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Behavioral implications of absorptive capacity: The role of technological effort and technological capability in leveraging alliance network technological resources

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ABSTRACT

This paper focuses on the moderating role of a firm's absorptive capacity in realizing innovation benefits from the firm's alliance network technological resources. We conceptualize absorptive capacity along two dimensions—technological effort and technological capability—and hypothesize that these two dimensions have opposing moderating effects which can result in theoretical and empirical misspecifications if ignored. We argue that firms with higher technological efforts have greater motivation to search for knowledge from their alliance partners, place more value on the external knowledge and mobilize such knowledge, and face lower internal resistance to assimilate and to use the knowledge. On the other hand, firms with stronger technological capability have lower motivation to search for knowledge from alliance partners, put lower value on the knowledge, make less intense efforts to mobilize it, and face greater internal resistance in assimilating and using the knowledge. By analyzing longitudinal data of 178 U.S.-based public semiconductor firms during 1988–2000 using negative binomial regression, we find that as firms increase their technological effort, the benefits from alliance network resources in terms of technological innovations come at a higher rate. In contrast, as technological capabilities of firms increase, the benefits from the alliance network resources in the form firm technological innovations come at a lower rate. We further discuss important theoretical and managerial implications of our findings.

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1. Introduction

While innovation is critical for firm growth and sustained competitive advantage, firms struggle to innovate due to lack of resources (Ahuja and Lampert, 2001). Research suggests that external resources stemming from a firm's alliance partners are helpful in overcoming resource constraints (Ahuja, 2000a) and that a firm's absorptive capacity (Cohen and Levinthal, 1990; Yu, 2013; Rostow, 1956) might be important in determining the firm's gain from its partners' resources. However, empirical findings on the moderating role of absorptive capacity in realizing innovation benefits from alliance partners are quite inconsistent. Some studies find a positive moderating effect (e.g., Yu, 2013; Tsai and Wang, 2008; Caloghirou et al., 2004), others find a negative moderating effect (Kim and Inkpen, 2005; Nooteboom et al., 2007), and still others find no effect (Kim and Inkpen, 2005; Mowery et al., 1996). Despite such inconsistent findings, surprisingly, the inconsistency has received little attention in the literature.

Similarly, while some literature suggests that recognizing the value of external knowledge and applying external knowledge reflect two important aspects of a firm's absorptive capacity (Lane et al., 2006; George et al., 2001), limited research has examined if these different aspects have similar or differential

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effects on the relationship between alliance partners' resources and firm innovation. Failure to recognize differing aspects of absorptive capacity and their unique roles could lead to theoretical misspecifications and to empirical inconsistencies. In the light of these critical issues, this paper conceptually decomposes absorptive capacity and empirically examines how different aspects matter in leveraging technological knowledge from alliance partners in the pursuit of innovations. Specifically, we examine the following questions: (1) To what extent do resources possessed by a firm's alliance partners impact the firm's generation of technological innovations? (2) How do different aspects of absorptive capacity moderate the relationship between alliance resources and firm technological innovation?

The key to the second question is defining the dimensions of absorptive capacity. We conceptualize absorptive capacity along two key dimensions: "technological effort" and "technological capability" and argue that these dimensions of absorptive capacity operate in different ways and influence differently a firm's likelihood of benefiting from its alliance resources. We argue that these two dimensions, which are used often interchangeably (Nooteboom et al., 2007; Mowery et al., 1996) under the broader construct absorptive capacity and are assumed to operate similarly, in fact are conceptually very different and consequently differentially moderate the relationship between alliance partners' resources and firm innovation.

We suggest that a firm with a strong commitment for knowledge exploration, i.e., developed a broader base of knowledge through investments in research and development, would be more likely to recognize the value of external knowledge. Since recognition of the value of external knowledge is important for its acquisition (Todorova and Durisin, 2007), we suggest that this aspect of absorptive capacity would be very helpful for the firm to leverage external knowledge in its pursuit of technological innovations. The valuing dimension relates to motivation to learn. Firms that are more motivated to search for external knowledge would identify and value more alliance network knowledge and would make greater efforts to mobilize and internalize that knowledge and consequently reap greater benefits from their alliance network resources. On the other hand, the technological capability dimension which reflects the firm's ability to apply external knowledge (Lane et al., 2006) is important for leveraging knowledge for innovation, but we suggest that such capability serves to limit the firm's motivation to reach out and acquire external knowledge (Kim and Song, 2007; Song and Shin, 2008). Such capability would make firms more inwardly focused (Song and Shin, 2008), would limit their willingness to search, value, and mobilize alliance network knowledge, and would increase internal resistance towards assimilation of external knowledge. Consequently, strong technological capability would reduce actual realization of the potential provided by the external knowledge. We therefore propose that this dimension of absorptive capacity negatively moderates the effect of alliance partners' resources on firm innovation.

We test our hypotheses using negative binomial regression on a sample of 178 U.S.-based public semiconductor firms during 1986–2000. Results demonstrate that a firm's likelihood of generating technological innovation increases with increase in technological resources in its alliance network. The benefits from alliance network resources become more pronounced with increase in the firm's technological effort or the recognizing and valuing dimension of its absorptive capacity. However, benefits from alliance network resources are lower with increase in the firm's internal technological capability or the use dimension of its absorptive capacity. By focusing on the direct and contingent effects of alliance network resources, our study demonstrates how and when external resources improve a firm's innovativeness. Our examination of different dimensions of absorptive capacity and their differential moderating roles provides a finer-grained analysis of absorptive capacity and underscores the need for unpacking the absorptive capacity construct in future research.

2. Theory and hypotheses

2.1. Role of alliance network resources

In the context of this paper, alliance network resources refer to the sum of the technological resources possessed by the focal firm's entire set of direct partners. When a firm's partners are rich in technological resources, the firm's potential pool of resources is greatly enhanced and the firm could choose from a range of resources available from these partners. We contend that a firm's alliance network imbued with higher technological resources greatly increases the firm's exposure to new technologies and provides the firm opportunities for effectively reaching out to take advantage of knowledge residing in its alliance network (Phelps, 2003). Moreover, such ties provide inter-firm resource-sharing mechanisms, promote engagement in co-development tasks (Schilling and Phelps, 2007), and offer opportunities to incorporate and recombine knowledge assets from multiple partners and create new knowledge (Kogut and Zander, 1992).

These advantages from alliance network resources help the focal firm to successfully pursue more innovations for several reasons. First, because of its relationships with partners that are rich in technological resources, the firm is more likely to be exposed to new ideas, projects, and technologies that reside with its partners. Exposure to various ideas and technologies of partners encourages divergent thinking and can generate more creative solutions necessary for sustained innovations. Second, due to greater availability of technological resources, the focal firm has more opportunities to combine a variety of resources of the partners (Lavie and Rosenkopf, 2006). Technologically active partners are likely to be more willing to commit resources and thus enable the firm to undertake more risky and technology-intensive projects needed to pursue innovations. Further, the availability of more technological resources in the alliance network is likely to help the firm cope with internal inertia, which is often an important barrier in the innovation process.

Overall, when the volume of alliance network resources is high, the focal firm gets more opportunities to access and acquire such resources, could combine and exchange its resources with those of its partners, and create synergy out of such resource combinations. Availability of such resources and potential for resource combinations is likely to increase the focal firm's commitment to more innovations. Availability of larger volume of resources increases the chances of experimentation and exploration necessary for generating innovations. Based on