Industrial Marketing Management 41 (2012) 469–480

Contents lists available at ScienceDirect

Industrial Marketing Management

The effect of strategic alliance resource accumulation and process characteristics on new product success: Exploration of international high-tech strategic alliances in China ☆

Chaoqun Ma [a], Zhi Yang [a,*], Zheng Yao [a], Greg Fisher [b], Eric (Er) Fang [b]

[a] School of Business Administration, Hunan University, Changsha, 410082, PR China
[b] College of Business, University of Illinois at Urbana-Champaign, United States

ARTICLE INFO

Article history:
Received 23 June 2010
Received in revised form 18 March 2011
Accepted 25 March 2011
Available online 5 May 2011

Keywords:
New product performance
Marketing resources
Technology resources
High-tech alliances

ABSTRACT

This paper examines two research questions: (1) how do strategic alliance resources influence new product outcomes, and (2) how do these effects differ under different NPD process characteristics. By integrating resource-based view and coordination literature, the authors argue that both marketing and technology resources demonstrate independent and interactive effects on new product innovativeness, speed to market, and market performance. Further, the individual effects of marketing and technology resources are moderated by the process characteristics of partner interdependence, while the interactive effect between marketing and technology resources is moderated by the development process characteristic of task interdependence. Using primary dyadic data collected from 142 international high-tech strategic alliances in China, we test and find general support for these arguments. The results provide significant theoretical implications for a variety of research streams, as well as managerial implications for strategic alliances with Chinese firms.

The use of strategic alliances for new product development (NPD) has become prevalent in high-tech industries. A critical reason for engaging in strategic alliances for NPD projects is to access and combine both partner firms' resources in order to respond to the increasing pressure to develop innovative new products quickly (Gupta & Wilemon, 1996; Talay et al., 2009). Parallel to the rise of strategic alliances for NPD activities, an increased amount of research has begun to examine strategic alliances, with a particular interest in the resource creation and performance implications of NPD activities in the B2B strategic alliance context (Wittmann et al., 2009). This is an important avenue of research since new product success has a direct impact on a firm's continued survival and performance, especially in high-tech industries (Brown & Eisenhardt, 1995).

Prior research has provided evidence that factors such as functional diversity, customer inputs, NPD strategic orientation, knowledge management and external competition, among others, influence NPD success for industrial firms (for a detailed summary, see Griffin & Page, 1993; Krishnan & Ulrich, 2001; Zhang et al., 2009). While these prior studies have significantly improved our knowledge of NPD activities in strategic alliances, there is a need for greater understanding of the implications of strategic alliance resources on the eventual success of new products developed and launched by alliances (Talay et al., 2009). Strategic alliances are voluntary arrangements between firms, often aimed at accumulating resources and engaging in the co-development of products, services, and technologies (Emden et al., 2006; Gulati, 1998). More specifically, strategic alliances are a type of dynamic capability that provides the firm with external resources that otherwise would have been missing (Eisenhardt & Martin, 2000). Due to the critical role of resources in forming strategic alliances, the lack of research on how strategic alliance resources lead to NPD success is a significant gap in the research on alliances.

The objective of this study is to address this research gap by answering two related research questions: (1) how do strategic alliance resources influence new product outcomes, and (2) how do these effects differ under different NPD process characteristics. Specifically, we build the conceptual model using the resource-based view (RBV) and its offspring dynamic capability literature, as well as coordination literature, and empirically test the model using dyadic data collected from 142 international high-tech strategic alliances in China. By answering these two research questions, this study attempts to make the following theoretical contributions to the literature.

First, we take an approach in which the linkage between alliance-level resources and project-level NPD outcomes is contingent on how alliance resources are integrated between partners and across

☆ Supported by National Natural Science Funds for Distinguished Young Scholar (70825006), Program for Changjiang Scholars and Innovative Research Team in University (IRT0916), and National Natural Science Foundation of China (70572027).
* Corresponding author.
E-mail addresses: cqma@hnu.cn (C. Ma), yangmkt@126.com (Z. Yang), Ce2701@126.com (Z. Yao), Fisher29@illinois.edu (G. Fisher), erfang@illinois.edu (E.(E.) Fang).

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doi:10.1016/j.indmarman.2011.04.001

different stages, and on how they are actually deployed in NPD activities. Specifically, we combine the coordination literature with the resource-based view (RBV) to suggest that the integration and deployment of alliance resources in NPD activities hinges upon characteristics of the NPD process and the coordination mechanisms adopted by the alliance (Gerwin 2004; Lawson et al., 2009; Terwiesch & Loch, 1999). By doing so, we echo the statement by Lewis et al. (2002) that neglecting to examine the effects of project characteristics can jeopardize our understanding of the resource integration and deployment process for developing successful new products.

Second, RBV has been the primary framework used to address the performance implications of a firm's resource endowments (e.g., Barney 1991; Mahoney & Pandian, 1992). While RBV has been focused primarily on firm-level outcomes such as financial performance and competitive advantage, its rich theoretical underpinnings also can be extended to explain project-level outcomes, such as new product success (Lee & Chen, 2009). This paper extends RBV to understand how alliance-level resources can influence project-level NPD outcomes. Thus, our theoretical development combines alliance-level resource endowments with project-level characteristics to form a more comprehensive model of the NPD process in strategic alliances.

Third, prior research has implicitly assumed that the effects of a strategic alliance's marketing and technology resources on strategic alliance performance outcomes are positive and linear (e.g., Song et al., 2005). In this study, we extend this prior research and argue that the effects of a strategic alliance's marketing and technology resources on NPD outcomes are more complex than a simple positive linear relationship. Based on the literature on resource exploration and exploitation (Li et al., 2010; March, 1991), we suggest that these positive effects are not linear, but have diminishing marginal returns. Furthermore, we argue that the effects of alliance resources on NPD outcomes are not independent. Rather, our theory suggests an interaction effect among different functional resources, specifically between marketing and technology resources. Empirical tests of these relatively under-researched relationships enrich our understanding of the complexity of the effects of resources on outcomes, such as NPD success, a core linkage in the RBV framework.

Finally, previous studies on NPD have tended to focus on market performance as the primary success measure for NPD projects, which has limited the theoretical completeness of our theories of NPD. As suggested by Atuahene-Gima and Li (2004), market performance is not the only desired outcome in the NPD process; there are other equally important aspects of NPD performance, particularly product innovativeness and speed to market (Barczak et al., 2009; Bayus, 1997; Parry et al., 2009). Moreover, firms are particularly concerned with managing the information flow between employees and external sources to achieve innovation and shorter product development cycle times (Lancioni & Chandran, 2009). We address this omission in the current study by examining new product market performance, as well as new product innovativeness and speed to market. Product innovativeness refers to the extent to which the product differs from competing alternatives in a way that is meaningful to customers, reflecting "meaningful uniqueness" (Dewar & Dutton, 1986; Sethi et al., 2001). New product speed to market is defined as the time elapsed between initial development, including the conception and definition of an innovation, and ultimate commercialization, or the introduction of a new product into the marketplace (Kessler & Chakrabarti, 1996). In high-tech industries, these two NPD outcomes are particularly salient (Atuahene-Gima, 2003; Brown & Eisenhardt, 1995; Kessler & Chakrabarti, 1996). High-tech industries tend to be characterized by rapid product obsolescence and a high rate of new product introductions (D'Aveni, 1994). Rapid product obsolescence requires firms not only to bring new products to market quickly, but to develop new products that are more innovative than the products of their competitors.

1. Theory and hypotheses

1.1. Strategic alliances resources and NPD success in high-tech industries

The resource-based view (RBV) holds that resources can enable a firm to be flexible and improvise, thereby improving the effectiveness of its strategic business processes, including NPD (Cheng & Kesner, 1997; Moorman & Miner, 1997). RBV further suggests that the competitive advantage of a firm depends not only on its available resources, but also on the capabilities to integrate these resources and leverage the full potential of its technological processes (Mahoney, 2005). In this manner, RBV has been extended by the complementary literature on dynamic capabilities and alliances. Dynamic capabilities are "specific strategic and organizational processes like product development, alliancing, and strategic decision making that create value for firms within dynamic markets by manipulating resources into new value-creating strategies" (Eisenhardt & Martin, 2000). These capabilities emphasize the firm's role in utilizing both internal and external "skills, resources, and functional competencies to match the requirements of a changing environment" (Teece et al., 1997). In particular, alliances are a dynamic capability that a firm can leverage to access new marketing and technology resources, which in turn create the firm's competitive advantage (Mahoney, 2005). Thus, dynamic capabilities include alliance routines that provide the firm with external resources that otherwise would have been missing (Eisenhardt & Martin, 2000).

The NPD process is a related, specific dynamic capability that integrates varied resources to achieve competitive advantage and create value-producing products and services (Eisenhardt & Martin, 2000). In the case of strategic alliances, NPD success is driven by the type and quantity of resources contributed by alliance partners, and how these resources are integrated and deployed in the NPD process (e.g., Gatignon & Xuereb, 1997; Kotabe & Swan, 1995; Smith et al., 2005; Verona, 1999). Resource endowments in strategic alliances are more complex than in a single firm because strategic alliances provide opportunities for accumulating resources contributed by both alliance partners to improve the alliance's overall marketing and technical skills, which contribute to NPD success (McGee et al., 1995; Park et al., 2002). Further, dynamic capabilities include the ability to achieve new forms of competitive advantage, especially when time-to-market is a critical factor of innovation in rapidly changing environments (Teece et al., 1997). High-tech industries are characterized by rapid environmental changes and demands for innovation speed.

Based on RBV, and given that NPD is a cross-functional process that spans marketing and technology (Atuahene-Gima & Evangelista, 2000; Brown & Eisenhardt, 1995), we examine two constructs that contribute to strategic alliance NPD success: marketing resources and technology resources. *Marketing resources* reflect the accumulated marketing resource stocks contributed by both alliance partners in areas such as building relationship with customers and channel members, collecting market information and analyzing customer needs and preferences (Day, 1994). Similarly, *technology resources* reflect the accumulated resource stocks contributed by both partners in areas such as research and development, industrial design, and engineering management. Here, resources include both tangible and intangible resources. Tangible resources include elements such as specialized development tools, information technology, and equipment. Intangible resources include employees' knowledge and skills in the implementation of specialized tasks (Grant, 1996; Kogut & Zander, 1992).

However, the marketing and technology resources only provide the *potential* to improve the NPD process. The total pool of resources available is not equivalent to the amount of resources an alliance has employed for an NPD project, a fact recognized by Penrose (1959). For example, knowledge complementarity is a key influence on the dynamic accumulation of knowledge resources (Helfat, 1997).