



## Product diversification through licensing: Empirical evidence from Chinese firms



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### ABSTRACT

Anecdotal evidence suggests that manufacturing firms are able to engage in product diversification through external technology acquisitions, such as technology licensing. However, there is little empirical evidence regarding this proposition to link inward technology licensing and firms' product diversification or to suggest when and under what conditions the effect of diversification through this channel may be mitigated or augmented. The current study aims to address this research gap through an empirical investigation of a sample of 141 Chinese manufacturing licensee firms. The results indicate that inward technology licensing is positively related to a firm's diversification and that this relationship is further moderated by a licensee firm's R&D expenditure and technological distance relative to the licensor firm.

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### Introduction

Product diversification, which refers to the scope of a firm's product portfolio, is considered one of the most important activities in strategy and operation management research (Chavas & Kim, 2010; Gemba & Kodama, 2001; Gort, 1962). The extant literature documents that product diversification itself has specific important performance implications, such as exploiting excess firm-specific assets and sharing resources, such as management skills, brands, technological innovations, and consumer loyalty (Dastidar, 2009; George & Kabir, 2012; Hitt, Hoskisson, & Kim, 1997; Li & Greenwood, 2004). With increasing competition, a shortening of product life cycles, rapid technological changes, and a shortage of capital and government regulatory requirements, many firms are under pressure to develop new products at a much faster rate than ever before (Chesbrough, 2003). Thus, firms' ability to diversify, i.e., to introduce new products, becomes increasingly important for growth, profitability, and survival.

The question of how firms should carry out product diversification to improve their performance has become the key issue in this line of enquiry. Most scholars suggest that firms that have diversified into areas related to their core businesses demonstrate better performance than others that have diversified into unrelated business fields (Markides & Williamson, 1994; Palich, Carini, & Seaman, 2000; Purkayastha, Manolova, & Edelman, 2012; Rumelt, 1982).

Following this insight, scholars argue, implementing a diversification strategy is not a random walk (Pehrsson, 2006). That is, firms should choose to diversify by developing new products within the firms in areas surrounding their core competences and skills (Gemba & Kodama, 2001).

However, this traditional insight has been criticised because a number of scholars state that diversifying through the development of new products within a firm is a slower but risky route (Atuahene-Gima & Patterson, 1993; Caves, Crookell, & Killing, 1983; Killing, 1978). In contrast, there is another competing means of engaging in product diversification in external technology acquisition: technology licensing. As Killing (1978) notes, diversification through licensing is a less risky route than traditional methods because the goal of licensee firms is to learn from the experience of firms that have already produced and marketed the product in question and thus avoid the risks and costs of product development. Under a license agreement, the licensor will offer the licensee technical know-how and patent rights, generally in exchange for a royalty based on sales (Arora & Gambardella, 2010). Along this line, Leone and Reichstein (2012) showed that in-licensing accelerates the invention speed of licensees, thereby enhancing their new product development process.

Although this anecdotal evidence has suggested that through external technology acquisition, such as technology licensing, achieving higher performance via product diversification strategy becomes promising, little effort has been invested to investigate more specifically the relationship between inward technology licensing and product diversification. To this end, this study

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intends to address this important question through an empirical analysis based on a unique dataset collected from Chinese firms that engaged in technology licensing activities between 2000 and 2003.

The contributions of this study to the existing literature can be drawn from several aspects. First, this paper represents the first step in providing empirical tests of the relationship between inward technology licensing and diversification. Second, we help to understand how, why, and under what conditions firms could benefit from inward technology licensing in the increasingly heavily populated technology market. Third, we extend the research on the above relationship to an emerging economy context, as diversification is considered an important growth strategy (Khanna & Palepu, 2000; Khanna & Rivkin, 2001). Finally, we contribute to the external technology search literature by measuring performance with respect to diversification.

The remainder of this paper is organised as follows. In the next section, we conduct a brief literature review and develop research hypotheses. Section 'Methods' describes the data, sample, measurements of variables, and methods used in this study. Section 'Results' presents the results of the empirical analysis. In section 'Conclusion and discussion', we conclude this study and draw several theoretical and practical implications, as well as discussing several limitations of this study, which deserve more attention in future research.

## Literature review and research hypotheses

Ansoff (1957) first introduced the concept of diversification to illustrate the growth strategies of companies entering new markets with new products. In general, diversification refers to the movement of a company into a number of markets, sectors, industries, or segments in which it was not previously involved (Gemba & Kodama, 2001). The first empirical analysis regarding diversification was conducted in 1962 by Gort, who analysed the relationship between diversification and profitability using data collected between 1947 and 1957 from 111 large U.S. firms. Since then, there has been prolific research in this field (Barbiroli & Focacci, 2003; Chavas & Kim, 2010; Christensen & Montgomery, 1981; Kim, Lim, & Park, 2009; Kodama, 1986; Miller, 2006; Pennings & Natter, 2001; Rumelt, 1974). A review of the current literature reveals four lines of research. The first strand stems from research on diversification typology. Using the distance from the diversified business to the main business, Rumelt (1974) outlines seven types of firm diversification: single business, dominant-vertical, dominant-constrained, dominant-linked, acquisitive conglomerate, related-linked, and unrelated-passive. Likewise, Killing (1977) states that to implement a new product, three different types of skills are required: product design, production process, and marketing capability. Therefore, the author identified four types of diversification based on the extent to which a firm must support a new product: core, closely related, loosely related, and unrelated diversification. In practice, more scholars use the dichotomy of related versus unrelated diversification to describe a firms' diversification behaviour (e.g., Bettis, 1981).

The second line of research focuses on the motives of diversification. The rationale behind a firm's entry into a new business area is widely discussed from two perspectives. First, according to the resource-based view, diversifying into a new business could improve the efficiency of a firm's resources when the new business offers extra resources, such as skills, brands, production and distribution systems, and other complementary assets (Patel & Pavitt, 1994; Penrose, 1959; Purkayastha et al., 2012). Diversification could thus bring to firms synergistic resource sharing or economies of scope. Diversified firms might also face lower entry

costs than firms attempting to enter into new business without preexisting resources. This advantage enables such firms to possess stronger market power than non-diversified firms (Gemba & Kodama, 2001). Secondly, the institutional perspective suggests that firms diversify themselves internally to substitute external financial and market intermediaries that absent or inefficient institutions and markets are unable to provide. In institutionally developing economies, diversified firms can enjoy greater net marginal benefits through this internationalisation (Khanna & Palepu, 2000; Khanna & Rivkin, 2001; Kock & Guillen, 2001). The third research direction is concerned with the relationship between diversification and performance. Although the diversification–performance relationship is the focus of extensive research, the empirical evidence remains mixed. The dominant view along this direction finds a positive relationship (Miller, 2006; Villalonga, 2004). However, Bettis (1981) and Singh, Nejadmalayeri, and Mathur (2007) find a negative or no relationship, and Rumelt (1974) and Palich, Cardinal, and Miller (2000) have found a curvilinear relationship.

The fourth research strand focuses on routes followed by firms implementing a diversification strategy. There are two major routes for diversifying firms: internal developments of new products and businesses, and external acquisition through mergers and acquisitions. Because acquiring other companies can be risky and expensive, firms may engage in internal new product development (Killing, 1977). Using this logic, scholars have paid considerable attention to firms' technology bases and argue that a firm's extension to other businesses is not a random walk but instead decided by the nature of the firm's technological competences (Breschi, Lissoni, & Malerba, 2003; Cesaroni, 2004; Gupta, 1990; Kim et al., 2009; Leten, Belderbos, & Van Looy, 2007). Specifically, scholars introduce the term technological diversification as a key predictor in product diversification (Breschi et al., 2003; Fleming, 2002; Leten et al., 2007; Markides & Williamson, 1994; Patel & Pavitt, 1994). They further argue that large firms normally have a wider technological than product diversity and that firms diversify along technological directions determined by the links and distances between technological fields. Meanwhile, an alternative technology acquisition approach has been presented by a few scholars, who have argued that instead of expensively acquiring other firms to implement diversification, firms could acquire external technology, such as licensed technology, to achieve the same aim (Atuahene-Gima, 1992; Caves et al., 1983; Killing, 1978; Kwa-ku, 1993; Lowe & Taylor, 1998). As technology markets become widely available and their sizes grow, firms would be able to engage in more inward licensing, thereby increasing the likelihood for licensees to pursue diversification through the introduction of new products (Caves et al., 1983; Cesaroni, 2004). Furthermore, inward licensing can shorten licensee firms' new product development process as it can feed their innovation capability by fostering licensees' learning and extending their knowledge bases (Leone & Reichstein, 2012). Firms would thus be able to use inward licensing as a technology outsourcing strategy and substitute or complement their internal research and development (R&D) for new product development (Cassiman & Veugelers, 2006). However, evidence based on studies of large-scale samples remains scarce.

As indicated in the above-mentioned literature, the focus of research on diversification has been shifting from describing diversification typology and investigating the relationship between diversification and performance to the question of how firms ought to engage in diversification to improve market competence. In particular, with the innovation paradigm shifting from closed to open innovation, resources supporting diversification within firms have been increasingly available outside firms (Chesbrough, 2003; Huizingh, 2011). How firms play in this new arena in terms of their

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