



## Multilateral R&D alliances by new ventures

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### ABSTRACT

We examine the antecedents and outcomes of new ventures' formation of multilateral R&D alliances. Our results show an inverted U-shaped relationship between market uncertainty and a new venture's likelihood of forming multilateral R&D alliances. Top management team's social capital and ventures' technological capabilities are critical for new ventures to identify and capture alliance opportunities. Moreover, our analysis reveals value creation effects of multilateral R&D alliances for new ventures despite the challenges and difficulties associated. We further show that the value creation effect is a function of the type of exchange relationship (i.e., net- vs. chain-based) in the multilateral R&D alliance and that governance structure moderates this relationship.

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### 1. Executive summary

For new ventures' survival and growth, the benefits from engaging in multilateral R&D alliances such as access to technical and market information and investment opportunities, can be crucial. However, significant amount of risk stems from the complicated design and governance associated with multilateral R&D alliances, which can be detrimental to the venture partners due to the possible loss of their valuable knowledge if not managed and protected carefully. Despite the importance and prevalence of multilateral R&D alliances in high-technology industries, our understanding remains restricted regarding why new ventures opt to take on the challenges and dive into the complicated cooperative relationship involving multiple partners and whether market value is created by multilateral R&D alliances for the venture partners. We draw insights from the resource-based view and transaction cost economics to study the antecedents and consequences of ventures' engagement in multilateral R&D alliances. Specifically, *why and how do new ventures form multilateral R&D alliances? Do multilateral R&D alliances create market value for new ventures? And how does the value creation effect vary across different types of multilateral R&D alliances for new venture partners?*

Our analyses of a sample of 346 new ventures in the high-technology industries from 1990 to 2005 reveal interesting findings. Regarding the antecedents of new ventures' engagement in multilateral R&D alliances, our results reveal a curvilinear relationship between market uncertainty and new ventures' formation of multilateral R&D alliances. This finding implies that ventures' capability of managing complicated exchange relationships such as multilateral R&D alliances may not match up with their strategic need for these alliances. This finding also underlines the enhanced concerns by new ventures of losing core technologies and the ventures' restricted capability of managing and implementing multilateral R&D alliances. When examining new ventures' abilities to identify and seize alliance opportunities, we find social capital held by top management team and ventures' technological capabilities are important predictors of new ventures' formation of multilateral R&D alliances. This finding enriches and extends our understanding of new ventures' alliance formation from a bilateral context to a multilateral context. Regarding the consequences of new ventures' engagement in multilateral R&D alliances, our analyses confirm the value creation effects of multilateral R&D alliances for new ventures

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despite the challenges and difficulties associated. Moreover, considering the organizational complexity involved in multilateral alliances, we show that chain-based multilateral R&D alliances generate more value for their venture partners than net-based ones and that equity-based governance structures can alleviate the negative effect of net-based exchange relationship and improve value creation.

Several practical implications can be inferred from the findings. First, for new ventures in high-technology industries seeking to survive and grow, the results underscore the importance of developing strategic alliances with multiple partners to access social, technical and financing resources that typically take years to accumulate. Second, the exposure of ventures' core technologies to multiple partner firms can be intimidating and risky, and thus represents the dark side of multilateral R&D alliances. The complicated exchange relationships in multilateral R&D alliances require greater alliance management capability by ventures in order to capture the value of such alliances while protecting themselves from being appropriated. Third, venture managers can take precautions by adjusting alliance governance structure according to the types of exchanging relationships (chain vs. net) among the multiple partners involved, in order to guard the venture's valuable technological assets.

## 2. Introduction

While scholars have studied the benefits and risks of bilateral alliances for new ventures, the antecedents and consequences of ventures' engagement in multilateral R&D alliances are under-researched. As a widely dispersed organizational form,<sup>1</sup> multilateral alliances offer partner firms access to complementary resources, market information, and investment opportunities (e.g., Mitchell et al., 2002; Sakakibara, 2002; Yin and Wu, 2003). These benefits can be critical to venture survival and growth. However, significant amount of risk stems from the complicated alliance design and governance associated with multilateral alliances (Doz and Hamel, 1998). If not managed and protected carefully, valuable knowledge owned by new ventures can be appropriated. There has been a great deal of research on new ventures' involvement in alliances in organization theory (e.g., Alvarez and Barney, 2001; Arino et al., 2008; Deeds and Hill, 1996; Gomes-Casseres, 1994; Larson, 1992; Stuart et al., 1999) and increasing amount of research on multilateral alliances from the incumbents' perspectives (e.g., Das and Teng, 2002; Lavie et al., 2007; Li et al., forthcoming). Yet, our understanding of why new ventures opt to take on the challenges and dive into the complicated cooperative relationship involving multiple partners and whether market value is created by multilateral R&D alliances for the venture partners remains restricted.

In this study, we tackle two sets of important questions. First, *why and how do new ventures form multilateral R&D alliances?* Prior research has recognized that, to form alliances, new ventures must have strategic needs for and social opportunities to cooperate (Eisenhardt and Schoonhoven, 1996; Roijakkers and Hagedoorn, 2006). Following the literature, we argue that strategic needs for and opportunities to cooperate affect new ventures' formation of multilateral R&D alliances. Considering ventures' liabilities of newness and frequently smallness (Stinchcombe, 1965) and the generalized exchange relationships featuring multilateral alliances (Ekeh, 1974), we hypothesize curvilinear relationships between market conditions (competition and uncertainty) and new ventures' formation of multilateral R&D alliances. We also propose positive relationships between social and technological opportunities for new ventures and their engagement in multilateral R&D alliances.

We then examine the value creation by multilateral R&D alliances for venture partners. The second set of research questions are: *do multilateral R&D alliances create market value for new ventures? And how does the value creation effect vary across different types of multilateral R&D alliances for new venture partners?* Most prior studies on alliance formation reported that alliance announcements on average are associated with market value creation and that the magnitude of the value creation varies with the characteristics of partner firms, industries, and alliances *per se* (e.g., Anand and Khanna, 2000; Das et al., 1998; McGahan and Villalonga, 2005; Reuer and Koza, 2000). We argue that cooperation with multiple partners offers ventures access to market, technology, and/or investment opportunities and therefore creates market value for new ventures. Moreover, considering the complicated exchange relationship among partners in a multilateral alliance, we argue that the value creation effect is a function of the type of exchange relationship (i.e., net- vs. chain-based) in the multilateral R&D alliance. Multilateral R&D alliances vary with respect to challenges and risks to partner firms (Li et al., forthcoming), which affects the amount of value derived from these alliances. We further investigate the moderating effect of governance structure on this relationship.

The resource-based view and transaction cost economics are the theoretical foundations for the issues we examine. These two theories juxtapose alliance benefits and costs and are the main theoretical frameworks adopted in the alliance literature (Beamish and Kachra, 2004). Arguments on the benefit side of multilateral alliances typically are grounded in the resource-based theory (for both resource exploration and exploitation) (e.g., Das and Teng, 2000; Dussauge et al., 2000; Shenkar and Li, 1999); arguments on the cost side usually are rooted in the transaction cost economics theory (e.g., Parkhe, 1993; Poppo and Zenger, 2002; Reuer and Arino, 2002). As noted by Beamish and Kachra (2004), "it is an empirical as much as a theoretical question whether the potential benefits of better resources offset the costs of managing [the] complex organization form" of multilateral alliance (p. 109). While both theories offer insights regarding multilateral R&D alliances, either of them alone is unlikely to enable us to develop a relatively accurate picture of the formation and implementation of multilateral R&D alliances. Therefore, we adopt the resource-based view and transaction cost economics as complementary perspectives in examining our research questions.

Our study is organized as follows. First, we define multilateral alliances to delineate the boundary of our study. Second, we draw insights from the resource-based view and transaction cost economics to develop hypotheses regarding the antecedents and consequences of multilateral R&D alliances and their value creation effects for new venture partners. Third, we conduct the analyses of 346 high-technology new ventures from 1990 to 2005 to test our hypotheses. Results show strong support for arguments

<sup>1</sup> Prior studies have reported the percentage of multilateral alliances ranging from around 30% (e.g., Gulati, 1995; Gulati and Singh, 1998) to over 50% (e.g., Garcia-Canal, Valdes-Llaneza and Arino, 2003; Makino and Beamish, 1998), in multiple industries and countries.

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