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Intellectual property infringements due to R&D abroad? A comparative analysis between firms with international and domestic innovation activities

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ABSTRACT

This paper aims to analyse the risk of intellectual property (IP) infringements by competitors from abroad and in particular to consider whether this risk is higher for international innovating firms. We distinguish three different types of IP infringements from abroad: the usage of firms' technical inventions, product piracy, and copying of corporate names and designs. Our analysis rests on the German data from the Europe-wide Community Innovation Survey (CIS). We use a unique data set of about 900 observations, which are retrieved from two survey waves. While the earlier wave contains information about international and domestic innovation activities, the later wave reports IP infringements. In a second analysis, the likelihood of infringements from innovation host countries and no-innovation host countries abroad is examined. Before the empirical analysis, an exploratory study was carried out in China with interviews of German firms with innovation activities in China and with a legal advisor for small and medium-sized German enterprises. The results show that firms with international R&D activities are increasing their chances of losing technological knowledge to their local competitors abroad. R&D activities in countries with weak intellectual property rights increase the risk for all types of IP infringements compared to domestic R&D activities. Infringements by competitors from the host country are driven by the production of new produces in this country. Export intensity is the major driver of infringements from no-innovation host countries. R&D activities in China and North America also increase the risk of an infringement. However, firms that innovate only in their home country experience significantly more product piracy cases than international innovating firms.

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1. Introduction

The internationalisation of corporate R&D activities enables firms to better serve customers abroad with customised products. R&D activities in customers' countries allow firms to react more quickly to local demands and supply customers in the host country as an authentic 'local' firm (Porter, 1980). Firms with international R&D centres further benefit from internalising foreign talents and expertise into their knowledge base. Many firms have realised the potential of international R&D activities and contributed to the persistent trend of internationalising their innovation strategies (UNCTAD, 2005). This trend is also spurred by emerging economies that have large numbers of university graduates and a growing importance in firms' market portfolios, and therefore increasingly appear as desired corporate innovation locations (Rammer and Schmiele, 2008). The internationalisation of corporate R&D activities is often associated with a loss of control over technological knowledge and other core competences. Foreign business environments can be very different culturally and legally in comparison to the home country and challenge the operations of international firms. In particular, for firms that carry out R&D activities abroad, the weakness of the intellectual property (IP) protection system can hamper their innovative efforts. The intellectual property right (IPR) standards often do not follow the economic development of some emerging countries such as China. Firms have to balance the attractiveness of a greater market size with customised innovative products against the risk of knowledge loss from their innovative efforts.

To evaluate this risk, this paper analyses whether firms with innovation activities abroad face a higher risk of experiencing IP infringements from abroad than firms that have innovation activities solely in their home country.

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Following the Oslo Manual (OECD/Eurostat, 2005) innovation activities comprise all scientific, technological, organisational, financial and commercial activities which lead (or are intended to lead) to the implementation of innovations. Innovation activities also include R&D that can be less related to the development of a specific innovation. In this vein, another contribution of this paper is to distinguish between different types of innovation activities abroad (R&D, conception/design of new products, production of new products, implementation of new processes). Further, we observe different types of IP infringements (infringement of inventions, product piracy, usage of firm name and designs). We are able to identify whether the IP infringement by competitors from abroad stems from a firm's innovation host country or from another country abroad. The distinction between host country and no-host country IP infringement can explain whether localised innovation activities, signalling effects or foreign market presence foster IP infringements.

Prior to the empirical analysis, an exploratory study on firms with innovation and business activities abroad was carried out. In interviews, the organisations that hold patents and trademarks commented on their experience with IP infringements from abroad. This so-called triangulation approach, the combination of different data sets and research methods, allows us to gain a wider and deeper understanding of the topic (Jick, 1979). The qualitative study can lead to conclusions which the empirical analysis would not reveal (Jick, 1979) and can make important contributions to the empirical study.

The outline of this paper is as follows: Section 2 will introduce previous work and related theoretical approaches in this field of research. In Section 3, we present the results of the exploratory study and frame the research questions accordingly in Section 4. Subsequently, in Section 5, an empirical study, which is based on a large sample of German firms, investigates whether the findings from the exploratory study hold for a sample of about 900 innovative firms from Germany, of which approximately 500 firms had international innovation activities. Section 6 provides the empirical results and Section 7 provides the conclusions and implications of this research work.

2. Theoretical framework

Firms that invest in R&D seek to appropriate the returns of their efforts. Depending on the nature of the innovation outcome, firms have different options to protect their IP. Technological inventions can be legally protected by applying for a patent grant. Non-technical IP can be protected with industrial designs or trademarks. Each type of IPR requires an application at the public authority which can grant an IPR for the territory it is responsible for. The enforcement of IPR is only possible if they are granted for the region in which the infringement case took place. The following paragraphs will introduce theoretical concepts which explain the occurrence of IP infringements from abroad.

2.1. Liabilities of foreignness

The internationalisation of business activities such as R&D and other innovation-related activities are faced with additional complexity in the business unit abroad. The complexity arises from unfamiliar business environments (Hymer, 1976), which are created by cultural, political, and economic differences between the home and host country. All costs that are associated with the foreignness of the foreign firm in the foreign business environment are summarised as the liabilities of foreignness (Zaheer, 1995). The foreign firm is less embedded in local networks and needs time to learn the 'rules' of the new business environment. The costs of being a foreigner in a foreign country arise from unexpected situations that lead to inappropriate decisions and hence expose the firm to extraordinary risks (Lord and Ranft, 2000). Social and cultural laws are not codified and therefore especially ambiguous to foreigners, which in turn create great potential to cause liabilities of foreignness (Jensen and Szulanski, 2004). As for international R&D centres, too much trust in formal contracts or in local R&D partners, the disrespect of the foreign culture and business etiquette can result in the loss of authority and the disloyalty of important employees. In certain countries, contracts are primarily based on personal relationships, and the respect of intellectual properties and their legal enforcement is not deeply embedded (Yang, 2005). The differences between the legal systems in the home and host country regarding intellectual property rights and their enforcement can be essential drivers for liabilities of foreignness. IP infringements that occur because of these differences are liabilities of foreignness. Similarly, the discrimination of foreign firms in courts or in governments' legislations increases the costs of foreign firms' innovation activities abroad. Firms have to make great efforts to learn and employ the strategies of the local legal system to work efficiently against counterfeiting.

2.2. Signalling effects of international R&D

Previous studies have found empirical evidence that firms that innovate in both their home country and abroad are more successful in generating innovative products and achieve higher sales growth due to these new products compared to firms that innovate only domestically (Peters and Schmiele, 2010a,b). This suggests that firms with international R&D units are highly competitive and more successful market actors. From this point of view, it can be surmised that firms are less at risk of incurring IP infringements because of their international innovation activities abroad per se, but rather from the success the firms attain from these activities. The market success with innovative products attracts more infringers. A good market position can thus act as a driver of IP infringements rather than the innovative activities that have been necessary to produce the innovations. Signalling (e.g. brand names) is a possible explanation why firms experience IP infringements from competitors of countries in which the firm has no innovation activities.

2.3. International R&D spillovers

Firms that carry out R&D activities are very likely to generate knowledge spillovers to third parties (Jaffe, 1986; Acs et al., 1992, 1994) which benefit from and exploit these assets. International spillovers from innovation activities can occur because of the imperfect appropriability of innovations (Macdissi and Negassi, 2002). International knowledge spillovers can take place via different channels such as trade, foreign direct investment (FDI) or cooperations. FDI seems to play a vital role (Hejazi and Safarian, 1999). Knowledge spillovers from internal R&D activities abroad can be transmitted by labour market mobility (Görg and Strobl, 2001; Maliranta et al., 2009), user-supplier relations (Javorcik, 2004; Markusen and Venables, 1999) or R&D collaborations (Macdissi and Negassi, 2002). The geographical proximity of the foreign firm in the host country increases the chances of knowledge flows (Marshall, 1920; Jaffe et al., 1993; Branstetter, 2001; Audretsch and Feldman, 1996).

An important aspect for the translation of R&D spillovers into a benefit for the receiving firms is that the receiving entity is able to productively use the information. The receiver requires absorptive capabilities (Cohen and Levinthal, 1989) in terms of pre-existing knowledge in the relevant technology field in order to be able to use the incoming spillovers. If a country or firm does not possess

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