



Linking business models with technological innovation performance through organizational learning



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ABSTRACT

This study examines how business models affect technological innovation performance through the mediating role of organizational learning. Using hierarchical regression analysis with data from 173 Chinese manufacturing firms embedded in global manufacturing networks, this study shows that both efficiency-centered and novelty-centered business models affect organizational learning. The results also demonstrate that organizational learning fully mediates the relationship between efficiency-centered business models and technological innovation performance and partially mediates the relationship between novelty-centered business models and technological innovation performance. This study provides new insights into the influence of business models on technological innovation performance by showing the indirect influence of business models. This study may help managers better understand the influence of business models on technological innovation performance.

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Introduction

Business models have received increasing attention from scholars in the research fields of strategy, competition, and technological innovation (e.g., Lee, Shin, & Park, 2012; Mitchell & Coles, 2003; Teece, 2010). This study focuses on the influence of business models on technological innovation performance because a great amount of previous research has highlighted the crucial effects of business models on the improvement of technological innovation performance. On the one hand, an appropriate business model design is necessary for the successful commercialization of innovative technology (Teece, 2010; Zott, Amit, & Massa, 2011). On the other hand, the lack of an appropriate business model design reduces the profit gained from technological innovation and even forces a firm to cancel the application of a new technology (Chesbrough & Rosenbloom, 2002).

Although prior studies are important for understanding the influence of business models on technological innovation performance, they are limited in two respects. First, prior studies do not take business model design themes into consideration. Business model design themes describe “the holistic gestalt of a firm’s business model, and they facilitate its conceptualization and measurement” (Zott & Amit, 2008, p. 4). The literature indicates great interest in efficiency-centered and novelty-centered business model design themes (e.g., Brettel, Strese, & Flatten, 2012; Zott & Amit, 2007, 2008). For example, Zott and Amit

(2007) examine the relationship between these two themes and the performance of entrepreneurial firms. An efficiency-centered business model design aims at “reducing transaction costs for all transaction participants” (Zott & Amit, 2008, p. 9). A novelty-centered business model design refers to “the conceptualization and adoption of new ways of conducting economic exchanges among transaction participants” (Zott & Amit, 2008, p. 8). From the perspective of practice, efficiency and novelty are the themes corresponding to product market strategy (Zott & Amit, 2008), and they allow a firm to reach its strategic goals (Casadesus-Masanell & Ricart, 2010). These two design themes are not mutually exclusive: they may coexist in a specific business model (Zott & Amit, 2008). Given the importance of these two design themes, it is surprising that few studies explore how these two themes affect technological innovation performance. Therefore, it is necessary to take these two business model design themes into account when trying to understand how business models affect technological innovation performance.

Second, prior studies have not yet examined the indirect influence of business models on technological innovation performance. As mentioned previously, these studies have primarily concentrated on the value of business models in terms of the commercialization of technological innovation, a concept that essentially belongs to studies of direct influence (Björkdahl, 2009; Chesbrough & Rosenbloom, 2002; Teece, 2010). However, practice (as demonstrated by Wanji and Geely) shows that the influence of business models can be indirect. Specifically, business models can affect technological innovation performance through organizational learning. Consider Wanji, a manufacturer of power

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components in China. Wanji's business model is efficiency-centered. The transactions the firm offers are simple and fast. For example, Wanji provides online transactions for customers. Moreover, Wanji enables transparent transactions (e.g., the disclosure of information regarding technical parameters) and reduces customer search costs by search engine marketing. Relying on the efficiency-centered business model, Wanji has built long-term cooperation with several top enterprises in their respective industries worldwide. These efforts have enabled Wanji not only to acquire market information and product knowledge from these customers but also to co-develop new products with these customers. Geely is one of the top ten automobile manufacturers in China. Compared with Wanji's business model, Geely's business model is novelty-centered because it focuses on connecting previously unconnected parties rather than reducing transaction costs (Zott & Amit, 2007, 2008). For example, Geely took over the global luxury car brand Volvo in 2010. Learning from Volvo was one of purposes of the takeover, as verified by cooperation in a new R&D center in Gothenburg, Sweden. The center aims to develop a new modular architecture and a set of components for future C-segment cars, addressing the needs of both Volvo and Geely. Do business models influence technological innovation performance indirectly through organizational learning? The answer to this question will help us better understand the influence of business models on technological innovation performance.

This study aims to address the gaps mentioned above. It focuses on two business model design themes, efficiency-centered and novelty-centered business model designs (Amit & Zott, 2001; Zott & Amit, 2007, 2008), and examines the influence of these two themes on technological innovation performance through the mediating role of organizational learning. The rest of the paper is organized as follows. In Section 2, the paper presents the theoretical foundation of this study and proposes hypotheses. Section 3 introduces the research methods used. Section 4 presents the results of this study, which were obtained by empirical analysis. Section 5 discusses the findings, theoretical contributions, practical implications, limitations, and further research.

Literature review and hypotheses

Business models

It is generally accepted that value creation is the core of the business model (Tece, 2010; Zott & Amit, 2010). Based on value-creation mechanisms, existing business model definitions can be divided into two types. The first type is built from the perspective of an internal value chain, which considers the offer of products or services, the arrangement of internal value activities, and the allocation of internal resources to be the main mechanisms of value creation (Morris, Schindehutte, & Allen, 2005; Timmers, 1998). For example, Morris et al. (2005, p. 727) define the business model as "a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets".

The second type is built from the perspective of an external value network. This type emphasizes the arrangement of a value network, the integration of boundary-spanning activities, and cooperation between firms as the primary mechanisms of value creation (Amit & Zott, 2001; Hienerth, Keinz, & Lettl, 2011; Zott & Amit, 2010). For example, Amit and Zott (2001, p. 511) define the business model as "depicting the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities". Zott and Amit (2007, p. 181) further state, "a business model elucidates how an organiza-

tion is linked to external stakeholders, and how it engages in economic exchanges with them to create value for all exchange partners".

This study adopts the definition of Amit and Zott (2001) for two major reasons. First, this definition, grounded in strategic network theory, reflects the characteristics of the business model as a network concept. Recent studies on open business models (Chesbrough, 2006), dynamic business models (Mason & Leek, 2008), and collaborative business models (Chen & Cheng, 2010) all indicate that the business model is a concept based on network structure. Second, although this definition is derived from the study of e-business, it has broad applicability. For example, Brettel et al. (2012) show that this definition is valid for both manufacturing and service firms.

The business model is an abstract concept but can be easily understood when interpreted in terms of design themes. Design themes depict the primary value creation sources, drivers, and effects constituting the essential elements of business models (Amit & Zott, 2001; Zott & Amit, 2008, 2010). Amit and Zott (2001) propose four design themes, namely, efficiency-centered, complementarities-centered, lock-in-centered, and novelty-centered. As mentioned previously, this study focuses on efficiency-centered and novelty-centered design themes. The efficiency-centered design, which builds on transaction cost theory (Williamson, 1975, 1979), focuses on improving the transaction efficiency and reducing the transaction costs of business model participants (Zott & Amit, 2007, 2008). The novelty-centered design, which is rooted in Schumpeterian innovation theory (Schumpeter, 1934), focuses on introducing new ways of making transactions or connecting with new partners (Zott & Amit, 2007, 2008). Similarly, Sorescu, Frambach, Singh, Rangaswamy, and Bridges (2011) propose that efficiency and effectiveness are the primary design themes of the retail business model. In their work, efficiency refers to making transactions faster, cheaper, and easier; effectiveness refers to achieving the goals of retail firms and consumers in innovative ways (e.g., customer co-creation) (Sorescu et al., 2011). Hamel (2000) also emphasizes that it is important to create an efficient and unique business model because efficiency and uniqueness determine the profit potential of a business model.

Organizational learning

Although organizational learning has many definitions, at the most fundamental level, it is "the development of new knowledge or insights that have the potential to influence behavior" (Slater & Narver, 1995, p. 63). Organizational learning is an important and basic organizational process through which information and knowledge can be processed and the attributes, behaviors, capabilities, and performance of an organization can be changed (Cohen & Levinthal, 1990; Huber, 1991). Organizational learning consists of a series of subprocesses, such as knowledge acquisition, knowledge sharing, and knowledge utilization (Nevis, DiBella, & Gould, 1995).

Organizations, where internal learning happens, also learn within interorganizational networks (Knight, 2002; Lane & Lubatkin, 1998). Networks gather the information and knowledge of different node firms to ensure that firms meet diverse information and knowledge needs (Uzzi, 1997). In addition, networks boost cooperation and communication among firms, leading to information flow and knowledge transfer (Dyer & Singh, 1998). Learning in networks suggests that organizations learn through interaction with other organizations to improve their structures, processes, strategies, and performance (Knight, 2002).

This study examines how business models affect technological innovation performance through organizational learning in networks consisting of business model participants. Therefore, organizational learning in this study refers to organizational learning in

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