and Motta, 1999; Giroud and Scott-Kennel, 2009).

Most of previous studies on local linkages have focused on the *quantitative* dimension of the phenomenon, which has been empirically measured either as the value of the amount of goods and services a subsidiary buys or sells in the host-economy (Belderbos et al., 2001; Driffield and Noor, 1999; Iguchi, 2008), or as the number of relationships it develops with local suppliers and customers (Scott-Kennel, 2007). Whereas the quantity of vertical linkages provides an information on the pecuniary benefits stemming from the increased demand for products and services FDI originate within host-countries, scholars have begun to point to the limited significance of this attribute, when it comes to evaluate the impact of subsidiaries on local firms' learning and upgrading, and vice-versa (Scott-Kennel, 2007; Giroud and Scott-Kennel, 2009). Indeed, among all linkages captured within the indicators of quantity, only some will last over years, inducing the development of shared vision and co-evolution (Li, 2005; Duanmu and Fai, 2007), while other will just be one-shot, arms-length relationships.

To account for such differences, scholars have recently begun to pay special attention to a more meaningful attribute of local linkages, that is "quality" (Scott-Kennel, 2007; Giroud and Scott-Kennel, 2009). Mainly, "quality" linkages act as a real mechanism for knowledge sharing and improvement (Gulati, 1995; Gulati and Gargiulo, 1999; Giroud and Scott-Kennel,

2009). Thanks to on-going interactions and trust, subsidiaries and local partners learn to work together and develop joint problem-solving capabilities.

Notwithstanding the widespread agreement on the need to evaluate linkages based on their impact on firms' learning and competitive enhancement, the existing studies on the quality of local vertical relationships seldom provide a direct assessment of the underlying *social dimension*, thus neglecting the main mechanism through which knowledge and competences flow. Indeed, it's the mutual adaptation, and the close and repeated contact between organizational structures and people among firms that generates common cognitive models and trust and acts as a facilitator for the development of value-creating ties, through which firms exchange resources and share unique knowledge (Gulati, 1995; Gulati and Gargiulo, 1999). In order to account for this "social-interaction" perspective, in this study, we propose an alternative empirical assessment of local linkages, in which their quality is related to the *degree of interdependency* such vertical relationships originate, but also to the amount of *direct interactions* between organizational areas (and hence individual managers) from the local firm and the subsidiary.

### ***Quality linkages and the trade-off between learning opportunities and the risk of spillover***

Multinational firms are widely considered as crucial actors in the dynamics of international knowledge transfer. In less advanced contexts, the linkages they establish with local partners, if characterized by trustful interaction and cooperative exchanges, have been emphasized for their ability to foster local firms' competitiveness (Jirma et al., 2009) through spillover mechanisms (Blomstrom and Kokko, 1998). Shifting the context of analysis to more advanced settings, scholars have instead focused on the subsidiaries' gain from high-quality local linkages, which have been found to increase subsidiaries' expected market performance (Andersson et al., 2002), to foster their technical competences, as well as to originate power and influence within the MNC internal network (Andersson et al., 2007).

However, when considering developed countries, greater attention should be paid to the *bi-directional* knowledge flows that quality linkages are able to activate (Mudambi and Navarra, 2004). Indeed, in such contexts, local partners' greater competitiveness is not only an opportunity, but also a threat. On the one hand, domestic customers and suppliers possess high-value business and technical resources, to which it is more attractive to be exposed to. On the other hand, their greater absorptive capacity makes them more able to internalize subsidiaries' knowledge and, eventually, to further channel it to their local competitors.

To clarify this latter point, it is worthwhile to remember that spillovers may be either intentional or unintentional (Mudambi and Navarra, 2004). When the knowledge receivers are the subsidiaries' partners (local suppliers or customers), the transfer of technology is usually intentional (Mudambi, 2002), as it fosters mutual understanding and facilitates the relationship's stability. Knowledge flows to local competitors are instead strongly unwilling by subsidiaries, since they may imply the erosion of the distinctive nature of their assets and, hence, of their local competitive position (Schrader, 1991; Von Hippel, 1987; Kachra and White, 2008).

Although subsidiaries tend to avoid direct exchanges with local competitors, for fear to lose control on their proprietary technology (Aitken and Harrison, 1999; Gorg and Greenaway, 2002), they might not be completely able to prevent them to intercept some of their knowledge. Horizontal externalities may indeed occur through *mediated contacts* between the subsidiary and its local competitors, since the set of information and resources shared within a vertical relationship might be channeled also to other agents within the local context (Spencer, 2008). Indeed, when a vertical linkage is embedded in an influential inter-firm business network, the subsidiary's local partners may turn into a *bridge* between its competitive resources and other local firms, since the knowledge they have gained *via* the direct relationship with the subsidiary may diffuse to all network participating agents through other inter-organizational relationships (Ghauri, Hadjikhani and Johanson, 2005; Gulati, 2007).

Recent literature on networks has strongly emphasized the existence of a “*tension between the hope to acquiring new capabilities and the fear of losing control over one’s resources*” (Brass et al. 2004, p.808).

How do subsidiaries manage such tension? We suggest that subsidiaries located in advanced settings are themselves “advanced” agents, and have the capabilities to screen the competitive dynamics and to recognize the existing opportunities and threats. Therefore, beyond recognizing that the integration with the domestic networks may improve their capabilities through local learning processes, they also perceive that it encompasses an opposite consequence, since it allows their knowledge to be transmitted to local competitors. As a consequence, they adapt the investment in local linkages to different external as well as internal conditions, on which we will elaborate in the next section.

## **Hypotheses development**

### ***Quality of local linkages and the local competitive pressure***

The importance of the host-country competitive conditions for the theory of foreign direct investment has been largely recognized in literature (Kogut and Chang, 1991). However, scarce attention has been paid to the understanding of how the *local competitive pressure* affects the pattern of linkages creation.

In general, market competition makes firms’ relative position uncertain, as their advantages and distinctive resources are less stable and more difficult to preserve (Cool and Dierickx, 1993). In presence of increasing market rivalry, firms are pushed towards upgrading and innovation (Porter, 1990; Grant, 1991), in an attempt to win the competitive race and gain future market power (Schumpeter, 1942; Cassiman and Veugelers, 1999).

Building linkages with local firms is an effective way to gain access to new practices and technologies (Chen et al., 2004), innovation, incremental upgrading of products or processes (Chen, 2002), that circulate within the linkages themselves. Many studies suggest that the



personal interaction between individuals across firms, and the subsequent relational capital and reciprocity in knowledge transfer, are pivotal mechanisms for learning and innovation (Saxenian, 1994; Kale et al., 2000; Dahl and Pedersen, 2004; Kachra and White, 2008).

Therefore, in presence of high competition, when firms are exposed to the *pressure to innovate* (Santangelo, 2010), and are required to update their set of competitive assets, leveraging on relationships with business partners might be crucial, as such networks can help to pool useful information and provide access to new distinctive resources, thus ultimately inducing to innovate. This is especially true for subsidiaries of foreign MNCs investing in developed countries as, in such contexts, local partners are more advanced either in technical and/or in business practices, thus representing a potentially rich source of relevant information and resources to learn from. Moreover, in the context of developed countries, the ability of subsidiaries to fit with the local markets and the local business network under increasing competition is crucial, since both the final demand characteristics and the industrial structure dynamics are more complex and challenging. Indeed, while in less advanced countries the subsidiaries' liability of foreignness may be significantly counterbalanced by the managerial and technological advantages they are presumed to enjoy with respect to local firms, in developed economies the competitive distance between local and foreign firms might be shorter, making the integration with the local business network even more important for subsidiaries, in order to overcome the structural disadvantages deriving from being an external actor.

Building on this reasoning, we expect that the competitive pressure in domestic markets increases the potential benefits of *local learning opportunities*, driving the quality of linkages. However, whereas competition fosters the quality of local linkages, pushing subsidiaries to interact with vertical partners to gather valuable information about the local markets, and to learn and exchange knowledge useful for innovation, we argue that when competitive

pressure becomes too high, subsidiaries may perceive an increase of the quality of local linkages as *too risky*.

In presence of fierce competition, firms may find it difficult to maintain the control over their proprietary assets: tumultuous and crowded competitive arenas might prevent even the more skilled subsidiaries to avoid the leakage of their knowledge, as this would require a large extent of resources to be committed to monitoring activities and to the implementation of private protection strategies. Moreover, as suggested by Scherer (1965), it is a moderate level of competition which seems to be the most conducive to innovation: scarce appropriability opportunities lower the firms' incentive to innovate, thus reducing the willingness to learn from the local environment, and to commit in high quality local linkages. Finally, the turbulence stemming from increasing competition may harm the general trust and social capital on which the focal relationships between the subsidiary and its local partners leverage, making them less loyal and more individualistic (Cooke, 2001), and increasing the risk of opportunistic behaviors: accordingly, research suggests that when knowledge is shared within a non-trust based environment, it is more likely to be transferred to third parties who are beyond the control of the knowledge source (McCann and Mudambi, 2005). Integrating these arguments, we expect that, in presence of very high levels of local competitive pressure, the *risk of spillover* increases, and overbears the value of potential local learning opportunities, thus lowering the quality of local linkages. It is worthwhile to stress here that this risk, which we refer to as the *risk of spillover*, is not merely dependent on the objective level of competition of a given setting; rather, it results from the assessment each subsidiary makes of the network of interdependent relationships (Gulati et al., 2000) in which the subsidiary itself, and its vertical linkages, are embedded. Therefore, when talking about the risk of spillover, we emphasize and refer to the role of the *perception* subsidiaries have of such risk. Accounting for this *perceived* threat, subsidiaries may decide to be more cautious, limiting

their openness and interaction with vertical partners, as well as the scope of the resources they commit to the relationship, thus reducing the quality of linkages. We thus expect that:

***Hypothesis 1: In developed countries, there is an inverted U-shaped relationship between the local competitive pressure and the quality of local linkages.***

### ***The role of subsidiary capabilities***

Previous research has suggested that the characteristics of foreign firms strongly influence the type of relationships they develop in the host-countries (Scott-Kennel, 2007; Jindra et al. 2009; Santangelo, 2009, Hanson et al., 2009; Iguchi, 2008). Following this approach, we claim that the subsidiaries' individual profile affects the quality of their local linkages, and focus our arguments on the construct of Subsidiary Capabilities.

In their recent review on networks and organizations, Brass et al. (2004, p.808) claim that “*actor characteristics, such as resources and capabilities, determine the type of network most useful to an actor and its ability to create such a network*”, suggesting that firms' endowment of resources and capabilities influences the relationships they will create with their business partners. Subsidiary Capabilities are partly driven by the role they have been assigned by the head-quarter (Cantwell and Mudambi, 2005). However, the competences subsidiaries are able to autonomously develop thanks to their self-determined local strategies (Birkinshaw and Hood, 1998) are crucial elements for them to become important within the MNC inter-organizational network. In fact, when subsidiaries create specific abilities and resources that can be used by other sister affiliates, they contribute to foster the whole MNC's competitiveness (Andersson et al., 2007).

To be able to build such competences, subsidiaries need to pursue systematic innovative and search processes within their host-country. The local business environment has been frequently emphasized as a determinant of the competence and knowledge creating capabilities of subsidiaries (Cantwell and Mudambi, 2005; Almeida and Phene, 2004; Phene

and Almeida, 2008). The involvement in these kinds of localized knowledge-creation and innovative processes is the main feature of what Marin and Bell (2006) have labeled “*active subsidiaries*”: in their work on Argentina, the authors recognize them as the driver of higher FDI-mediated technology spillovers, arguing that one of the developmental mechanism that may have fostered local learning in the country is foreign firms’ “*embeddedness in linkages with the domestic economy through which [...] knowledge assets might flow*”. Marin and Sasidharan (2010) come to similar results and conclusions in India. Consistently, Jindra et al. (2009) find that when subsidiaries located in transition economies possess their own technological capabilities, the intensity of the linkages they create within the host-country is higher.

The logic that sees important and technologically active subsidiaries more prone to link with local partners makes even more sense in *developed countries*, where the degree of advancement of the local context is an attractive source of valuable information and competences, and represents an incentive for subsidiaries to invest in high quality relationships with local firms.

Highly capable subsidiaries may also be expected to be better able to recognize the opportunities arising from dealing with specific partners, thus investing more in potentially valuable linkages. Finally, subsidiaries that enjoy a high level of capabilities should possess a greater degree of *absorptive capacity* that allows them to profit more from the interaction with their local business partner, thus increasing the incentive to commit in quality linkages. Based on these considerations, we can argue that a high degree of subsidiary capabilities emphasizes the “*learning opportunities*” side of quality linkages, by making the interaction with local firms more attractive and desirable. Hence, we expect that:

***Hypothesis 2: In developed countries, there is a positive relationship between subsidiary capabilities and the quality of local linkages.***

The role of subsidiaries' capabilities is also crucial to delve into the relationship between local competitive pressure and the quality of local linkages. Indeed, according to our reasoning, when dealing with local partners, subsidiaries are "*seeking to gain information, while not giving too much away*" (Brrass et al., 2004, p. 809): specifically, they aim to maximize the net spillover, i.e. the difference between the extent of inward and outward flows of knowledge and resources, arising from the integration within the domestic network.

Following the approach of Birkinshaw and Hood (1998), subsidiaries' capabilities may be defined as "*the capacity to deploy resources, usually in combination, using organizational processes to effect a desired end*". Beyond being a source of subsidiaries' competitive advantage (Barney, 1991), these capabilities simultaneously contribute to their evolution within the MNCs' hierarchy (Birkinshaw and Hood, 1998; Andersson et al., 2007). Therefore, they might be seen as the opportunity set on which subsidiaries can leverage in order to achieve both their external and their internal success.

Subsidiaries with high level of capabilities are very attractive to their counterparts, since the extent of knowledge and competences they hold and can ideally share within a relational network is remarkable (Hakansson and Nobel, 2001). Therefore, local partners of high capable subsidiaries are strongly incentivized to build high quality linkages, through which gaining access to their extensive set of competences.

However, the Resource-Based Theory suggests that, in order to serve as a means to pursue the firms' objectives, capabilities must have some particular characteristics: among others, they must be rare and difficult to imitate (Barney, 1991; Dyer and Singh, 1998).

When capabilities diffuse to competitors and become replicable, they lose their strategic value. Hence, subsidiaries tend to be highly motivated to prevent the leakage of their capabilities to the local rivals. A recent study by Faria and Sofka (2010) supports this claim, demonstrating that subsidiaries of foreign MNCs protect their knowledge more extensively

than local firms do, in order to defend the integrity of their competitive assets from the threat of local spillover.

Subsidiaries that enjoy a high level of capabilities have much more to lose from the interaction with local partners. As a consequence, when local competitive pressure is high, and the risk of spillover increases, they are driven to limit the investment in local linkages even more (compared to subsidiaries with low capabilities) since, in this case, the expected loss from outward spillover is perceived to be higher than the potential gain from local learning opportunities.

Conversely, when there is low competitive pressure, we expect subsidiaries with high capabilities to have higher quality linkages (compared to subsidiaries with low capabilities) because, while their resources are still very attractive to local partners (Hakansson and Nobel, 2001), the perceived risk of spillover will be reduced: subsidiaries will invest more in the local relationships with their business counterparts in order to exploit the learning opportunities they offer, without fearing local competitors' appropriation of their relevant resources and competences. Based on this reasoning, we expect that:

***Hypothesis 3: In developed countries, subsidiaries' capabilities negatively moderates the U-shaped relationship between the local competitive pressure and the quality of local linkages.***

### **Data and Methodology**

The sample used in this study includes Swedish multinationals involved in a variety of manufacturing industries, such as paper, telecommunications, petrochemicals, hard materials, power systems, and equipment manufacturing. Initially we approached the managing directors of 20 international divisions/business areas, belonging to 13 Swedish MNCs. The MNCs were chosen from the Swedish OMX 'Large Cap' list, excluding firms in the financial, insurance and banking sectors. We chose to sample on the divisional/business area level of the firms as

we wanted to focus particular products or groups of products at the subsidiary level. In order to study the quality of local linkages it is necessary to pinpoint the particular relationships between the subsidiary and the local counterpart. It is very often necessary to limit the search for local linkages using a particular product or product line as the subsidiary might be involved in several product lines. Therefore, to make the interviews focused on specific relationships and the internal resources, capabilities and structures in the subsidiary 'devoted' to the specific relationships, it is necessary to start in the product end of the MNC, i.e. at the subsidiary level. As several of our measures are reported by the headquarters it is necessary that the headquarters respondent has a thorough knowledge of the particular product or product line in the subsidiary why the divisional/business are headquarters is a more relevant level compared to the MNC headquarters.

All divisions studied were highly international, 75 percent of them having more than half of their employees outside the home country. In these international divisions we gathered data from 97 subsidiaries located in European countries and in North America. Although the majority of the subsidiaries were based in Europe, the subsidiaries are widely distributed between northern, central, western and southern parts of Europe. No, so called, transition economies are represented in the sample. On average, five subsidiaries were studied in each division, although the variance is between two and nine. The divisions' headquarters assisted in the selection of subsidiaries that were representative for the division's business activities with the intention of increasing the possibility of drawing general conclusions. On average, the subsidiaries in the sample accounted for over 50 percent of the divisions' combined operations measured in terms of the number of employees. In 25 percent of the divisions, the subsidiaries investigated accounted for more than 80 percent of the division's total operations, whilst they accounted for between 10 and 60 percent in the remaining divisions. The number of employees in the subsidiaries varied from 50 to over 5,000. The subsidiaries investigated all performed their own production and sales. Product development and production process

development are, therefore, important activities in all subsidiaries studied. In short, the data used to test the hypotheses comes from 97 subsidiaries belonging to 20 international divisions. The analysis was made on the subsidiary level, meaning that each subsidiary has an observed value with regard to the measurements of the constructs presented in Table 1.

The data used to test the model were administered through face-to-face interviews, using a standardized questionnaire, with managers both at the divisional headquarters level and at the subsidiary level. The questionnaire was carefully developed incorporating feedback from several academics, which identified questions that were vague, ambiguous or the source of possible bias, and pilot tested on an experienced manager in an MNC not approached in the actual study. Subsequently, we modified some of the initial questions, eliminated some and added others to the revised instrument. We also took precaution to limit potential common method variance by placing dependent and independent variables or items for constructs at different positions in the survey, also scale anchors were changed. In order to reduce the effects of consistency artefacts (Salancik and Pfeffer, 1977) we placed the dependent variables after the independent variables in the questionnaire. From the flow of the questionnaire it was improbable that respondents could guess hypothesized relations between constructs thereby avoiding social desirability bias.

In the first step the interviews were carried out with subsidiary top, sales and purchasing managers, respectively. The subsidiary CEO answered questions regarding the subsidiary's overall performance, relations to headquarters and other sister subsidiaries. The sales and purchasing managers answered questions specifically about the relationships to the subsidiaries most important customer and supplier relationships, respectively, for a specific product group. After the interviews with the subsidiary managers in one division had been completed, the second step was to conduct interviews with the managing director of the divisional HQ, using the same type of standardized questionnaire. Through these interviews, we collected information about the managing director's view of the subsidiaries, considered



in terms of the measurement of constructs (see the discussion below about how each construct was measured and which indicators and respondents were used). The personal interviews lasted for about two hours each, during which time, problems involving concepts in and interpretations of the questionnaire could be discussed and explained if necessary.

## **Measures**

### ***Dependent variable: the quality of vertical linkages***

As anticipated in the theory section, we measure the quality of local linkages based on our focus on the “social interaction” perspective. Specifically, we build a measure of quality of local linkages which is based on the appraisal made by the subsidiary of the *degree of technical and business adaptation* occurred between the foreign and the local partners, as well as of the *number of functional areas involved in direct contact with people from the business counterpart* (suppliers or customers). This measure provides an effective way to capture the extent to which a market-based relationship can go beyond its pure transactional content, allowing its partners to *exchange more* than what they contractually agreed to do. To this end, we first asked the subsidiary sales and purchasing managers to indicate the six most important (for any reason) relationships with external customers (3) and external suppliers (3). Secondly, the respondents provided information about the extent of technical as well as of business adaptation that each *external* relationship had produced: technical adaptation was measured as the degree of adaptation in production development and product development, while business adaptation was captured by the degree of adaptation of the overall business conduct. A Likert scale ranging from 1 (not at all) to 5 (very much) was used. Finally, sales and purchasing managers were asked to assess the number of different functional areas from which individuals are involved in direct contacts with customers and suppliers. These functional areas are the chief executives, the administration, the purchasing department, the sales department, the production department (technical staff), and the R&D department. For

each of the four indicators informed by the subsidiary managers, we summated the scores of the subsidiaries' external relationships, and then divided the obtained value by the total number of external relationships. These indicators on the subsidiary level load on a single factor, leading to a Cronbach's alpha of .774. They were used to create the subsidiary's average quality of local linkages.

The advantage of this measure is that it allows to point directly to "quality linkages", thanks to the choice made by the subsidiaries' managers, responsible for the relevant functions: through this technique, rather than considering the whole set of heterogeneous local relationships of the subsidiary, we concentrate on those which have been screened by an internal agent, who is the most privileged witness of the relationships' status, in terms of quality. This procedure meets our goal to focus on relationships which play a *strategic role* for the subsidiary, thus allowing for considerations on the trade-off subsidiaries face between the benefits of local learning opportunities and the threat of dissemination of their competitive resources.

While the focus on *adaptation* allows us to depict the extent to which subsidiaries invest in local linkages, upgrading them from simple arm's length relationships to high-interdependency ties, the emphasis on the *different functional areas involved* points to the "social dimension" of linkages. Through this latter indicator, we are able to respond to recent literature's call for greater attention on the "*social interaction aspects*" of local vertical relationships (Giroud and Scott-Kennel, 2009). Moreover, embracing the idea that the highest-level capabilities of the firm are the "*cross-functional capabilities*" (Grant, 2008), which derive from the combination of more specialized, functional capabilities, it becomes clear that – through the interaction with different subsidiaries' functional areas (captured by our quality linkages measure) - vertical partners can access to the most important subsidiaries' competitive assets. Therefore, we are able to assess the extent to which local linkages allow for the sharing of the "highest-level" capabilities. A limitation in this study is that only

vertical linkages, to customers and suppliers, are included in our measure. This means that we might underestimate the risks of spillover, but on the other hand the focus on local customers and suppliers increase the precision and the relevance of technological knowledge compared to a more heterogeneous set of local partners.

### ***Local competitive pressure***

We measure the local competitive pressure by asking the subsidiary purchasing and sales managers to evaluate the extent to which they experience competitors influencing their business activities. This results in a perceptual measure of competitive pressure in the subsidiary's local environment, which is consistent with our aim to investigate how environmental conditions impact the subsidiary's choice to invest in local linkages. The point is that only when subsidiaries *perceive* the competitive pressure, they will assess the consequent costs and benefits of quality linkages, and adapt their strategic behavior, thus adjusting their degree of commitment to the local relationships. In other words, managers act on their perceptions about the environment and not necessarily on "true" facts (Weick and Roberts 1993, Boyd, Dess and Rasheed 1993, Day and Negundgadi 1994). We asked the subsidiaries' sales and purchasing managers to assess the extent they perceive competitors influencing the subsidiary's downstream and upstream activities respectively. This is to ensure we have the most knowledgeable respondent assessing this and get a better measure compared to the case of one single respondent. The indicator of influence was measured on a five-point Likert scale from 1 (not at all) to 5 (very much). We averaged the scores attributed by the two respondents to the competitors' influence and standardized the resulting value, which represents the average competitive pressure perceived by the subsidiary within its local business network regarding upstream and downstream activities

### ***Subsidiary capabilities***

It is difficult to objectively measure capabilities. To overcome this limit, we focused on the results of such capabilities (cfr. Ambos et al., 2006; Phene and Almeida, 2008 for similar approaches). We asked the subsidiary management to assess the extent to which the subsidiary has responsibility for other units' purchasing and sales activities on a 5 point Likert-type scale. We assume the higher the level of responsibility for other units the more the subsidiary is a "center of excellence" and hence, the higher its capability base. This is along the lines of the approach by Frost, Birkinshaw, Ensigh (2002). We created an average to establish a proxy for the extent to which the subsidiary possesses capabilities.

### ***Controls***

We controlled for several industry-specific and firm-specific factors. Following previous literature on local linkages (Jindra et al., 2009) we included a measure that accounts for the type of entry mode, and created a dummy indicating whether the foreign investment was made through acquisition. We also controlled for subsidiary size (Scott-Kennel, 2007), as captured by the total number of subsidiary employees, as well as for subsidiary age, measured by the number of years the subsidiary has been located in the given location (Scott-Kennel, 2007).

Industry-effects have been accounted for through the introduction of two industry-dummies. Following Chen et al. (2004), we split subsidiaries into three groups: high-tech industries, which cover electrical and electronics, machinery and precision instrument sectors; producer-driven industries, which cover chemicals, basic metals, metal products, non-metal mineral sectors; buyer-driven industries, which cover textiles, food, paper, wood products and leather. We also controlled for the geographical distance between the subsidiary and the headquarter, by introducing a dichotomous variable that takes the value of 1 for long distances (> 6000 km), and 0 otherwise.

Following previous literature (Jindra et al., 2009) we also accounted for subsidiary autonomy measured as the extent to which the subsidiary can decide about purchasing, organizational structure, investments in R&D and acquisitions. We averaged the values of the items of this 5-point scale to derive an average measure of subsidiary autonomy.

## Results

To test our hypotheses, OLS regressions were used. To account for the fact that several subsidiaries belong to the same firm division, we applied the robust cluster procedure (since the intraclass correlation is 0.25 with  $p < 0.01$ ). Conversely, we do not control for host-country effects, since the intraclass correlation between countries is nearly zero and not significant. We also checked for the normality of the residuals and the absence of multicollinearity. We obtained an average variance inflation factor of 1.41, with its highest value scoring 2.35, indicating no apparent risk of multicollinearity (Hair et al., 2006).

Table 3 shows the result of our models. The baseline model (Model 1) shows as sub-units in *producer-driven* industries have significantly lower quality in their local linkages than subsidiaries operating in high-tech industries; also in *buyer-driven* sectors the quality of local linkages is lower, though the difference compared to the high-tech industries is not significant. None of the other regressors turns out to be significant. This model explains less than 10% of the variance, suggesting that industry differences do matter for the quality of vertical linkages, though other determinants should be investigated in order to gain a more complete understanding of the phenomenon.

Model 2 tests the curvilinear relationship between the local competitive pressure and the quality of vertical linkages. The explained variance increases up to the 33.3%. The positive and significant coefficient of our variable “Local Competitive Pressure” ( $p < 0.01$ ) confirms our expectations that quality of vertical linkages increases as subsidiaries perceive higher competition in the local business network: the need to effectively respond to potential local

competitive threats and the *pressure to innovate* increase the value of the learning opportunities arising from the local environment, thus improving the quality of local linkages. Including the square of “Local Competitive Pressure”, we are able to depict the curvilinear effect of perceived local competition on the quality of linkages. The sign and statistical significance of the variable “Local Competitive Pressure” remains unchanged, and the squared term turns out to be negative and significant at the level of 1%, supporting our view that a too fierce competition in the local business network makes the risk of unintentional spillovers to prevail on the incentive to learn from the local partners, thus reducing the quality of vertical linkages.

In Model 3, we test our second hypothesis, which accounts for the role of Subsidiary Capabilities. While the sign of our coefficient is positive, as we expected, it appears to be non significant. The explained variance increases up to the 33.8%.

In Model 4 we add the interaction between Subsidiary Capabilities and Local Competitive Pressure to test Hypothesis 3., Subsidiary Capabilities has a negative contingent effect on the relationship between Local Competitive Pressure and the Quality of Local Linkages. In fact, the coefficient of the interaction term is negative (-0.100) and statistically significant ( $p < 0.05$ ). This result supports Hypothesis 3. As shown in Figure 1., subsidiaries with a high level of capabilities invest more in local linkages (compared to subsidiaries with low levels of capabilities) for low degrees of competitive pressure, since their willingness to learn from the domestic network and their high attractiveness as a business partner are not undermined by the risk of spillover (which is low, given the relative stability of the competitive environment). However, when competitive pressure increases, subsidiaries with high capabilities reduce the quality of their local linkages more than low capabilities’ subsidiaries do, because they fear the spillover effect stemming from the interaction with domestic partners more, due to the relevant set of resources and competences they would expose to the risk of local leakage. Significantly, in this model, the R-squared increases up to 37.8%,

confirming the importance of the interaction effect between environmental-level and subsidiary-level factors in explaining the phenomenon of our interest.

## **Discussion and Conclusions**

In this paper, we aim to contribute to the literature that investigates the relationship between linkages and spillovers. Shifting the focus of the analysis from the host-country to the firm, we are able to explicitly account for the *double role* quality linkages plays for subsidiary's competitiveness. Building high-interdependent relationships with local partners allows for gathering information on the foreign markets, to develop new capabilities and to improve the general fit with the external environment; on the other hand, it encompasses the risk of unintended knowledge dissemination to the host-economy. We show that, being aware of the contrasting effects stemming from linkages, subsidiaries in developed countries *adapt the investment into their local relationships*, depending on both external and internal drivers. Specifically, our results suggest that increasing competitive pressure fosters the importance of sourcing resources for innovation from the local context. However, when competition becomes too high, subsidiaries tend to lower the quality of their local linkages, in order to protect their competitive assets from the increased risk of knowledge spillover in the external environment. This finding is consistent with recent research on networks and inter-firm relationships, stating that "inter-organizational networks offer a variety of knowledge, innovation, performance, and survival benefits, but the issue of competition, information control, and trust in partners makes the problem of building effective networks highly complex" (Brass et al., 2004). Moreover, we find that when subsidiaries possess a high degree of capabilities, they leverage more on the relationships with local partners when competition is low, but they also reduce more the commitment to such relationships when the perceived pressure from the competitive environment overcome a certain threshold, since – in this latter case - their potential loss from outward spillover could be too high..

Previous literature has either focused on the linkages' effects on domestic firms' competitiveness (Javorcik, 2004; Scott-Kennel and Enderwick, 2005), or emphasized the beneficial consequences of embeddedness for subsidiaries (Chen and Chen, 1998; Andersson et al, 2002). We believe that, in both cases, considering the trade-off associated with quality linkages is relevant. On the one hand, in order to appraise FDI impact on host-country firms through linkages, it is important to recognize that subsidiaries are aware of the risk of knowledge spillovers they face in the local context, and react to it adapting their investment in local relationships: this finding supports the view that FDI-mediated knowledge spillovers do not happen automatically (Marin and Bell, 2006; Driffield et al., 2010), but rather depend on the subsidiary strategic behavior within host-countries. On the other hand, when discussing local linkages as a driver of subsidiaries' performance, it should be considered that they are not only beneficial to them, but may also give rise to some costs, which subsidiaries may or may not decide to bear, depending on the influence of both internal and external factors.

This study also adds to the literature on quality of local linkages. Despite the recent call for a more thorough analysis of this linkages' attribute (Scott-Kennel, 2007; Giroud and Scott-Kennel, 2009), scant attention has been paid in literature to how the characteristics of the local competitive environment and the subsidiary individual profile affect the *quality* of linkages. We make a contribution by using a measure that tries to capture two relevant components of local linkages' quality: (1) the degree of interdependency between partners (mutual adaptation); and (2) its underlying "social dimension" (number of direct contacts between different functional areas and the local counterpart). Furthermore, we relate it to both context-level and firm-level conditions.

Finally, we add to empirical research on linkages by testing our hypotheses in a *developed countries* setting. As far as quality relationships are concerned, the characteristics of these contexts may be relevant in shaping



the patterns of local linkages creation, for at least two reasons. First, in developed countries, MNCs' entry motivations tend to be different than in less advanced settings: whereas the access to basic, low cost inputs is not a priority, and the emphasis is rather on the strategic resources available in the host-country, the "local integration" issue become more relevant and acquires a more complex meaning for the subsidiary itself. Second, as local firms represent a potential source of relevant knowledge, but at the same time are also more capable to take advantage of the MNCs' presence, the decision to commit in quality linkages with them becomes a strategic matter for foreign subsidiaries.

This paper has several managerial implications. First, it confirms the strategic importance of linking with local partners, as a way to manage the external environment and to leverage on subsidiary capabilities. Simultaneously, it shows that managers should be aware that local linkages, when they encompass knowledge sharing and interdependency within an advanced business network, might turn into a channel of spillovers to local competitors, through which the subsidiary resources might lose their distinctive nature. Moreover, as suggested by our results, subsidiary managers should learn to assess under which external and internal conditions the advantages of local learning opportunities overbear the drawbacks of the risk of spillover, and vice-versa.

Our study suffers from some limitations. First, our measure of quality of local linkages is based on the assessment made by only one of the relationships' partners. Of course, incorporating also the local firms' evaluation of the linkage quality would have added a lot of reliability to our empirical results. However, we believe that our focus on the subsidiary perspective reduces the relevance of this issue; moreover, it has been shown by Hallén et al. (1991) that the adaptation of one party in the relationship is a demonstration of reciprocal commitment and trust.

Furthermore, our analysis on local linkages quality and the risk of knowledge dissemination does not cover the effects of other types of "spillover-controlling" mechanisms, such as the

formal protection strategies (Sofka and De Faria, 2010). However, this should not be a big concern for our study, since once such “regulating restrictions” are in place, they automatically reduce the quality of local linkages, because they signal distrust to local partners.

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**Table 1: Descriptive statistics.**

<b>Variables</b>	<b>Means</b>	<b>Std. Dev.</b>
Quality of Vertical Linkages	2.796	0.686
Type of Entry (1 = Acquisition)	0.216	0.414
Sub. Size	684.3	1612.3
Sub. Age	29.9	27.8
Producer-Driven Industry Dummy	0.082	0.277
Buyer-Driven Industry Dummy	0.361	0.483
Large Distance Dummy	0.598	0.493
Sub. Autonomy	3.586	0.990
Local Competitive Pressure	0.000	1.000
Local Competitive Pressure Squared	0.990	1.197
Sub. Capabilities	3.835	1.913
Sub. Capabilities x Local Competitive Pressure	0.111	1.700
Sub. Capabilities x Local Competitive Pressure SQR	-0.232	2.514

**Table 2: Correlation matrix.**

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Quality of Vertical Linkages	1.000												
2 Type of Entry (1 = Acquisition)	0.068	1.000											
3 Sub. Size	0.124	0.056	1.000										
4 Sub. Age	-0.022	-0.169	0.055	1.000									
5 Producer-Driven Industry Dummy	-0.120	0.114	-0.080	0.051	1.000								
6 Buyer-Driven Industry Dummy	-0.089	-0.244	-0.125	0.184	-0.228	1.000							
7 Large Distance Dummy	-0.093	0.079	0.004	-0.118	-0.211	-0.079	1.000						
8 Sub. Autonomy	0.081	-0.028	-0.080	0.033	0.247	-0.364	0.111	1.000					
9 Local Competitive Pressure	0.466	0.118	0.098	0.054	-0.025	-0.038	0.062	0.071	1.000				
10 Local Competitive Pressure Squared	-0.190	0.168	-0.026	-0.160	-0.199	0.060	0.108	-0.129	0.056	1.000			
11 Sub. Capabilities	0.176	0.046	0.082	-0.008	-0.131	-0.149	-0.128	-0.121	0.058	-0.101	1.000		
12 Sub. Capabilities x Local Competitive Pressure	-0.207	-0.012	0.051	-0.172	-0.039	-0.117	-0.066	-0.098	-0.138	0.153	0.230	1.000	
13 Sub. Capabilities x Local Competitive Pressure Squared	0.210	0.025	0.020	-0.168	-0.004	-0.142	0.006	0.027	0.168	-0.194	0.601	0.433	1.000

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All correlations with  $r > .20$  are significant at  $p < .05$ .



**Table 3: OLS regression results for dependent variable quality of vertical linkages.<sup>1)</sup>**

Specifications		(1)	(2)	(3)	(4)	VIF
Hypothesized relationships	H1: Local Competitive Pressure		0.321 *** (0.056)	0.317 *** (0.054)	0.275 *** (0.068)	1.17
	Local Competitive Pressure Squared		-0.143 *** (0.038)	-0.137 *** (0.040)	-0.095 ** (0.044)	1.30
	H2: Sub. Capabilities			0.027 (0.038)	0.009 (0.042)	1.85
	H3: Local Competitive Pressure x Sub. Capabilities				-0.100 ** (0.046)	1.51
	Local Competitive Pressure Squared x Sub. Capabilities				0.047 (0.028)	2.35
Controls	Type of Entry (1 = Acquisition)	0.127 (0.172)	0.109 (0.165)	0.104 (0.167)	0.076 (0.192)	1.18
	Sub. Size	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	1.07
	Sub. Age	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	1.19
	Producer-Driven Industry Dummy (baseline: high-tech industry)	-0.513 *** (0.154)	-0.552 *** (0.105)	-0.513 *** (0.121)	-0.527 *** (0.123)	1.30
	Buyer_Driven Industry Dummy (baseline: high-tech industry)	-0.092 (0.194)	-0.077 (0.139)	-0.050 (0.123)	-0.099 (0.108)	1.47
	Large Distance Dummy	-0.220 (0.146)	-0.235 (0.155)	-0.218 (0.166)	-0.256 (0.156)	1.17
	Sub. Autonomy	0.107 (0.095)	0.055 (0.058)	0.063 (0.060)	0.043 (0.043)	1.34
	Constant	2.578 *** (0.447)	2.967 *** (0.264)	2.807 *** (0.339)	2.968 *** (0.340)	
	Firm-Controls <sup>2)</sup>	Yes	Yes	Yes	Yes	
	F	6.09 ***	36.14 ***	36.28 ***	32.71 ***	
R-squared		0.08	0.33	0.34	0.38	
Mean VIF						1.41

1) Unstandardized regression coefficients. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Number of observations n=96.

2) Controls for potential intercorrelations between subsidiaries belonging to the same firm division included (Robust clusters procedures as in STATA 10).

**Figure 1: The relationship between Local Competitive Pressure and Quality of Vertical Linkages for different levels of Subsidiary Capabilities.**





