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# Joint venture research and development activity: an analysis of the international biotechnology industry

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## Abstract

The research question we investigate is under what conditions will joint ventures engage in research and development (R&D) activity within the context of a global, high-technology environment. To explore this question, we examine the collective impact of initial conditions that influence the presence of R&D activity among joint ventures (JVs) formed in the global biotechnology industry. Our investigation is driven by two streams of research in joint ventures: transaction costs and initial conditions. Specifically, we examine whether business relatedness, cultural relatedness, country risk, and prior joint venture experience are related to R&D activity in joint ventures. Our results show that cultural relatedness and country risk factors do matter when it comes to R&D activity in biotechnology joint ventures. On the other hand, business similarities and prior JV experience between the parents do not seem to be as important as one might expect.

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## 1. Introduction

There has been a proliferation of theoretical and empirical research in the area of strategic alliances spanning strategy, entrepreneurship, organizational theory, economics and sociology. This interest reflects the fact that alliances are an integral part of competitive strategy in many industries (Gulati et al., 2000). Technological advances and globalization create the

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need for interfirm cooperation in order to stay competitive. A major finding from the literature on strategic alliances is that research and development (R&D) intensity and the level of sophistication of any particular industry are positively correlated with the intensity and number of alliances in those industry (Powell et al., 1996). This fact highlights the rapid pace of knowledge development in technologically dynamic industries and the need for firms to acquire knowledge and complementary assets from outside the organization in order to stay competitive. Collaboration is a critical component of technology strategy in these industries.

Joint ventures (JVs) represent a particular type of alliance that involve two or more partners forming a separate company. These are equity arrangements and as such, signify a substantial commitment on the part of each partner in terms of financial, technical and human resources. Although the rationale for a joint venture can extend along any activity on the value chain, joint ventures that involve R&D activity may be particularly risky strategic investment (Harrigan, 1985; Kogut, 1988). Appropriation of specific knowledge or people could result in the loss of a competitive advantage. This is in addition to the already difficult organizational issues such as personnel transfer and usage, information technology sharing and corporate culture clashes. Consequently, although collaborating may be necessary in technology-intensive industries, it is also dangerous. The complications of joint ventures are magnified in international settings in the face of different cultures and political environments.

Prior research, both theoretical and empirical, has addressed the motives for strategic technology partnering (see Hagedoorn, 1993, for a comprehensive review). Some of the motives already identified in the literature are the following: the increased complexity and intersectoral nature of emerging technologies, technological synergies, access to scientific knowledge, complementary technologies, reduction and minimizing of uncertainty in R&D, capturing a partner's tacit knowledge and technology transfer.

To the extent that prior empirical research has established a set of strategically motivated variables stemming from scientific and/or technological characteristics of companies, we extend this literature by exploring other strategically important but not yet tested variables in the context of global R&D joint venture formation. Whereas we acknowledge the magnitude of the firm-specific variables that influence the decision to engage in R&D based joint ventures such as complimentary capabilities and nature of existing capabilities that have been the subject of prior research, our study adds to the literature by examining other equally relevant variables that may be associated with R&D joint venture formation.

Two research streams in the alliance literature drive our investigation: transaction costs (Williamson, 1979) and initial conditions or coevolutionary theory (Koza and Lewin, 1998). Our model suggests that business relatedness, prior partner experience, cultural relatedness (distance) and political risk represent critical variables in the decision to participate in these cooperative efforts. We test this model in a technologically dynamic industry characterized by numerous alliances—biotechnology.

This study contributes to the alliance literature by examining variables that are related to the decision to engage in R&D joint venture formation that have not been previously investigated within the context of a global high-technology environment. Prior research on alliances has investigated the performance implications of alliances (Baum et al., 2000; Shan et al., 1994; Stuart et al., 1999), knowledge flows among partners (Kogut, 1988; Mowery et

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