

**PHD IN MANAGEMENT**

**XXXIII° CYCLE**

**THESIS**

**INTERNATIONAL KNOWLEDGE TRANSFER:**

**AN INTEGRATED ANALYSIS OF ANTECEDENTS, CONSEQUENCES AND TIME  
PATTERNS OF THE FDI KNOWLEDGE SPILLOVER EFFECT**

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## Abstract

This thesis is concerned with the process of international knowledge transfer mediated by multinational corporations' Foreign Direct Investment. Multinational firms (hereafter, MNC) are recognized as central actors for the dynamics of this phenomenon, since - through their globally distributed network of foreign subsidiaries - they transfer part of their knowledge to the host-locations, and contribute to the processes of local innovation and knowledge creation.

Foreign Direct Investment (hereafter, FDI) has been recognized as a crucial channel through which recipient countries become more able to overcome the geographic localisation of knowledge distribution, thanks to the effect of localised spillovers. This strategic importance has legitimated a substantial strand of literature to focus on the *macro-level mechanisms* that explain the positive consequences of FDI on countries' growth, but has lead to postpone the analysis of its consequences on individual firms' competitiveness.

However, over time, a relevant line of study has emphasized the role played by firm-level heterogeneity on the FDI knowledge spillover effect (Castellani and Zanfei, 2006). Research has in fact recognized that, in the case of FDI, the knowledge sources (i.e., the MNCs' affiliates) and the knowledge recipients (i.e., the domestic firms) can be the parties of a competitive relation (Meyer, 2004; Chang and Xu, 2008) and, as a consequence, the resources that flow from MNCs to local firms are an important determinant of their relative competitive position (Alcacer and Chung, 2007). The acknowledgment of knowledge spillovers' relevance for the micro-level competitive dynamics among foreign and local firms - which has probably been motivated by the increasing diffusion of knowledge-based theoretical perspectives in the International

Business literature - has promoted the start of a research strand on the antecedents and consequences of FDI-mediated spillovers *at the level of the individual firm*.

The very first contributions to this literature aimed to account for the role that MNCs' parent companies can play in determining the extent of spillovers generated within their host-locations. These studies suggest that not only are multinational corporations different in terms of their *potential* to generate knowledge spillovers (due to their different endowments in terms of technological capabilities); rather, they also heterogeneously manage the risk of spillover (due to their different willingness to share knowledge with competitors), thus affecting the *actual* level of knowledge flows they generate to local firms.

Consequences of these sources of heterogeneity *at the subsidiary-level* have long been ignored, due to the established belief that sees subsidiaries as passive actors of the MNC and the host-country networks. Indeed, on a more theoretical level, the knowledge spillover effect has been traditionally conceptualized through the so-called "pipeline-model" (Marin and Bell, 2006), as an *automatic* consequence of the international transfer of the knowledge assets developed at the level of headquarters, with no role for the subsidiaries in the dynamics of this process.

Only very recently, scholars have begun to recognize that also *subsidiaries* may influence the patterns of knowledge flows to local firms (Branstetter, 2006; Marin and Sasidharan, 2010). However, most of the studies on the subsidiary-level antecedents of FDI-spillovers have focused on the *structural* characteristics of subsidiaries (e.g. the type of facility, the intensity of local technological activity, the relationships with the parent company), thus overlooking the potential impact of subsidiaries' *strategy*.

Answering to International Business scholars' recent call for a deeper analysis of the multinational firms' strategic behaviour at the level of the subsidiary, this dissertation

explores the theoretical drivers behind the active role foreign subsidiaries can play in influencing the process of knowledge dissemination within the host-location, and its consequences for the knowledge spillover effect.

Understanding how *subsidiaries* can affect the degree of knowledge spillovers to local firms is important for two main reasons: first, because knowledge spillovers happen *locally*, through the process of interaction between the foreign affiliate of the MNC firm and the domestic organizations (accordingly, being the real *local* agent, it's the subsidiary – rather than the parent company - to be the main character of the interactive dynamics); second, because subsidiaries are becoming increasingly active within both the MNC network and the local context (Cantwell, 1995; Birkinshaw *et al.*, 1998; Birkinshaw and Hood, 2000; Marin and Bell, 2006) especially with regard to their technological activities (Blomkvist *et al.*, 2010).

Inspired by these insights, the overarching research question of this dissertation is: *How does subsidiaries' local strategic behavior affect the knowledge spillover effect to domestic firms?* In answering this overarching research question, the dissertation is composed of four essays, each addressing a specific aspect of the general subject.

In the first essay, the drivers, consequences and attributes of the FDI-mediated knowledge spillover effect are elaborated within a comprehensive theoretical framework, which integrates the several contributions to the topic over the different levels of analysis (both macro and micro) with the new perspectives on subsidiaries' active role, and provides innovative tools to comprehensively evaluate this effect. This essay aims to address the lack of conceptualisation of International Business research on FDI-mediated knowledge spillovers, which is due to both the predominance of macroeconomic analyses on the topic, and the complexity of disentangling the effects of the manifold variables that may influence the phenomenon.

The second essay investigates the relationship between subsidiaries' knowledge strategies within the host-location and the spillover effect. Subsidiaries' local strategic behaviour, with respect to the management of their knowledge assets, is in fact conceptualised through the identification of two main knowledge imperatives: a need for knowledge creation, explained by the importance of sourcing local knowledge to feed the innovative process and create new technology, and a need for knowledge protection, related to the urge to fully appropriate the benefits of proprietary assets and outperform local rivals. In order to understand how a subsidiary's management of these knowledge imperatives influences the spillover effect to local firms, the following research question is addressed: *How does the tension between knowledge creation and knowledge protection influence the extent of a subsidiary's local knowledge outflows?*

In the third essay, the effects of subsidiaries' strategy on FDI-mediated spillovers are analysed by exploring how subsidiaries manage their local vertical linkages (i.e., their business relationships with local suppliers and distributors). Research has indeed demonstrated that "quality linkages", that is linkages characterized by trust, interdependence and mutual adaptation, act as privileged conduits through which tacit knowledge flows bidirectionally, thus generating both outward (from foreign subsidiary to local firms) and inward (from local firms to foreign subsidiaries) spillovers. Traditional empirical research on vertical linkages has focused on less developed and developing countries, and has mainly investigated local firms' gain from MNCs' subsidiaries presence. However, in more developed settings, local partners are endowed with absorptive capacity and possess competitive resources, which make outward spillovers more dangerous and inward spillovers more attractive. An analysis of how subsidiaries behave under these conditions, and of how this behaviour influences the local spillover effect, is still missing. To fill this gap, the third essay addresses the

following research question: *To what extent do foreign subsidiaries develop high-quality buyer-supplier relationships in developed countries?*

The fourth essay matches International Business literature on spillovers with recent “Open Innovation” perspectives. This choice is justified by the fact that openness can be defined as the attitude to emphasize the search for external knowledge sources, while downsizing the relevance of knowledge protection. Therefore, multinational corporations’ adoption of such an attitude can be crucial in fostering the local knowledge spillover effect, especially if firms in the host-location share the same approach. Moreover, in a departure from previous literature that has merely investigated the *magnitude* of the knowledge spillover effect, in this essay, the impact of “openness” is explored by looking at the time patterns of the phenomenon. This study therefore elaborates on the speed with which subsidiaries’ knowledge diffuses to the host economy and become available to local firms, thus allowing them to accelerate their innovation processes, and reads this phenomenon through an “Open Innovation” lens. To investigate this topic, the fourth essay addresses the following research question: *How do multinational firms’ and host-regions’ openness influence the time patterns of the FDI-mediated knowledge spillover effect?*

Using two different datasets on foreign subsidiaries’ local innovative activity and business linkages with domestic suppliers and distributors, the empirical analysis lends support for established theorizing about multinational firms’ trade-off between the opportunity to learn from the host-environment and the risk to lose control over their proprietary knowledge assets, due to the local spillover effect. Moreover, shifting the focus of the analysis from the head-quarter to the foreign subunits, the results reveal that subsidiaries actively manage these knowledge flows within their host-locations, to the aim of fostering incoming information (in terms of both technology and knowledge of

the local business network and market), while at the same time controlling outward spillovers.

Previous research suggests that, within the MNC's organization, headquarters are the subjects that have the responsibility to manage the spillover risks in host-countries. Adding to this literature, the empirical analysis of this dissertation provides support to the idea that also subsidiaries can influence the local spillover effect, and that this happens not only because of their structural characteristics (like the subsidiary type or the local activity developed in the foreign location), but also depending on their local strategic behaviour.

It is also shown that, in order to manage these knowledge flows, foreign subsidiaries adapt their investment in local interaction with domestic firms to both internal and external factors. More specifically, the 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 extent of close interaction with local counterparts, in order to protect their competitive assets from the increased risk of knowledge spillover in the external environment. Furthermore, this relationship is moderated by the extent to which the subsidiaries possess relevant competitive assets. In other words, especially capable subsidiaries in very competitive environments tend to shy away from strong interaction with local firms, since under such circumstances the risk of spillovers is larger than the potential benefits of learning.

**Keywords:** knowledge spillover, multinational corporation, foreign subsidiaries, knowledge strategies, local linkages, patents, speed.

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