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Social capital and new product development outcomes: The mediating role of sensing capability in Chinese high-tech firms

Junfeng Zhang*, Wei-ping Wu¹

Department of Marketing, Hong Kong Baptist University, 5/F The Wing Lung Bank Building for Business Studies, 34 Renfrew Road, Kowloon Tong, Kowloon, Hong Kong, China

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ABSTRACT

This study investigates the effects of social capital (trust and power) on a high-tech firm's new product development outcomes through the leveraging of its sensing capability in an emerging market, China. A sample of high-tech firms in China is used to test the proposed relationships. Findings confirm that both trust and power in a high-tech firm's social network are significantly associated with its two new product development outcomes through sensing capability which fully mediates the relationships.

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1. Introduction

Social capital has been identified as a critical factor for new product development (e.g., Rindfleisch & Moorman, 2001; Zhang & Li, 2010). It not only helps to provide access to information and facilitates greater utilization and sharing of information and knowledge (e.g., Adler & Kwon, 2002; Wu, 2008), but it also improves the chance of efficient knowledge transfer and utilization by reducing the likelihood of opportunistic behavior and attrition in implementation (e.g., Rindfleisch & Moorman, 2001). This eventually results in better knowledge exploitation and knowledge exploration in the form of increased product innovation.

Extant studies suggest that realizing these benefits can be difficult for high-tech firms, especially those in emerging economies (e.g., Fang, 2008; Molina-Morales & Martinez-Fernandez, 2009; Yli-Renko, Autio, & Sapienza, 2001). The rapidly changing environment in high-tech industries, coupled with the economic liberation in emerging markets, makes it difficult for many high-tech firms to grasp appropriate information and knowledge for their product innovation in a timely manner. This can make it extremely difficult for a high-tech firm in an emerging economy to efficiently and effectively turn the information and knowledge benefits available through networking with its business partners into new product innovations. The inherent problems of a business network such as inertia can make this almost an insurmountable task. Fang (2008) found that sharing information with customers in a highly connected network in an emerging economy could lead to

undesirable new product outcomes because the network structure facilitates homogeneous market information. This endangers the firm to adapt to the volatile market.

A question remains: what underlying mechanisms can the potential benefits of social capital be realized to enhance new product development outcomes of a high-tech firm, especially in an emerging market? Drawing on the resource-based view (RBV), this study argues that social capital, a firm resource residing in its social network, provides only *potential* benefits such as information access and a safe environment. Sensing capability, a distinctive capability, is essential to turn these potential benefits into realized new product development outcomes. Sensing capability is defined as the ability of a firm to sense and identify opportunities and options in its scanning, searching and exploring across technologies and markets for its new product development (Teece, 2007). This is because mere information access or sharing does not guarantee better new product outcomes in this setting. New product development is a problem-solving process that requires accurate and up-to-date market information (e.g. Fang, 2011; Song, Di Benedetto, & Parry, 2009), and complementary and specialized knowledge (Kogut & Zander, 1992). In a highly volatile environment such as a high-tech industry in an emerging market, failure to recognize and evaluate properly critical knowledge residing in a firm's external network for product innovation could handicap a high-tech firm in developing innovative products. Being slow to identify valuable, current and accurate market information can limit a high-tech firm's ability to launch new products fast to markets. This makes sensing capability essential for realizing the potential benefits offered by a firm's social capital. It allows a firm to renew its competences and align its products with a fast-changing environment, which is critical to firm competitiveness in this setting (Teece, Pisano, & Shuen, 1997, p. 515).

* Corresponding author. Tel.: +852 3411 7524; fax: +852 3411 5586.

E-mail addresses: junfzh@hkbu.edu.hk (J. Zhang), tigerwu@hkbu.edu.hk (W.-p. Wu).

¹ Tel.: +852 3411 5209; fax: +852 3411 5586.

This study is the first attempt to investigate sensing capability as a mediating mechanism in the relationship between social capital (specifically trust and power) and new product development outcomes (product innovativeness and speed to market). It focused on high-tech firms in China. Product innovativeness and speed to market were chosen as the new product development outcomes because both become imperative with the short product life cycles and intense competition now prevailing in global markets (Langerak & Hultink, 2006), especially in high-tech industries. Using a sample of high-tech firms in China, our findings provide a strong evidence for the essential role of sensing capability in transforming potential benefits of social capital into concrete outcomes such as more innovative products and faster speed to market.

High-tech firms in China offer an appropriate research setting for such a study for two reasons. First, China provides an appropriate context to test the effect of social capital. China shares many of the common characteristics of emerging economies such as institutional voids and rapid changes. In addition, the Chinese have a long tradition of using social ties to facilitate cooperation in business transactions (Li, Poppo, & Zhou, 2008). These can be evidenced by the prevalence of social ties in China. Second, new products are increasingly important for Chinese high-tech firms as local customers as well as foreign customers become more sophisticated in their requirements and more demanding about technology. In response, China's high-tech firms have been accelerating their new product development and initiating more joint high-tech new product development projects (Fang, 2011, p. 159). Consequently, this setting helps to elucidate how sensing capability can help translate the benefits of social capital into enhanced product innovativeness and greater speed to market for a high-tech firm in an emerging market.

The remainder of the article is organized as follows: First of all, literature on the RBV, social capital and new product development, and sensing capability is reviewed and several hypotheses are put forward. Then, the research methods and data collection procedures are described. After that, hypotheses are tested using a sample of 102 high-tech firms in China. Structural equation modeling technique with bootstrap tests is used to perform data analysis. In the end, findings are discussed and both theoretical and practical implications are offered.

2. Theoretical background and hypotheses

2.1. The resource-based view

The resource-based view (RBV) suggests that valuable and rare resources are essential to firm competitive advantage and performance (e.g., Barney, 1991). This view regards a firm as a bundle of resources, and suggests that firms differ in their resources and these resources are imperfectly mobile. These resources include both tangible resources and intangible resources such as skills and proprietary technologies. Recent extension of the RBV takes into consideration resources residing in a firm's external network. It argues that "interconnected firm can extract value from resources that are not fully owned or controlled by its internal organization" (Lavie, 2006, p. 639). The assets and resources available through a firm's social relations can also, therefore, be key resources for competitive advantage and performance (e.g., Payne, Moore, Griffis, & Autry, 2011).

Some scholars of the RBV explicitly distinguish between resources and capabilities. They define resources as assets owned or controlled by the firm while capabilities are the ability to exploit those assets (Amit & Schoemaker, 1993). They also argue that resources can be conferred to competitive advantage only when they are properly leveraged (Peteraf, 1993). For example, Mahoney

and Pandain (1992) state that rents can be obtained by a firm "not because it has better resources, but rather the firm's distinctive competence involves making better use of its resources" (p. 365). Various firm capabilities have been highlighted as examples of such leveraging processes (Amit & Schoemaker, 1993; Russo & Fouts, 1997). More recent extension of RBV particularly singles out the importance of dynamic capabilities in rapidly changing markets. These dynamic capabilities reflect the abilities of firms to continuously alter their resources (e.g., Eisenhardt & Martin, 2000). In Barney and his co-workers' words, they are "capabilities that are dynamic" (Barney, Wirght, & Ketchen, 2001, p. 630). Sensing capability in this study is regarded to be such a capability.

2.2. Social capital and new product development

Social capital refers to the goodwill available to individuals or groups (Adler & Kwon, 2002, p. 23). The literature has articulated different dimensions or forms of social capital (e.g., Coleman, 1988; Nahapiet & Ghoshal, 1998). Social capital offers three key benefits: information, influence, and solidarity (e.g., Adler & Kwon, 2002; Coleman, 1988; Uzzi, 1997). Information benefit refers to the advantage of social capital in providing access to broader sources of information and improving information's quality, relevance, and timeliness. Influence benefit describes the benefit of social capital in allowing a firm to get things done and achieve its goals. Solidarity benefit is the encouragement of network members' compliance with local rules and customs and the reduction of the need for formal controls. In all these ways, social capital helps create a more efficient and safe environment potentially more conducive to knowledge access, transfer, and utilization.

This study focused on the relational and structural dimensions of social capital (Nahapiet & Ghoshal, 1998) manifested by trust and power respectively. The level of trust and power is normally sufficient to indicate the strength of the three key benefits of social capital. Trust facilitates the sharing of information (Wu, 2008) and the joint problem solving (Uzzi, 1997). Power is directly related to the other two benefits – influence and solidarity – in that it enhances partner compliance and reduces concerns about opportunistic behavior. Both help conserve a firm's cognitive resources, time and attention (Uzzi, 1997). Besides, the relational and structural dimensions have been the dimensions most frequently used in empirical studies (e.g., Moran, 2005), which are particularly relevant to the Chinese context (Tang, 2010).

Studies suggest that the realization of the benefits of social capital could bring favorable outcomes in product innovation. For example, a prior study of UK high-tech firms has revealed that social capital increases the number of new products through enhancing the effectiveness of knowledge utilization (Yli-Renko et al., 2001). Tsai and Ghoshal (1998) have found that social capital enhances product innovation through facilitating resource exchange and combination among business units. Furthermore, Rindfleisch and Moorman (2001) suggest that reciprocity and closeness between new product alliance partners can lead to positive new product outcomes by improving the efficiency of knowledge transfer and product development activities.

Previous studies also imply that social capital only provides a firm with the potential to access resources (including knowledge and information) residing in its external network (Portes, 1998). Social capital can become a hindrance for information utilization if over-embeddedness in social relations leads to inertia (Maurer & Ebers, 2006; Molina-Morales & Martinez-Fernandez, 2009; Uzzi, 1997). That would hinder the adaptation of new product development to a changing environment and the execution of new product development processes. Empirical studies have indeed confirmed that trusting relationships may not always be beneficial for knowledge utilization as they can cause relational

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