

Technological flows and choice of joint ventures in technology alliances

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Abstract

This paper analyses the influence of technological flows in the choice of joint ventures as a governance form of technology alliances, using a theoretical framework based on Transaction Costs Economics and the Economics of Intellectual Property Rights. We argue that the formation of a joint venture is only necessary in situations for which technological flows make the monitoring of alliance activities and the distribution of cooperation rents difficult. Our hypotheses have been confirmed using a sample of technology alliances created by companies from the European Union between 1992 and 1999.

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1. Introduction

The R&D boundaries of the firm, i.e. the governance choices in the R&D process, constitute a mainstream topic in the fields of technology and strategic management (Pisano, 1990, 2006; Oxley, 1997; Veugelers and Cassiman, 1999; Arora et al., 2001; Arora and Merges, 2004; Tallman and Phene, 2006). Many papers have studied this issue, whose importance has been rising due to the growing trend to use external sources of technology (von Hippel, 1988; Nooteboom, 1999). In effect, technological change and global competition have forced firms to search for external sources of knowledge through a wide diversity of alliances (Hagedoorn and Osborn, 2002). In fact, firms are also looking for external sources for specific R&D services, even from emerging countries

(UNCTAD, 2005). Thus, the R&D process that was once performed in house is now organized through a network of technological alliances in order to reap the benefits of complementary skills and fast product development (Rothaermel and Deeds, 2004; Colombo et al., 2006). Given this proliferation of technological alliances, their effective governance becomes a key factor in designing a technology strategy.

The identity of the main drivers behind the use of joint ventures (henceforth JVs) as a governance form in technology alliances is a puzzling question, still not fully understood despite research carried out by Pisano (1989), Osborn and Baughn (1990), Gulati (1995), Oxley (1997), Colombo (2003), and Sampson (2004). The literature on contractual form in strategic alliances shows that JVs are an appropriate governance form for dealing with complex alliances (García-Canal, 1996; Colombo, 2003) and those entailing high appropriability hazards (Oxley, 1997). By setting up an administrative hierarchy as well as a basis for distributing the rents of the cooperation, JVs can protect their partners from opportunism.

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Table 1
Previous empirical evidence of determining factors of the creation of JVs

| | Factors | Positive influence | Neutral effect (not significant) | Negative influence |
|------------------------------------|---|--|---|--|
| Functional domain of the agreement | R&D | Gulati (1995), Oxley (1997) ^b , Oxley (1999), Pisano (1989) ^c , Osborn and Baughn (1990), Gulati and Singh (1998) | Colombo (2003) | García-Canal (1996), Pisano et al. (1988) ^a , Rialp and Salas (2002) ^c , Casciaro (2003) |
| | Several functional areas | García-Canal (1996), Colombo (2003), Oxley (1997) ^b , Oxley (1999), Pisano et al. (1988) ^a , Pisano (1989) ^c , Rialp and Salas (2002) ^c , Oxley and Sampson (2004), Sampson (2004) | | |
| | Production | Casciaro (2003), Pisano et al. (1988) ^a , Tallman and Phene (2006) | | |
| | Technology transfer | | Pisano et al. (1988) ^a | |
| | Marketing | | Casciaro (2003), Pisano et al. (1988) ^a | Tallman and Phene (2006) |
| | License | | | Casciaro (2003), Tallman and Phene (2006) |
| Other domains of agreement | Supply | | Tallman and Phene (2006) | Casciaro (2003) |
| | Number of partners | García-Canal (1996), Colombo (2003), Croisier (1998) ^b , Oxley (1997) ^b , Oxley and Sampson (2004), Rialp and Salas (2002) ^c | Gulati (1995), Gulati and Singh (1998), Sampson (2004) | |
| | Number of products or technologies | Croisier (1998) ^b , Oxley (1997) ^b , Oxley (1999), Pisano (1989) ^c , Sampson (2004) ^d | Oxley and Sampson (2004) | |
| | Cooperation covers several countries | Croisier (1998) ^b | | García-Canal (1996), Oxley (1997) ^b |
| | Duration | Croisier (1998) ^b | | |
| | Interdependence | Gulati and Singh (1998) | | |
| | Diversification product/market | Rialp and Salas (2002) ^c | | |
| | Competitors | Rialp and Salas (2002) ^c | Oxley (1997) ^b , Colombo (2003) | Oxley and Sampson (2004) ^d |
| | International partners | Gulati (1995) | | Oxley and Sampson (2004) ^d |
| | Previous relationships | Colombo (2003) | García-Canal (1996), Oxley (1997) ^b , Oxley and Sampson (2004), Sampson (2004) | Gulati (1995), Casciaro (2003) ^d Gulati and Singh (1998) |
| Partners' characteristics | Partners' experience in alliance management | | Oxley (1997) ^b , Colombo (2003), Hagedoorn et al. (2005) | |
| | Companies' technological diversity | Sampson (2004) ^e , Colombo (2003), Hagedoorn et al. (2005) | | |
| | Reputation | | Sampson (2004) | |
| | Effectiveness of the intellectual property protection systems | | | Oxley (1999) |
| | Cultural distance | Hagedoorn et al. (2005) ^d | Oxley (1999) | |
| Domain of the alliance | Industry's technological intensity | Osborn and Baughn (1990) | | Hagedoorn and Narula (1996) ^a , Hagedoorn et al. (2005) |
| | Number of potential allies | | | Pisano (1989) ^c |

^a Bivaried tests.

^b Tests based on ordered logit model of three categories in which the JVs are the third category.

^c Minority shareholdings are grouped together with JVs.

^d Only partial evidence.

^e Relation in the shape of inverted U.

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