



A Resource-Based Theory of Strategic Alliances

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The resource-based view of the firm has not been systematically applied to strategic alliances. By examining the role of firm resources in strategic alliances, we attempt, in this paper, to put forward a general resource-based theory of strategic alliances, synthesizing the various findings in the literature on alliances from a resource-based view. The proposed theory covers four major aspects of strategic alliances: rationale, formation, structural preferences, and performance. The resource-based view suggests that the rationale for alliances is the value-creation potential of firm resources that are pooled together. We note that certain resource characteristics, such as imperfect mobility, imitability, and substitutability, promise accentuated value-creation, and thus facilitate alliance formation. We discuss how the resource profiles of partner firms would determine their structural preferences in terms of four major categories of alliances: equity joint ventures, minority equity alliances, bilateral contract-based alliances, and unilateral contract-based alliances. As part of the theory, we propose a typology of inter-partner resource alignment based on the two dimensions of resource similarity and resource utilization, yielding four types of alignment: supplementary, surplus, complementary, and wasteful. We also discuss how partner resource alignment directly affects collective strengths and inter-firm conflicts in alliances, which in turn contribute to alliance performance. Finally, we develop a number of propositions to facilitate empirical testing of the theoretical framework, suggest ways to carry out this testing, indicate future research directions, and list some of the more significant managerial implications of the framework.

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The resource-based view has recently emerged as an alternative approach to understanding industrial organizations and their competitive strategies. According

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to this view, a firm is equivalent to a broad set of resources that it owns. Wernerfelt (1984: 172) defines resources as "those (tangible and intangible) assets which are tied semi-permanently to the firm." Unlike traditional industrial organization economics, which relies heavily on the analysis of the competitive environment, the resource-based view focuses on the analysis of various resources possessed by the firm. Because many resources are firm-specific and not perfectly mobile or imitable, firms are continuously heterogeneous in terms of their resource base. Sustained firm resource heterogeneity, thus, becomes a possible source of competitive advantage, which then leads to economic rents, or above-normal returns.

Traditional strategy research suggests that firms need to seek a strategic fit between their internal characteristics (strengths and weaknesses) and their external environment (opportunities and threats). Considerable emphasis has usually been given, however, to a firm's competitive environment and its competitive position. In contradistinction to that external emphasis, the resource-based view embodies a different approach, which stresses the internal aspects of a firm. Barney (1991), for example, points out that strategy models based mainly on environmental and industrial scrutiny make the unrealistic assumption of firm homogeneity. Rather than being defined by the competitive environment, the parameters of a firm's competitive strategy are critically influenced by its accumulated resources. In other words, what a firm possesses would determine what it accomplishes. Accordingly, a firm should pay more attention to its resources than to its competitive environment. The contribution of the resource-based view is that it develops the idea that "a firm's competitive position is defined by a bundle of unique resources and relationships" (Rumelt, 1984: 557), and thus provides a balance vis-à-vis environmental models of strategy.

Although some theorists suggest that the resource-based view could be a new theory of the firm, it is still part of a developing paradigm in strategy research (Amit & Schoemaker, 1993; Barney, 1991; Conner, 1991; Conner & Prahalad, 1996; Grant, 1996; Mahoney & Pandian, 1992; Mehra, 1996; Miller & Shamsie, 1996; Roth, 1995). The usefulness and richness of the paradigm need to be demonstrated in a variety of strategy areas. Indeed, researchers are still in the phase of accumulating applications of the resource-based view. For example, Peteraf (1993) shows that sustainable differences in firm profitability that cannot be attributed to industrial differences can be better explained by the resource-based view. Our understanding of diversification strategy is also enhanced because the resource-based view strongly argues for strategic relatedness within a conglomerate (Chatterjee & Wernerfelt, 1991). Harrison, Hitt, Hoskisson, and Ireland (1991) examined the performance of mergers and acquisitions through a resource-based perspective. Global strategy, technological strategy, and strategic regulation have also been studied by applying the resource-based view (Collis, 1991; Leonard-Barton, 1992; Maijor & Van Witteloostuijn, 1996).

One area that remains under-explored in the literature is the resource-based view of strategic alliances, even though such alliances are rapidly increasing in importance in today's competitive landscape (Das & Teng, in press; Doz & Hamel, 1998; Gomes-Casseres, 1996; Yoshino & Rangan, 1995). A resource-

based view seems particularly appropriate for examining strategic alliances because firms essentially use alliances to gain access to other firms' valuable resources. Thus, firm resources provide a relevant basis for studying alliances. The few studies that have applied the resource-based perspective to strategic alliances cover only limited aspects (e.g., Blodgett, 1991; Eisenhardt & Schoonhoven, 1996; Kogut, 1988; Mowery, Oxley, & Silverman, 1998; Rouse & Daelenbach, 1999; Tyler & Steensma, 1995, 1998; Varadarajan & Cunningham, 1995). Focusing exclusively on the resource-based view of strategic alliances, Eisenhardt and Schoonhoven (1996) found essentially that alliances are more likely to be formed when both firms are in vulnerable strategic positions (i.e., in need of resources) or when they are in strong social positions (i.e., possess valuable resources to share). Other researchers have tackled only selected aspects of alliances, such as organizational knowledge (Kogut, 1988) and international business (Blodgett, 1991; Lyles & Salk, 1997). Thus, a general resource-based theory of strategic alliances has yet to emerge. Our purpose here is to develop a more encompassing resource-based theory of strategic alliances than is available in the extant literature.

We divide the article into four parts. First, we examine the rationale for entering into strategic alliances from a resource perspective, as compared with a transaction-cost perspective. We then identify the resource characteristics of individual firms that are the antecedents of alliance formation. Third, we discuss structural preferences for alliances, as determined by the resource types of partner firms. Finally, we develop a typology of inter-partner resource alignments and explore the effects of these resource alignments on alliance performance. The four parts of the article set out the four essential components of a resource-based theory of strategic alliances: rationale, formation, structure, and performance. These four components are integral to a general theory of alliances, because they have been the main focus of alliance research. What has been lacking in the literature thus far is the fact that none of these aspects has been adequately examined from the resource-based perspective. Taken together, the four aspects contribute toward a comprehensive and integrated theory of strategic alliances from the resource-based viewpoint. To facilitate empirical testing of the resource-based theory of strategic alliances presented here, we also develop a number of propositions. We represent in Figure 1 a schematic of our exposition.

Resource-Based Rationale of Alliances

Strategic alliances are voluntary cooperative inter-firm agreements aimed at achieving competitive advantage for the partners. The proliferation of strategic

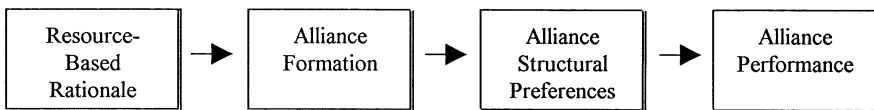


Figure 1. Schematic of Exposition

alliances in recent years marks a shift in the conception of the intrinsic nature of competition, which is increasingly characterized by constant technological innovations and speedy entry into new markets. The critical part played by technology and speed in the new competitive calculus, among other factors, has led to the contention that the key to success in the coming years lies in the creation of collaborative advantage through strategic alliances.

To account for the emergence of strategic alliances as well as their operation, a number of theories and models have been proposed, such as transaction cost economics (Hennart, 1988; Williamson, 1985), game theory (Parkhe, 1993), the strategic behavior model (Hagedoorn, 1993; Porter, 1985), the strategic decision-making model (Das & Teng, 1996a,b, 1997a, 1998a,b, 1999b,c; Tyler & Steensma, 1995, 1998), social exchange theory (Axelrod, 1984; Blau, 1964), and power-dependence theory (Chisholm, 1989; Pfeffer & Salancik, 1978; Schmidt & Kochan, 1977; Van de Ven & Walker, 1984). For brief discussions of these theories the reader is referred to two recent reviews by Gray and Wood (1991) and Smith, Carroll, and Ashford (1995). These theories, especially the dominant transaction cost view, have proven to be useful in understanding the phenomenon of strategic alliances. They do not, however, assign a significant role to partner firm resources in theorizing about strategic alliances. In our view, as strategic alliances are essentially the result of resource integration among firms, a resource-based view has the potential for helping us understand alliances better. From a resource-based perspective, Eisenhardt and Schoonhoven (1996: 137) view alliances as "cooperative relationships driven by a logic of strategic resource needs and social resource opportunities." Van de Ven (1976) noted early on that the process of building inter-organizational relationships can be studied as a flow of resources among organizations. For example, a joint venture is formed when "two or more firms pool a portion of their resources within a common legal organization" (Kogut, 1988: 319).

Scholars have often considered strategic alliances an alternative to internalization on the one hand and market exchanges on the other. That is, for a given factor (product or service), a firm may choose to: (1) produce it on its own; (2) purchase it from the spot markets; or (3) make it jointly with partner firms. We now compare the transaction cost rationale with the resource-based rationale as regards this question of ownership decision among internalization, market exchanges, and alliances (see Table 1).

Transaction Cost Rationale

In transaction cost economics, a firm's ownership decision centers on minimizing the sum of transaction costs and production costs (Coase, 1937; Williamson, 1975). While transaction costs refer to costs that are incurred from activities necessary for an exchange (such as writing and enforcing a contract), production costs come from coordinating activities in-house, in terms of learning, organizing, and managing production. Since internalization (e.g., mergers, acquisitions, and internal development) controls transaction costs effectively, this will be preferred when transaction costs of an exchange are high. In contrast, market exchanges

Table 1. Ownership Decisions Based on Transaction Cost and Resource-Based Rationales

	<i>Transaction Cost Rationale</i>	<i>Resource-Based Rationale</i>
Logic behind the Ownership Decision	“Minimizing the sum of production and transaction costs” (Kogut, 1988: 320)	Maximizing firm value through gaining access to other firms’ valuable resources (Madhok, 1997; Ramanathan et al., 1997)
Mergers/ Acquisitions/ Internal Development	High transaction costs (i.e., high asset specificity, uncertainty, and frequency of the transactions, and high costs for controlling opportunistic behavior) and/or low production costs (i.e., coordinating and learning) (Kogut, 1988)	<p>“A firm will favor acquisitions over joint ventures when the assets it needs are not commingled with other unneeded assets within the firm that holds them, and hence can be acquired by buying the firm or a part of it.” (Hennart & Reddy, 1997: 1)</p> <p>“If the market is munificent or the firm is pursuing a strategy for which it has extensive resource capabilities, there is much less incentive to cooperate. Firms are more likely to continue alone.” (Eisenhardt & Schoonhoven, 1996: 137)</p>
Market Transactions	Low transaction costs and/or high production costs	When “the <i>purchase of the resource’s service</i> from the firm that possesses it” (Chi, 1994: 272) can be efficiently conducted through the market.
Strategic Alliances	<p>Medium transaction and production costs, i.e., “when the transaction costs associated with an exchange are intermediate and not high enough to justify vertical integration . . .” (Gulati, 1995: 87)</p> <p>“JVs are formed when transactional hazards suggest that internalization is efficient . . . , but constraints of various kinds prohibit full internalization” (Ramanathan et al., 1997: 57)</p> <p>“The situational characteristics best suited for a joint venture [rather than a contract] are high <i>uncertainty</i> over specifying and monitoring performance, in addition to a high degree of asset specificity.” (Kogut, 1988: 320).</p>	<p>Alliances preferred “when the critical inputs required to pursue the opportunity are owned by different parties and when these inputs are inseparable from the other assets of the owner firms.” (Ramanathan et al., 1997: 65)</p> <p>“Collaborations are a useful vehicle for enhancing knowledge in critical areas of functioning where the requisite level of knowledge is lacking and cannot be developed within an acceptable timeframe or cost.” (Madhok, 1997: 43)</p>

bear transaction costs but avoid production costs, so that they will be used when transaction costs are low and production costs are high.

Strategic alliances combine the features of internalization and market exchanges, because they partially internalize an exchange (e.g., joint ventures). Contracts will still be needed, but since they are often incomplete, much of the activities will be left to joint coordination. As a result, researchers suggest that alliances will be preferred “when the transaction costs associated with an exchange are intermediate and not high enough to justify vertical integration . . .” (Gulati, 1995: 87). If alliances are viewed as reflecting semi-internalization, a slightly different conception would hold that alliances can be justified when internalization is more cost efficient “but constraints of various kinds prohibit full internalization” (Ramanathan, Seth, & Thomas, 1997: 57).

Resource-Based Rationale

In contrast to the transaction cost logic, which emphasizes cost minimization, the resource-based rationale emphasizes value maximization of a firm through pooling and utilizing valuable resources. That is, firms are viewed as attempting to find the optimal resource boundary through which the value of their resources is better realized than through other resource combinations. The difference between the two perspectives is sometimes reflected in the competing research hypotheses derived from the two theories. For example, transaction-cost theorists suggest that whether or not partner firms are in the same industry will affect the choice of joint venture or acquisition (Balakrishnan & Koza, 1993). The resource-based view, focusing on resource integration, does not imply such a relationship. The argument is that resource integration can be accomplished regardless of industry affiliation (see Hennart & Reddy, 1997: 5).

According to Barney (1991: 102), “a firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously implemented by any current or potential competitors.” The reason such a strategy is not ordinarily implemented by competitors is that they may not possess the appropriate resources. The strategy literature has established the close relationship between resources (or competence) and competitive advantage (Reed & DeFilippi, 1990).

The resource-based view suggests that valuable firm resources are usually scarce, imperfectly imitable, and lacking in direct substitutes (Barney, 1991; Peteraf, 1993). Thus, the trading and accumulation of resources becomes a strategic necessity. When efficient market exchange of resources is possible, “firms are more likely to continue alone” (Eisenhardt & Schoonhoven, 1996) and rely on the market. However, although market transactions are the default mode, efficient exchanges are often not possible on the spot market. Certain resources are not perfectly tradable, as they are either mingled with other resources or embedded in organizations (Chi, 1994). Hence, mergers, acquisitions, and strategic alliances are variously employed.

Thus, the resource-based view considers strategic alliances and mergers/acquisitions as strategies used to access other firms’ resources, for the purpose of garnering otherwise unavailable competitive advantages and values to the firm.

Although researchers have explored the resource-based view of alliances under different names—such as the property rights perspective (Ramanathan et al., 1997) and the organizational capability perspective (Madhok, 1997)—the overall rationale for entering into a strategic alliance appears fairly simple. It is to aggregate, share, or exchange valuable resources with other firms when these resources cannot be efficiently obtained through market exchanges or mergers/acquisitions (M&As). In sum, it is about creating the most value out of one's existing resources by combining these with others' resources, provided, of course, that this combination results in optimal returns.

The resource-based view further indicates the conditions under which alliances will be preferred over M&As. These conditions have mainly to do with obtaining and retaining resources. Kogut's (1988) organizational learning model, which is a part of the broad resource-based view, offers a refined view of alliance formation based on firm resources such as knowledge and technology. According to him, there are two possible reasons firms forge alliances: either to acquire the other's organizational know-how, or to maintain one's own know-how while benefiting from another's resources. Extending this approach to all types of firm resources, we suggest that there are two related, but distinct, motives for firms to use strategic alliances or M&As: (1) to obtain others' resources; and (2) to retain and develop one's own resources by combining them with others' resources.

Obtaining Resources. Firms may use alliances or mergers/acquisitions to obtain resources possessed by other firms that are valuable and essential to achieving competitive advantage. In the international arena, multinational companies may enter foreign markets by acquiring a local company. They may also seek the resources of their local partners, such as local facilities, knowledge, and connections, by forming international joint ventures (Beamish, 1987; Yan & Gray, 1994). In new product development, strategic alliances are used to pool the technological know-how and expertise of different firms (Leonard-Barton, 1992; Teece, 1992). Furthermore, M&As are often used to create economies of scale in R&D.

While both alliances and mergers/acquisitions can accomplish the objective of obtaining a selected firm's resources, the resource-based view suggests two conditions that favor alliances over M&As. First, strategic alliances serve as a more viable option than M&As when not all the resources possessed by the target firm are valuable to the acquiring firm. Second, since a certain degree of asset specificity is usually involved, some of the less valuable or redundant resources in a M&A cannot be easily disposed of without taking a loss (Ramanathan et al., 1997). Hennart and Reddy (1997) reason that when unwanted assets are mixed with needed assets, and the two are not readily separable, acquisitions inevitably result in unneeded assets. When non-desired assets are not easily separable, strategic alliances allow the partner firms to access only the assets each desires while bypassing non-desired ones, thereby augmenting overall value. Thus, the distinct advantage of strategic alliances is to have access to precisely those resources that are needed, with minimum superfluity. In support of this view, Hennart and Reddy (1997: 4) found that firms prefer acquisitions "when the desired assets are 'digestible.'"

Retaining Resources. Whereas the motive of obtaining resources is to reach others' resources, the motive of "retaining resources" is to keep one's own valuable resources securely in the firm. Kogut (1988) suggests that firms may wish to maintain certain resources but lack the setup to make use of them. For example, sometimes there may be an excess of research personnel, without sufficient meaningful work at hand. Rather than laying these individuals off, firms out-source them by seeking projects that can be carried out in conjunction with the resources of other firms, such as financial and physical resources. To that end, strategic alliances may help retain those resources that are currently under-utilized internally. Nelson and Winter (1982) maintain that, in order to prevent their know-how from decaying, firms sometimes need to engage in alliances, in order to avail themselves of opportunities to keep using these capabilities—or remembering-by-doing. In this case, the choice between alliances and M&As is about whether one should relinquish one's resources permanently (M&A) or for a specified period only (alliances). The possible advantage of strategic alliances over M&As is that the firm only temporarily relinquishes its resources, which remain available for future internal deployment. Thus, strategic alliances will be preferred only when discounted present value of the deployment of its resources in the future is greater than the realized value of selling its resources in the present.

The difference between the two motives, gaining access to additional resources possessed by others, and retaining one's own resources, is that, while obtaining resources is more about creating competitive advantage in the immediate present, retaining resources is concerned more with securing competitive advantage later on. Despite this difference, the commonality of the two motives seems more important: The realized values of those resources contributed to the alliance must be higher than the value realized either by selling or by utilizing the resources in-house. Regardless of whether the motive is to use others' resources temporarily (i.e., obtaining) or to let others use one's own resources temporarily (i.e., retaining), the principal decision criterion should be the opportunity cost of the resources. Strategic alliances will be forged only when the realized value of those resources contributed to the alliance is higher than their value as realized through either internal uses or relinquishment. If more long-term value can be created by either the internal deployment or the sale of the resources, strategic alliances should not be used at all.

Resource Characteristics and Alliance Formation

In light of the above discussion on the resource-based rationale of strategic alliances, we now examine the specific resource profiles of individual firms that tend to encourage the formation of strategic alliances (see Figure 2 for the proposed analytical framework). Existing studies suggest such antecedents to alliance formation as internationalization (Yoshino & Rangan, 1995), technological needs (Hagedoorn, 1993; Tyler & Steensma, 1995), perceived environmental uncertainty (Dickson & Weaver, 1997), and various other strategic motives (Glaister & Buckley, 1996). In our theory, firm resources are important indicators

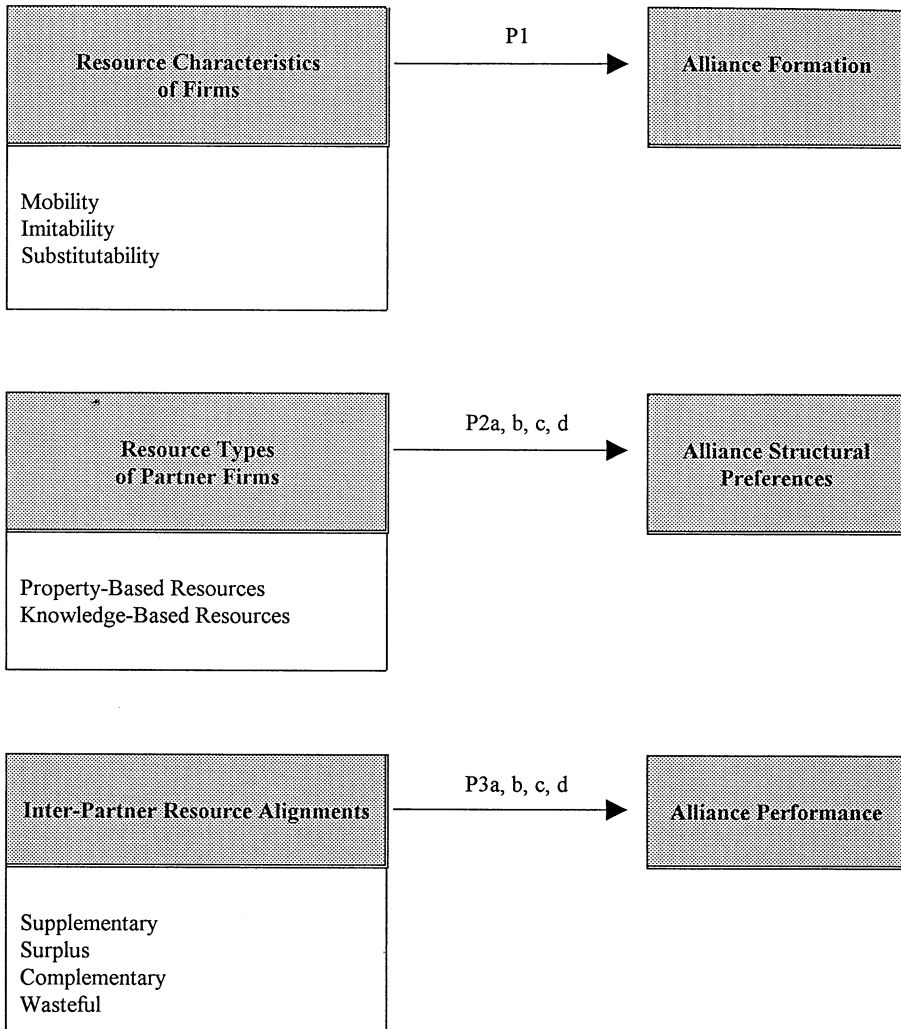


Figure 2. Analytical Framework and Proposed Relationships

of the likelihood of firms entering into strategic alliances. For instance, the possession of critical resources is a prerequisite for alliance formation. Using an experimental design, Dollinger, Golden, and Saxton (1997) found that a target firm's reputation, including elements such as product and management reputation, encourages decision-makers to form a strategic alliance with it. Apparently, some firms are less self-reliant than others, and tend to actively seek out partners for strategic alliances. We submit that such differences can be accounted for by the firms' resource characteristics.

The resource-based view suggests that firm resource heterogeneity is not a short-term phenomenon; rather, a degree of heterogeneity tends to be sustained

over time (Peteraf, 1993). Some resource characteristics that prevent firms from moving toward resource homogeneity have been identified as: imperfect mobility, imperfect imitability, and imperfect substitutability (Barney, 1991; Chi, 1994; Dierickx & Cool, 1989; Peteraf, 1993).

Imperfect mobility refers to the difficulty, as well as the nontrivial costs, of moving certain resources from one firm to another. According to Dierickx and Cool (1989), factor markets are often incomplete and imperfect, so that many resources are either not tradable at all or not perfectly tradable. For example, resources such as firm reputation and organizational culture are simply not tradable. Many resources, such as the tacit knowledge of firms, lose much of their value if moved from their current organizational context and other resources used in conjunction.

Whereas imperfect mobility is concerned with barriers to getting the resources from the owners, imperfect imitability and imperfect substitutability refer to barriers to obtaining similar resources from elsewhere (Barney, 1991; Peteraf, 1993). Lippman and Rumelt (1982) introduced the concept of causal ambiguity, or the lack of transparency about what resources are responsible for competitive advantage. Causal ambiguity makes the connection between resources and competitive advantage less clear, and thus constrains a firm's ability to imitate its competitors and/or to employ substitutes. Reed and DeFillippi (1990) identify three resource characteristics that give rise to causal ambiguity: tacitness, complexity, and specificity.

Imperfect mobility, imperfect imitability, and imperfect substitutability of firm resources are not only essential for sustained resource heterogeneity, but are also instrumental in the formation of strategic alliances. Imagine a firm whose resources are perfectly or easily mobile, imitable, and substitutable. Clearly, other firms would be in a position to bid desirable resources away from such a firm in factor markets. There would then hardly be a need to form strategic alliances. Should all desirable resources be available for acquisition in factor markets at fair prices, it would be foolhardy for firms to get involved in strategic alliances, which usually entail high governance costs (Osborn & Baughn, 1990) and some sacrifice of organizational control (Lyles & Reger, 1993). A fairly self-evident premise for this argument is that resources that are not perfectly mobile, imitable, and substitutable can be obtained through alliances. For example, although reputation is not tradable, it can be transferred to a strategic alliance formed by a firm, as in the Universal Card case between AT&T and TSYS (Sankar, Boulton, Davidson, Snyder, & Ussery, 1995).

As our earlier discussion on alliance rationale has shown, only if a firm cannot efficiently get needed resources from elsewhere—except by a sharing arrangement with its owners—will it be willing to form a strategic alliance. For instance, since there is, in most cases, a well-developed—that is, perfectly mobile and substitutable—capital market for establishing businesses, firms with only financial resources to share may provide no particular advantage and are usually not approached for strategic alliances. Nevertheless, in cases where particular projects are too risky and the capital market fails to provide needed capital, the financial resources available from provider firms become imperfectly mobile and

imperfectly substitutable. As a result, these firms will be wooed by those in need of capital. The point is that the more imperfect the mobility, imitability, and substitutability of a firm's resources is, the more likely that others will be interested in forming alliances with it. For instance, in the pharmaceutical industry, small biotechnology firms often ally with large pharmaceutical companies for R&D activities. However, the major reason is not just to have access to financial resources, which are quite mobile (otherwise, we would have seen many partners from other industries also). The key is that, in addition to financial resources, large pharmaceutical companies also provide intangible resources such as marketing and operations know-how—which are far less mobile, imitable, and substitutable.

P1: The more a firm's resources are characterized by imperfect mobility, imperfect imitability, and imperfect substitutability, the more likely the firm will get involved in strategic alliances.

Resource Types and Structural Preferences

In this section we examine how different resource types influence the choice of alliance structures. To assist us in this examination, we identify two major types of resources and propose a four-part typology of alliance forms.

Resource Types

Since firm resources are of various types, it is no surprise that scholars have proposed a number of resource typologies. The simplest approach differentiates between tangible and intangible resources (Grant, 1991). Barney (1991) classifies firm resources into physical capital resources, human capital resources, and organizational capital resources. Hofer and Schendel (1978) suggest that a firm's resource profile includes the following: financial, physical, managerial, human, organizational, and technological resources. Das and Teng (1998a) recently analyzed the different contingent "orientations" that firms tend to adopt for managing four specific kinds of resources—namely, financial, technological, physical, managerial—in the alliance making process. These descriptive typologies, however, lack adequate theoretical underpinnings. Miller and Shamsie (1996) suggest that, based on the notion of barriers to imitability, all resources may be classified into two broad categories: property-based resources and knowledge-based resources.

Property-based resources are legal properties owned by firms, including financial capital, physical resources, human resources, etc. Owners enjoy clear property rights to these resources, or rights to use the resources, so that others cannot take them away without the owners' consent. Thus, property-based resources cannot be easily obtained, because they are legally protected through property rights in such forms as patents, contracts, and deeds of ownership (Miller & Shamsie, 1996). Because others cannot take property-based resources away, alliance partners will not be overly concerned about unintended transfers of these resources.

Different property-based resources may exhibit different resource characteristics (see Table 2). First, human resources tend to have a high degree of imperfect

Table 2. Typical Resources Based on Resource Characteristics and Resource Types

<i>Resource Characteristics</i>	<i>Resource Types</i>	
	<i>Property-Based Resources</i>	<i>Knowledge-Based Resources</i>
Imperfect Mobility	Human resources	Organizational resources (e.g., culture)
Imperfect Imitability	Patents, contracts, copyrights, trademarks, and registered designs	Technological and managerial resources
Imperfect Substitutability	Physical resources	Technological and managerial resources

mobility. Although it is possible to hire away individual personnel from a firm, trading an entire workforce of a company or division through the job market is not possible unless the whole firm/division is acquired. Since human resources cannot be traded efficiently without being bundled with other resources (such as physical resources), their mobility is far from perfect.

Second, property-based resources that are particularly inimitable include patents, contracts, copyrights, trademarks, and registered designs. Hall (1992) categorizes these intangible resources as assets because they are deemed to have clear property rights. These resources are difficult to imitate, as they are often uniquely present in firms. An example is a single contract for a government project. Also, once a patent is granted, similar endeavors are prohibited. In such cases, imitation of these resources is either not possible or not permissible.

Third, as compared to some property-based resources, physical resources are known for their imperfect substitutability. Whereas the same financial resources can be obtained through different channels—stock market, bond market, commercial lending, and so on—physical resources such as oil fields and distribution channels are often specific to a business and, thus, not easily substitutable. A good location for a business cannot be substituted either.

Knowledge-based resources refer to a firm's intangible know-how and skills. In contrast to property-based resources, knowledge-based resources are not easily imitable owing to knowledge and information barriers. Others cannot easily copy or imitate knowledge-based resources, because they are vague and ambiguous. Thus, tacit know-how, skills, and technical and managerial systems not protected by patents, all fall in this category (Hall, 1992). Imitating technological and managerial resources may be inherently "uncertain," because knowledge creation inevitably involves "irreducible ex ante uncertainty" (Lippman & Rumelt, 1982: 418).

Besides imperfect imitability, technological and managerial resources are also imperfectly substitutable. Satisfactory substitutes and alternatives to superior technologies and managerial talents are often not available. Nevertheless, these resources are relatively mobile, because technologies and managerial talents may be acquired rather efficiently through the market. In contrast, organizational

resources, such as culture and learning capacity, are deeply embedded in a firm, and are thus characterized by imperfect mobility.

The key difference between property-based and knowledge-based resources springs from the fact that “the protection of knowledge barriers is not perfect” (Miller & Shamsie, 1996). Whereas property-based resources enjoy near-perfect legal protection, knowledge-based resources are more vulnerable to unintended transfers. Once others get adequate access to knowledge-based resources, it is difficult to keep these resources within the confines of the firm for long. Consequently, alliance partners will be concerned with losing their knowledge-based resources through an alliance (Hamel, 1991; Mowery, Oxley, & Silverman, 1996).

A Typology of Alliance Structures

Strategic alliances can take a variety of forms, including, but not limited to, joint ventures, minority equity alliances, R&D contracts, joint R&D, joint production, joint marketing and promotion, enhanced supplier partnership, distribution agreements, and licensing agreements (Gates, 1993; Yoshino & Rangan, 1995). In an effort to better organize such a large collection of alliance forms, theorists have proposed several typologies of strategic alliances (Dussauge & Garrette, 1995; Lorange & Roos, 1990; Oliver, 1990; Pisano & Teece, 1989).

Most studies on alliance structural choice have been based on the dichotomy of equity alliance vs nonequity alliances (Gulati, 1995; Osborn & Baughn, 1990; Tallman & Shenkar, 1990). Whereas equity alliances include equity joint ventures and minority equity alliances, nonequity alliances refer to all other cooperative arrangements that do not involve equity exchange. Killing (1988) and Yoshino and Rangan (1995) differentiate equity alliances into three types: nontraditional contracts (non-equity-based), minority equity alliances, and joint ventures. For non-equity alliances, Mowery et al. (1996) suggest two types: (1) unilateral contract-based; and (2) bilateral contract-based. Integrating the above approaches into the classification of alliance structures, we adopt the following four-part alliance typology: (1) joint ventures; (2) minority equity alliances; (3) bilateral contract-based alliances; and (4) unilateral contract-based alliances.

Alliances are unilateral contract-based when they embody a well-defined transfer of property rights, such as the “technology for cash” exchange in licensing agreements. Licensing, distribution agreements, and R&D contracts are the main forms of unilateral contract-based alliances. The key feature here is that individual firms carry out their obligations independently of others. Such contracts tend to be complete and specific, and partners are expected to perform on their own accordingly, without much coordination or collaboration. Thus, the level of integration is relatively low in unilateral contract-based alliances (Mowery et al., 1996).

On the other hand, alliances are called bilateral contract-based when the partners have sustained production of property rights. These alliances require partners to put in resources and work together on a continuing basis. Joint R&D, joint marketing and promotion, joint production, and enhanced supplier partnership are some good examples of bilateral contract-based alliances (Mowery et al., 1996). These alliances require partners to put in resources and work together

constantly, so that they are integrated in a tighter manner. As compared to unilateral contracts, bilateral contracts are usually incomplete and more open-ended. To some extent, partners of unilateral contract-based alliances have to let the cooperative relationship unfold itself.

The resource-based view emphasizes that each partner will bring valuable resources to the alliance. To rely solely on one single type of resource is not likely to prove effective in today's environment of intensified competition. Reed and DeFillippi (1990) argue that physical assets alone do not help a firm build sustainable competitive advantage. It is only natural, therefore, that so many firms reach out for a variety of resources.

We argue that the types of resources that firms could potentially contribute constitute a key dimension in predicting the partners' structural preferences in the prospective alliance. From a resource-based view, firms are interested not only in accessing or acquiring their partners' valuable resources through an alliance, but also in protecting their own valuable resources during the alliance-making process. Thus, the partners' structural preferences will be based on their consideration of these two issues simultaneously. Essentially, the principle is to find the structure that balances the two issues: *being able to procure valuable resources from another party without losing control of one's own resources*.

We need to note that a single firm may be able to contribute multiple types of resources to an alliance. For example, large multinational corporations can provide financial, technological, and managerial resources to their local partners. Therefore, it is important to identify which types of resources ought to be committed to the alliance at a significant level—that is, which is their primary resource type. Thus, a prospective partner will expect to contribute either primarily property-based or primarily knowledge-based resources to the alliance. It would rarely be the case that property-based and knowledge-based resources are equally significant. A partner's structural preferences will be more influenced by its primary resource type (i.e., the type of resource that can be contributed at a significant level to the alliance). Because it is difficult to consider all types of resources in an alliance, partners will focus on the primary resource type, either property-based or knowledge-based.

We now discuss partners' structural preferences in terms of the four major categories of alliances outlined above: equity joint ventures, minority equity alliances, bilateral contract-based alliances, and unilateral contract-based alliances (see Table 3).

Equity Joint Ventures

Equity joint ventures are created to substantially integrate the joint efforts of partners—separate entities in which the partners literally work together. One key problem in strategic alliances is that firms may be opportunistic in maximizing their own particular interests, to the detriment of their partners. Such opportunistic behavior tends to be more severe when it involves tacit knowledge and skills that are not protected by property laws. Scholars suggest a number of knowledge-based resources that are particularly vulnerable to unintended transfers, such as subtle technical and creative talents, skills at collaboration and coordination, and

Table 3. Resource Types and a Firm's Structural Preferences

<i>Firm (A)</i>	<i>Partner Firm (B)</i>	
	<i>Property-Based Resources</i>	<i>Knowledge-Based Resources</i>
Property-Based Resources	Unilateral Contract-Based Alliances	Equity Joint Ventures
Knowledge-Based Resources	Minority Equity Alliances	Bilateral Contract-Based Alliances

managerial and employee know-how (Black & Boal, 1994; Hall, 1992). When the partners work shoulder to shoulder in the same entity for an extended period, it becomes difficult to keep others from accessing one's tacit know-how (Hamel, 1991). Consequently, equity joint ventures provide the best opportunities to acquire partners' tacit knowledge and other knowledge-based resources. Researchers note that partners often use alliances as a cover for appropriating knowledge-based resources (Inkpen & Beamish, 1997).

Among various alliance forms, equity joint ventures are the most instrumental in the transfer of tacit knowledge between the partners, because of the significant extent to which partners are exposed to each other (Kogut, 1988). Alliance forms such as licensing agreements provide much less by way of learning opportunities. Mowery et al. (1996) found that equity joint ventures significantly facilitated inter-firm transfer of technologies, resulting in greater technological similarities between the partners. Hennart and Reddy (1997: 11) report that "a joint venture is primarily a device to obtain access to resources which are embedded in other organizations." Because equity joint ventures enable a firm to better appropriate its partner's knowledge-based resources, they are preferable to the firm if knowledge-based resources are its partner's primary resource in the alliance. On the other hand, the advantage of a joint venture for a particular firm will be limited if its partner contributes mainly property-based resources.

Furthermore, although firms will ordinarily want to acquire their partners' know-how, they are also wary about losing their own knowledge-based resources in a highly integrated operation characteristic of a joint venture. Thus, they will prefer equity joint ventures only if knowledge-based resources are not their primary resource type in the alliance. In other words, only when firms contribute mainly property-based resources will they prefer a joint venture structure. This is so because property-based resources are protected by property rights, minimizing the likelihood of unintended transfer of resources.

Tallman and Shenker (1990) focus on technological resources and differentiate them as being either explicit technology or implicit organizational knowledge. Clearly, explicit technology is analogous to property-based resources, while implicit organizational knowledge is akin to knowledge-based resources. They found that the use of explicit technology led to contract-based alliances, while equity joint ventures were used to transfer implicit knowledge.

P2a: A partner firm will prefer an equity joint venture if, in the prospective alliance, its primary resources are property-based and its partner's primary resources are knowledge-based.

Minority Equity Alliances

In minority equity alliances, one or more partners take an equity position in others. Das and Teng (1996a) argue that shared ownership helps control opportunistic behaviors. Since equity arrangements are rather complicated to implement as well as to get out of, they are usually entered into for longer time horizons, compared to alliances without equity investments. A long duration for an alliance provides an incentive to partners to behave honestly and curb opportunistic behavior.

In the context of the so-called "shadow of the future" effect, firms that expect a relatively lasting relationship will be more careful about taking advantage of their partners (Axelrod, 1984; Heide & Miner, 1992; Joskow, 1987). Should a partner be found appropriating others' knowledge-based resources to an undue extent, its equity stake may be held as hostage. Thus, equity investments provide some protection against the unintended transfer of partners' tacit knowledge.

We believe firms will prefer minority equity alliances when they have primarily knowledge-based resources to contribute to the alliance and their partners have primarily property-based resources. Contract-based alliances will be less attractive in such cases, because they do not offer sufficient safeguards against opportunistic behavior regarding knowledge-based resources.

In this situation, equity joint ventures will also not be preferred, for two reasons. First, there are no substantial knowledge-based resources contributed by the partners available for exploitation. Second, there are altogether too much of one's own knowledge-based resources that the partner could potentially appropriate, making it too risky to form a joint venture.

P2b: A partner firm will prefer a minority equity alliance if, in the prospective alliance, its primary resources are knowledge-based and its partner's primary resources are property-based.

Bilateral Contract-Based Alliances

Because equity joint ventures facilitate the process of transferring knowledge-based resources, they can be a disadvantage if both partners have substantial knowledge-based resources in an alliance. Thus, equity joint ventures may be too risky a choice in such situations. First, a firm would be concerned that its own tacit knowledge could be significantly appropriated by its partner firm. The tacitness and complexity of these knowledge-based resources, which once constituted the barriers to imitability, can no longer effectively prevent partners from secretly capturing these resources. Working closely with each other, firms are now exposed to the covetous intentions of their partners. In this sense, equity joint ventures can amount to too high a price to pay for learning others' know-how.

Second, when both partners have primarily knowledge-based resources for an alliance, they will be prepared to see the alliance, whether or not it is a joint

venture, becoming a learning race (Hamel, 1991). Also, the partners will be likely to believe in their ability to be the leader in such a learning race. Scholars suggest that once learning has been accomplished, alliances are likely to be intentionally terminated (Inkpen & Beamish, 1997). Hence, contract-based alliances, which are much easier to dissolve, will be preferred over equity joint ventures and minority equity alliances.

Between the two types of contract-based alliances, the better choice is bilateral contract-based alliances if the mission is one of learning. In alliances such as joint production, joint R&D, and joint marketing and promotion, there are many more opportunities for learning than in unilateral contract-based alliances such as licensing and subcontracting.

P2c: A partner firm will prefer a bilateral contract-based alliance if both partner firms' primary resources in the prospective alliance are knowledge-based.

Unilateral Contract-Based Alliances

Unilateral contract-based alliances include licensing, subcontracting, and distribution agreements, and so on. As we noted, their distinct characteristic is a comparatively light engagement of the partners. In alliances such as licensing agreements, the transfer of tacit knowledge will be difficult "because the very knowledge that is being transferred is organizationally embedded" (Kogut, 1988: 323). More "engaged" alliance forms are needed if the purpose of entering into an alliance is to secretly acquire knowledge-based resources.

Following this logic, we argue that unilateral contract-based alliances will be preferable when both partners intend to contribute primarily property-based resources to a prospective alliance. Property-based resources refer to capital, plants, distribution channels, patents, copyrights, and so on. Because both firms expect to contribute property-based resources, the alliance is essentially an exchange of property rights (e.g., money for a patent). As such, a less engaged alliance form should serve well. Since neither firm will be interested in secretly acquiring the other's tacit knowledge, there will be little need for a bilateral contract-based alliance. Unilateral contract-based alliances will provide the requisite clarity for exchange of property rights. For example, if financing for distribution channels is needed, then a distribution agreement will suffice. Supporting this view, Tallman and Shenkar (1990) report that contract-based alliances are preferred when the aim is one of transferring explicit knowledge, one type of property-based knowledge.

P2d: A partner firm will prefer a unilateral contract-based alliance if both partner firms' primary resources regarding the prospective alliance are property-based.

Inter-Partner Resource Alignment and Alliance Performance

We have, thus far, discussed the impact of individual firms' resource profiles on alliance formation and alliance structural preference. The resource-based logic

suggests that the competitive advantage of alliances is based on the effective integration of the partner firms' valuable resources. Consequently, the way resources are aggregated will significantly influence the performance of the alliance (Hagedoorn, 1993).

Performance of strategic alliances can be measured in several different ways, such as alliance longevity (Beamish, 1987) and profitability (Reuer & Miller, 1997). Some studies have evaluated alliance performance in terms of meeting the objectives of individual partner firms (Dollinger & Golden, 1992; Thomas & Trevino, 1993). Clearly, then, the performance of an alliance can be evaluated differently by each partner firm. To get around this problem, other studies have used the alliance *per se* as the unit of analysis for alliance performance, and have measured alliance goal achievement in terms of new product development (Deeds & Hill, 1996) and alliance profitability (Cullen, Johnson, & Sakano, 1995). In this article, we adopt the latter approach and view alliance performance as the degree to which agreed objectives of an alliance are achieved. We examine how the performance of alliances may be particularly influenced by resource alignment among partner firms.

Partner Resource Alignment

Research using the strategic behavior model has mostly emphasized the concept of "strategic fit" among the partners—that is, highly compatible goals and appropriate competitive positions (Harrigan, 1988a). Medcof (1997: 720) considers this strategic fit between alliance partners in terms of "a shared understanding of the business rationale for the alliance." In contrast, we argue that the critical test, in terms of the resource-based view, is whether there is a "resource alignment" among the firms. As Seabright, Levinthal, and Fichman note (1992: 124), the criterion for partner selection is "the fit between one organization's resource needs and another's resource provision, relative to an opportunity set." They report that changes in partners' resource requirements, resource provisions, and sets of alternative partners increase the chances of dissolution in existing alliances.

Partner resource alignment refers broadly to the pattern, whereby the resources of partner firms are matched and integrated in an alliance. This pattern defines the resource-based relationship between the partners. Although researchers discuss resource alignment between partners (Beamish, 1987; Bucklin & Sengupta, 1993; Lei, 1993), the term "alignment" is often restricted to a supplementary or complementary pattern—that is, bringing in similar or dissimilar resources.

This approach makes the clear assumption, largely unstated, that only resources related and useful to an alliance should be considered. In this article, we propose that a comprehensive view of partner resource alignment should also include an examination of those resources that are not performing. A broader and more refined interpretation of resource alignment should include the value-creating aspect of resource integration. That is, not all contributed resources can be used effectively in an alliance. Similar is not the same as supplementary, and dissimilar is not the same as complementary. Accordingly, we believe that the

concept of resource alignment should encompass both resource similarity and resource utilization.

Resource similarity in alliances is defined as the degree to which two partner firms contribute resources “comparable, in terms of both type and amount,” to an alliance (Chen, 1996: 107). Resource similarity will be high if two partners contribute comparable amounts of similar types of resources to an alliance. For example, in joint bidding agreements, both partners contribute their manufacturing capacity. In contrast, in licensing agreements, resource similarity will be low, as one partner provides money and the other offers patented design or technology.

Resource utilization, on the other hand, is the degree to which the resources contributed by the partners are utilized for achieving the goals of the alliance. The resource utilization dimension distinguishes performing resources from non-performing resources. Performing resources are essential for alliance operation; they are, by definition, put to full use. By comparison, non-performing resources remain idle in the alliance; they are brought into the alliance mainly because they are not separable from certain other needed resources. For example, firms often have joint production agreements, in which both contribute manufacturing facilities to the alliance. Excess capacities associated with those facilities may have to be wasted, at least for the time being.

In contrast to the two types of alignment (complementary and supplementary) emphasized in the literature (Harrigan, 1988b; Hill & Hellriegel, 1994), the two dimensions in Table 4 suggest four types of partner resource alignment: supplementary, surplus, complementary, and wasteful.

Resource alignment between partners is supplementary when the firms contribute similar resources that are performing in the alliance. For example, both partners may contribute financial resources that are essential for the formation of a joint venture. A supplementary alignment can provide risk sharing (Hill & Hellriegel, 1994), market power, entry deterrence, and economies of scale and scope in such areas as R&D activities, production, and marketing. Thus, an integration of supplementary resources could lead to synergy—that is, create more value in the integrated condition than the sum of the separate values of the resources with individual firms.

When partner firms contribute similar resources that are not utilized fully in an alliance, the alignment is called surplus because of slack. Slack has been defined as “the pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output” (Nohria &

Table 4. A Typology of Inter-Partner Resource Alignments

<i>Resource Similarity</i>	<i>Resource Utilization</i>	
	<i>Performing Resources</i>	<i>Nonperforming Resources</i>
Similar Resources	Supplementary [Similar-Performing]	Surplus [Similar-Nonperforming]
Dissimilar Resources	Complementary [Dissimilar-Performing]	Wasteful [Dissimilar-Nonperforming]

Gulati, 1996: 1246). On the one hand, certain resources, such as manufacturing capacity, are often mingled with other resources, such as physical resources. Thus, when partners contribute these types of resources, it is possible that a certain amount is redundant and not needed initially in the alliance. As such, surplus is often not a positive resource alignment, as useful resources are not being utilized to their full potential. On the other hand, though, partner firms may deliberately have some surplus in an alliance, in order to provide themselves with some cushion against unforeseen adverse conditions and to engage in some risk taking (Singh, 1986).

Complementary alignment has been the most widely acknowledged type of alignment in alliances (Brouthers, Brouthers, & Wilkinson, 1995; Lei, 1993). For instance, in joint ventures, complementarity has been defined as “the extent to which the joint venture partners bring non-redundant distinctive competencies to the partnership” (Hill & Hellriegel, 1994: 595). Complementarity may refer to the same major resource type (such as technology), as long as the nature of the resources is different (Helfat, 1997). Doz (1988: 324), for instance, discusses “technological complementarity” among partners. Researchers argue that synergy may be created when firms bring different resources to the table (Harrison et al., 1991; Medcof, 1997; Stafford, 1994). Implicit in this notion is the belief that resource dissimilarity is necessarily related to better alliance performance (Hill & Hellriegel, 1994; Olk, 1997). We argue that complementary alignment is not equivalent to resource diversity, as dissimilar resources may not be compatible (Parkhe, 1991). We suggest that complementary alignment exists under two conditions: the resources have to be dissimilar and also be performing. In other words, to be complementary, different resources need to be compatible and be pressed into effective service (i.e., utilized).

When different resources are not compatible or not used fully, we call it a wasteful resource alignment. One type of wasteful alignment results from incompatibility—that is, when different resources of firms cannot be effectively integrated. For example, managerial knowledge provided by one firm may fail to be adopted by its partner because of differences in strategic orientations and organizational structures. This kind of incompatibility is akin to Type II diversity, as suggested by Parkhe (1991), in regard to counterproductive differences between partners. Another form of wastefulness—somewhat like surplus—refers to potentially compatible resources that are not fully utilized in an alliance because they are surplus to needs.

Resource Alignment and Alliance Performance

Scholars do not seem to agree about the nature of the relationship between resource alignment and alliance performance. On the one hand, Harrigan (1988b) suggests that significant partner asymmetries—that is, a complementary alignment—may have a positive effect on alliance stability, but a negative effect on alliance performance. The empirical results relating to these effects are limited and inconsistent. Olk (1997) also hypothesizes a negative relationship between alliance performance and partner differences (i.e., complementary alignment) in

terms of technology, research location, industry, etc. Overall, he found no empirical support.

On the other hand, Hill and Hellriegel (1994) hypothesized a positive relationship between a complementary resource alignment and alliance performance but found no empirical support either. We suggest that alliance performance should be examined through the proposed four types of partner resource alignment. Also, we believe that partner resource alignment affects alliance performance through two critical variables: collective strengths and inter-firm conflicts.

Collective Strengths. Collective strengths are the amounts of relevant valuable resources possessed by the alliance. In essence, strategic alliances are formed to take advantage of the joint power of the partners. Collective strengths provide opportunities for partners to create value for their resources. Thus, collective strengths describe the alliance's overall resource endowments and capabilities. Sankar et al. (1995), for example, discussed the product strengths and service strengths of a successful alliance between TSYS and UCS. Indeed, collective strengths may be reflected in all types of resources, such as market power (Luo, 1997), technology (Blodgett, 1991), and so on.

Partner firms' collective strengths, or the overall resources and competencies of the alliance, contribute to better alliance performance (Beamish, 1987). From a resource-based point of view, the very objective of forming alliances is to join forces with partners in order to pursue market opportunities that are otherwise beyond reach. The advantage of strategic alliances over single-firm strategies is the ability to draw upon the strengths of more than one firm, and therefore, to ensure that the alliances have better odds for success.

Inter-firm Conflicts. The importance of inter-firm conflicts in strategic alliances has been widely recognized in the literature (Bucklin & Sengupta, 1993; Hardy & Phillips, 1998; Kogut, 1988). One type of inter-firm conflict is in terms of competing interests. Stopford and Wells (1972) discuss the conflict between a multinational firm and its local partner regarding control. Other issues, such as incompatible goals, disagreements regarding resource allocation, and opportunistic behavior, can all lead to inter-firm conflicts (Cullen et al., 1995). Kogut (1989) notes that competitive conflict in joint ventures may take place in areas such as knowledge imitation and competition in downstream markets.

Khanna, Gulati, and Nohria (1998) suggest that there are two types of benefits in alliances: private benefits and common benefits. Clearly, private benefits give rise to potential conflicts of interest in alliances. One can perhaps argue that, because partner firms' objectives in an alliance are not usually completely congruent, a certain degree of conflict is inevitable. This is why relational contracting theorists suggest that inter-firm trust and mutual forbearance are important for controlling potential conflicts in cooperative arrangements (Buckley & Casson, 1988; Ring & Van de Ven, 1992, 1994).

The other type of inter-firm conflict is in terms of the diversity of the partners that creates problems for cooperative activities (Olk, 1997; Parkhe, 1991). According to Whetten (1981: 17), coordination costs "increase as a function of differences between the collaborating organizations." Firms cannot work together

very well if they are too different in organizational cultures, managerial practices, strategic orientations, and technological systems (Harrigan, 1988b; Park & Ungson, 1997).

Researchers often suggest that inter-firm conflicts lead to unsatisfactory alliance performance (Bucklin & Sengupta, 1993; Habib & Burnett, 1989; Zaheer, McEvily, & Perrone, 1998). Our view is more fine-grained, in the sense that we have suggested that inter-firm conflicts can be both interest conflicts and operational conflicts. Both types are detrimental to alliance performance. First, when partner firms have different and competing interests in the alliance, their incentive and willingness to work together will be reduced. Park and Russo (1996) report that alliances formed by direct competitors are more likely to fail. When firms have competing objectives in alliances, it becomes very difficult for both partners to achieve their goals. Hatfield and Pearce (1994) found that the satisfaction of joint venture partners is positively related to their goal overlap. Partners may get involved in political activities in order to get ahead in conflicting situations, leading to poor cooperation and performance (Pearce, 1997).

Second, operational conflicts result from different and incompatible organizational cultures and operational practices of the partners, which reduce the effectiveness of the alliance (Olk, 1997). Firms have to allocate considerable time and energy to conflict resolution activities. Although conflict resolution behaviors have been found to be helpful (Thomas & Trevino, 1993), they are nevertheless "non-value-enhancing activities" that make the alliance less competitive (Zaheer et al., 1998: 146).

Alliance Performance. We now turn to the effects of partner resource alignment on collective strengths and inter-firm conflicts, which in turn affect alliance performance. Both supplementary alignment and complementary alignment have a positive effect on the collective strengths of the alliance. We noted earlier that researchers often stress the value of complementary alignment in the success of alliances (Deeds & Hill, 1996; Harrigan, 1985). The reason is that, in such an alignment, partners bring in something unique and non-redundant to the alliance, so that the overall resource base of the alliance becomes stronger (Hill & Hellriegel, 1994). The benefits of a supplementary alignment are not adequately recognized in the literature (Olk, 1997). It can be argued that the more individual firms contribute supplementary resources to an alliance, the more they accumulate critical resources that would not, as a result, be easily available for deployment elsewhere. Since all such resources are of the performing kind (see Table 4), the employment of these supplementary resources in the alliance suggests the pursuit of a value-creating strategy. Supplementarity of resources, in this sense, is always beneficial to effective alliance performance.

Furthermore, supplementary and complementary resources are not significantly related to inter-firm conflicts, because additional performing resources do not necessarily reduce or increase interest conflicts between partners. Nor do they reduce, or increase, operational conflicts between the partners.

P3a: Alliance performance is positively related to supplementary alignment.

P3b: Alliance performance is positively related to complementary alignment.

Furthermore, additional surplus and wasteful resources will not contribute to the collective strengths of an alliance, mainly because these resources by definition are not performing. These resources are essentially wasted and do not make the alliance more competitive. Surplus and wasteful resources may be difficult to avoid in alliances, since certain physical and technological resources cannot be easily separated. In any case, the surplus resources do not add to the alliances' collective strengths.

Nevertheless, we believe that more surplus in an alliance will help reduce inter-firm conflicts. With more surplus in the alliance, resource constraints will be less rigid, and the different interests of partners can be better accommodated. Because the alliance has more resources to spare, there is less need to fight for favorable resource allocation in the alliance. Researchers have found that organizations with more surplus are more able to decentralize decision-making (Singh, 1986). Decentralization in alliances means that partners will have more autonomy in deciding what to do in an alliance, thus reducing conflicts in operating the alliance.

P3c: Alliance performance is positively related to surplus alignment.

Conflicts between partner firms tend to increase with a wasteful alignment, because wasteful resources often suggest a lack of compatibility in the different resources contributed by the partners. As we noted earlier, one type of inter-firm conflict results from differences between partners that are counter-productive to alliance operations (Park & Ungson, 1997). This diversity includes various types of strategic orientations, managerial practices, organizational cultures, and so on (Parkhe, 1991). These dissimilar resources of firms are an obstacle to smooth cooperation. Thus, the more this kind of resources and wasteful alignment, the more inter-firm conflicts will occur in an alliance.

P3d: Alliance performance is negatively related to wasteful alignment.

Implications for Research and Managerial Practice

In this section, we discuss the following: (1) the lines along which empirical explorations may be carried out to test the various propositions, including observations on the operationalization of the key variables; (2) future research directions; and (3) managerial implications of the theory presented here.

Suggestions for Empirical Testing

Several issues need to be considered in order to test empirically the proposed theory. Given the nature of the data that would be relevant, a survey procedure with top-level alliance executives seems to be most appropriate. The nature of the constructs (e.g., resource alignment and alliance structural preferences) makes it exceedingly difficult to access secondary data with sufficient validity.

The operationalization of resource-based constructs has been a major problem in the literature (McGrath, 1996). Almost all published studies on the resource-based view used proxies from secondary data, such as the data on constructs like physical resources and intangible resources (Chatterjee & Wernerfelt, 1991) and resource imitability (Maijoor & Van Witteloostuijn, 1996; Miller & Shamsie, 1996). These proxies are highly industry-specific, so that most of the measures developed cannot be used for cross-industry studies. No general survey measures for the key resource constructs have been established in the literature, principally because these constructs remain non-codifiable (Reed & DeFillippi, 1990).

As such, we suggest that efforts should be focused on developing relevant resource-based measures suitable for gathering survey data. The process should, of course, begin with the theoretical definitions. For example, to test Proposition 1, researchers need to develop descriptions of the nature of resource mobility, imitability, and substitutability in consonance with the theoretical discussions of these concepts (e.g., as in Amit & Schoemaker, 1993; Barney, 1991). The other approach is to use proxies. Referring to Table 2, various resources may be coded as having different degrees (i.e., high, medium, and low) of mobility, imitability, and substitutability.

For Proposition 2, the measure for resource types can be several Likert-type items asking respondents the degree (or amount) to which each partner contributes the following types of resources: financial, physical, human, patents and copyrights, technological, managerial, employee skills, and knowledge of business environment (as in Grant, 1991; Hofer & Schendel, 1978). While the first four types can be classified as property-based resources, the latter four are knowledge-based resources. Regarding alliance structural preferences, the survey researchers can directly ask each partner firm for their original structural preference in the alliance, which is not necessarily reflected in the current structural status.

Finally, in respect of Proposition 3, which deals with partner resource alignment and alliance performance, we note that established measures of alliance performance are abundant in the literature (e.g., Geringer & Hebert, 1991; Glaister & Buckley, 1998; Mjoen & Tallman, 1997). Resource alignment is made up of the dimensions of resource similarity and resource utilization. Resource similarity can be derived from the previous question on resource type—that is, by aggregating differences in each type of resource contributed to the alliance by the partners. The extent of resource utilization can be provided by the partner firms in terms of how much of each type of contributed resources is being actively utilized in the alliance.

Future Research Directions

Although we have attempted to present a fairly comprehensive resource-based theory of strategic alliances, there are two significant issues that researchers need to address in the future. First, the four principal components of the theory need to be integrated in a more thorough manner than has been achieved here. Although these represent separate aspects of strategic alliances, one can argue that they may share common resource-related factors. Currently, these aspects are

linked merely through the logic of the resource-based perspective. It is a plausible expectation that alliance formation may affect alliance structure, which in turn may affect alliance performance, and so forth. Hence, future research may explore the arguments for integrating more definitively the various parts of the theoretical framework.

Second, although our resource-based theory offers new insights into strategic alliances, it needs to be synthesized with other views of alliance making, including the market-based view and the risk-based view (Das & Teng, 1997b, 1999a). Empirical research, in a spirit of comparison, needs to be carried out to assess the relevancy and explanatory power of both approaches. A comprehensive theory of strategic alliances should, we feel, include both resource and market factors (Das & Teng, 1999b).

Managerial Implications

The resource-based theory proposed here is a call to alliance managers to focus on the internal environment of partner firms. According to the resource-based view, the competitive advantage of a firm is built upon their unique resources and resource combinations. Alliances are formed to achieve superior resource combinations that single firms cannot. Thus, alliance managers need to understand how resources affect alliance formation, structure, and performance.

We have noted that alliance formation is facilitated by several resource characteristics: imperfect mobility, imitability, and substitutability. Firms with these resource characteristics will be highly in demand as alliance partners. Alliance managers should, therefore, examine the degree to which the resources of their own firm and of other firms have these characteristics. This would enable alliance managers to better understand why other firms are interested in forming alliances with them, and also who are the most desirable and likely candidates as alliance partners (Das & Teng, 1997a).

In determining alliance structure, alliance managers should again examine the resource profiles of their own firm and of the potential partner firms. Using our four-part alliance structural typology, managers should find it a relatively simple process to focus on the evaluation of different property-based and knowledge-based resources. This part of the exercise should be of particular benefit to alliance managers because they may not be aware of all the structural options that are available and may not have a systematic way of selecting the most appropriate structure under given circumstances.

In addition, our theory informs alliance managers of the importance of resource alignment for alliance performance. Managers can now systematically evaluate their options for optimum allocations of firm resources for potential alliances to achieve suitable alliance resource alignments. If in an alliance already, managers can examine the contributed resources in an alliance and explicitly assess the degree to which the alliance has the four types of resource alignment. They can also, for instance, take note of the fact that wasteful alignment is detrimental to alliance performance and decide ways to modify this type of resource alignment.

Concluding Remarks

We proposed and discussed here the four essential components of a resource-based theory of strategic alliances: rationale, formation, structural preferences, and performance. Existing studies of alliances from a resource-based perspective have been, at best, limited in scope and divergent in their approaches. Our proposed theory attempts to synthesize the various fragmented findings in the literature.

As compared to other major theories relating to strategic alliances, we believe the resource-based view can make particularly valuable contributions. We noted that, whereas transaction cost economics and the resource-based view share a concern about the characteristics of a firm's internal elements, the aim of transaction cost economics is to minimize the costs involved in inter-firm transactions. Such a view has been criticized for paying exclusive attention to cost minimization and neglecting value-creation in strategic alliances. In contrast, the resource-based view suggests that the rationale for alliances is the value-creation potential of firm resources that are pooled together. In accord with this, we noted that certain resource characteristics—that is, imperfect mobility, imitability, and substitutability—promise accentuated value-creation and thus facilitate alliance formation.

In terms of alliance structure, a resource-based view suggests that the resource profiles of partner firms would determine their structural preferences. Transaction cost economics (TCE), by comparison, predicts only alliance structural outcomes. Also, whereas TCE holds that alliance performance is determined by the nature of transactions performed by the alliance, the resource-based view proposed here emphasizes the significant role of partner resource alignment. We proposed a new typology of partner resource alignment based on the two dimensions of resource similarity and resource utilization, yielding four types of alignment: supplementary, surplus, complementary, and wasteful. We discussed how partner resource alignment directly affects collective strengths and inter-firm conflicts in alliances, which in turn contribute to alliance performance. These latter issues are not covered by the TCE approach.

We also noted that in our proposed resource-based theory, as in other theories, strategic alliances are employed to secure a favorable competitive position vis-à-vis rivals. Most other theories, however, such as agency theory, strategic behavior theory, and game theory, fail to meaningfully distinguish between cooperative strategies (such as strategic alliances) and other single-firm strategies. The advantage of our resource-based theory is that it recognizes and incorporates this critical difference—that is, in strategic alliances the partners intend to obtain access to other firms' resources rather than employ only their own resources. In forming strategic alliances, the firms are complemented or supplemented by other firms' resources, even when this inevitably attracts some non-performing surplus and wasteful resources, enabling them to exploit jointly their combined competitive advantage.

We attempted in this article to provide the argument and the ingredients for a general resource-based theory of strategic alliances. We also developed prop-

ositions from the proposed theoretical framework to facilitate empirical testing, suggested ways to carry out this testing, indicated future research directions, and listed some of the more significant managerial implications of the framework. The tentative insights from our resource-based theory will, we hope, provide the impetus for a new way of thinking about strategic alliances.

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