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Technological opportunism and firm performance: Moderating contexts

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ABSTRACT

Technological opportunism is a sense-and-respond capability of firms with respect to new technologies. This research examines the effect of technological opportunism on firm performance from the dynamic capabilities' perspective, and how such an effect depends on relevant firm and/or market contingencies. Analyzing data from a variety of Taiwanese manufacturing industries, the authors find that technological opportunism has a positive effect on firm performance. The technological opportunism–firm performance link is negatively moderated by market orientation and network externality, and positively moderated by technological turbulence. These results confirm the underlying theme of the dynamic capabilities approach to technological changes and contextual (environmental and organizational) relevance. The finding that technological opportunism and market orientation fail to produce any synergistic impact implies that technological opportunism is a more influential source of a firm's competitive advantage.

1. Introduction

A variety of markets compete over scientific and technical know-how. These technology-intensive markets bear witness the emergence and supremacy of radical technologies, which contain high degrees of new knowledge and represent clear departures from current practices (Dewar & Dutton, 1986; Utterback, 1996). In such fast-moving markets, firms' specific technological capabilities provide relatively secure foundations for a long-term strategy that enables them to achieve competitive advantages over their rivals (Grant, 2010).

Accordingly, technology management and its relationship to firm performance clearly are worth more academic attention and explicit formal consideration (Capon & Glazer, 1987; Swan & Allred, 2003). Cooper (1984) finds that a firm's strong R&D orientation and its use of sophisticated technologies in new product development can influence the commercial performance of a new product. In a similar vein, Gatignon and Xuereb (1997) indicate that a technology-oriented firm should be more likely to achieve a superior level of new product performance in the market. Nevertheless, technology innovators, with their first-mover advantages associated with pioneering, are not always the winners in terms of appropriating value created by innovations. Imitators that can copy and modify technologies may outperform the innovators. For example, Apple was a pioneer in the personal computer industry, and IBM was a follower. The latter delayed its entry to the industry until market and technological risks had been reduced and large-scale manufacturing, marketing, and distribution became the key to success, taking over the former's leading market position (Grant, 2010).

Despite the explosive development of new technologies, organizations adopt them at a rather slower rate. The development/adoption gap, that is, the increasing difference between the rate of new technology development and its rate of adoption, may result from the inadequacy of adopting organizations in terms of their human and financial capacities (More, 1992). Srinivasan, Lilien, and Rangaswamy (2002) advocate technological opportunism, a sense-and-respond capability of firms with respect to new technologies, to account for differences in adoption of radical technologies among firms. Because of such a capability, technologically opportunistic firms can explore the technologies that could represent potential threats or opportunities.

This study explores the link of technological opportunism with firm performance, featuring the circumstances under which technological opportunism differs in its influence on firm performance. The study probes how relevant (internal and external) factors moderate the effect of technological opportunism on firm performance. The moderation of market orientation (MO) reflects the interaction between a firm's dynamic capabilities of sensing and responding to its market and technological environments. Such an investigation falls in line with a notable research stream in understanding the interactive impact of technology capabilities and marketing capabilities (e.g., Song, Droge, Hanvanich, & Calantone, 2005). In contrast, technological turbulence and network externality respectively capture the impacts of technology-specific and market-specific environmental changes on the technological opportunism-performance link.

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2. Theoretical background and hypothesis development

Rooted in the dynamic capabilities theory (Teece, Pisano, & Shuen, 1997), the conceptual framework in Fig. 1 posits that technological opportunism relates positively to firm performance. The exploitation of a firm's technological opportunism depends on two environmental factors—technological turbulence and network externality. Market orientation, an organizational capability that allows the firm to sense and respond to external environments (cf. Song et al., 2005), also interacts with technological opportunism to affect firm performance. Due to the inconsistent findings on the MO–performance link (e.g., Atuahene-Gima, 1996; Jaworski & Kohli, 1993; Narver & Slater, 1990; Voss & Voss, 2000; Zhou, Yim, & Tse, 2005), the conceptual model does not propose any direct impact of MO on firm performance.

2.1. Relationship between technological opportunism and firm performance

The dynamic capabilities' approach emphasizes a firm's inimitable capacity to shape, reshape, configure and reconfigure the firm's asset base in response to changing technologies and markets (Augier & Teece, 2007; Teece et al., 1997). Dynamic capabilities such as technological opportunism enable firms to draw on different areas of technology and meet the needs of various markets (Eisenhardt & Martin, 2000). Technologically opportunistic firms possess both the ability to understand and acquire knowledge about new technology developments (technology-sensing capability) and the willingness and ability to respond to identified new technologies (technology-response capability). These firms regularly scan for information about the development of new technologies that are viewed as potential sources of growth (Daft & Weick, 1984), respond proactively to radical technologies (Srinivasan et al., 2002), and are also able to reformulate business strategies to exploit the opportunities or lessen the threats posed by these new technologies.

These sense and respond activities allow firms to incorporate new technology advances into their new products and make preemptive moves in the marketplace than their competitors, which leads to sustainable competitive advantages (Teece, 2007) and superior firm performance (Olavarrieta & Friedmann, 2008).

H1. As the technological opportunism of a firm increases, performance increases for the firm.

2.2. The moderating effect of market orientation

Both technological opportunism and market orientation pertain to organizational sensing and response capabilities. However, they are distinct in terms of sensing domain and responsiveness, and they do not imply each other (Srinivasan et al., 2002). A reasonably large body of literature shows that the market orientation concept has a customer-focused and somewhat reactive predisposition (Hills & Sarin, 2003). As opposed to their technology-oriented counterparts, market-oriented firms place high priority on firm-wide behaviors geared toward understanding customer needs (Pelham, 1999).

The narrowing of market orientation has led to myopia with respect to future needs (Hamel & Prahalad, 1991). This phenomenon may reflect some market-oriented firms' failure to adopt new technologies, especially in high-tech markets, due to their existing customers' perceptions of the uselessness of these technologies (Hills & Sarin, 2003). Firms find responding to markets rather than to new technologies to be rewarding. Responsiveness to the latter is inherently risky because firms cannot know whether these technologies will benefit them in advance (Srinivasan et al., 2002). When market orientation is high, firms tend to take market needs to the extreme, and may choose either to neglect or not to respond to technological opportunities and other environmental conditions (Holt, 2002). Being market oriented thus may restrain technologically opportunistic firms from gaining true insights in their pursuit of product innovation (Zhou et al., 2005).

Accordingly, the potential of technologically opportunistic firms to exploit new technologies will become dim if they are also highly market oriented. In contrast, in conditions of low market orientation, technologically opportunistic firms can enhance their performance by proactively adopting radical technologies and exploiting upcoming business opportunities based on technology developments.

H2. The positive effect of technological opportunism on firm performance decreases as market orientation increases.

2.3. The moderating effect of technological turbulence

Technological turbulence refers to the rate of technology change in a market (Jaworski & Kohli, 1993), implying the unpredictability of, unfamiliarity with, or an inability to understand technological developments or changes in the external environment (Bstieler, 2005). Short cycles of technological innovation and obsolescence are characteristics of a highly technologically turbulent environment. Inherent risks arise from technological complexity and uncertainty in such industries (Soh & Roberts, 2003).

Teece et al. (1997) posit that dynamic capabilities such as the ability to sense markets and technologies and the capacity to reconfigure and transform competences are more valuable in dynamic environments than in static environments. High technological

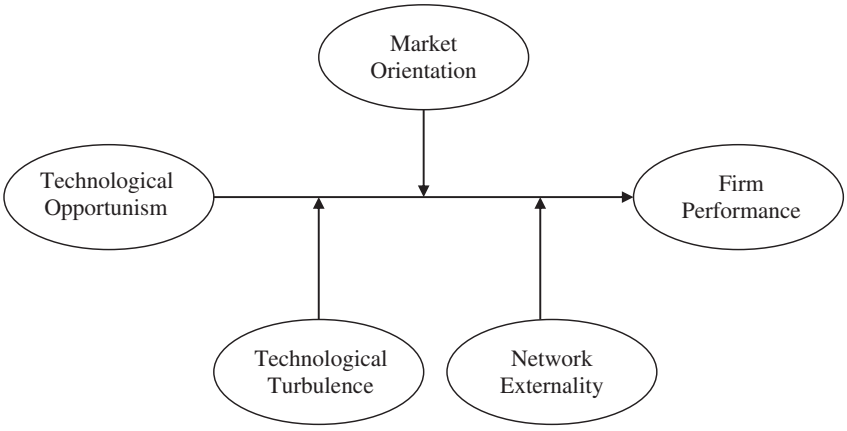

Fig. 1. Conceptual framework for technological opportunism and firm performance.