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Knowledge outflows from foreign subsidiaries and the tension between knowledge creation and knowledge protection: Evidence from the semiconductor industry

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ABSTRACT

This paper analyzes the MNC subsidiaries' trade-off between the need for knowledge creation and the need for knowledge protection, and relates it to the extent of knowledge outflows generated within the host location. Combining research in International Business with Social Theory, we build a conceptual framework suggesting that subsidiaries that extensively draw on external knowledge sources are also more likely to generate knowledge outflows to local firms. We argue that this may be explained by the subsidiaries' willingness to build the trust that facilitates the establishment of reciprocal knowledge linkages. However, when the value of the subsidiary's knowledge stock is very high, the need for knowledge protection restrains reciprocity mechanisms in knowledge exchanges, thus reducing the extent of knowledge outflows to the host location. This study contributes to the literature on the firm-level antecedents of FDI-mediated local knowledge outflows, as well as to the broad IB literature on the relationship between subsidiaries and their host regions. The implications for managers and policy-makers are also discussed.

1. Introduction

A widely investigated topic in the field of international business (IB) is the globalization of the innovative activities of Multinational Corporations (MNCs), particularly in high-technology sectors (Phene & Almeida, 2008). Since the pioneering works that attributed the very existence of MNCs to the failure of the international market for technology (Buckley & Casson, 1976), a growing body of literature has started to look at MNCs as geographically distributed networks of innovation, whose main ability is to assimilate, create and integrate knowledge on a global basis (Kogut & Zander, 1993; Birkinshaw, 1997; Frost, Birkinshaw, & Ensign, 2002).

An important consequence of MNCs' international distribution of innovation resides in the phenomenon of the *knowledge flows to the host-location*. Indeed, beyond absorbing knowledge from local sources of expertise, MNCs' foreign subsidiaries also diffuse – either intentionally or unintentionally – some of their knowledge to domestic firms (Almeida, 1996), through the process of local interaction (Haskel, Pereira, & Slaughter, 2007). Much literature has analysed the direction, the scope, the channels and the antecedents of such knowledge flows (Teece, 1977; Rodriguez-Clare, 1996; Song, Almeida, & Wu, 2003; Feinberg & Majumdar, 2001; Giroud & Scott-Kennel, 2009). Overall, theory predicts that the higher the technological distance between the MNC's home and host economy, the higher the potential for FDI knowledge outflows and local learning (Findlay, 1978). Yet, in order for this potential to materialize, host-country firms need to enjoy a sufficient level of absorptive capacity, which may enable them to effectively adopt and integrate such pieces of knowledge (Glass & Saggi, 1998). Several other macro-level factors have been found to play a role in this process. In fact, literature has demonstrated that in order to predict the level of local knowledge outflows from FDI, it is important to account for the differences in terms of host-countries' trade policy (Kokko, Tansini & Zejan, 2001), intellectual property rights regimes (Javorcik, 2004; Zhao, 2006), local competition (Wang & Blomstrom, 1992; Perri, Andersson, Nell, & Santangelo, 2013) and the sectoral structure of FDI (Crespo & Fontoura, 2007). Despite this substantial strand of research on FDI local knowledge outflows, an accurate analysis of the extant literature still reveals some gaps.

In the first place, while there is plenty of analysis regarding the *country-level* and *industry-level* determinants of this phenomenon,

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the influence that *the firm* itself (and, in particular, its subsidiaries) may exert on the patterns of local knowledge outflows remains an under investigated topic. Notable exceptions have tried to account for the role of the MNCs' investing motive (Chung, 2001; Driffield & Love, 2007), of the relationships with the MNC internal network (Zhao, 2006; Driffield, Love, & Menghinello, 2010), and of the type of activity realized abroad by foreign facilities (Branstetter, 2006; Marin & Bell, 2006). Despite these contributions, research has failed to look at how *the subsidiary's strategy*, in terms of the management of its knowledge assets, affects the extent of the knowledge that flows to domestic firms. However, this issue is relevant since it is by now recognized that subsidiaries can *actively* manage their knowledge resources within their local context (Birkinshaw & Hood, 1998; Cantwell & Mudambi, 2005), thus generating heterogeneous patterns of interaction with the local knowledge network and, hence, different levels of knowledge outflows.

In addition, IB and strategy literature has looked at the knowledge exchange relationships between subsidiaries and domestic firms from two different perspectives. Traditional research on subsidiary innovation (Almeida & Phene, 2004; Phene & Almeida, 2008), mandate (Birkinshaw & Hood, 1998; Cantwell & Mudambi, 2005) and embeddedness (Andersson, Forsgren, & Holm, 2002, 2007) has highlighted the role of the local firms as a source of valuable resources and knowledge. On the other hand, literature on the knowledge protection strategies of multinational firms (Alcacer & Chung, 2007; De Faria & Sofka, 2010; Shaver & Flyer, 2000; Zhao, 2006) has pointed to the threats, in terms of knowledge spillover, arising from the contact with the local context. An integrated analysis of the double role the interaction with domestic firms plays for a subsidiary's competitiveness is still missing.

In order to account for these gaps, in this paper, we theoretically analyze how the opportunities and challenges subsidiaries face in the local knowledge network influence the patterns of knowledge outflows they generate to the host location. We conceptualize the mechanism that drives the subsidiaries' management of their knowledge assets as the *tension between knowledge creation and knowledge protection.* A subsidiary's knowledge creation is highly dependent on its ability to leverage external resources (Almeida & Phene, 2004). Building on social network theory (Hansen, 1999; Dyer & Hatch, 2006), we suggest that the access to such resources is facilitated by the involvement in reciprocal exchange relationships (Håkansson & Snehota, 1989; Johanson & Mattsson, 1992; Kachra & White, 2008), which consequently boost the knowledge outflows to local firms. However, such relationships – through which knowledge flow bidirectionally – may also be detrimental for subsidiaries' competitive standing in the foreign location, especially when their knowledge is highly valuable. In this latter case, subsidiaries might be driven to strengthen their knowledge protection strategies when interacting with the local environment, thus reducing the level of knowledge outflows.

The conceptual framework developed in this paper proposes that the differences in patterns of local knowledge outflows generated by MNCs' foreign subsidiaries may be explained by accounting for the trade-off between knowledge creation and knowledge protection they face within their host location. We analyze the need for knowledge creation by looking at subsidiaries' *external focus in knowledge sourcing*, which allows us to speculate on the consequences, in terms of local knowledge outflows, of subsidiaries' ability to absorb knowledge from external sources. Additionally, we focus on subsidiaries' *knowledge value* as one condition that may activate the need for knowledge protection.

While our main objective in this paper is to offer conceptual understanding of how the tension between knowledge creation and knowledge protection may influence the extent to which subsidiaries generate knowledge outflows to the host-location, in the last section of the manuscript we also carry out an exploratory analysis aimed at providing preliminary empirical insights on our framework's validity. While to really be able to capture the social mechanisms underlying knowledge flows one needs to use interviews or survey data, as most of the social network literature has done in many other research settings, we perform preliminary tests on a panel dataset of US subsidiaries of foreign MNCs using patent citation data. Our empirical results suggest that an external focus in knowledge sourcing tends to be associated with higher levels of knowledge outflows. However, in the presence of a high value of subsidiaries' knowledge stock, the extent of local knowledge outflows appears to be narrowed. Our conceptual framework suggests that one possible explanation for this phenomenon is that, in order to source external knowledge, subsidiaries may build on reciprocity mechanisms that foster knowledge outflows. However, they also tend to increasingly protect their highly valuable knowledge assets. Under this conditions, they limit reciprocity behaviors in knowledge exchanges and reduce the extent of local knowledge outflows.

Our study contributes to the literature on FDI knowledge outflows, by accounting for the double role host locations play for subsidiaries' competitiveness. Previous research has analyzed either subsidiaries' knowledge exchange dynamics (Almeida, 1996; Singh, 2007) or MNCs' strategies to prevent knowledge leakage (Alcacer & Chung, 2007). No study has elaborated on the simultaneous effects that the need for knowledge creation and the need for knowledge protection exert on the phenomenon of local knowledge outflows. We believe that this focus will set the stage for a more comprehensive understanding of how subsidiaries find a balance between such conflicting forces, and shed more light on the subsidiary-level antecedents of FDI local knowledge outflows. In addition, by highlighting some of the social mechanisms underpinning FDI-mediated local knowledge outflows, our conceptual framework provides a more socially enriched description of this phenomenon.

The rest of the paper is organized as follows. In the next section, we review the existing research on subsidiaries' knowledge flows and knowledge management. We then elaborate on the "trade-off" between knowledge creation and knowledge protection, and develop hypotheses. Finally, we present the preliminary analyses we have conducted on our sample of subsidiaries, and discuss the resulting empirical insights.

2. Literature review

2.1. Knowledge flows and knowledge spillovers: An overview of existing research

IB theory has highlighted that the localization of FDI generates positive externalities for host-country firms. This finding has fostered the development of a substantial strand of literature on FDI-mediated spillovers to host-countries (for a review, see, Görg & Greenaway, 2003). Spillovers from FDI may take different forms. Beyond the ability to boost local employment and to pull in large capital inflows, the embedding of multinational operations may result in knowledge outflows, which span MNCs affiliates' boundaries through several channels. Established literature suggests that knowledge flows from MNCs to host-country firms derive from the technological assets generated by parent companies (Caves, 1974), which can be transferred to subsidiaries located abroad (Dunning, 1981). When this transfer takes place, the contact between MNCs' subsidiaries and the local firms may produce local knowledge outflows, allowing host-country firms to access MNCs' technology (Haskel et al., 2007).