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Multinational subsidiary knowledge protection—Do mandates and clusters matter?

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ABSTRACT

International knowledge spillovers, especially through multinational companies (MNCs), have recently been a major topic of academic and management debate. However, most studies treat MNC subsidiaries as relatively passive actors. We challenge this assumption by investigating the drivers of knowledge protection intensity of MNC subsidiaries. We argue that knowledge protection intensity is determined by MNC subsidiary mandates and by opportunities and risks originating from the host region. We hypothesize that not just competence-creating but also competence-exploiting mandates increase knowledge protection intensity. In addition, technological cluster regions in the host country can be expected to provide opportunities for knowledge sourcing and MNC subsidiaries may be willing to protect knowledge less intensively to participate in cluster networks. We test our hypotheses using a dataset of 694 observations of 631 MNC subsidiaries in Germany and develop recommendations for research, managers and policy makers.

1. Introduction

The knowledge production of multinational companies (MNCs) and their capabilities for knowledge transfer with the host country have received much attention in international economics (e.g., Haskel et al., 2007; Keller, 2002; Shaver and Flyer, 2000) as well as in the international business literature (Almeida, 1996; Frost, 2001). However, relatively little is known about how MNC subsidiaries protect their knowledge in the host country. This is especially surprising as unique knowledge is a cornerstone of MNC success (Kogut and Zander, 1993). Organizations that are well equipped for managing knowledge should be equally adept in preventing unintended outflows. Our goal is to fill a gap in management theory with regard to the active role of MNC subsidiaries in protecting their knowledge. We develop theoretical arguments for explaining differences in the intensity of knowledge protection of MNC subsidiaries. We define the knowledge protection intensity of an MNC subsidiary as the degree to which an MNC subsidiary actively uses knowledge protection instruments in order to prevent that its knowledge becomes unintentionally available or useful to competitors. We exploit the opportunity to capture the intensity of an MNC subsidiary's knowledge protection for a comprehensive set of protection methods encompassing patents, copyrights, trademarks, industrial design, secrecy, lead time, and complex design. We argue that the knowledge protection intensity can be explained based on subsidiary mandates as well as opportunities and risks from the host country region.

Existing research has assumed that knowledge flows between MNC subsidiaries and host country firms are inevitable because of the nature of knowledge and its characteristics as a public good (Arrow, 1962). However, empirical studies provide inconsistent results. The absence of knowledge flows has been predominantly explained with a mismatch between MNC knowledge and host country capabilities for absorbing it (Keller, 2004; Meyer and Sinani, 2009). In addition, research has relied on patent statistics from MNCs as measures for knowledge production as opposed to their original role for preventing knowledge from being imitated by competitors, i.e., knowledge protection (e.g., Almeida, 1996; Jaffe and Trajtenberg, 1999).

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Empirical evidence on how MNCs actively protect their knowledge is limited and only focused on small subsets of the instruments an MNC can utilize for knowledge protection. Shaver and Flyer (2000) as well as Alcacer and Chung (2007) focus on initial location choices of MNCs in a host country. They find that MNCs collocate with host country industry clusters if they expect to benefit from knowledge flows and stay away from them otherwise. Zhao (2006) argues that MNCs locate only those R&D activities in China that are valuable when combined with R&D performed in countries with stronger protection of intellectual property rights (IPR). de Faria and Sofka (2010) find that the difference between the breadth of knowledge protection strategies of MNC subsidiaries and domestic firms is dependent on the firm level investment in innovation and on the characteristics of the host country.

A central advantage of MNCs lies in their ability to transfer knowledge across national borders (Kogut and Zander, 1993). Hence, MNC subsidiaries have especially strong incentives for protecting it and preventing its "misappropriation" by host country competitors (Katila et al., 2008). Our study applies appropriability theory and provides new insights by comparing MNC subsidiaries.

We develop two sets of hypotheses. First, we hypothesize that the knowledge protection intensity of an MNC subsidiary is determined by its mandates. Subsidiary mandates can be defined as the assignments of the subsidiary from its global headquarters. Mandates can range from simply applying and adapting MNC procedures or products (competence exploitation) to developing totally new capabilities, products, or markets for the MNC as a whole (competence creation; Cantwell and Mudambi, 2005). We argue that MNC subsidiaries are different from strictly domestic firms in the sense that they have a need to protect knowledge that is produced and transferred from other parts of the MNC. Hence, it is not just competence-creation within the MNC subsidiary that requires intense knowledge protection but also competence-exploitation. Secondly, we suggest that knowledge protection intensity is influenced by the regional environment in which the MNC subsidiary is active. We argue that being located in a technological cluster entails both opportunities and risks for the MNC subsidiary. On the one hand, technological clusters have a high concentration of scientists and engineers working in the same industry that provide opportunities for knowledge sourcing. We claim that in these conditions an MNC subsidiary will lower its knowledge protection intensity in order to signal the willingness to participate in intra-cluster knowledge flows. On the other hand, clusters have a high level of personnel mobility and, therefore, key employees of MNC subsidiaries have multiple job opportunities. Hence, we expect that MNC subsidiaries located in regions with high levels of personnel mobility have higher knowledge protection intensity since labor flows entail higher risks of unintended knowledge spillovers.

The hypotheses are tested using a dataset of 694 observations of 631 MNC subsidiaries in Germany. Unique data allows us to distinguish between opportunities and risks originating at the regional level. We access comprehensive employment data for each subsidiary's agglomeration area in Germany. We can track opportunities from the technological development of these regions based on the number of scientists and engineers as well as the risks originating by the frequency of job switches in the region. Our data provides these regional variables at an industry level. This allows for much more precise testing of our hypotheses because opportunities and risks for MNC subsidiaries can be assumed to be much more pronounced within their own industry.

Our analysis adds to the emerging stream of research on knowledge protection by MNC subsidiaries by making two main contributions. First, we find that MNC subsidiaries not only actively protect the knowledge that results from their own R&D activities but also the knowledge that is created by the MNC headquarters and other subsidiaries and that they then exploit in their own local market. This result deepens our understanding of how MNCs transfer their competitive advantage from one country context to another by replicating and protecting knowledge and resources. Second, we separate the opportunities and risks associated with regional clusters. We find that MNC subsidiaries located in a region with a high concentration of scientists and engineers working in the focal subsidiary's industry have lower levels of knowledge protection intensity, but, contrary to our expectations, we do not find a significant relationship between regional personnel mobility and the MNC subsidiary's knowledge protection intensity. MNC subsidiaries' knowledge protection strategies are more sensitive to the opportunities than to the risks associated with their location.

Our findings also have major implications for both managers and policy-makers in host countries. The former must be aware of intense knowledge protection by MNC subsidiaries, especially outside of technological clusters of the host country. Hence, knowledge exchanges with MNC subsidiaries, e.g., through alliances, would require comparatively more effort. Host country policy-makers, with the intention of attracting MNC subsidiaries to generate knowledge flows to domestic firms, must be aware that they can expect intense protective behaviors from both competence-creating as well as competence-exploiting subsidiaries. The knowledge protection intensity is only lower if the MNC subsidiary locates in a technological cluster of the host country. Hence, subsidizing MNC subsidiary investments in peripheral regions for generating knowledge flows can be counterproductive.

The remainder of this article is structured as follows. Section 2 reviews the knowledge protection literature and Section 3 derives the hypotheses. Section 4 presents the empirical study, and is followed by results presented and discussed in Section 5. We draw conclusions and suggest pathways for future research in Section 6.

2. Knowledge protection

The goal of our theoretical discussion is to predict differences in the intensity of knowledge protection in MNC subsidiaries. Within our conceptualization, MNC subsidiaries (and all firms in general) have a set of knowledge protection instruments that they can use to prevent that their knowledge becomes unintentionally available or useful to competitors, e.g., patenting, secrecy, and copyright. Within this set of knowledge protection options, firms can choose how intensively they want to rely on each of these instruments: e.g., a pharmaceutical firm can opt for developing drugs in secret laboratory locations, patenting all of its discoveries, and applying for trademarks of drug names. We define the knowledge protection intensity of an MNC subsidiary as higher if it attributes higher importance to multiple knowledge protection instruments. Obviously, parts of the differences among firms in knowledge protection intensity can be explained at the industry level, based on technological opportunities and legal intellectual property rights regimes for using certain protection instruments (Arundel and Kabla, 1998). This conceptualization is different from other studies that explain, for example, differences in patenting activity among firms because the patenting activity may be driven by other motives than knowledge protection, such as signaling to potential partners and investors (Ndofor and Levitas, 2004).

The increasing importance of unique knowledge within a firm for generating sustainable competitive advantage has culminated in the knowledge based theory (Grant, 1996; Liebeskind, 1996). The control over exclusive knowledge provides firms with a superior platform for making decisions on the development, deployment, or abandonment of all other firm resources (Ndofor and Levitas, 2004). However, knowledge has some characteristics of a public good (Arrow, 1962). It can "spill over" to competitors and enable them