



Sources of open innovation in foreign subsidiaries: An enriched typology

Filip De Beule^{a,*}, Ilke Van Beveren^b^a Faculty of Economics and Business, KU Leuven University, Korte Nieuwstraat 33, 2000 Antwerpen, Belgium^b Faculty of Economics and Business, KU Leuven University, Belgium

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ABSTRACT

This paper analyzes the drivers of multinational affiliates' innovation, using a dataset based on the Community Innovation Survey for Belgium. Specifically, we investigate the role of external knowledge sources on foreign affiliates' research efforts and innovation. We thereby develop an enriched typology by taking both the MNC and the host country perspective into consideration and distinguish between different types of subsidiaries, in order to disentangle differences in the use of knowledge sources between technology exploiting, seeking and creating subsidiaries. Our findings show that technology-creating foreign affiliates are able to tap into a combination of industry-based value chain partners and science-based partners. In particular, a combination of clients and universities have a powerful impetus on the research effort of technology creating firms. Our results also indicate that technology-seeking subsidiaries make more use of collaboration with competitors. Technology exploiting subsidiaries make significantly less use of external knowledge sources and have a lower R&D intensity.

1. Introduction

In recent years, a good deal of literature has been devoted to the motive of knowledge seeking in the international activities of multinational companies (MNCs) (e.g., Cantwell, 1989; Cantwell & Mudambi, 2011; Cantwell & Piscitello, 2000; Kappen, 2011; Liu, Vahtera, Wang, Wang, & Wei, 2017; Michailova & Zhan, 2015). The increasing internationalization of R&D by MNCs is reflected in the growing role played by foreign affiliates in the R&D activities of many countries (Narula & Zanfei, 2005; UNCTAD, 2005). This growing evidence of a "globalization of innovation" trend means that foreign subsidiaries are increasingly carrying out R&D themselves. The R&D resources of a foreign subsidiary can play two roles: facilitate local adaptation of the MNC's products and services or enable the creation and acquisition of globally relevant technology for the entire corporation (Feinberg & Gupta, 2004; Makino, Lau, & Yeh, 2002; Zhang, Jiang, & Cantwell, 2015).

The purely internal view of innovation has been increasingly fading as recent literature has highlighted the merits of acquiring external knowledge and moved away from intramural research and development to open innovation (Cruz-González, López-Sáez, & Navas-López, 2015; Grimpe & Sofka, 2009; Huston & Sakkab, 2006). To cope with the increased complexity of innovation, research collaboration provides access to resources firms cannot generate internally. This allows firms

to develop valuable knowledge assets through a joint effort with partner firms (Knudsen, Tranekjer, & Cantner, 2017). The role of learning from external sources as a key means for obtaining new valuable ideas for the innovative process has therefore gained much attention. The concept of open innovation was coined by Chesbrough (2003) to explain and understand the various combinations of knowledge sourcing strategies. The open innovation model relies on the notion that a single organization cannot successfully innovate in isolation (Dahlander & Gann, 2010). External knowledge acquisition becomes critical since it complements and renews knowledge stocks available within the organization.

Open innovation has contributed to the proliferation of empirical studies which investigate how knowledge collaboration with different external sources can affect firms' innovation (Berghman, Matthyssens, & Vandembemt, 2012; Chen, Lin, & Chang, 2009; Chen, Chen, & Vanhaverbeke, 2011; Chesbrough, 2003; De Luca & Atuahene-Gima, 2007; Laursen & Salter, 2006; Zhang, Hoenig, Di Benedetto, Lancioni, & Phatak, 2009). This research stream has devoted considerable efforts to identify those external sources having a bigger effect on firm's innovativeness and ability to develop more novel products (Cruz-González et al., 2015). However, these studies offer mixed results and do not enable reaching a clear conclusion about which external knowledge sources are more relevant in order to reach different innovation outputs.

* Corresponding author.

E-mail address: Filip.DeBeule@kuleuven.be (F. De Beule).

Existing empirical quantitative contributions scarcely address the fact that not all sources may be of equal value for innovating firms. Thus, the nature of external knowledge sourcing presents a critical but poorly explored and understood aspect of open innovation (Brunswick & Vanhaverbeke, 2015). This is even more so the case for foreign subsidiaries. The main objective of this paper is therefore to analyze and determine the firm-level drivers of innovation of foreign subsidiaries. It will analyze to what extent foreign affiliates' research activities are shaped by its access to and use of local knowledge sources. We will specifically investigate whether foreign affiliates are able to innovate by tapping into local knowledge sources. In particular, we will make a distinction on the basis of industry-based and science-based external partners. As to foreign subsidiaries' innovation, our study focuses on product innovation and distinguishes by the degree of novelty to the firm, on the one hand, and novelty to the market, on the other hand. We believe our typology based on firms' existing knowledge as well as on prior knowledge being present in the host market concerning the innovation that is introduced, will yield novel insights into the determinants of foreign subsidiaries' type of innovation.

We would like to suggest that the usefulness of different industry-based and science-based partners on research and innovation is dependent on an important boundary condition, i.e., the type of subsidiary innovation. It is suggested here that we have to take account of the type of subsidiary innovation in order to explain the usefulness of the different knowledge sources in foreign subsidiaries' innovation. We would therefore like to find out what type of knowledge source has an important yet divergent impact on foreign subsidiaries.

This study has a number of contributions. First, our enriched typology of different technology exploiting and technology exploring strategies move away from a purely MNC-driven approach and contributes to IB literature by offering a more fine-grained lens to understand MNCs and their technology exploiting and exploring subsidiaries. Second, this study intends to contribute to the extant literature on open innovation by taking science-based and industry-based partnerships simultaneously into account, and by examining how innovation strategies with different types of external partners feed into the innovation of different types of subsidiary companies. Third, the processes we outline carry important consequences for the locations that host the subsidiaries as well, making this issue of interest to policy makers. Our insights into the determinants of foreign affiliates' innovativeness might allow host countries to create an environment conducive to foreign innovation efforts, allowing them to attract more research activities while MNCs can contribute to transforming the location itself.

Finally, important insights into the linkages from the local environment towards multinational subsidiaries can inform multinational (subsidiary) managers of how to benefit from their local presence. In a world of increasing global knowledge flows, innovation management is increasingly challenged to access and relate to the right knowledge sources to ensure innovation. Collaborating with appropriate partners that possess heterogeneous and tacit knowledge are truly challenging tasks for even the most experienced innovation managers (Knudsen et al., 2017).

The rest of this paper is organized as follows. Section 2 discusses background literature and puts forward our conceptual model and related hypotheses, while Section 3 describes the data set and relevant summary statistics. Section 4 deals with the empirical analysis and Section 5 discusses the major results of our analyses and draws relevant conclusions for managers and policy makers.

2. Literature

2.1. Literature background

Innovative effort is traditionally expected to take place mainly in the home country of multinational corporations (Castellani & Zanfei, 2006), whereby the MNC exploits its existing knowledge through a

network of subsidiaries. However, MNCs are increasingly seeking complementary foreign assets and knowledge-facilitating capabilities in order to add value to their core competitive advantages. Examples of this approach indicate that foreign-owned subsidiaries typically tap into local industry in order to keep their parent company informed about leading-edge thinking (Bartlett & Ghoshal, 1986; Ghoshal & Bartlett, 1988; Patel & Vega, 1999), while studies by Frost (2001) and Almeida and Kogut (1997) show how subsidiaries draw from local sources in their innovation processes. Cantwell (1989) argued that in order to benefit from knowledge feedbacks, MNCs' subsidiaries have to internalize foreign technology development, which implies that their own operations have to be firmly embedded in the host-country environment. Frost (2001) makes a similar argument, which he also formulates from an embeddedness perspective. His empirical analysis of patent citations made by a sample of US-based subsidiaries of foreign MNCs during the period 1980–1990 provides broad empirical support for this reasoning.

So literature has typically made a distinction between value creation that rests on the adaptation and deepening of the established competencies of the MNC group and value creation that extends MNC group competencies into new areas, usually by combining MNC group knowledge with knowledge from fields of expertise previously unfamiliar to the group. The first strategy has been labeled as technology, home-base, asset or competence exploiting. These strategies are associated with a view of multinational enterprises as a means to exploit firm-specific advantages in foreign markets (Barba Navaretti & Venables, 2004; Dunning, 2000). These subsidiaries support the exploitation by adapting technologies, products and processes to local needs, consumer tastes, regulation, etc. (Dachs & Ebersberger, 2009).

Owing to changes in the competitive, international and technological environment, MNCs have complemented this adaptive R&D with more innovative R&D abroad. Such a strategy has been described as technology exploring, home-base augmenting, asset or competence creating. These strategies are driven by supply factors, such as the availability of skilled researchers, the need to monitor the technological activities of competitors, clients, universities and other research organizations to assimilate local knowledge in the host countries (Castellani & Zanfei, 2006; March, 1991; Zhang et al., 2015).

2.2. Enriched conceptual framework

Many authors have investigated the characteristics of companies involved in technology exploiting versus technology exploring foreign investment activities (Berry, Shankar, Parish, Cadwallader, & Dotzel, 2006; Cantwell & Mudambi, 2005; Kuemmerle, 1999; Le Bas & Sierra, 2002). An important concern in this literature is how to distinguish between different motivations for FDI in R&D and innovation. A number of studies have specifically investigated this issue, using different taxonomies to classify the motives for FDI (e.g., Cantwell & Mudambi, 2011; Cantwell & Smeets, 2013; Driffield & Love, 2007; Griffith, Harrison, & Van Reenen, 2006; Le Bas & Sierra, 2002; Schmid & Schurig, 2003). However, often their tests are at the macro-level, inferring firm-level strategies from country-level characteristics, while the mechanisms of knowledge appropriation and flows are at the micro-level. Besides, the field in general would benefit from a tighter match between the theoretical and empirical levels of analysis (Alcacer & Chung, 2011).

In order to address this issue, this study divides subsidiary competence exploiting and competence exploring activities into four categories by taking both the MNC and the host country into consideration. Particularly, if innovations carried out by the subsidiary are not new to the firm, this implies that the firm is exploiting its existing ownership advantages in new locations (technology exploiting FDI from the point of view of the MNC). On the other hand, if the innovation introduced by the subsidiary is new to the firm, we consider the investment to be technology exploring FDI (from the point of view of the MNC).

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