

## **Alliances With Competitors: How to Combine and Protect Key Resources?**

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### **Abstract**

Our study addresses two main questions: First, what types of alliances do firms tend to create when combining different kinds of resources? Second, what governance mechanisms do firms set up to coordinate and protect resources when they use them for different alliances? We examine 227 alliances between competitors in Asia, North America, and Europe. We first identify two types of alliances: scale alliances in which the partner firms contribute similar resources, and link alliances in which the partners contribute complementary resources. We find that firms contributing R&D and production resources tend to form scale alliances, while firms contributing marketing resources tend to enter into link alliances. We also find that firms are more likely to choose stronger protection mechanisms for link alliances, which create greater appropriation risks, while they tend to seek higher levels of coordination in scale alliances.

**Key Words:** Alliance, Resource, Appropriation, Governance, Protection, Transaction costs

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## **Creating and Protecting Resources: Formation and Governance of Scale And Link Alliances Between Competitors**

This study examines the formation of strategic alliances, with the goal of moving us toward a more general understanding of the relationship between two streams of strategy research. During the past two decades, two major themes concerning firm-specific resources have emerged within the field of strategy. First, since Nelson and Winter's (1982) and Wernerfelt's (1984) arguments revived and developed earlier insights from Edith Penrose (1959) and others, many strategy researchers have focused on the role of firm-specific resources in shaping a firm's competence. Second, building on Williamson's (1975, 1985) work concerning the appropriation risks associated with idiosyncratic resources, much research attention has focused on identifying mechanisms by which firms protect the value of their resources. Following Williamson (1999), we will refer to these themes as the governance and competence perspectives on strategy. The competence and governance themes have developed in parallel, with some attempts to integrate the arguments but, more often, with competence and governance researchers talking past each other. We attempt to bring together these themes by studying the types of resources and types of governance mechanisms that firms use when forming alliances with competitors in order to increase efficiency in their existing activities (scale alliances) or to expand into new activities or markets (link alliances).

On two key dimensions, concerning conceptual systemization and units of analysis, the two strands of research have different strengths and weaknesses. First, the two strands have proceeded with different emphasis on conceptual systemization and generalizability. Governance research has been relatively systematic. Williamson and those who have drawn on his insights have developed a cohesive logic that underlies the identification and protection of idiosyncratic resources (e.g., Williamson, 1991b). Competence research tends to be somewhat more fragmented. At this point, there is at least a partial consensus in the strategy field that resources exist and that they influence what firms do (e.g., Barney, 1986; Conner, 1991; Amit and Shoemaker, 1993). Many studies now use competence arguments as research motivations, sometimes by inferring the existence of resources and other times by explicitly operationalizing dimensions of resources (e.g., Mitchell, 1991; Henderson and Cockburn, 1994; Karim and Mitchell, 2000). Despite the common usage, though, there is little consensus about how to generalize the concept of resources or how to identify general influences of resources on

strategic action. On the systemization dimension, therefore, governance research has proceeded somewhat farther than competence research.

Second, the two strands have emphasized different units of analysis. Governance research has emphasized individual transactions as units of analysis, emphasizing contractual and organizational modes by which firms can protect the value of transaction specific assets that relate to particular exchanges. While this approach has offered conceptual clarity, the approach has also tended to under-emphasize the intertwined nature of many transactions, in the sense that firms often must make decisions that affect many exchanges, involving many different assets. Competence research, by contrast with governance research, tends to address more aggregated units of analysis, involving intertwined sets of physical assets and organizational systems that together provide key influences on what firms do and how they perform. Competence research often stresses the role of the firm in coordinating the development and use of firm-specific resources. With respect to units of analysis, competence research may come closer than governance research to many of the inter-twined strategic issues that firms face.

We attempt to bring together the competence and governance arguments to investigate how firms undertake a particular type of strategic action, alliances among competitors. We focus on two questions. First, what types of resources do firms tend to use for different types of alliances? Second, what governance mechanisms do firms use to create and protect resources when they use them for different alliances? We have three conceptual goals. First, we attempt to show that the nature of a firm's resources influences its strategy choices; in doing so, we build on competence research that offers elements of a general framework for identifying resources. Second, we attempt to demonstrate how incentives to create and protect firm-specific resources tend to influence managerial action. Third, at a more specific level, the study helps describe the multiple roles that alliances between competitors play in modern economies, as firms attempt to reinforce their strategic positions in their existing markets and expand throughout the world.

Studying alliances between competitors provides a suitable context for exploring issues that arise from competence and governance arguments. The competence view of the firm suggests that firms' competitive advantages derive from their preferential access to idiosyncratic resources, especially resources that stem from tacit knowledge-based routines (Penrose, 1959; Wernerfelt, 1984; Conner, 1991; Amit and Shoemaker, 1993). Although firms gain advantages from possessing idiosyncratic resources, strategists and organizational theorists dating to

Commons (1934), Coase (1937), Barnard (1938), Simon (1957), Richardson (1972), and others have long recognized that no one business can create all resources needed to prosper and grow. Authors in several research traditions argue that interfirm alliances provide a means of pooling resources held by different firms in order to exploit new business opportunities and to increase the efficiency of existing business activities. Collaboration is often an effective way of pooling resources that are subject to a high degree of knowledge-based market failure because interfirm collaboration helps facilitate ongoing interpersonal contact between the allied firms (Itami and Roehl, 1987; Mitchell and Singh, 1993, 1996; Gulati, 1998). Moreover, collaboration provides a means for firms to protect the value of their resources through financial and organizational safeguards against opportunistic behavior (Teece, 1986; Hennart, 1988; Bresser, 1988; Kogut, 1988; Jorde and Teece, 1990; Williamson, 1991a; Chi, 1994). At the same time, firms usually cannot fully protect their resources from appropriation by partners, because the same organizational and individual processes that help pool the firms' resources also tend to expose the resources to the partners (Zajac and Olsen, 1993; Sobrero and Roberts, 1996). Although firms can attempt to create credible bilateral commitments that align the resource coordination, creation, and protection incentives of the partners (Oxley, 2001), complete alignment is often impossible owing to the multiplicity of organizational and personal interactions and incentives that arise during the course of an alliance. Thus, collaboration provides a variety of potential benefits that stem from the combination of partner resources, as well as potential risks that firms will attempt to minimize by choosing the best available governance mechanisms.

Our empirical analysis examines 227 alliances between competitors in Asia, North America, and Europe between 1952 and 1996. The alliances include firms operating in the telecom-electronics, auto, aerospace, and other sectors. The industries in the sample tend to be oligopolistic, open to international trade, R&D intensive, subject to significant economies of scale, and globally competitive. Alliances in such industries offer a high potential for efficiency gains and expansion benefits, with few opportunities for limiting competition (Jacquemin, Buigues and Ilzkovitz, 1989; Millington and Bayliss, 1995).

## **Background and Predictions**

### **Assumptions and implications for alliances**

Table 1 reviews our basic assumptions. Williamson (1999) argues that a theory of the firm must specify five conceptual elements, including behavioral assumptions, units of analysis,

description of the firm, purpose of the firm, and efficiency criteria. Williamson also argues that conceptual arguments require empirical testing. We outline the assumptions and discuss their implications for alliances. We then attempt to test predictions that arise from the conceptual base in the empirical context of alliances between competitors.

\*\*\*\*\* **Table 1 about here** \*\*\*\*\*

Our behavioral assumptions include potential self-interest plus bounded rationality with firm-specific foresight. The implication for alliances of potential self-interest and bounded rationality is that alliance contracts are not self-enforcing, so that firms must organize alliances in ways that protect their resources as well as use other firms' resources and create new resources. We assume that economic actors have the capacity to look ahead and recognize opportunities and risks, but that a firm's experience shapes its foresight. This assumption of firm-specific foresight suggests that firms commonly recognize potential opportunities to gain efficiencies or expansion via alliances with other organizations, but that different firms will have different expectations about the potential outcome of an alliance. Because of different expectations, the allies may create asymmetric governance mechanisms.

Our fundamental unit of analysis is the routine, which closely relates to the concept of resources. Routines are identifiable patterns of activity embodied in human or capital assets (Nelson and Winter, 1982; Winter, 1990; Dosi, Marengo, and Fagiolo, 1996) and contain much of the knowledge of what a firm can accomplish (Hannan and Freeman, 1989). Routines consist of multiple related transactions that take place over time either within a firm or via interaction with external parties. Routines are often tacit, either because they are intrinsically uncodifiable or because they require the interactive participation of multiple people. Routines also tend to be co-specialized with other routines and to be embedded in broader organizational contexts.

Several routines combine together to create particular resources. Resources, which we view as synonymous with capabilities, are stocks of knowledge, skills, financial assets, physical assets, human capital, and other tangible and intangible factors (Wernerfelt, 1984; Grant, 1991; Amit and Schoemaker, 1993). Resources tend to be only semi-decomposable into their underlying routines, so that resources also provide relevant units of analysis, in addition to routines. In our discussion of alliances, we will emphasize the joint use of firms' resources as the purpose of alliances. We will refer to a resource typology that includes R&D, production, and marketing resources (Capron, Dussauge, and Mitchell, 1998). Firms create new resources by

creating new routines and recombining existing routines in novel ways. Resources and their underlying routines are often firm-specific and imperfectly tradable, owing to their tacitness, co-specialization and organizational nature.

The need for alliances arises from the imperfect tradability of routine and resources. Firms often need to ally with other organizations in order to extract value from under-utilized resources they possess, either through more efficient use of existing resources or by creating new resources. Allying firms may pool similar resources in order to gain greater efficiency, so long as increased economies of scale more than outweigh the governance cost of alliances. In addition, allying firms may wish to combine the routines that underlie different types of resources in order to create valuable new resources, again accounting for governance costs.

Our description of the firm and our view of the purpose of the firm involve assumptions concerning the role of the firm in governing resources. We describe a firm as a governance structure, where governance includes coordinating the use of existing resources, creating new resources, and protecting the value of resources. This view closely follows Coriat and Dosi (1998), who argue that a firm is a particular set of routines that result from the co-evolution between corporate patterns of knowledge distribution and mechanisms of governance. Governance mechanisms include formal and informal incentive and control systems, legal regimes, organizational structures, and corporate cultures (Argyres, 1996; Liebeskind, 1996). Governance mechanisms are often shaped by path dependency and local search, which arise from the tacitness, co-specialization, and organizational embeddedness of routines. In turn, the purpose of the firm is to economize on the combination of production and governance costs. Our approach implies that production costs are partly an endogenous outcome of firm-specific resources and governance mechanisms. That is, production costs vary with the nature of a firm's resources and the effectiveness with which a firm governs the use and creation of resources.

The alliance implication of our assumptions concerning the description and purpose of the firm is that a firm must create governance mechanisms for its inter-organizational activities. A firm's inter-organizational governance mechanisms must attempt to increase and protect the value of the firm's current resources, as well as create and protect the value of new resources (Child and Faulkner, 1998). Thus, the inter-organizational governance mechanisms need to address resource coordination to ensure efficient use of current resources and resource creation

to support expansion, as well as protection of the value of the resources that fall within the coordination and creation activities of the alliance.

Our efficiency criterion is of the best available value of current and future use of routines, by which we mean that a firm seeks the best available mechanisms to jointly protect and create resources. In this paper, our emphasis will be on factors that differentiate the types of resources that firms use for alliances that create either efficiency or expansion opportunities, along with the protection mechanisms that the firms use to protect the value of the resources.

Overall, our conceptual approach combines the protection emphasis of governance research with the coordination emphasis of the competence research. The key difference between our approach and transaction cost economics, which is the core theory of the governance approach, is that we focus on routines rather than individual transactions. In turn, this leads us to emphasize coordination and creation roles for governance in addition to a protection role. This dual emphasis on protection and creation credits the firm with a critical coordination role in both enhancing the value of existing resources and creating new resources. Our focus on routines as the fundamental unit brings our approach close to that of evolutionary economics (Nelson and Winter, 1982), with the primary difference being that we focus on relationships among firms in the use of resources rather than on independent search activities by single firms.

Our summary argument concerning alliances is that alliances provide opportunities for firms to pool imperfectly tradable resources in order to gain greater efficiency in the use of existing resources as well as opportunities to create new resources. The firms must create governance mechanisms that both combine the resources effectively and protect the value of the resources. The nature of the resources creates incentives to seek either efficiency or expansion benefits from the alliance. Some types of resources provide greater potential for efficiency gains, when a firm accounts for the governance costs of creating and protecting the resources as well as potential scale economies. Other types of resources provide greater opportunities for expansion gains, again accounting for governance costs. We will focus on two types of alliances (link and scale), two sets of resources (geographic and functional), and two sets of governance mechanisms (equity holdings and joint ventures). We first develop predictions concerning the types of resources that firms will tend to use for link and scale alliances. We then develop predictions concerning governance mechanisms that the firms will use to protect and create resources in the two types of alliances.

## **Formation of link and scale alliances**

Industry analysts and academic researchers report a growing incidence and importance of alliance activity among competitors for many purposes, including technology and product development, joint manufacturing, and market entry (Doz, 1996; Harbison and Pekar, 1998; Park and Russo, 1996; Sakakibara, 1997). Increasingly, researchers distinguish between two basic types of alliances between competitors, which we refer to as link alliances and scale alliances (Porter and Fuller, 1986; Hennart, 1988; Dussauge, Garrette, and Mitchell, 2000). The distinction between link and scale alliances arises from the symmetry or asymmetry of the partners' resource contributions to an alliance, which reflect different strategic purposes (Dussauge and Garrette, 1997). Scale alliances are partnerships to which partners contribute similar resources, while link alliances are partnerships to which partners contribute substantially different resources. Scale alliances allow firms to gain greater efficiency in their existing business activities, while link alliances allow firms to combine complementary resources in order to expand their business activities. This distinction is similar to Sakakibara (1997), who defines alliances in terms of cost-sharing and skill-sharing motivation. We define the concept of scale and link alliances on the basis of the similarity or difference in the resources that the partner firms contribute to the alliance. Empirically, we examine three types of resources, including R&D resources, production resources, and marketing resources.

Although a substantial literature addresses alliance formation (e.g., Harrigan, 1985; Teece, 1986; Contractor and Lorange, 1988; Hennart, 1988; Kogut, 1988; Oliver, 1990; Williamson, 1991a), this literature has not fully explored the strategic factors that differentiate incentives to ally with competitors for expansion or efficiency. In particular, it is not clear which resources firms tend to use for efficiency and expansion purposes when they ally with competitors or, in turn, how the firms govern the use of resources in link and scale alliances.

Although both scale and link alliances may create advantages for the allying firms, the nature of the advantages differ (Dussauge and Garrette, 1995). Because they are based on similar contributions from the partner firms, scale alliances produce significant economies of scale for collaborative activities, thereby allowing the firms to reduce excess capacity (Hennart, 1988). Such scale alliances can include joint R&D efforts, the joint production of a component or end product, or joint marketing of the allies' goods. Such scale alliances provide a way of avoiding, or at least postponing, mergers in industries undergoing strong concentration processes.



Link alliances, in contrast with scale alliances, combine complementary resources from the partners (Porter and Fuller, 1988). Link alliances include partnerships in which one partner provides market access to products that another firm developed, such that the two allies create a form of customer-supplier relationship. Therefore, link alliances create opportunities for the partnering firms to undertake immediate expansion within the current markets of one or other of the partners. In addition, link alliances create opportunities for firms to learn from their partners and to use this learning as the basis for future expansion beyond the scope of the alliance (Hamel, 1991; Khanna, Gulati, and Nohria, 1998; Dussauge, Garrette, and Mitchell, 2000). Link alliances sometimes involve joint manufacturing, as long as the other components of the value-chain remain distributed between the partners.

A central proposition of this paper is that partners will tend to use different types of resources in alliances, depending on whether the firms seek efficiency or expansion benefits from the alliance. In order to predict the relationship between particular types of resources and alliance types, we distinguish several dimensions of geographic and functional resources. Tables 2a and 2b list the resources, along with several control variables. We first discuss geographic resources, next turn to functional resources, and then outline several other strategic factors that might underlie the formation of scale and link alliances.

\*\*\*\*\* **Table 2a about here** \*\*\*\*\*

By geographic resources, we mean the resources that arise as a result of a firm's activities in different geographic home markets. A literature that focuses on distinctions among national innovation infrastructures (Nelson, 1991) suggests that firms based in different geographic contexts tend to develop differing resources. We use two aspects of geographic resources, including the parents' geographic origins and the alliance's geographic market.

We expect expansion incentives to be particularly strong for alliances involving firms with disparate national origins. Firms based in different countries can often combine different complementary resources in link alliances that draw on their different national environments to create expansion opportunities. In order to explore the impact of increasingly divergent geographic origins, we will distinguish empirically between parents from the same country, parents from different countries within a single continent, and parents from different continents.

**Hypothesis 1a.** Alliances between competitors with different geographic origins are more likely to be link alliances than scale alliances.

By contrast, we expect that alliances covering broader geographic markets will offer greater opportunities for economies of scale and thus will tend to be scale alliances. Broader market coverage offers a greater potential for efficiency gains which, in turn, requires greater business scale; this creates incentives for partners to pool similar resources within scale alliances in order to achieve efficient size. For example, global markets offer particularly strong opportunities for firms to increase efficiency by pooling similar resources and therefore favor the formation of scale alliances. In contrast, fragmented markets require access to locally-specific resources in order for firms to expand internationally, which, in turn, tends to lead to the formation of link alliances. We will distinguish empirically between alliances that sell goods within a single continent (few alliances in our sample limit their sales to a single country) and alliances that sell goods across multiple continents.

**Hypothesis 1b.** Alliances between competitors that provide sales coverage for broader geographic markets are more likely to be scale alliances than link alliances.

We now turn to functional resources. By functional resources, we mean resources that firms use for R&D, production, and marketing. Several typologies in the literature that has become known as the resource-based view of the firm suggest classes of functional resources. Amit and Schoemaker (1993) distinguish between R&D resources (technological resources, R&D resources, product development speed), manufacturing resources, and marketing resources (brand management, distribution channels, buyer-seller relationships, user base, customer service, business reputation). Similarly, Teece and Pisano (1994) and Teece, Pisano, and Shuen (1997) distinguish between technological resources, production resources, and customer-related resources. Chatterjee and Wernerfelt (1991) distinguish between R&D resources, production resources, and marketing resources. Three categories of functional resources stand out in these discussions, together encompassing the commercialization sequence of product development, production, and marketing. Capron, Dussauge, and Mitchell (1998) show that R&D, production, and marketing resources are particularly common targets for inter-business usage following business acquisitions, while Dussauge, Garrette, and Mitchell (2000) show that the three types of resources are important elements of alliance activity. In addition to functional R&D, production, and marketing resources, one might also investigate the complementary functions of general management and financial support (Barney, 1986; Teece, 1986; Chatterjee and Wernerfelt, 1991;

Teece, Pisano, and Shuen, 1997; Capron, Dussauge, and Mitchell, 1998). For this paper, we will focus on the three-part functional sequence of R&D, production, and marketing resources.

When competing firms ally, we expect scale efficiency incentives to be particularly strong for alliances that involve R&D or production resources. R&D resources may offer substantial opportunities for link alliances in order to expand, but such link alliances involving R&D resources would create appropriation risks when combined with a competitor's production or marketing resources (Hamel, 1991; Hennart, Roehl and Zietlow, 1999). Therefore, we expect firms to be reluctant to combine their R&D resources in link alliances with competitors. Instead, when forming link alliances, firms will often exclude R&D resources from the activities of the alliance and will contribute only outputs of their proprietary R&D resources, such as existing designs and previously developed products. In contrast, firms are most likely to pool R&D resources with a competitor in order to achieve greater scale, which has a longer-term commercialization horizon and lesser immediate risks. In addition, because all partners contribute R&D resources in scale alliances, the mutual hostage situation thus created limits opportunism (Oxley, 2001).

**Hypothesis 2a.** Competing firm alliances that involve R&D resources are more likely to be scale alliances than link alliances.

Production resources often offer opportunities for two or more firms to pool resources in order to achieve efficient size. Because of the extent of scale economies and experience effects in production, firms possessing under-utilized production resources will often form alliances with partners that contribute similar resources in order to achieve efficient size or reduce excess capacity. Therefore, we expect the efficiency potential created by alliances involving production activities to lead to the formation of scale alliances rather than link alliances.

**Hypothesis 2b.** Competing firm alliances that involve production resources are more likely to be scale alliances than link alliances.

We expect expansion incentives to be particularly strong for competing-firm alliances that involve marketing resources. Alliances involving marketing activities provide opportunities to expand by using one firm's marketing resources in order to sell goods based on another firm's development or production resources. Thus, marketing link alliances will often use one firm's marketing systems to sell the other partner's products, rather than combine one partner's

production or R&D resources with the other competitor's marketing resources in order to produce and market a new product specifically developed within the scope of the alliance.

**Hypothesis 2c.** Competing firm alliances that involve marketing resources are more likely to be link alliances than scale alliances.

To test hypotheses 2a to 2c, we will compare alliances that involve only a single functional resource to alliances that involve combinations of different types of resources. We expect the prediction to hold for alliances that involve only one type of resource. That is, we expect alliances involving only R&D or production resources to tend to be scale alliances, while alliances involving only marketing resources to tend to be link alliances.<sup>1</sup> We do not have uniform expectations concerning alliances that combine marketing resources with R&D and/or production resources. In such cases, it is possible that the market expansion incentives for link alliances may dominate or, conversely, that the R&D and production protection and efficiency incentives for scale alliances will dominate.

We will consider four other firm-level factors that also might underlie competitors' alliance formation. These four variables include asymmetric competitive strength, number of partners, year of formation, and prior alliance experience.

Competitive asymmetry is likely to favor link alliances, in which the partners attempt to create expansion opportunities. In link alliances, the firms seek partners with complementary skills and capabilities. Provided a partner possesses the needed skills, its relative size should not arise as an issue in link alliances. By contrast, if partners seek economies of scale, each partner will only agree to engage in the collaboration if the increased volume that the other partner contributes is large enough to produce savings that will outweigh the costs of governing the collaboration. In other words, it often is not worth while for a firm to engage in a scale alliance with a smaller partner, because the governance cost of collaborating will exceed the expected scale benefits. This argument is consistent with Hennart's (1988) transaction cost theory of joint ventures. The argument also corresponds to the view of Porter and Fuller (1986), who argue that partners that have dissimilar strengths and weaknesses tend to form X coalitions (link alliances).

**Hypothesis 3a:** Alliances involving competitors with asymmetric competitive positions are more likely to be link alliances than scale alliances.

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1 - Link alliances that involve only marketing resources are alliances in which one partner provides a marketing system and the other partner provides the alliance with an existing product that the firm produces itself.

Alliances with more than two partners are more likely to favor efficiency gains than to create expansion opportunities. Indeed, scale economies tend to increase with the number of partner firms involved in an alliance, thus creating incentives to form scale alliances. The very similarity in the partners' contributions tends to keep governance costs relatively low. In contrast, combining complementary resources of multiple partner firms becomes increasingly complex and increases governance costs, while, at the same time, the incremental contribution of each additional partner to the expansion potential of the alliance tends to decrease. Moreover, appropriation risks are likely to increase with the number of partners involved in the alliance. Therefore, we expect most multiple partner alliances to be scale alliances.

**Hypothesis 3b:** Alliances involving more than two partner firms are more likely to be scale alliances than link alliances.

The influences of the other two firm-level factors that might tend to favor either link or scale alliances, formation year and prior alliance experience, are ambiguous. Alliances formed in more recent years might tend to involve expansion, if popular perceptions about changes in alliance objectives are correct, but, alternatively, alliances have long been important to firm expansion so that there is no clear prediction. Allies with prior experience in alliances together might be more willing to undertake expansion opportunities together. Alternatively, experience might also lead to independent competition for expansion opportunities, so that prior experience might predict scale alliances rather than link relationships.

It would be desirable also to control for differential industry growth and concentration as influences on alliance formation, but the multi-period and multi-national scope of this study makes such measurement impossible. The focus of our argument is on firm-level issues, however, rather than on industry-level trends. Moreover, the industry variables help address differences across economic sectors, while the alliance founding year and geographic variables help address inter-period and inter-region differences.

In summary, the hypotheses address the tendency of competing firms to use geographic resources and functional resources for scale and link alliances. We expect that scale alliances among competitors will primarily involve R&D resources, production resources, broad geographic market coverage, competitors with similar competitive positions and multiple partners. We expect that link alliances will emphasize marketing resources, competitors with different geographic origins, and competitors with asymmetric competitive positions.

## **Governance mechanisms for protecting, coordinating, and creating resources**

Scale and link alliances tend to require different governance mechanisms. We expect the mechanisms to reflect the need to coordinate the use of existing resources in scale alliances and create new resources in link alliances, while also protecting the value of resources in either case. As we noted earlier, we will focus on resources as the analytic unit, subsuming the concept of routines within that of resources. We will examine two sets of governance mechanisms, including parent equity holdings and joint venture structures. The two governance choices have different implications for resource coordination, creation, and protection. Table 2b summarizes the variables and predictions.

\*\*\*\*\* **Table 2b about here** \*\*\*\*\*

Parent equity holdings arise as a means of protecting firms from opportunistic behavior by partners, because the firms either unilaterally or jointly can exercise a degree of ownership control over their partners (Geringer and Hebert, 1989; Gomes-Casseres, 1990; Harrigan, 1986; Hennart, 1991; Killing, 1983; Pisano, 1989). Firms have greatest need of such equity holdings in the case of link alliances, when they face greater uncertainty about the resources that alliance activities might create and about unwanted resource transfers. In scale alliances, by contrast, the ownership costs that equity holdings entail will often out-weigh protection value.

**Hypothesis 4.** Parent equity holdings will be more common in link alliances than in scale alliances.

By contrast with equity holdings, the formation of a joint venture, rather than simply undertaking a contractual relationship, may provide coordination and creation roles, as well as a protection mechanism. A joint venture provides a protection mechanism by giving the partners' direct influence over alliance activities via their financial stake in the joint venture (Williamson, 1983). A joint venture also provides coordination and creation roles by forming a focal entity to which the allies can direct their human resources and other assets for the alliance's efforts to combine their existing resources and possibly create new resources (Killing, 1983; Geringer and Hebert, 1989; Oxley, 2001). The coordination and creation roles can include both management of the use of the allies' resources and, in some cases, active functional use of the partners' resources in a joint venture facility.

It is not clear whether joint ventures will be more common for different types of alliances. Scale alliances require that the firms pool their similar resources and actively

undertake coordinated use of the resources in order to achieve greater scale efficiencies. A joint venture organization provides a mechanism for coordinating this joint use. Some link alliances, by contrast, may require less joint use of the allies' resources than in the case of scale alliances. Instead, the allies may often be able to use contractual relationships to govern the complementary use of their resources that the firms draw upon at different stages in the production process. The resource creation activities of such link alliances may then tend to take place within the parent firms, rather than within a joint venture entity. Nonetheless, many link alliances will require interaction among the partners in order to create resources, so that joint ventures might well be equally common for link alliances as for scale alliances.

Once one makes the first distinction between joint ventures versus contractual alliances, different forms of joint ventures provide insights concerning firms attempt to balance the protection, coordination, and creation incentives. Two variants of joint ventures are particularly interesting in this context.

The first variant concerns balanced and unbalanced joint ventures. Unbalanced joint ventures, which are joint ventures in which one partner has greater share of equity than other partners, provide the leading shareholder with greater resource protection than balanced joint ventures because the greater ownership share allows some degree of unilateral control. We expect unbalanced joint ventures to be common in the case of link alliances, in which concerns about losing the value of key resources to a partner are particularly strong. By contrast, firms will tend to use balanced joint ventures for scale alliances, to which firms contribute similar resources and need have less concern about appropriation by a partner.

**Hypothesis 5a.** Unbalanced joint ventures will be more common in link alliances than in scale alliances.

**Hypothesis 5b.** Balanced joint ventures will be more common in scale alliances than in link alliances.

The second variant compares integrative and sequential joint ventures. Integrative joint ventures are joint ventures that create a stand-alone alliance organization, while sequential joint ventures are ventures in which each partner carries out part of the alliance activities within its own facility and then passes that part on to its partner for further activity (Park and Russo, 1996). In an integrative joint venture, the joint venture organization has the potential to provide hands-on coordination and creation roles in the joint use of the firms' resources, while the joint venture

organization for a sequential joint venture coordinates only the establishment of legal and functional cooperation frameworks. Owing to the distinct organizational presence of integrative joint ventures, which blend personnel and other resources of the parents, such ventures provide greater opportunities than sequential joint ventures for the partners to combine their resources.

We expect sequential joint ventures to be particularly uncommon in link alliances. Sequential joint ventures provide only a coordinating organization, without providing a functional organization for resource creation. Link alliances are likely to rely on either contractual relationships or integrative joint ventures, rather than sequential joint ventures. Integrative joint ventures will be appropriate for link alliances in which the partners require active ongoing coordination of the combination of their complementary resources. Contractual alliances will be appropriate for link alliances in which the partners are more interested in learning from each others' resources than in undertaking joint combination, and can rely on individual-level coordination to achieve the desired learning. Moreover, sequential alliances involve the risk of creating a coordinating organization that may allow competitors to gain substantial access to resources that the competitors lack, and thereby risk appropriation of the value of the resources, without the benefit of providing a functional organization that can create new resources in which all partners will have an ownership share. Therefore, few link alliances will be sequential joint ventures.

**Hypothesis 6.** Sequential joint ventures will be more common in scale alliances than in link alliances.

By contrast, integrative joint ventures may arise for both scale alliances and link alliances. Scale alliances may use integrative joint ventures in order to achieve functional coordination of their similar resources and thereby obtain scale economies. As we noted above, link alliances may use integrative joint ventures in order to combine dissimilar and complementary resources in order to create new resources.

In summary, this section argues that different governance mechanisms address different elements of coordination, creation, and protection in the use of the resources that competing firms contribute to alliances. We argue that firms can at least partly achieve the joint needs of resource coordination, creation, and protection, counter to arguments that the goals tend to be opposed (e.g., Ghoshal and Moran, 1996; Sobrero and Roberts, 1996). Parent equity holdings emphasize protection mechanisms. Joint ventures provide coordination and creation mechanism,



but may also create appropriation risks, which will be particularly prevalent for link alliances. Balanced joint ventures and sequential joint ventures, which raise appropriation risks, will tend to be suited to coordination and pooling of similar resources in scale alliances. Unbalanced joint ventures, which provide protection mechanisms for one of the parents, will tend to be suited to the creation of new resources from recombination of complementary resources in link alliances. Integrative joint ventures provide opportunities to either coordinate the use of similar resources or create new resources from complementary resources. Empirically, we will also examine how combinations of the governance mechanisms align with scale and link alliances. It is possible that combinations of mechanisms that emphasize protection will tend to align with link alliances (e.g., parent equity holdings and unbalanced joint ventures), while combinations that emphasize coordination benefits for similar resources will tend to align with scale alliances (e.g., balance sequential joint ventures).

Overall, this paper focuses on how the functional and geographic resource scope of the alliances and parent firms distinguish competitors' strategic objectives to coordinate the use of existing resources and to create new resources. The predictions address the opportunities and risks that firms face when they form alliances with competitors. The study helps describe the multiple roles that alliances between competitors play in modern economies, as firms attempt to reinforce their strategic positions in their existing markets and expand throughout the world.

### **Data, Variables, And Statistical Methods**

We tested our hypotheses on a set of 227 alliances among competing firms in a range of manufacturing industries. We define strategic alliances as arrangements between two or more independent companies that choose to carry out a project or operate in a specific business area by coordinating the necessary skills and resources jointly rather than either operating on their own or merging their operations. The alliances in our sample include equity joint ventures as well as contractual partnerships that did not entail the formation of a separate legal entity.

The alliances in this study involved partnerships between competitors, that is, firms that operated in the same industries. We based industry categorization on descriptions of the alliances' business areas. The industry definitions approximate a three-digit to four-digit level in the U.S. Standard Industrial Categorization classification, although we did not use formal SIC-type classifications because of the international nature of the data and of inconsistencies and unavailability of different national classification systems. The most frequent industry in our

analysis is telecom-electronics (35 percent), followed by automobiles (29 percent), aerospace (19 percent) and a mixture of other industries, such as pharmaceuticals, medical devices, chemicals, and foods (17 percent). Business areas in the telecom-electronics cases included public switching equipment, PBX, radiotelephone equipment, mainframe computers, personal computers, consumer electronics, and semiconductors. Business areas in the auto industry cases included cars, trucks, engines, and transmissions. Business areas in the aerospace cases included commercial airplanes, military airplanes, airplane engines, helicopters, helicopter engines, missiles, and spacecraft. For each alliance, we checked secondary sources, industry analysts, and executives to determine that each partner had prior activities in the alliance business area.

The alliances in the sample involve partner firms from North America (U.S. and Canada), Western Europe (Sweden, Italy, Britain, Germany, France, the Netherlands, Spain, Switzerland, and Finland), or Asia (Japan and Korea) and entail operations in one of these three continental zones. We included only agreements that operated within at least one of the partners' home markets. Thus, we excluded agreements such as the General Motors-Toyota joint venture in Australia and the Autolatina alliance that Ford and Volkswagen formed in Brazil and Argentina. We also did not collect information on agreements concerning the supply of components and sub-assemblies from one manufacturer to another because such exchanges are closer to market transactions than to strategic alliances. In addition, we excluded government-sponsored research consortia, such as those sponsored by the European Commission and by MITI in Japan. The resulting data focus on strategic alliances that involve the partners' core businesses and markets.

Each data point in our sample corresponds to an agreement between two or more partners, covering a specific business area. For example, in aerospace we considered agreements involving commercial airplanes, military airplanes, airplane engines, helicopters, helicopter engines, missiles and spacecraft. Each alliance operates in one of the three above-mentioned geographic zones. To identify alliances in which reorganizations occurred, we categorized collaborative activities into four main functions, including R&D, manufacturing, assembly, and marketing. Each alliance corresponds to a specific allocation of R&D, manufacturing, assembly, and marketing activities among the partners. Thus, an alliance between an American and a European telecommunications equipment manufacturer by which they each agree to market one of the other's products in their respective home markets would include two cases: one in which

the European partner markets the American system in Europe, and a second in which the American partner markets the European system in North America.

We gathered the data for the study from secondary sources such as industry reports, publications of manufacturers' associations, and journals specializing in specific industries. Examples of the publications include *Automotive News* or *Aviation Week and Space Technology*. Reports of all the alliances in the sample occurred in published sources. Trade associations and private research institutes publish annual updates on alliances and collaborative ventures for the industries that account for a significant portion of our sample (automobile, aerospace, telecommunication), which makes it possible to trace alliance formation, reorganization, and termination on a yearly basis. In addition, when information necessary for our study was not available from these sources, we complemented the data by interviewing industry analysts and company executives. Park and Russo (1996) report using a similar supplementary interview approach to complement archival source data. To avoid perception biases, we relied on variables describing a factual event or situation, rather than using variables that reflected managers' opinions.

#### **Alliance formation variables and methods**

The dependent variable for the empirical analysis of alliance formation is the alliance type. We set a dummy variable equal to 1 for link alliances and 0 for scale alliances. To do this, we classified possible contributions to an alliance into three categories that distinguished between technical, production, and marketing activities: (i) research, technology development, and product design, (ii) manufacturing facilities and resources, and (iii) marketing and sales networks and resources. We then examined the respective contributions of each partner. When, based on the three categories, all the contributions of the partners overlapped, we considered a partnership to be a scale alliance. When, in at least one of the three categories, all contributions came from one partner, we considered a partnership to be of a link alliance. Two authors of this study each coded the variable independently. We then asked an industry expert to independently classify alliances in the automobile, aerospace, data processing, electronics, and telecommunication industries. After undertaking this process, we dropped eleven ambiguous cases because of conflicting coding. Table 3a reports summary statistics for the alliance formation variables.

\*\*\*\*\* **Table 3a about here** \*\*\*\*\*

We recognize that the routines that comprise resources within a common category will differ across firms. For instance, the routines that make up the marketing resources of one firm

will differ from the routines that make up the marketing resources of another firm. The differences among the routines thus provide an aspect of link alliance to all alliances among firms. However, an assumption concerning the alliance categorization is that the routines that comprise the resources within a common category are more alike than the routines that comprise resources in different categories. This assumption allows us to classify alliances that involve resources within common categories as scale alliances.

We defined several variables to address the predictions concerning alliance formation. We defined three dummy variables to denote alliance activities, based on whether the alliance involved R&D, production, and/or marketing activities. We considered a function to be within the scope of the alliance if the firms performed the tasks pertaining to this function as a direct element of the alliance's activities. For example, if firms formed an alliance to market an existing product in a new geographic zone, we considered the alliance to involve marketing but not R&D. If the alliance led to the development of a new product, then we considered its scope to encompass R&D. We defined several variables for geographic coverage of the alliance and the allies. We determined whether the market of the alliance covered Europe, Asia, North America, or a combination of these zones. Three variables denoted alliances, such as the Rover Honda and NUMMI alliances, that sold goods only within one continent. A comparison variable denoted alliances, such as Airbus, that also sold their output outside the continent in which the firms based the alliance. We defined four 0-1 dummy variables to denote partnerships involving parent firms from the same country, same continent, or different continents.

We defined several variables to address other formation factors, including multi-firm alliances, alliance founding year, competitive asymmetry, alliance experience, and industry identity. A 0-1 dummy variable denoted alliances that had more than two partners. We defined a variable to denote the calendar year in which the firms founded the alliance. We defined a variable to denote the competitive asymmetry of the partners. We operationalized the concept of asymmetry by comparing the sales of the partner firms in the industry in which the firms created the alliance. The asymmetry measure is appropriate because the alliance partners compete in the same industries and product lines, which we checked from secondary sources, industry analysts, and company executives. We considered a partnership to be asymmetric when, at the time the firms created the alliance, the sales in the focal industry of one of the partner firms were at least twice as large as the sales of the other partner. Franko (1971) and Ravenscraft and Scherer

(1987) used similar factors. The alliance experience variable noted whether two or more of the partners in an alliance had formed an alliance with each other within the ten years before the formation of the focal alliance. Finally, to address industry differences and to investigate alliances in the telecom sector, which is the largest sector in our data and has been particularly dynamic (Garrette and Quelin, 1994), we defined two 0-1 dummy variables to distinguish alliances set up in the telecom-electronics industry and in other sectors.

We used maximum likelihood binomial logistic regression to test the formation propositions. The logistic regression models took the form  $\text{Ln } P_i/(1-P_i) = bX_i$ . In this equation,  $P_i$  is the probability that alliance  $i$  will be a link or scale alliances. A vector of covariates  $X_i$  with coefficient vector  $b$ , including an intercept, linearly affects the log odds of the probability. The effect of a one-unit change of covariate  $j$  on the probability that an alliance will be a particular type is  $b_j P_i(1-P_i)$ . We used the logistic regression procedure of the SAS statistical package to obtain the estimates. Logistic regression provides a well-accepted technique for estimating the likelihood that discrete outcomes will occur.

#### **Governance mechanism variables and methods**

To test the governance mechanism predictions, we defined several dummy variables for parent equity holdings and the various types of joint ventures. An equity variable took a value of 1 if an alliance partner held equity in the other parent. A joint venture variable denoted if the alliance took the form of an equity joint venture organization. We distinguished between balanced and unbalanced joint venture ownership where, in the case of two partner alliances, balanced ownership corresponds to 50-50 joint ventures. We distinguished between integrative and sequential joint ventures (Park and Russo, 1996). Integrative joint ventures assign alliance manufacturing activities to a jointly owned joint venture facility. In sequential joint ventures, the firms allocate all activities to individual partners in a sequential path, with no joint operations within a separate joint venture facility. We also created two-way interaction terms among the governance mechanisms that had consistent direction for their single variable predictions to test for augmenting joint relationships among governance modes. We then used the alliance type (link or scale) variable that we described earlier as the independent variable for the governance analysis. Table 3b reports summary statistics for the governance variables.

\*\*\*\*\* **Table 3b about here** \*\*\*\*\*

We chose a correlation approach to test the governance mechanisms hypotheses. In this approach, we estimated correlation relationships between each governance mechanism and the alliance type variable. Each of the mechanisms represents a different outcome choice, so that a more complicated approach to the statistical analysis would require a large number of models. Moreover, we view link formation and governance as a two-stage process in which firms first chose an alliance type, depending on their strategic objectives, and then chose a governance mode that is appropriate for the type of alliance. That is, we view resource characteristics as the determinant of alliance type, with alliance type then determining governance mode. With this two-stage approach, the appropriate test of the governance hypotheses is to examine the simple relationships between alliance type and governance mode, rather than undertake a more complicated analysis in which alliance type and resource characteristics jointly determine governance mode. Indeed, such a multiple regression approach would entail endogeneity among the independent variables on the right hand side of the regression equations.

In summary, we have gathered data that is highly relevant to testing the hypotheses that we develop in this paper. The data include more than 200 alliances among competing firms from Europe, North America, and Asia, in several industrial sectors. The data provide operational measures of alliance types, resource characteristics, and alliance governance mechanisms. The sample supports the use of straightforward statistical techniques to test the hypotheses.

## **Results**

### **Alliance formation**

Table 4 reports the results of the alliance formation analysis. The results provide strong support for most formation hypotheses. The overall statistical fit of the models is reasonable, with pseudo R-square statistics (the proportion of the loglikelihood of a model with no covariates that the reported model explains) of 0.64.

\*\*\*\*\* **Table 4 about here** \*\*\*\*\*

The results in Table 4 are consistent with both geographic resource predictions. As hypothesis 1a predicted, allies with different geographic origins are most likely to form link alliances. The results apply to parents that have home bases on different continents, with similar results for intercontinental alliances involving Asian, European, and North American firms. The parent geographic dispersion result does not hold for parents from different countries within the

same continent, likely because there has been substantial diffusion of resources among countries within Europe and within North America.

As hypothesis 1b predicted, Table 4 shows that alliances with narrower geographic coverage tend to be link alliances. Alliances that limit coverage to only a single continent, whether the continent be Asia, Europe, or North America, are more likely to be link alliances, while alliances that provide market coverage beyond a single continent tend to be scale alliances.

The results in Table 4 are also consistent with the functional resource predictions. As hypotheses 2a and 2b predicted, firms are unlikely to employ R&D or production resources in link alliances. As hypothesis 2c predicted, firms tend to employ marketing resources in link alliances. The table also examines cases in which alliances involve more than one type of resource. The results show that the marketing influence towards link alliances tends to drive alliances that combine production and marketing resources. By contrast, alliances that combine all three types of resources tend to be scale alliances, likely because of the concern about R&D appropriation that arises in link alliances among competitors.

The results in Table 4 moderately support hypotheses 3a and 3b, concerning competitive asymmetry and number of partners. As expected, we find that alliances among partners with asymmetric competitive positions tend to be link alliances, although with only moderate significance. Similarly, alliances involving multiple partners tend to be scale alliances, with moderate significance.

The other factors in column 1a also reveal influences on alliance formation. Link alliances are less common in more recent years. Link alliances are also moderately less common when the partners have previous experience with each other. The telecom-electronics industry variable shows that link alliances are more common in that sector than in the other industries. The recent technical, market, regulatory, and competitive dynamics of the telecom-electronics sector appears to have driven a greater need for expansion-oriented link alliances, which provide opportunities to recombine resources and create new resources that attempt to respond to the rapidly changing environment.

Overall, the alliance formation results in Table 4 show that how firms apply geographic and functional resources has strong influences on the types of alliances that they form. Link alliances are most common with parents from different continents, with alliances that involve marketing resources, and with alliances among competitors with asymmetric competitive

strength. Scale alliances are most common for alliances with multi-continental market coverage and for alliances involving R&D or production resources.

### **Governance mechanisms**

Table 5 reports the governance mechanism results, showing the correlations between link alliances and the different governance mechanisms. The correlations provide support for most predictions, with some intriguing differences emerging across the industry sub-samples. As hypothesis 4 predicted, link alliances tend to associate with parent equity holding. We also find that joint ventures are more common among scale alliances, which we posed as an empirical question. As hypothesis 5a predicted, unbalanced joint ventures are somewhat more common among link alliances, although this result is not statistically significant. As hypothesis 5b predicted, balanced joint ventures are more common among scale alliances. Consistent with hypothesis 6, sequential joint ventures are most common for scale alliances. Finally, consistent with our arguments, integrative joint ventures associate with both types of alliances.

\*\*\*\*\* **Table 5 about here** \*\*\*\*\*

The analysis of interactions among governance mechanisms offers additional insights. Firms appear to use the basic protection mechanisms we discussed earlier predominantly as substitutes for one another rather than in a cumulative way. This implication emerges from the observation that the single variable correlations with link alliances tend to be about as strong as the interactions of two or more variables that have the same predicted relationship with link alliances. Indeed, we find that the combination of equity holdings and unbalanced joint ventures has no significant relationship with link alliances. Link alliances tend to include one form of protection, i.e., equity holdings or unbalanced joint ventures, but do not systematically combine the two forms of protection. Scale alliances, in which unwanted resource transfers are a less salient issue, are more likely to combine governance mechanisms that offer a low level of protection and also offer opportunities for coordination via joint ventures. Nonetheless, the strength of the statistical relationship is similar to those that we found with the individual coordination mechanisms of balanced joint ventures and sequential joint ventures.

Overall, the correlations between alliance types and governance mechanisms are only moderately strong. A likely explanation is that firms address many of their concerns about resource protection when they undertake alliances with competitors through the choice of the most appropriate alliance type and through the nature of the resources they contribute to the



alliance, as much as through specific safeguard mechanisms. For instance, to limit the risk of appropriation, firms avoid contributing R&D resources in the context of link alliances, as the results of hypothesis 2a in Table 4 show. If firms tend not to contribute sensitive resources to alliances that would encompass strong appropriation hazards, then the need for highly protective governance mechanisms is limited. This suggests that firms do not rely primarily on governance mechanisms to protect the value of the resources they own or of resources they create through collaboration with competitors.

Our study of alliances between competing firms suggests that a fundamental choice firms make in alliances involves the resources they are willing to share with a partner rather than solely the organization they set up to protect the value of these resources. This result at first might appear to contradict the view that "the best strategy is to organize and operate efficiently" (Williamson, 1991b). Our results, though, are consistent with Williamson's (1975, 1985) arguments concerning incentives for internal organization versus external forms of organization. That is, firms appear to be more likely to retain internal control of resources that would be difficult to protect via contractual safeguards. Overall, the choice of alliance type and resource contributions suggests that firms make such decisions in anticipation of maneuvering and strategizing during interactions with competitors.

The results suggest limits to the ability of contractual relationships such as equity holdings in partners and majority holdings in joint ventures to provide safeguards in inter-organizational alliances. If firms anticipated that it would be possible to create strong protection mechanisms for most alliances with competitors, then they could choose to economize by contributing and combining any under-utilized resources with any relevant partner in any type of alliance. In such cases, the links between parent firm features and alliance type on the one hand, and between resources contributed and alliance type on the other hand would then be weak. In contrast, the link between resource appropriation hazards and governance mechanisms would be strong. Instead, we found results in support of both the formation and governance predictions, suggesting that firms both attempt to take appropriation risks into account when forming

alliances and then attempt to choose governance mechanisms that address protection concerns, along with resource coordination and creation opportunities.<sup>2</sup>

## **Conclusion**

This study uses a competence perspective on firm strategy to develop hypotheses concerning alliance formation and governance. We start with the assumption of bounded rationality by potentially self-interested actors who face firm-specific limits on their foresight. We then focus on routines and resources as the fundamental units of analysis for firm strategy, while viewing firms as structures for governing routines and resources. We argue that resource governance has three aspects, including resource coordination, creation, and protection. We argue that the alliances firms form with their competitors will attempt to govern resource use in a way that economizes on resource coordination, creation, and protection. We find that firms tend to contribute different types of resources to link and scale alliances with competitors: firms primarily contribute R&D and production resources to scale alliances, and marketing resources to link alliances. This is consistent with the argument that different resources both offer different opportunities for resource coordination and creation and also create different appropriation risks. We also find that firms tend to use different governance mechanisms for link and scale alliances: firms are more likely to choose stronger protection mechanisms for link alliances which create greater appropriation risks, and tend to seek higher levels of coordination in scale alliances. This is consistent with the argument that the governance mechanisms provide differential opportunities to coordinate, create, and protect resources.

We view this research as part of an emerging stream of work that is attempting to develop a more detailed conceptual basis for understanding the business organization. We believe that such work needs to grapple with the joint demands of conceptual clarity on the one hand and managerial ambiguity on the other. That is, a central challenge that faces researchers who are developing routine-based theories of the firm lies in defining a cumulative set of concepts and measures, while retaining key inter-connections among the factors that managers must address when they make decisions about what their firms will do.

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2 - We also tested for the cases in which links between alliance type and governance mechanisms on those alliances did not fit the dominant model (link alliances including R&D, multi-partner link alliances or scale alliances including marketing), finding no relationship with governance mechanisms.

- Amit, R., Schoemaker, P. J. H., (1993). "Strategic Assets And Organizational Rents." *Strategic Management Journal*, 14, 1, 33-46.
- Argyres, Nicholas (1996). Capabilities, Technological Diversification And Divisionalization. *Strategic Management Journal*, 17, 395-410.
- Barnard, C. I. (1938). *The Functions of The Executive*, Cambridge, MA: Harvard University Press.
- Barney, J. B. (1986). "Strategic Factors Markets: Expectations, Luck, And Business Strategy." *Management Science*, 42, 1231-1241.
- Bresser, R. (1988). "Matching Collective and Competitive Strategies", *Strategic Management Journal*, 9, 375-385.
- Capron, L., Dussauge, P., and W. Mitchell, (1998), "Resource Redeployment Following Horizontal Acquisitions in Europe and North America, 1988-1992", *Strategic Management Journal*, 19, pp.631-661.
- Chatterjee, S., and B. Wernerfelt. (1991). "The Link Between Resources And Type Of Diversification: Theory And Evidence." *Strategic Management Journal*, 12, 33-48.
- Chi, T. (1994). "Trading In Strategic Resources: Necessary Conditions, Transaction Cost Problems, And Choice Of Exchange Structure." *Strategic Management Journal*, 15, 271-290.
- Child, John, and David Faulkner. (1998). *Strategies of Co-operation*. Oxford: Oxford University Press.
- Coase, R. H. (1937). "The Nature Of The Firm". *Economica*, 4, pp.386-405
- Commons, J. R. (1934). *Institutional Economics: Its Place In Political Economy*. New York: Macmillan Company.
- Conner, K.R. (1991). "A Historical Comparison Of Resource-Based Theory And Five Schools Of Thought Within Industrial Organization Economics: Do We Have A New Theory Of The Firm?" *Journal of Management*, 17, 121-154.
- Contractor, F.J., Lorange, P. (1988). "Why Should Firms Cooperate? The Strategy and Economics Basis for Cooperative Ventures", in : Contractor, F.J., and P., Lorange, *Cooperative Strategies in International Business*, Lexington Books, Lexington, MA, 3-30.
- Coriat, B. and G. Dosi. (1998). Learning How To Govern And Learning How To Solve Problems: On The Co-Evolution Of Competences, Conflicts, And Organizational Routines", pp. 103-133 in Alfred Chandler, Peter Hagstrom, and Orjan Solwell (eds.), *The Dynamic Firm*, Oxford: Oxford University Press.
- Dosi, G., L. Marengo, G. Fagiolo (1996). "Learning In Evolutionary Environments" Univ. of Rome working paper.
- Doz, Y.L., (1996). "The Evolution of Cooperation in Strategic Alliances: Initial Conditions, or Learning Processes?", *Strategic Management Journal*, 17, 55-83.
- Dussauge, P., Garrette, B., (1995). "Determinants of Success in International Strategic Alliances : Evidence from the Global Aerospace Industry", *Journal of International Business Studies*, 26, 505-530.
- Dussauge, P., Garrette, B., (1997). "Anticipating the Evolutions and Outcomes of Strategic Alliances Between Rival Firms", *International Studies of Management and Organization*, 27, 4, 104-126.
- Dussauge, P., Garrette, B., Mitchell, W., (2000). "Learning from Competing Partners: Outcomes and Durations of Scale and Link Alliances in Europe, North America and Asia", *Strategic Management Journal*, 21, 99-126
- Franko, L.G., (1971). *Joint Venture Survival in Multinational Corporations*, Praeger, New York.
- Garrette, B., Quelin, B., (1994). "An Empirical Study of Hybrid Forms of Governance Structure: The Case of the Telecommunication Equipment Industry", *Research Policy*, 23, 395-412.
- Geringer, J.M., Hebert, L., (1989). "Control and Performance of International Joint Ventures", *Journal of International Business Studies*, 20, 235-254.
- Ghoshal, S., and P. Moran (1996). "Bad For Practice: A Critique of Transaction Cost Theory", *Academy of Management Review*, 21(1), 13-47.

- Gomes-Casseres, B., (1990). "Firm Ownership Preferences and Host Government Restrictions: An Integrated Approach", *Journal of International Business Studies*, 21, 1-22
- Grant, R. M. (1991). "The Resource-Based Theory Of Competitive Advantage: Implications For Strategy Formulation." *California Management Review*, 33, 3 114-135.
- Gulati, R., (1998). "Alliances and networks", *Strategic Management Journal*, 19, 293-317
- Hamel, G., (1991). "Competition for Competence and Inter-Partner Learning within International Strategic Alliances", *Strategic Management Journal*, 12 (special issue), 83-103.
- Hannan, M. T., and J. H. Freeman. (1989). *Organizational Ecology*. Cambridge, MA: Harvard University Press.
- Harbison, J. R., P. Pekar, Jr. (1998). *Smart Alliances: A Practical Guide To Repeatable Success*. Jossey-Bass, San Francisco.
- Harrigan, K. (1986). *Managing for Joint Venture Success*. Lexington, MA: Lexington Books.
- Harrigan, K.R., (1985). *Strategies for Joint Ventures*, Lexington, MA : Lexington Books.
- Henderson, R., and I. Cockburn. (1994). "Measuring Competence? Exploring Firm Effects In Pharmaceutical Research." *Strategic Management Journal*, Winter Special Issue, 15, 63-84.
- Hennart, J.-F. (1991). 'The transaction costs theory of the multinational enterprise,' In C. Pitelis and R. Sugden (Eds.). *The Nature of the Transnational Firm*. London: Routledge.
- Hennart, J.F. (1988) "A Transaction Cost Theory of Equity Joint Ventures", *Strategic Management Journal*, 9, 361-374.
- Hennart, J.F., Roehl, T., Zietlow, D.S., (1999). "Trojan Horse or Workhorse? The Evolution of U.S.-Japanese Joint Ventures in the United States", *Strategic Management Journal*, 20, 15-29.
- Itami, H. and T. Roehl. (1987). *Mobilizing invisible assets*. Cambridge, MA: Harvard University Press.
- Jacquemin, A., Buigues, P. and F. Ilzkovitz, (1989). "Horizontal Mergers and Competition Policy in the European Community", *European Economy*, 40, 125-143.
- Jorde T.M., and D.J. Teece, (1990). "Innovation and Cooperation : Implications for Competition and Antitrust", *Journal of Economic Perspectives*, 4, 75-96.
- Karim, S., and W. Mitchell (2000). Reconfiguring business resources following acquisitions in the U.S. medical sector, 1978-1995, *Strategic Management Journal*, Special Issue on the Evolution of Business Capabilities, Volume 21 (10-11), 1061-1081, 2000.
- Khanna, T., Gulati, R., and N. Nohria, (1998). "The Dynamics of Learning Alliances: Competition, Cooperation and Relative Scope", *Strategic Management Journal*, 19, 193-210.
- Killing, J.P., (1983). *Strategies for Joint Venture Success*, New York : Praeger.
- Kogut, B. (1988). "Joint Ventures: Theoretical and Empirical Perspectives", *Strategic Management Journal*, 9, 319-332.
- Liebeskind, Julia. 1996. Knowledge, strategy, and the theory of the firm. *Strategic Management Journal*, 17 (Winter Special Issue), 93-107.
- Millington, A.I., and B.T. Bayliss, (1995). "Transnational Joint Ventures between UK and EU Manufacturing Companies and the Structure of Competition", *Journal of International Business Studies*, 26, 239-254.
- Mitchell, W., (1991). "Dual Clocks : Entry Order Influences on Industry Incumbent and Newcomer Market Share and Survival When Specialized Assets Retain Their Value", *Strategic Management Journal*, 12, 85-100.
- Mitchell, W., Singh, K., (1993). "Death of the Lethargic : Effects of Expansion into New Technical Subfields on Performance in a Firm's Base Business", *Organization Science*, 4, 152-180.
- Mitchell, W., Singh, K., (1996). "Survival of Businesses using Collaborative Relationships to Commercialize Complex Goods", *Strategic Management Journal*, 17, 169-195.

- Nelson, R.R., (1991). "Why Do Firms Differ and How Does it Matter?", *Strategic Management Journal*, 12, 61-74.
- Nelson, R.R., Winter, S.G., (1982). *An Evolutionary Theory of Economic Change*, Harvard University Press, Cambridge, MA.
- Oliver, C., (1990). "Determinants of Interorganizational Relationships: Integration and Future Directions", *Academy of Management Review*, 15, 241-265.
- Oxley, J.E. (2001). "Institutional Environment And The Mechanisms Of Governance: The Impact Of Intellectual Property Protection On The Structure Of Inter-Firm Alliances". *Journal of Economic Behavior*, forthcoming.
- Park, S.H., Russo, M.V., (1996). "When Competition Eclipses Cooperation: An Event History Analysis of Joint Venture Failure", *Management Science*, 42, 875-890.
- Penrose, E.T., (1959). *The Theory of Growth of the Firm*, London: Basil Blackwell.
- Pisano, G. (1989). 'Using Equity Participation To Support Exchange: Evidence From The Biotechnology Industry,' *Journal of Law, Economics and Organization*, 5 (1), 109-26.
- Porter, M.E., Fuller, M.B., (1986). "Coalitions and Global Strategy", in Porter, M.E., *Competition in Global Industries*, 315-344, Cambridge, MA: Harvard University Press.
- Ravenscraft, D.J., F.M Scherer (1987). "Life after Takeover", *Journal of Industrial Economics*, vol. 36, 2, 147-156.
- Richardson, G.B., (1972). "The Organization Of Industry", *Economic Journal*, 82, September, pp.883-896.
- Sakakibara,, M. 1997. "Heterogeneity Of Firm Capabilities And Cooperative Research And Development: An Empirical Examination Of Motives", *Strategic Management Journal*, 18, Summer Special Issue, 143-164.
- Simon, H. A., (1957). *Administrative Behavior*. New York, Macmillan.
- Sobrero, M. and Roberts, E. B. (1996). 'The trade-off between efficiency and learning in inter-organizational relationships,' Working Paper #3896, MIT Sloan School of Management.
- Teece, D. J., (1986). "Profiting From Technological Innovation: Implications For Integration, Collaboration, Licensing, And Public Policy", *Research Policy*, 15, 285-305.
- Teece, D. J., G. Pisano, A. Shuen. (1997). "Dynamic capabilities and strategic management." *Strategic Management Journal* 18(7): 509-533.
- Teece, D.J., and G. Pisano. (1994). "The Dynamic Capabilities Of Firms: An Introduction." *Industrial and Corporate Change*, 3 (3), 537-556.
- Wernerfelt, B., (1984). "A Resource Based View Of The Firm", *Strategic Management Journal*, 5, 171-180.
- Williamson, O. E. (1975). *Markets and Hierarchies*. New York: Free Press.
- Williamson, O. E. (1983). "Credible Commitments: Using Hostages To Support Exchange," *American Economic Review*, 73, 519-540.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. New York, NY: The Free Press.
- Williamson, O.E., (1991a). "Comparative Economic Organization : The Analysis of Discrete Structural Alternatives", *Administrative Science Quarterly*, 36, 269-296.
- Williamson, O.E., (1991b). "Strategizing, Economizing, and Economic Organization", *Strategic Management Journal*, 12 (special issue), 75-94.
- Williamson, O.E. (1999) "Strategy research: Governance and competence perspectives." University of California at Berkeley working paper.
- Winter, S.G. (1990). "Survival, selection, and inheritance in evolutionary theories of organization." In Jitendra V. Singh (ed.), *Organizational Evolution: New Directions*: 269-296, Newbury Park, CA: Sage.
- Zajac, E. J., and C. P. Olsen (1993). "From Transaction Cost To Transaction Value Analysis: Implications For The Study Of Interorganizational Strategies", *Journal of Management Studies*, 30, 131-145.

Table 1. Assumptions

Elements of theory	Governance perspective	Competence perspective	Competence perspective: Alliance implications
<b>1. Behavioral assumptions</b>	Bounded rationality, with foresight; potential self-interest.	Bounded rationality, with firm-specific foresight; potential self-interest.	Firms must organize alliances in ways that protect their resources as well as use other firms' resources and create new resources. Partners may have different perspectives on alliance purposes and governance.
<b>2. Units of analysis</b>	Transactions	Routines (tacit, co-specialized, organizationally-embedded), which combine to form resources. Use of resources generates value. Production costs are outcomes of resources.	Routines and resources are imperfectly tradeable. Firms often need alliances to gain access to other organizations' resources.
<b>3. Description of the firm</b>	Structure for governing transactions. Governance emphasizes protection.	Structure for governing routines and resources. Governance includes coordination, creation, and protection.	Firms require mechanisms to govern the use of routines and resources that they use in alliances.
<b>4. Purposes served</b>	Economizing on sum of production costs & transaction costs, where transaction costs stem from alignment between transaction attributes & governance structure of current and future transactions. Takes production costs as exogenous to firm.	Economizing on the sum of production costs and governance costs. Multi-faceted cost dimensions create substantial ambiguity concerning economizing choices and scope for self-interested choices.	A firm's governance mechanisms for inter-organizational resources must attempt to coordinate and protect the value of current resources, plus create and protect the value of new resources.
<b>5. Efficiency criterion</b>	Relative efficiency of overall set of current and future firm transactions, based on feasible alternatives.	Relative efficiency of current and future use of overall set of firm resources, based on feasible alternatives.	A firm seeks the best available mechanisms for jointly protecting and creating resources that fall within the activities of an alliance.

**Table 2a. Alliance formation factors**

<i>H</i>	<i>Alliance formation factors</i>	<i>Type</i>	<i>Resource combination opportunities</i>
H1a	Different geographic origins of parents	Link	Combine resources that draw on different national environments to create new resources needed to expand activities.
H1b	Broader geographic market coverage	Scale	Combine similar resources to achieve scale needed for greater sales in more extensive markets.
H2a	R&D resources	Scale	Link alliances involving R&D resources create expansion opportunities, but also create appropriation risks. Firms are most likely to combine R&D with a competitor for greater scale, which has a longer term commercialization horizon, than to contribute their R&D resources to a competitor's production or marketing resources, which would have immediate competitive risks.
H2b	Production resources	Scale	Combine production resources to achieve scale efficiency.
H2c	Marketing resources	Link	Use one firm's marketing resources to sell goods that use another firm's development or production resources.
	Multiple functional resources	?	The incentives of one type of resource may tend to dominate the other, or there may be substantial heterogeneity.
H3a	Competitive asymmetry	Link	In link alliances, relative size is not be an issue so long as a partner possesses needed resource. By contrast, it often is not worth while for a firm to engage in a scale alliance a smaller partner, because the cost of collaborating will exceed the expected scale benefits.
H3b	Number of partners	Scale	Scale economies opportunities increase with multiple partners, while governance costs for disparate resources in link alliances increase with multiple partners.
	Year	?	Expansion opportunities might have arisen more frequently in recent years, but firms have long had incentives to ally for expansion. Recent competitive pressure may have increased the incentives to undertake scale alliances for greater efficiency.
	Prior alliances among partners	?	Allies with prior experience might be more willing to undertake expansion opportunities together, but experience might also lead to independent competition for expansion opportunities rather than continued cooperation.

**Table 2b. Alliance governance mechanisms**

<i>H</i>	<i>Alliance governance mechanisms</i>	<i>Type</i>	<i>Resource governance roles: Protection, coordination, creation</i>
H4	Parent equity holdings	Link	<b>Protection:</b> Protect the value of resources that alliance activities might create (less incentive to incur ownership costs in scale alliances).
	Joint ventures	Both	<b>Protection, coordination, creation:</b> Protection via ownership, coordination while using similar resources, creation while using complementary resources.
H5a	Unbalanced joint ventures	Link	<b>Protection &amp; creation:</b> Create and protect new resources that arise from complementary resources (may also coordinate use of similar resources but unbalanced structure is less necessary in such cases).
H5b	Balanced joint ventures	Scale	<b>Coordination:</b> Coordination while using similar resources in scale alliances, which incur fewer appropriation risks than link alliances.
H6	Sequential joint ventures	Scale	<b>Coordination:</b> Coordinate use of similar resources in scale alliances. Uncommon for link alliances, because sequential joint ventures raise appropriation risks without providing functional organization to create new resources.
	Integrated joint ventures	Both	<b>Coordination &amp; creation:</b> Coordination while using similar resources in scale alliances; creation while using complementary resources in link alliances.

**Table 3a. Summary statistics for link formation variables (N=227)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Link alliances	1	-1,00	-0,61	-0,16	0,41	-0,27	0,05	0,21	0,06	-0,51	0,04	0,30	0,32	-0,13	-0,44	0,42	0,14	0,01	-0,01
2 Scale alliances	-1,00	1	0,61	0,16	-0,41	0,27	-0,05	-0,21	-0,06	0,51	-0,04	-0,30	-0,32	0,13	0,44	-0,42	-0,14	-0,01	0,01
3 R&D activities	-0,61	0,61	1	0,24	-0,12	0,18	-0,05	-0,18	-0,19	0,40	0,04	-0,21	-0,39	0,02	0,33	-0,41	0,05	0,16	-0,16
4 Production activities	-0,16	0,16	0,24	1	0,30	0,02	-0,31	0,11	-0,27	0,19	0,10	-0,18	-0,21	-0,12	0,18	-0,18	0,08	-0,07	0,07
5 Marketing activities	0,41	-0,41	-0,12	0,30	1	-0,17	-0,08	0,21	0,05	-0,13	-0,08	0,12	0,15	-0,29	-0,01	0,14	0,09	-0,23	0,23
6 Multi-firm alliances	-0,27	0,27	0,18	0,02	-0,17	1	-0,15	-0,09	0,04	0,25	-0,10	-0,14	-0,06	0,00	0,17	-0,13	-0,06	-0,04	0,04
7 Year of formation	0,05	-0,05	-0,05	-0,31	-0,08	-0,15	1	-0,05	0,10	-0,28	0,18	0,03	0,11	0,07	-0,13	0,01	0,07	0,11	-0,11
8 Competitive asymmetry	0,21	-0,21	-0,18	0,11	0,21	-0,09	-0,05	1	0,08	0,00	-0,02	0,02	0,02	-0,04	-0,16	0,07	0,14	0,02	-0,02
9 Prior alliances among partners	0,06	-0,06	-0,19	-0,27	0,05	0,04	0,10	0,08	1	-0,10	-0,03	0,04	0,13	-0,07	0,07	0,08	-0,11	-0,10	0,10
10 Zone, global	-0,51	0,51	0,40	0,19	-0,13	0,25	-0,28	0,00	-0,10	1	-0,55	-0,28	-0,28	0,08	0,22	-0,25	-0,03	-0,23	0,23
11 Single zone, Europe	0,04	-0,04	0,04	0,10	-0,08	-0,10	0,18	-0,02	-0,03	-0,55	1	-0,33	-0,33	-0,11	0,13	-0,15	0,11	0,38	-0,38
12 Single zone, North America	0,30	-0,30	-0,21	-0,18	0,12	-0,14	0,03	0,02	0,04	-0,28	-0,33	1	-0,17	0,10	-0,25	0,07	0,12	-0,07	0,07
13 Single zone, Asia	0,32	-0,32	-0,39	-0,21	0,15	-0,06	0,11	0,02	0,13	-0,28	-0,33	-0,17	1	-0,05	-0,22	0,48	-0,23	-0,15	0,15
14 Parent same continent	-0,13	0,13	0,02	-0,12	-0,29	0,00	0,07	-0,04	-0,07	0,08	-0,11	0,10	-0,05	1	-0,28	-0,25	-0,21	-0,06	0,06
15 Parent inter-continent	-0,44	0,44	0,33	0,18	-0,01	0,17	-0,13	-0,16	0,07	0,22	0,13	-0,25	-0,22	-0,28	1	-0,46	-0,40	-0,03	0,03
16 Parent inter-continent, Asia	0,42	-0,42	-0,41	-0,18	0,14	-0,13	0,01	0,07	0,08	-0,25	-0,15	0,07	0,48	-0,25	-0,46	1	-0,36	-0,05	0,05
17 Parent inter-continent, Eur-NAm	0,14	-0,14	0,05	0,08	0,09	-0,06	0,07	0,14	-0,11	-0,03	0,11	0,12	-0,23	-0,21	-0,40	-0,36	1	0,13	-0,13
18 Industry telecom-electronics	0,01	-0,01	0,16	-0,07	-0,23	-0,04	0,11	0,02	-0,10	-0,23	0,38	-0,07	-0,15	-0,06	-0,03	-0,05	0,13	1	-1,00
19 Other industries	-0,01	0,01	-0,16	0,07	0,23	0,04	-0,11	-0,02	0,10	0,23	-0,38	0,07	0,15	0,06	0,03	0,05	-0,13	-1,00	1
Mean	0,52	0,48	0,53	0,63	0,79	0,11	82,8	0,74	0,21	0,32	0,39	0,15	0,15	0,13	0,34	0,29	0,24	0,35	0,65
s.d.	0,50	0,50	0,50	0,48	0,41	0,31	8,3	0,44	0,41	0,47	0,49	0,35	0,35	0,33	0,48	0,46	0,43	0,48	0,48
Minimum	0	0	0	0	0	0	52	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	1	1	1	1	1	1	96	1	1	1	1	1	1	1	1	1	1	1	1

**Table 3b. Summary statistics for governance variables (N=227)**

	20	21	22	23	24	25	26	27	28	29	30
20 Parent equity holding	1	-0,19	-0,17	-0,03	-0,05	-0,15	0,39	-0,33	-0,17	-0,09	-0,15
21 Joint venture (v. Contract alliance)	-0,19	1	0,65	0,49	0,34	0,79	0,19	0,60	0,31	0,30	0,28
22 Balanced joint venture	-0,17	0,65	1	-0,35	0,35	0,43	-0,14	0,92	0,35	0,46	0,43
23 Unbalanced joint venture	-0,03	0,49	-0,35	1	0,02	0,48	0,40	-0,32	-0,02	-0,16	-0,15
24 Sequential JV (Coordination organization)	-0,05	0,34	0,35	0,02	1	-0,30	0,07	0,33	0,91	0,86	0,82
25 Integrative JV (Coordination & functional org.)	-0,15	0,79	0,43	0,48	-0,30	1	0,15	0,39	-0,27	-0,26	-0,24
26 Equity holding * Unbalanced joint venture	0,39	0,19	-0,14	0,40	0,07	0,15	1	-0,13	-0,07	-0,06	-0,06
27 Nonequity * Balanced joint venture	-0,33	0,60	0,92	-0,32	0,33	0,39	-0,13	1	0,39	0,43	0,47
28 Nonequity * Sequential joint venture	-0,17	0,31	0,35	-0,02	0,91	-0,27	-0,07	0,39	1	0,84	0,90
29 Balanced sequential joint venture	-0,09	0,30	0,46	-0,16	0,86	-0,26	-0,06	0,43	0,84	1	0,94
30 Nonequity * Balanced JV * Sequential JV	-0,15	0,28	0,43	-0,15	0,82	-0,24	-0,06	0,47	0,90	0,94	1
Mean	0,22	0,52	0,32	0,21	0,11	0,41	0,04	0,28	0,10	0,09	0,08
s.d.	0,41	0,50	0,47	0,41	0,32	0,49	0,20	0,45	0,30	0,28	0,27
Minimum	0	0	0	0	0	0	0	0	0	0	0
Maximum	1	1	1	1	1	1	1	1	1	1	1



**Table 4. Logistic regression estimates of associations with link and scale alliances**

Positive coefficient means association with link alliances, negative coefficient is association with scale alliances

		Link prediction	Coef	s.e.
<b>Parent geographic origin</b>				
Parent same continent	(a) H1a	+	-0,55	0,87
Parent inter-continent, Asia	(a) H1a	++	1,71	0,89 *
Parent inter-continent, Eur-NAM	(a) H1a	++	1,67	0,87 *
<b>Alliance geographic market</b>				
Single zone, Europe	(b) H1b	++	2,18	0,69 ***
Single zone, North America	(b) H1b	++	3,39	1,06 ***
Single zone, Asia	(b) H1b	++	2,02	1,07 *
<b>Alliance functional resources (c)</b>				
R&D resources	H2a	-	-3,12	0,85 ***
Production resources	H2b	-	-1,93	0,72 ***
Marketing resources	H2c	+	3,79	1,06 ***
Production & marketing resources			2,50	0,79 ***
R&D, production, marketing			-1,24	0,48 ***
Competitive asymmetry	H3a	+	0,87	0,64 #
Multi-firm alliances	H3b	-	-1,70	1,16 #
<b>Other factors</b>				
Year of formation			-0,10	0,04 ***
Prior alliances among partners			-1,25	0,91 #
Industry telecom-electronics	(d)		1,02	0,60 *
Intercept			5,96	3,20 *
Loglikelihood ratio			201,8	***
Cases (Link alliances)			227	(118)
Pseudo R-square			0,64	

(a) Compared to parents from the same country

(b) Compared to market coverage that extends beyond a single continent

(c) Resource variables are mutually-exclusive mean effects dummy variables.

(d) Compared to industries other than telecom-electronics (auto, aerospace, other)

\* p<.10, \*\* p<.05, \*\*\* p<.01 (two-tailed tests of coefficients; one tailed test of loglikelihood ratio chi-square); # p<.10 (one-tail

**Table 5. Correlations between alliance type and governance mechanisms**

Variables (n=227)	Hypothesis		<i>Correllation with link alliance</i>
<b><i>Governance mechanisms</i></b>			
Parent equity holding	H4	+	<b>0,18</b>
Joint venture (v. Contract alliance)			<b>-0,12</b>
Unbalanced joint venture	H5a	+	0,08
Balanced joint venture	H5b	--	<b>-0,20</b>
Sequential JV (Coordination organization)	H6	--	<b>-0,13</b>
Integrative JV (Coordination & functional org.)			-0,04
<b><i>Governance mechanism interactions</i></b>			
Equity holding * Unbalanced JV	H4 & 5a	+,+	0,01
Nonequity * Balanced JV	H4 & 5b	-,-	<b>-0,16</b>
Nonequity * Sequential JV	H4 & 6	-,-	<b>-0,13</b>
Balanced JV * Sequential JV	H5b & 6	-,-	<b>-0,20</b>
Nonequity * Balanced JV * Sequential JV	H4, 5b, & 6	-,-,-	<b>-0,17</b>

p < 0.10 in **bold** typeface