



Organizing for external technology exploitation in diversified firms

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ABSTRACT

Besides applying technology in their own products, industrial firms increasingly exploit their technologies externally, for example through out-licensing. Earlier studies cannot explain the discrepancies between a few pioneering firms in active technology licensing and the managerial difficulties of many others. In diversified firms, diverging interests of the corporate and business unit level in the keep-or-sell decision constitute a central barrier to active licensing. Therefore, this article examines two essential dimensions of designing the corporate/business unit interface in diversified firms: the centralization of the activities on the corporate level and the alignment between the organizational levels. The study tests three hypotheses regarding the interaction and consequences of these organizational dimensions with data from 152 firms. Consistent with the hypotheses, the data provide support for the benefits from medium levels of corporate centralization and corporate/business unit alignment. The results have implications for technology exploitation, open innovation, markets for technology, and corporate strategy.

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1. Introduction

In the past, most industrial firms focused on internal technology exploitation, whereas external technology exploitation, for example technology licensing, was relatively neglected (Auh and Menguc, 2005; March, 1991). Recently, many firms have adopted open technology exploitation strategies, which go beyond marginal activities of commercializing residual knowledge (Lichtenthaler and Lichtenthaler, 2009). Some pioneering firms, such as Texas Instruments and Honeywell Inc., achieve enormous monetary and strategic benefits from transferring technology, for example licensing revenues (Fosfuri, 2006; Rivette and Kline, 2000). However, prior research relatively neglects external technology exploitation (Lichtenthaler and Ernst, 2009). The literature thoroughly addresses internal technology application in new products (Lin et al., 2006; Simpson et al., 2006) and external technology acquisition (Lichtenthaler, 2009; Nielsen, 2005; Norman, 2004). By contrast, most earlier research into external technology exploitation focuses on descriptive issues, and only some recent studies deepen the understanding of environmental antecedents of licensing (Fosfuri, 2006; Gambardella et al., 2007; Nagaoka and Kwon, 2006). However, an empirical analysis of internal antecedents is lacking (Lichtenthaler and Ernst, 2009). Therefore, this article analyzes the impact of two essential dimensions of designing the corporate/business unit interface in external technology exploitation in diversified firms: the centralization of the activities at the corporate level and the corporate/business unit alignment.

The discrepancies between some pioneering firms in active licensing and the substantial managerial difficulties of many others underline the research deficit (Chesbrough, 2007). In particular, a close alignment of external technology exploitation and the technology source's product business is necessary because of the substantial risks of transferring technology. The technology source's primary potential downside is the negative "profit dissipation effect" based on a weaker competitive position, which may result from transferring relevant knowledge (Fosfuri, 2006). The examples of some pioneering firms in active licensing underline that the organizational design constitutes a major challenge (Davis and Harrison, 2001). These managerial challenges are especially high in diversified firms in comparison with more focused companies. In particular, the business units in diversified firms may have competitive interests that may differ from the firm's overall corporate strategy, and these interests may limit outward technology transfer (Porter, 1987; Ramanujam and Varadarajan, 1989).

The decision to refrain from technology transfer may be beneficial from a single business unit's perspective. From a corporate perspective, however, it may be sub-optimal because the firm misses the potential benefits from technology licensing, and these benefits might overcompensate licensing's potential downsides. Consequently, the organization of licensing activities concerning the corporate/business unit interface plays a particularly important role in diversified firms because it may strongly limit outward technology transfer. Various pioneering firms have corporate technology transfer units, which receive support from the business units (Arora et al., 2001; Chesbrough, 2007). Moreover, prior managerial works suggest involving business units to ensure the implementation of corporate licensing strategy (Parr, 1996; Sullivan and Fox, 1996).

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This study offers several contributions. In particular, it helps to explain the discrepancies between some active licensors and many others (Rivette and Kline, 2000). Drawing on a dynamic capabilities perspective, this article is among the first quantitative studies into managing technology licensing. It tests three hypotheses with data from a large sample of firms. Because of interdependencies between internal and external technology exploitation, the study's implications go beyond licensing. In particular, this article provides new insights into capturing value from technology in open innovation processes (Chesbrough, 2007). Furthermore, the results contribute to understanding the technology markets, which differ substantially from product markets (Fosfuri, 2006). Finally, the findings have implications for research into university technology transfer (Markman et al., 2005) and corporate strategy of multibusiness firms (Chang and Harrington, 2000).

2. Theory and hypotheses

As external technology exploitation is a major managerial challenge, firms may have to develop a dynamic capability to actively transfer technology. The dynamic capabilities perspective suggests that a firm's organization constitutes an essential antecedent of its extent of licensing (Davis and Harrison, 2001; Lichtenthaler, 2007). However, there is only anecdotal evidence that some pioneering firms, such as IBM and Dow Chemical, have corporate licensing functions, which receive support from the business units (Arora et al., 2001; Chesbrough, 2007). A proficient organization is particularly important in light of the potential negative consequences of transferring technology due to strengthening competitors (Arora et al., 2001; Fosfuri, 2006). To actively transfer technology, firms need to integrate external technology exploitation into their organizational structures (Parr, 1996). In diversified firms, organizational integration involves the critical issue of conducting the relevant activities at the corporate or business unit level.

The corporate perspective has major consequences. By implying a multi-transaction view, firms have to focus on the aggregate outcome of their external technology exploitation activities, in addition to the consequences of individual technology transactions (Heimeriks and Duysters, 2007; Rothaermel and Deeds, 2006). The aim to reach a corporate optimum is essential because the local rationality of optimizing the results of every individual technology transaction may have negative influences on other transactions because of their potential-positive or negative-synergies (Kale and Singh, 2007). In addition, the corporate perspective underscores that the corporation as a whole must gain a competitive advantage from outward technology transfer (Burgelman, 1983; Porter, 1987). Thus, firms have to focus in the keep-or-sell decision (Lichtenthaler and Ernst, 2009) in technology exploitation on the potential benefits for the overall corporation rather than for a single business unit. To optimize licensing from a corporate perspective, firms have to proficiently manage the organizational interfaces between the corporate and

business unit level. The corporate-level centralization is essential because business units may be reluctant to conduct activities that are not valuable in the short term (Parr, 1996). Accordingly, special emphasis should be given to a clear division between corporate and divisional responsibilities (Escher, 2003).

Prior research into dynamic capabilities, corporate diversification, and technology licensing underscores two essential dimensions of designing the corporate/business unit interface in external technology exploitation: the degree of centralization on the corporate level and the degree of corporate/business unit alignment (Argyres, 1995; Burgelman, 1983; Markides and Williamson, 1996; Sinkula and Hampton, 1988; Teece et al., 1997; Watson and Wooldridge, 2005). These two organizational mechanisms constitute important dimensions of managing external technology exploitation (Parr, 1996). A proficient organization concerning these two dimensions likely helps firms to achieve an overall optimum in the keep-or-sell decisions (Burgelman, 1983; Lichtenthaler and Ernst, 2009). Moreover, it facilitates the coordination of external technology exploitation from a multi-transaction perspective (Kale and Singh, 2007). Thus, the following sections detail these two key organizational dimensions in diversified firms. Fig. 1 shows the conceptual framework of this study.

2.1. Corporate centralization

Because of the diversity of the technology transfer tasks, a decision for a more centralized organization at the corporate level does not constitute an either-or decision. Instead, it may be interpreted as a continuum of organizational designs from strong corporate centralization to strong business unit focus (Gassmann and Gaso, 2004). Often, a clear differentiation is impossible. In many cases, only individuals from one level, such as R&D experts from a business unit (Escher, 2003), can conduct particular activities. Accordingly, firms carry out the activities at this organizational level although a firm's overall organization would imply their coordination at the other level, such as the corporate licensing function. However, the organizational structure usually allows for distinguishing different degrees of centralization (Chu and Markides, 2005; Windsperger, 2003). Based on prior conceptualizations of focused organization (Andersen, 2004; Caruana et al., 1998; Siggelkow and Levinthal, 2003), we therefore define the corporate centralization of external technology exploitation in this study as the degree of organizing external technology exploitation activities at the corporate level rather than the business unit level.

Because of most firms' limited extent of external technology exploitation (Escher, 2003; Rivette and Kline, 2000), it is usually inappropriate to establish dedicated organizational structures in all business units. In particular, a critical volume of technology transfer is necessary to achieve learning effects (Cohen and Levinthal, 1990; Kogut and Zander, 1992). It is therefore easier to enhance a firm's external technology exploitation capability by pooling the activities at the corporate level (Heimeriks and Duysters, 2007; Teece et al., 1997).

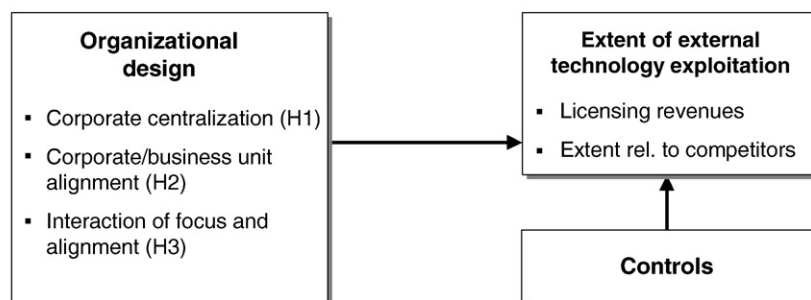


Fig. 1. Conceptual framework.

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