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ALLIANCES AND NETWORKS

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This paper introduces a social network perspective to the study of strategic alliances. It extends prior research, which has primarily considered alliances as dyadic exchanges and paid less attention to the fact that key precursors, processes, and outcomes associated with alliances can be defined and shaped in important ways by the social networks within which most firms are embedded. It identifies five key issues for the study of alliances: (1) the formation of alliances, (2) the choice of governance structure, (3) the dynamic evolution of alliances, (4) the performance of alliances, and (5) the performance consequences for firms entering alliances. For each of these issues, this paper outlines some of the current research and debates at the firm and dyad level and then discusses some of the new and important insights that result from introducing a network perspective. It highlights current network research on alliances and suggests an agenda for future research.© 1998 John Wiley & Sons, Ltd.

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INTRODUCTION

Strategic alliances between firms are now a ubiquitous phenomenon. Their proliferation has led to a growing stream of research by strategy and organizational scholars who have examined some of the causes and consequences of such partnerships, mostly at the dyadic level. In this article I don't intend to review this vast and burgeoning field of research (for a review, see Auster, 1994). Instead, I will develop a social network perspective on some of the key questions associated with strategic alliances, going beyond the dyadic level to the larger network in which alliances are embedded. I will discuss how this perspective provides new insights on important factors that may influence the behavior and performance of firms. I define strategic alliances as voluntary arrangements between firms involving exchange, sharing, or codevelopment of products, technologies, or services. They can occur as a result of a wide range of motives and goals, take a variety of forms, and occur across vertical and horizontal boundaries. While I focus here on highlighting the importance of a social network perspective on strategic alliances, I will also discuss some of the valuable contributions and current research debates at the firm and dyad level for each of the key questions. This discussion of research on strategic alliances admittedly reflects my own biases and research preferences, and there is a large amount of research on this topic that will not fall under my purview.

From a strategic standpoint, some of the key facets of the behavior of firms as it relates to alliances can be understood by looking at the sequence of events in alliances. This sequencing includes the decision to enter an alliance, the choice of an appropriate partner, the choice of structure for the alliance, and the dynamic evolu-

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tion of the alliance as the relationship develops over time. While all alliances may not necessarily progress through the same sequence of events, nonetheless, the decisions involved constitute some of the key behavioral issues that arise in alliances. Mirroring this sequence are the following relevant research questions: (1) Which firms enter alliances and whom do they choose as partners? (2) What types of contracts do firms use to formalize the alliance? and (3) How do the alliance and the partners' participation evolve over time?

A second important issue for alliances is their performance consequences, both in terms of the performance of the alliance relationship itself and the performance of firms entering alliances. Two research questions focus on the performance issue: (1) What factors influence the success of alliances? and (2) What is the effect of alliances on the performance of firms entering them?

In this paper I will discuss these five critical questions for the study of strategic alliances and, for each, I will discuss current research efforts at both the dyadic and network levels and highlight some of the insights that result from a network perspective on the study of strategic alliances. Introducing networks into our calculus of the alliance behavior of firms allows an examination of both the innate propensities or inducements that lead firms into alliances and also the opportunities and constraints that can influence their behavior.

The notion that a firm's social connections guide its interest in new alliances, and provides it with opportunities to realize that interest, is closely rooted in the processes that underlie a firm's entry into new alliances. I first observed this when I was conducting field interviews at a number of firms with multiple alliances and found that firms don't necessarily follow the sequence of events that is usually offered for alliances (Gulati, 1993). A firm on its own initiative identifies the need for an alliance, identifies the best partner available, and chooses an appropriate contract to formalize the alliance. Rather, I observed that many new opportunities for alliances were presented to firms through their existing sets of alliance partners. In the instances in which firms independently initiated new alliances, they turned to their existing relationships first for potential partners or sought referrals from them on potential partners. The manner and extent to which firms were embedded were likely to influence several key decisions, including the frequency with which firms entered alliances, their choice of partner, the type of contracts used, and how the alliance developed and evolved over time. My fieldwork suggested that the social networks of prior ties not only influenced the creation of new ties but also affected their design, their evolutionary path, and their ultimate success.

A BRIEF CRITIQUE OF PRIOR RESEARCH ON ALLIANCES

Prior research on alliances has led to valuable insights on the behavior of firms in alliances and the performance consequences from such partnerships. Three related themes run across these prior efforts. First, the unit of analysis that is usually adopted is the firm or the alliance. For instance, researchers have tried to identify the attributes of firms that influence their proclivity to enter alliances or their choice of partner, or to identify the characteristics of alliances that may influence the formal contracts used to organize them.

A second and related theme has been examining the formation and performance of alliances in an asocial context. The role of the external environment is usually encapsulated within measures of competitiveness in product or supplier markets. For instance, from a transaction costs standpoint, this translates to the argument that the lower the competition, the more likely that a firm will be exposed to 'small numbers bargaining' and other forms of opportunistic behavior (Williamson, 1985). Resource dependence theorists, similarly, make the case that at intermediate levels of industry concentration, firms experience high levels of competitive uncertainty and are likely to mitigate this competitive interdependence by entering into frequent joint ventures (Pfeffer and Nowak, 1976a). Finally, prior research on alliances has focused primarily on firm- and industry-level factors that impel firms to enter alliances. In his seminal book, Andrews (1971) claimed that the strategic actions of firms are the outcome of a match between a firm's existing competence and the availability of new opportunities. For the study of alliances, scholars have primarily focused on the existing competence (or lack thereof) that may propel firms to enter into new alliances, but they have

generally paid less attention to factors that may lead to the availability of and access to alliance opportunities in the first place. Thus, in Andrews' terms, they have focused primarily on the competence side of the conditions that propel strategic actions and not on the conditions that determine the opportunity set firms may perceive.

The focus on the firm or alliance as the unit of analysis and the description of external context in competitive terms has typically assumed an atomistic notion of firms evaluating alternative courses of action and does not take into account the actions of other firms or the relationships in which they themselves are already embedded. Moreover, it ignores the interactive elements of the market, whereby participants discover market information through their interactions in the market (Hayek, 1949; White, 1981). It is important to recognize that although strategic alliances are essentially dyadic exchanges, key precursors, processes, and outcomes associated with them can be defined and shaped by the social networks within which most firms are embedded. There is a rich strand of research in economic sociology that has devoted itself to explaining how economic actions may be influenced by the social structure of ties within which they are embedded (e.g., Granovetter, 1985). Sociologists have convincingly demonstrated that the distinct social structural patterns in exchange relations within markets shape the flow of information (White, 1981; Burt, 1982; Baker, 1984). This in turn provides both opportunities and constraints for firms and can have implications for their behavior and performance. Viewed from this standpoint, much of the research on strategic alliances represents an undersocialized account of firm behavior.

In recent years there has been a growing interest in understanding the influence of the social context in which firms are embedded on their behavior and performance. A number of researchers have explicitly incorporated embeddedness, broadly defined, into our understanding of strategic management questions relating to the behavior and performance of firms (for a collection of recent articles, see Baum and Dutton, 1996). The social context in which firms are embedded includes a whole array of elements that can be classified broadly as structural, cognitive, institutional, and cultural (Zukin and DiMaggio, 1990). While each of these facets can be significant, my focus in this paper will be on the structural context, which highlights the significance of the social networks in which economic actors may be placed. Prior to discussing the key questions for the study of alliances, I will provide a general theoretical perspective for examining the implications of social embeddedness on firm behavior and performance.

SOCIAL STRUCTURE AND THE EMBEDDEDNESS OF FIRM BEHAVIOR

Building on an open systems perspective first put forward by organizational theorists, structural sociologists have suggested that the most important facet of an organization's environment is its social network of external contacts (for a review, see Powell and Smith-Doerr, 1994). They emphasize the fact that economic action—like any other form of social action—does not take place in a barren social context but, rather, is embedded in social networks of relationships. A social network can be defined as 'a set of nodes (e.g., persons, organizations) linked by a set of social relationships (e.g., friendship, transfer of funds, overlapping membership) of a specified type' (Laumann, Galaskiewicz, and Marsden, 1978: 458).

Network perspectives build on the general notion that economic actions are influenced by the social context in which they are embedded and that actions can be influenced by the position of actors in social networks. Embeddedness refers to

> the fact that exchanges and discussions within a group typically have a history, and that this history results in the routinization and stabilization of linkages among members. As elements of ongoing social structures, actors do not respond solely to individualistically determined interests … a structure of relations affects the actions taken by the individual actors composing it. It does so by constraining the set of actions available to the individual actors and by changing the dispositions of those actors toward the actions they may take. (Marsden, 1981: 1210)

Underlying embeddedness is the quest for information to reduce uncertainty, a quest that has been identified as one of the main drivers of organizational action (Granovetter, 1985). Networks of contact between actors can be important

sources of information for the participants, and what can matter is not only the identity of the members of a network but also the pattern of ties among them.

There have been four broad foci of prior research on the influence of social networks: inequality, embedding, contagion, and contingency (Burt *et al*., 1994). Research on inequality suggests how network connections can explain differences in the resources available to individuals, groups, or organizations, while research on embedding describes the institutions and identities resulting from networks and how they enable difficult transactions. The research on contagion has shown how networks can promote behavioral conformity by serving as conduits for both technological and social information about organizational activities, which in turn can influence the extent to which they adopt new innovations (Davis, 1991; Haunschild, 1992). Finally, contingency approaches suggest how social networks can moderate key organizational processes. While all four perspectives focus primarily on the consequences of embeddedness in social networks, recent accounts have also begun to consider some of the bases for the origin of these networks.

There are two broad analytical approaches for examining the influence of social networks. The first emphasizes the differential informational advantages bestowed by social networks, while the second highlights the control benefits actors can generate by being advantageously positioned within a social network. These two benefits are analytically distinct but also overlap, since much of the control benefit can arise from the manipulation of information (Burt, 1992: 78). Networks may provide informational benefits through two mechanisms (Granovetter, 1992). Relational embeddedness or cohesion perspectives on networks stress the role of direct cohesive ties as a mechanism for gaining fine-grained information. Actors who share direct connections with each other are likely to possess more common information and knowledge of each other. Structural embeddedness or positional perspectives on networks go beyond the immediate ties of firms and emphasize the informational value of the structural position these partners occupy in the network. Information travels not only through proximate ties in networks, but through the structure of the network itself. Both mechanisms have generally been applied to explain similarities in the attitudes and behavior of actors resulting from the sharing of information through networks (e.g., Burt, 1987).

Relational embeddedness typically suggests that actors who are strongly tied to each other are likely to develop a shared understanding of the utility of certain behavior as a result of discussing opinions in strong, socializing relations, which in turn influence their actions (Coleman, Katz, and Menzel, 1966). Cohesively tied actors are likely to emulate each other's behavior. Cohesion can also be viewed as the capacity for social ties to carry information that diminishes uncertainty and promotes trust between actors (Granovetter, 1973; Podolny, 1994; Gulati, 1995a; Burt and Knez, 1995). Thus, cohesive ties can become a unique source of information about the partner's capabilities and reliability.

Structural embeddedness focuses on the informational role of the position an organization occupies in the overall structure of the network. Consequently, the frame of reference shifts from the dyad and triad to the system (Marsden and Friedkin, 1993). In network analysis, the position an actor occupies in the structure is a function of the actor's relational pattern in this network. Actors occupying similar positions need not be tied with each other. Instead, they are likely to be tied to the same set of other actors or to similar sets of other actors, and there is a whole array of network measures to capture the position an actor occupies in a network.

Scholars have frequently linked the position actors occupy to the notion of 'status' and suggested that actors occupying similar positions reflect distinct status groups (Podolny, 1993, 1994). In sociological terms, status evokes a series of observable characteristics associated with a particular position, or 'role,' in a social structure, that entails a relatively defined set of expected behaviors toward other actors. Because an actor's status is based on its affiliations and patterns of interaction, it is affected by its web of affiliations and by the status of its exchange partners. When focusing on an interorganizational context, we can also view status as an attribution of the quality of products an actor–organization provides when the quality cannot be directly observed (Podolny, 1993). Following a similar logic, the observable features associated with a certain status can also become an important signal of how members of that status are likely to behave. Thus, status groupings resulting from

network position can provide powerful informational cues for actors about the likely behavior of others in the network.

Both perspectives of relational and structural embeddedness highlight the informational advantages social networks can confer on certain actors. Another view of networks highlights the control benefits actors can receive and has been developed furthest in the work of Burt (1992). An actor in a social network can derive control advantages by being the *tertius gaudens*, or one who is situated between two other actors. This can occur either when two or more actors are after the same relationship with a focal actor, as is the case when multiple firms want to enter an alliance with a given firm, or can occur when an actor is the tertius in separate relationships with two actors with conflicting demands, as may occur for a firm that has separate alliances with two independent firms that may create conflicting demands. In both such instances, firms in the tertius role can create advantages for themselves by playing one off against the other and brokering tension between the other players. These advantages can translate into concrete benefits in the form of favorable terms in their exchange relationships with partners.

While the original focus of network research was on understanding how the embeddedness of individuals influences their behavior, a similar argument has been extended to organizations (e.g., Burt, 1982; Walker, 1988; Mizruchi, 1992; Gulati, 1995b). Firms can be interconnected with other firms through a wide array of social and economic relationships, each of which can constitute a social network. These include supplier relationships, resource flows, trade association memberships, interlocking directorates, relationships among individual employees, and prior strategic alliances. While firms may be connected through a multitude of connections, each of which could be a social network, some may be more or less significant than others and researchers have rarely focused on more than one network at a time (for a review of research on interorganizational relationships, see Galaskiewicz, 1985a). To recognize the true importance of a social network, it is important to understand the nature and purpose of the network as well as the contents of information flowing through it (Stinchcombe, 1990). While much of the research on interorganizational relationships has focused on the networks of interlocking directorates (for a review, see Mizruchi, 1996), scholars have also looked at other networks, such as those between corporations and investment banks (Baker, 1990), among hospitals (Westphal, Gulati, and Shortell, 1997), among firms resulting from prior alliances (Gulati, 1995a, 1995b), and those among corporate contributions officers (Galaskiewicz, 1985b).

Only recently have scholars begun to explore the implications of the social structure resulting from intercorporate networks on strategic alliances. Strategic alliances are distinctive in that entering one constitutes a strategic action, and their cumulation can also become a social network. Thus, alliances are unique in that they can be studied as both endogenous and exogenous factors. The former can be examined by looking at the influence of social networks on the formation of alliances, while the latter can be assessed by considering the effects of the social network of cumulated alliances. Both can be examined simultaneously by assessing the influence of the social network of prior alliances on its future alliances in a longitudinal setting. Studying the development of an alliance network over time can provide unique insights into the evolution of networks, where strategic action and social structure are closely intertwined. It also allows us to examine the extent to which alliances formed by firms may lock them into path-dependent courses of action in the future. The normative side of this, of course, is that once firms understand the dynamics of alliance networks, they may choose path-creation strategies rather than becoming path-dependent (Garud and Rappa, 1994). As a result, they can visualize the desired network structure of alliances in the future and work backwards to define their current alliance strategy.

The same dual orientation is feasible for studying the performance consequences of alliances including the performance of alliances themselves and how alliances may influence the performance of partnering firms. One way to understand the performance consequences of social networks for alliances and for the firms entering them is to think of social networks as bestowing firms with 'social capital' which can become an important basis for competitive advantage (Burt, 1997). While the notion that actors possess social capital has been most developed for individuals and their interpersonal networks, the idea can easily be extended to organizations and their interorgani-

zational networks (Gulati, 1997). The benefits of social capital accrue to firms from the access to information it provides and the potential for control benefits. This information can be a powerful catalyst, providing firms with new productive opportunities to utilize the financial and human capital with which they are endowed. For instance, the informational advantages to firms from a social network can enable the creation of new alliances by three distinct means: access, timing, and referrals (Burt, 1992). Access refers to information about current or potential partners as to their capabilities and trustworthiness—an existing network can influence a firm's choice of feasible partners and its attractiveness to other firms as a partner. The availability of current information about alliance partners can also affect the partnering firms' choice of structure to formalize the alliance, as well as key processes underlying the dynamic evolution of the alliance. Timing entails having informational benefits about potential partners at the right time, which can be important when a firm seeking attractive partners must approach them at the right time and preempt their seeking alliances elsewhere. It can also alter the evolutionary path of the alliance by providing partners with information at critical junctures in the alliance, which can affect the performance of the alliance and the benefits the firm receives from the alliance. Referrals can be particularly important in alliance formation, as a firm's existing partners may refer other firms to it for alliances or to enter three-way partnerships.

In the case of alliances, firms with more social capital will not only have access to information about a larger number of alliances, but they may also be able to attract better partners who want to ally with them. Furthermore, they may be able to extract superior terms of trade because of possible control benefits that may ensue from their social capital. The informational benefits from social networks can have ramifications for the development and ultimate success of the alliance itself. Ties that are structurally embedded can have fundamentally different characteristics and life course than those that are not (Powell, 1990). Embedded ties promote greater frequency of information exchange between partners, which can affect the success of the alliance as well as the performance of firms entering them.

KEY ISSUES IN ALLIANCES

The section is organized around the five key questions that I outlined to be critical issues for studying strategic alliances. For each question, I first discuss some of the current research and debates at the firm and dyadic levels, followed by an examination of how introducing a social network perspective opens up an additional set of issues that can be considered.

The formation of alliances

In a review of some of the theoretical explanations for the formation of joint ventures, Kogut (1988a) highlighted three main motivations which are broadly applicable to other types of alliances as well: transaction costs resulting from small numbers bargaining, strategic behavior that leads firms to try to enhance their competitive positioning or market power, and a quest for organizational knowledge or learning that results when one or both partners want to acquire some critical knowledge from the other or one partner wants to maintain its capability while seeking another firm's knowledge.

Some of the early empirical studies on alliances focused on the formation of joint ventures in particular, which entail the creation of a new entity with shared equity between partners. They examined some of the strategic imperatives for joint ventures, which included the enhancement of market power and increased efficiency. Several studies focused on the incidence of such alliances across industries and the size of firms entering them. The concentration of such alliances within particular industries in the manufacturing sector and the heightened proclivity of larger firms to enter them led scholars to conclude that the quest for market power may be an important motive for such ties (e.g., Pate, 1969; Berg and Friedman, 1978). These arguments were further refined to incorporate transaction costs as an inducement for certain types of alliances (Stuckey, 1983) and knowledge acquisition as a salient motive for many alliances (Berg and Friedman, 1981).

Current studies on alliance formation have followed tradition and examined industry- and firm-level factors that could explain the frequency with which alliances occur. More detailed measures have been developed, and the domain of inquiry has expanded from joint ventures to other

types of alliances. Some of the industry-level factors linked with alliance formation include the extent of competition, the stage of development of the market, and demand and competitive uncertainty (Harrigan, 1988; Shan, 1990; Burgers, Hill, and Kim, 1993; Eisenhardt and Schoonhoven, 1996). The focus has remained on strategic factors, since empirical investigations of transaction cost and knowledge-based imperatives for alliance formation have been less tractable.

The study of firm-specific imperatives has focused on identifying some of the inducements likely to lead firms to enter alliances (for a review, see Harrigan and Newman, 1990). This has led to a rich research stream that has examined which types of firms in which industries enter what types of alliances for what reasons (Mariti and Smiley, 1983; Ghemawat, Porter, and Rawlinson, 1986; Porter and Fuller, 1986). This has been refined within a cost–benefit framework in which the costs and benefits from alliances are primarily strategic and technological and alliances materialize when the benefits exceed the costs (Harrigan, 1985; Contractor and Lorange, 1988). At the firm level, scholars have sought to show the role of resource contingencies such as strategic vulnerability and incumbency on the proclivity of firms to enter alliances (Eisenhardt and Schoonhoven, 1996; Mitchell and Singh, 1992). Other scholars have looked at firms' attributes, such as size, age, competitive position, product diversity, and financial resources, as important predictors of their propensity to enter strategic alliances with each other (Shan, 1990; Barley, Freeman, and Hybels, 1992; Powell and Brantley, 1992; Burgers *et al.*, 1993; Shan, Walker, and Kogut, 1994). The importance of resource considerations has been further refined by Kogut (1991), who suggested that many joint ventures occur as options to expand in the future and are interim mechanisms by which firms both buffer and explore uncertainty.

A second question associated with alliance behavior of firms has to do with the question of with whom firms partner. Just as a person's decision to get married is tied to the choice and availability of a specific partner, a firm's decision to enter into an alliance is closely linked with its choice of an appropriate partner and may even be determined by that partner's availability. Hence, the dyad can be a valuable unit of analysis to study the alliance behavior of firms. A research stream that has paid attention to alliance formation at this level has been resource dependence theory. A rich literature on the formation of relations among social service agencies flourished in the 1960s and 1970s (for reviews, see Galaskiewicz, 1985a; Oliver, 1990). This research built on the original open systems model of resource procurement but added an exchange perspective that suggested that organizations enter partnerships when they perceive critical strategic interdependence with other organizations in their environment (e.g., Levine and White, 1961; Aiken and Hage, 1968), in which one organization has resources or capabilities beneficial to but not possessed by the other. Applied to the dyadic context, these arguments suggest that firms sought out ties with partners who could help them manage such strategic interdependencies. Richardson (1972), in a theoretical economic account, also proposed that the necessity for complementary resources is a key driver of interorganizational cooperation.

In recent years, the focus of scholars studying interorganizational relations has shifted from social service agencies to business organizations. A strategic interdependence perspective on alliance formation suggests that firms ally with those with whom they share the greatest interdependence. To assess the significance of resource dependence at the dyadic level, researchers have linked the formation of alliances to the distribution of various kinds of capabilities within the industry, such as production, marketing, distribution, regulatory approval, and access to new technologies. At the interindustry level, resource dependence theorists have empirically tested the role of strategic interdependence by predicting the number of joint ventures formed across industries (Pfeffer and Nowak, 1976a, 1976b; Berg and Friedman, 1980; Duncan, 1982). Recent efforts have focused more closely on the industry level and explored the role of resource configurations within an industry in predicting alliance formation. They have not only revealed distinct patterns, such as densely linked cliques, but have also tried to explain the observed patterns on the basis of strategic interdependence resulting from country-specific resource advantages (Shan and Hamilton, 1991), the distribution of strategic capabilities (Nohria and Garcia-Pont, 1991), and the relative size and performance of firms (Burgers, Hill, and Kim, 1993). This research

suggests that industry patterns in the formation of alliances indicate that firms are driven to enter alliances with each other by critical strategic interdependence.

Although interdependence may explain tie formation between some firms, it may not adequately account for alliance formation. This inadequacy is clear from the fact that not all possible opportunities for sharing interdependence across firms actually materialize as alliances. An account of alliance formation that focuses only on interdependence ignores how firms learn about new alliance opportunities and overcome the fears associated with such partnerships. Implicit in such accounts is the assumption that firms exist in an atomistic system in which information is freely available and equally accessible to all and opportunities for alliances are exogenously presented (Granovetter, 1985).

To understand why social networks and the information they channel are important for firms and their alliances, we need to consider the circumstances usually associated with such ties. Firms entering alliances face considerable moral hazard concerns because of the unpredictability of the behavior of partners and the likely costs to a firm from opportunistic behavior by a partner, if it occurs. Despite the rapid growth of both domestic and international alliances in many industrial sectors, such partnerships are still considered risky (*Business Week*, 1986; Kogut, 1989; Hamel, Doz and Prahalad, 1989). A partner may either free-ride by limiting its contributions to an alliance or simply behave opportunistically. Such concerns are further compounded by the unpredictable character of such relationships. Rapid changes in the environment may lead organizations to alter their needs and orientation, thus affecting their ongoing partnerships. For organizations to build ties that effectively address their needs while minimizing the risks posed by such concerns, they must be aware of the existence of their potential partners and have an idea of their needs and requirements. Organizations also need information about the reliability of those partners, especially when success depends heavily upon the partners' behavior (Bleeke and Ernst, 1991).

Sociologists have suggested that economic actors address concerns of opportunism in economic transactions by embedding transactions in the social context in which those transactions occur. Faced with uncertainty about a partner, actors adopt a more social orientation and resort to existing networks to discover information that lowers search costs and alleviates the risk of opportunism. Granovetter (1985: 490) noted that 'the widespread preference for transacting with individuals of known reputation implies that few are actually content to rely on either generalized morality or institutional arrangements to guard against trouble.' A person resorts to 'trusted informants' who have dealt with the potential partner and found him or her trustworthy, or, even better, to 'information from one's own past dealings with that person' (Granovetter, 1985: 490).

The embeddedness of firms in social networks can both restrict and enable the alliances a firm enters. By influencing the extent to which firms have access to information about potential partners, social networks can alter the opportunity set firms perceive for viable alliances. Similarly, networks constrain the extent to which potential partners are aware of a focal firm and thus may constrain its set of choices for alliances. This is vividly illustrated by the influence of one such social network, the cumulation of prior alliances, on the subsequent alliances by firms. As the typical comments by a manager I interviewed indicate, firm managers embed their new ties by relying extensively on their partners from past alliances for information:

> They are familiar with many of our projects from their very inception and if there is potential for an alliance we discuss it. Likewise, we learn about many of their product goals very early on and we actively explore alliance opportunities with them. (Gulati, 1993: 84)

Such comments suggest that firms are influenced in their ability to enter new partnerships by the social network of their past alliances.

Several recent studies have explored the importance of social embeddedness on the formation of alliances by firms. The first question examined has been at the firm level—which firms enter into alliances? Evidence suggests that the proclivity of firms to enter alliances is influenced not only by their financial and technological attributes (treated as proxies for strategic imperatives), but also by how they are embedded in social networks between firms. For instance, several studies have used the social network of prior alliances between firms to show that firms that had more prior

alliances, were more centrally situated in the alliance network, or had more focused networks, were more likely to enter into new alliances and did so with greater frequency (Kogut, Shan, and Walker, 1992; Gulati, 1993, 1997). Similiar findings have been reported for the influence of firm centrality in various other networks on their likelihood of entering new alliances. These networks include alliance networks among biotechnology firms (Powell, Koput, and Smith-Doerr, 1996), semiconductor firms and their patent citation networks (Podolny and Stuart, 1995), and those of top management teams of semiconductor firms (Eisenhardt and Schoonhoven, 1996). Each network highlights a different underlying social process that enables central firms to enter alliances more frequently. Nonetheless, these studies strongly suggest that the embeddedness of firms is an important influence on their alliance behavior.

The influence of social embeddedness on the formation of new alliances has also been observed at the dyad level, with a focus on who partners with whom. In a study of alliance formation over a 20-year period, Gulati (1995b) examined the factors explaining which of all possible dyads entered alliances during the observed time period. The social context examined was the cumulation of prior alliances between firms. The observed social structural effects resulted from both the direct and indirect ties of firms with each other. Previously allied firms were likely to engage in further alliances. This was confirmed in comments by alliance executives such as: 'We have close working relationships with most of our alliance partners. As a result, we are familiar with many of their own goals and capabilities. Since they also know about our specific skills and needs, many new deals are created interactively with them.' The results also provided evidence of the informational benefits of indirect ties between firms, both one-level-removed indirect ties and more distant ties. Previously unconnected firms were more likely to enter an alliance if they had common partners or were less distant from each other in the alliance network.

Structural embeddedness can also influence the choice of partner in alliances. The cues provided by the position of organizations enlarge the realm of potential partners about which an organization can have *a priori* information beyond the circle of organizations directly or indirectly tied to it. The status of an organization in the network affects its reputation and visibility in the system. The greater this reputation, the wider the organization's access to a variety of sources of knowledge, and the richer the collaborative experience, which makes it an attractive partner. The signaling properties of status are particularly important in uncertain environments, where the attractiveness of a potential partner can be gauged from its status, which in turn depends on the organizations (or type of organizations) already tied to this partner (Podolny, 1994). This phenomenon has important behavioral consequences. If the status of whom they partner with enhances their own attractiveness, organizations will have a tendency to seek high-status partners. Although special reasons, such as the control of a new technology, may prompt a high-status organization to cooperate with a low-status player, the 'homophily principle' in terms of status that operates under conditions of uncertainty makes this an unlikely occurrence (Gulati and Gargiulo, 1997).

The formation of dyadic ties between particular firms has also been studied in vertical alliances between buyers and suppliers. For instance, scholars have examined the extent to which Japanese automotive assemblers recreate their relationships in Japan in their North American operations (Martin, Mitchell, and Swaminathan, 1995). The evidence suggests that in addition to an array of strategic factors associated with the characteristics of the buyer and supplier, an important consideration in the recreation of ties was the history of prior engagements in which these firms are embedded. The longer the prior history between two firms, the more likely they were to recreate these ties in North America. This suggests that the social embeddedness of firms influences the creation of vertical alliances between firms.

The social explanation offered by the reported studies that highlight the role of embeddedness does not contradict the economic motivations for alliances. Firms don't form alliances as symbolic social affirmations of their social networks but, rather, base alliances on concrete strategic complementarities that they have to offer each other. It does suggest that the conditions of mutual economic advantage are necessary but not sufficient conditions for the formation of an alliance between two firms. While considerations of individual quest for resources and complementarity

are relevant, it is a firm's social connections that help it identify new alliance opportunities and choose specific partners that possess such complementary assets.

As highlighted earlier, firms are embedded in multiple social networks and the implications of these manifold ties on alliance formation remain an open question. The evidence that exists thus far highlights the significance of one social network at a time on new alliances. The possible implications of the simultaneous and possibly conflicting influence of multiple social networks on alliance formation have yet to be systematically examined. For instance, one of the most widely studied interorganizational networks has been board interlocks, and yet the implications of such ties and other interfirm networks on alliances has largely been overlooked until recently (Gulati and Westphal, 1997). Furthermore, the broader institutional context in which such networks are placed can also be influential (Dacin, Hitt, and Levitas, 1997).

Governance structure of alliances

A notable characteristic of the dramatic growth of strategic alliances in the last two decades has been the increasing diversity of such alliances. The nationalities of partners, their motives and goals in entering alliances, and the formal contractual structures used to organize the partnerships, called the governance structure, have all become increasingly varied. While alliances may be considered a distinct form of governance that is different from markets or hierarchies, there is also considerable variation in the formal structure of alliances themselves (Powell, 1990). The variety of organizing structures implies that firms face an array of choices in structuring their alliances. Prior research has distinguished among alliance structures in terms of the degree of hierarchical elements they embody and the extent to which they replicate the control and coordination features associated with organizations, which are considered to be at the hierarchical end of the spectrum (e.g., Harrigan 1987; Hennart, 1988; Osborn and Baughn, 1990; Teece, 1992). At one end are joint ventures, which involve partners creating a new entity in which they share equity and which most closely replicate the hierarchical control features of organizations. At the other end are alliances with no sharing of equity that have few hierarchical controls built into them.

Organizational scholars have long studied the diversity of structures within organizations and viewed structure as a mechanism to manage uncertainty. Prior research on contract choices in alliances and the extent of hierarchical controls they embody has been influenced primarily by transaction cost economists, who have focused on the appropriation concerns in alliances, which originate from contracting hazards and behavioral uncertainty at the time of their formation (e.g., Pisano, Russo, and Teece, 1988; Pisano, 1989; Balakrishnan and Koza, 1993; Oxley, 1997). Following this perspective, scholars have suggested that hierarchical controls are an effective response to such concerns as they are anticipated at the time the alliance is formed. The logic for hierarchical controls as a response to appropriation concerns is based on the ability of such controls to assert control by fiat, enable monitoring, and align incentives. The operation of such a logic was originally examined in the classic make-or-buy decisions (e.g., Walker and Weber, 1984; Masten, Meehan, and Snyder, 1991). The same logic by which firms choose between the extremes of making or buying a component is also expected to operate once firms have decided to form an alliance in their choice of governance structure. The greater the appropriation concerns, the more hierarchical the governance structures for organizing the alliance are likely to be.

An important shortcoming with such prior approaches has been their implicit treatment of each transaction as a discrete independent event (Doz and Prahalad, 1991). This leads to temporal reductionism since it treats alliances as occurring in an ahistorical context. Firms may very well have a longer history with each other through their entering multiple strategic alliances over several years. One of the executives who specialized in alliances for his firm that I interviewed highlighted this point:

> We originally initiated technology partnerships with a number of key industry players in the mid-1980s. These in turn have led to numerous repeated alliances with the same set of firms. With each partner maintaining on-site staff at our facilities that was only to be expected. (Gulati, 1993: 84)

Empirical studies on the governance of alliances have unfortunately continued in the transaction cost economics tradition, treating each alliance as independent and considering the activi-

ties it includes at the time of its formation as singularly reflecting the transaction costs associated with it. The approach taken is thus static: it specifies the unit of analysis to be each transaction and not the economic relationship and thus ignores the possibility of a social structure resulting from repeated alliances and the emergent processes resulting from prior interactions between partners that may alter their calculus when they are choosing contracts in alliances (Ring and Van de Ven, 1992; Gulati, 1995a; Dyer and Singh, 1997; Nickerson and Silverman, 1997). Furthermore, it would be useful to consider the implications of structural embeddedness which would suggest the importance of the overall network in which individual transactions and also economic relationships are situated.

An important implication of the embeddedness of firms in social networks is the enhanced trust between firms. Trust between firms refers to the confidence that a partner will not exploit the vulnerabilities of the other (Barney and Hansen, 1994). A social network of prior ties can promote trust through two possible means. First, by serving as effective referral networks, the prior social structure makes firms aware of each other's existence. Take, for instance, the comments of one of the executives responsible for alliance decisions that I interviewed:

> In some cases we realize that perhaps our skills don't really match for a project, and our partner may refer us to another firm about whom we were unaware …. An important aspect of this referral business is of course about vouching for the reliability of that firm. Thus, if one of our long-standing partners suggests one of their own partners as a good fit for our needs, we usually consider it very seriously. (Gulati, 1993: 84)

Through these ongoing interactions, firms not only learn about each other but may also develop trust around norms of equity, or 'knowledge-based trust' (Shapiro, Sheppard, and Cheraskin, 1992). There are strong cognitive and emotional bases for such trust, which are perhaps most visible among individual organization members. Macaulay (1963: 63) observed how close personal ties emerged between individuals in organizations that contracted with each other; these personal relationships in turn 'exert pressures for conformity to expectations.' Similarly, Ring and Van de Ven (1989, 1994) pointed to the important role of informal, personal connections across organizations in determining the governance structure used to organize their transactions. Second, social networks can serve as an important basis for 'enforceable' or 'deterrence-based' trust (Kreps, 1990; Raub and Weesie, 1990; Shapiro *et al*., 1992; Burt and Knez, 1995). The anticipated utility from a tie with a given partner and those with shared partners motivates good behavior. Each partner's awareness that the other has much to lose from behaving opportunistically enhances its confidence in the other. Potential sanctions include loss of repeat business with the same partner, loss of other points of interaction between the two firms, and loss of reputation.

How is trust between two firms likely to alter their choice of contracts in subsequent alliances? An important concern of firms entering alliances has to do with appropriation and relates to the predictability of their partners' behavior. A detailed contract is one mechanism for making behavior predictable, and another is trust. Both knowledge-based trust resulting from mutual awareness and equity norms and deterrence-based trust arising from reputational concerns creates 'self-enforcing' safeguards in an exchange relationship and can substitute for contractual safeguards (Bradach and Eccles, 1989; Powell, 1990). As a result, where there is trust, appropriation concerns are likely to be mitigated, and organizations may not choose to rely on detailed contracts to ensure predictability. In a study of the choice of governance structures in strategic alliances, I found that firms select contractual forms for their alliances not only on the basis of the activities they include and the related appropriation concerns they anticipate at the outset, but also the existence of the social network of prior alliances in which the partners may be embedded (Gulati, 1995a). What emerges from this account is an image of alliance formation in which cautious contracting gives way to looser practices as partners become increasingly embedded in a social network of prior ties. Familiarity between organizations through prior alliances does indeed breed trust which enables firms to progressively use less hierarchical structures in organizing new alliances.

Several provocative articles have questioned the role of transaction costs and appropriation concerns in alliances. Powell (1990) suggested that alliances and other such exchange relationships don't necessarily fall on the market-

hierarchy continuum put forth by transaction cost economics but, rather, constitute a distinct form of governance that he calls the network form. He used the term 'network' to classify such dyadic ties because many such ties are deeply embedded in a multiplicity of relationships. This study poses some important questions for future research on the governance structure of alliances. In particular, if we are to go beyond the confines of market and hierarchy as the dual anchors around which we study the governance structure of alliances, it becomes imperative to begin considering some of the alternative dimensions along which we can examine such structure (see also Stinchcombe, 1986).

In another important critique of transaction cost economics applications to alliances, Zajac and Olsen (1993) pointed to two additional shortcomings. First, transaction cost accounts in general focus on single-party cost minimization while alliances are inherently dyadic exchanges, which raises the question of whose costs are minimized. Relatedly, alliances are not only about cost minimization but also about joint value maximization, an issue neglected previously. Second, the structural emphasis of transaction cost economics leads it to neglect important processual issues resulting from their ongoing nature. Alliances are usually not one-off transactions but, rather, entail continuing exchange and adjustments, as a result of which process issues become salient (Khanna, 1997).

Another concern with the transaction cost approach stems from the fact that it has focused entirely on appropriation concerns that originate from the presence of contracting hazards and behavioral uncertainty. While appropriation can clearly be an important concern, there is also another set of concerns for firms entering alliances resulting from coordination costs. Such anticipated costs arise from the likely interdependence of tasks across organizational boundaries and the complexity of coordinating activities to be completed jointly or individually. Coordination considerations are extensive in alliances. In an empirical study of over 1500 alliances, my colleague and I found that the deliberations underlying the choice of alliance structure at the time an alliance is formed are not dominated by concerns of appropriation, as previously suggested, but by considerations associated with managing coordination costs resulting from the anticipated ongoing coordination of tasks across partners (Gulati and Singh, 1997). This study also suggests that social structure of trusting relationships are distinctive in addressing both coordination costs and appropriation concerns, and this is reflected in the nature of contracts used when firms are embedded in social networks. The presence of interfirm trust is an extraordinary lubricant for alliances that involve considerable interdependence and task coordination between partners, since firms with prior network connections are likely to have a greater awareness of the rules, routines, and procedures each follows. Such a social structure can thus enable them to work together closely, if necessary, all without the need for formal hierarchical controls.

Prior research on the governance structure of alliances has primarily focused on the implications of embeddedness in one type of social network, the network of prior alliances, yet the role of the multiplicity of social and economic contexts in which firms are embedded on their choice of alliances remains underexplored. There may also be implications from the embeddedness of firms in other types of social networks such as board interlocks, that could influence the design of alliances, but this has yet to be examined. Firms are also embedded in a social structure of dependence that can alter the likely power dynamics in a potential alliance. Firms are likely to anticipate such conditions and modify the structure of their relationship accordingly (Baker, 1990). The economic context can influence the structure as well. For instance, the extent of market overlap between the partners and within the alliance, also known as 'relative scope,' can influence the likelihood of competitive dynamics between the partners (Harrigan, 1987; Khanna, Gulati, and Nohria, 1998). Firms may anticipate the likelihood of such dynamics in an alliance and alter the structure to address those concerns if they arise.

Dynamic evolution of alliances and networks

There has been considerable interest in uncovering some of the dynamic processes that underlie the development of individual alliances. Such dyadic exchanges can be transformed significantly beyond their original design and mandate once they are under way. The varying evolutionary paths alliances follow can have significant

consequences for their performance (Harrigan, 1985, 1986). Thus, understanding the evolution of alliances can provide critical insights into how such ties can be better managed. Using detailed clinical studies of individual alliances, scholars have sought to uncover some of the formal and informal processes and key stages that unfold in alliances (Hamel, 1991; Larson, 1992; Ring and Van de Ven, 1994; Doz, 1996). Considerable efforts have been devoted to understanding some of the factors that influence this development and possible stages through which alliances may proceed.

In recent years, scholars have studied the role of the initial conditions under which alliances are formed in their subsequent development. For instance, Gulati *et al*. (1994) have introduced the idea that each partner's comprehension of an alliance's pay-offs is crucial for understanding the incentives to cooperate and for realizing the possible ways each can unilaterally influence the alliance's outcome (see also, Parkhe, 1993). The possible consequences of changing pay-offs once the alliance is under way were also discussed. In a related study, Khanna *et al*. (1998) introduced the concept of a firm's 'relative scope,' which captures the initial conditions likely to influence the competitive and cooperative dynamics and for each firm is the ratio of the scope of the alliance to the total set of markets in which the firm is active. This measure was used to establish testable propositions that suggest that the opportunity set of each firm outside the particular alliance crucially affects its behavior within the alliance. Thus, the extent of market overlap in activities between the partners and with the alliance can be an important determinant of the likely behavior of partners. This coincides with prior efforts that linked initial asymmetries between partners with the ultimate success of the alliance (Harrigan, 1986). Scholars have also begun to look at the combined impact of initial imprinting conditions and adaptive processes on the ultimate behavior and performance in an alliance (Hamel *et al*., 1989; Doz, 1996). Evidence seems to suggest that while initial conditions such as the objectives of partners, their adeptness at learning, and the nature of the environment and interorganizational context do assert an influence over the development of an alliance (Hamel, 1991), the evolution of some alliances may in fact be akin to a punctuated equilibrium model in which there may be discrete stages that occur due to discontinuous changes in the environment (Gray and Yan, 1997).

The rich insights from these detailed clinical and theoretical accounts have advanced our understanding of the dynamics within alliances enormously. The focus of these efforts has remained at the dyadic level of exchange, however, with their primary emphasis on uncovering some of the important interpartner dynamics. Similar behavioral processes can span dyads and occur within networks as well but remain to be explored. For instance, individual contacts between firms through social networks can affect the decision processes that may occur inside those firms (Gulati, 1993). Boundary-spanning individuals can have crucial influence on the decision making not only within their own organizations but also in partner organizations. When alliances entail the creation of new entities, such as joint ventures, they can lead to conflicting identities for individuals involved, who may be torn between loyalties to the venture itself and to the parent organization from which they originally came. Furthermore, when network-level decisions must be made among clusters of firms, specific multilateral negotiations and dynamics may be poorly understood. Firms may also use their network contacts to create control benefits proactively by utilizing their advantageous position in social networks to play one partner off against the other. They may also seek to manage their network to sustain such advantages (Lorenzoni and Baden-Fuller, 1995). Such dynamic processes related to potential control benefits have yet to be examined.

The dynamics of behavior over time can be observed at the level of networks as well. Several scholars have suggested that clusters of firms with dense ties with each other may pursue collective strategies in conjunction with the competitive strategies of their individual members (Astley and Fombrun, 1983; Bresser, 1988). This has led to new forms of competition in which networks of firms compete with each other (Gomes-Casseres, 1994). Such networks of firms could include both horizontally and vertically connected firms. In an illuminating study, Nohria and Garcia-Pont (1991) demonstrated the importance of horizontal alliances in shaping the global automotive industry into distinct 'strategic blocks,' which either bring together firms with complementary differences or pool together firms with supplementary

similarities, and can become a basis for competition within the industry. Similarly, scholars focusing on the supply chain of large manufacturers, particularly in the automotive industry, have examined how vertical networks and individual ties within them have become structured over time (Dyer, 1996; Helper, 1991; Lawrence and Gulati, 1997).

While prior studies have provided new insights into the structure of both horizontal and vertical networks, important questions still remain about the growth and development of interorganizational alliance networks (for a review, see Grandori and Soda, 1995). The shaping of such a dynamic interorganizational network can be influenced in important ways by exogenous factors, such as the nature of competition and critical industry events (Madhavan, Koka, and Prescott, 1998). In a recent study, my colleague and I suggested that the production of interorganizational alliance networks is driven by a dynamic process involving both exogenous resource dependencies, which prompt organizations to seek cooperation, and an 'endogenous embeddedness' dynamic, in which the emerging network progressively orients the choice of partners (Gulati and Gargiulo, 1997). Alliance networks are not static social structures in which organizations embed new alliances: they are also evolutionary products of these ties. As a result, new ties are influenced by the social network of prior ties in which they are embedded. Yet, when observed over time, the formation of new ties in each period alters the very same network that influenced their creation. This results in an endogenous network dynamic between embedded organizational action and the network structure that guides but is also transformed by that action. As the social network grows, the new ties contribute to the differentiation among organizations by their specific direct and indirect relations and by the structural positions organizations occupy in the emerging network. This 'structural differentiation' enables organizations to discriminate among partners in terms of their particular relational and structural profiles. As the available information grows, organizations seeking to build partnerships can become less reliant on exogenous factors and instead are more influenced by the network in which they are embedded.

The influence of networks on firms may also change over time if the content of information flowing through those networks changes. After all, networks have influence primarily through their channeling of information. Thus, if one is to observe dynamics at the network level, it is also valuable to assess how the content of information flowing through those networks may change over time. In a study of the influence of hospital networks on the extent and form of adoption of total quality management programs by hospitals, my colleagues and I observed that the nature of information transmitted about total quality management through the network varied depending on the stage of institutionalization of the innovation (Westphal *et al.*, 1997). In the early periods, when total quality management was less institutionalized, the information flowing through networks was about the technological attributes of total quality management, while later on, when total quality management became more institutionalized, the information transmitted had stronger institutional elements in it. This changing nature of information in turn affected the influence of social networks on the type of total quality management programs hospitals adopted. As a result, the effect of social networks on the adoption of administrative innovations was contingent on the stage of its institutionalization as an innovation. Studying changes in information flows in the networks that influence alliances may provide valuable insights (Stinchcombe, 1990).

Performance of alliances

The performance of alliances has received less attention than other areas because of some onerous research obstacles, which include measuring alliance performance and the logistical challenges of collecting the rich data necessary to assess these issues in greater detail. As a result, it remains one of the most exciting and underexplored areas. Numerous studies have reported dramatically high failure rates of alliances, and several practitioners have sought to identify the magical formula for alliance success (e.g., Kanter, 1989; Bleeke and Ernst, 1991). This wish list includes: flexibility in management of the alliance, building trust with partners, regular information exchange with the partners, constructive management of conflict, continuity of boundary personnel responsible for the interface between the firm and the alliance, managing partner expectations, and so on. The focus of the

research generating such lists has primarily been at the alliance level, with efforts targeted at identifying antecedent conditions and emergent processes that can influence performance.

The primary approach to empirical studies of the performance of alliances has been to examine the termination of an alliance. Several careful empirical inquiries have yielded important insights into some of the key factors that may be associated with the termination of alliances, including industry and dyadic conditions such as concentration and growth rates, country of origin of partners as developed or developing, the presence of concurrent ties, partner asymmetry, age dependence or the duration of the alliance, the competitive overlap between the partners, and characteristics of the venture itself such as autonomy and flexibility (Beamish, 1985; Harrigan, 1986; Levinthal and Fichman, 1988; Kogut, 1989). While these studies have provided valuable insights into the termination of alliances, their importance for understanding the performance of an alliance *per se* is limited by two factors. First, studying failure by looking at terminations fails to distinguish between natural and untimely deaths. Many successful alliances terminate because they are predestined to do so by the parent firms at the very outset. In other instances, an alliance may simply be a transitional arrangement that the parents plan to terminate when their objectives are met or when they have valuable new information that makes viable an acquisition or divestiture of that business (Kogut, 1991; Bleeke and Ernst, 1991; Balakrishnan and Koza, 1993). In some instances, the transformation of a venture may actually indicate successful adaptation to environmental shifts (Gomes-Casseres, 1987). Also, not all ongoing alliances are necessarily successful, and some may be continuing more out of inertia or the high exit costs associated with dismantling it than because of the inherent success of the partnership. Second, studies of alliance terminations and alliance failure implicitly consider performance as an either–or condition. This is clearly not the case, and a more accurate assessment would focus on gradations of performance in alliances.

One of the vexatious obstacles to studying performance, and also one of the problems with the many studies that have reported high failure rates for alliances, is measuring performance itself (Anderson, 1990). Given the multifaceted objectives of many alliances, performance can be difficult to measure with financial outcomes. Furthermore, in most cases, such measures simply don't exist. A further complication results from the dyadic nature of alliances. Sometimes performance is asymmetric: one firm achieves its objectives while the other fails to do so. For instance, several cases have been reported of alliances in which one partner had raced to learn the other's skills while the other did not have any such intentions (Hamel *et al*., 1989; Hamel, 1991; Khanna *et al*., 1998). Despite these measurement obstacles, researchers have gone beyond the initial efforts that equated alliance termination with failure, to try to uncover some of the factors associated with the success of alliances. These require detailed surveys or careful fieldwork on alliances that uncovers the multiple facets of alliance performance and considers the perspectives of all the partners in the alliance. In a set of pioneering studies, Harrigan (1985, 1986) used both archival and survey data to assess factors that might influence the performance of alliances, with performance measured both by the survival of the alliance and by participants' assessment of success. More recently, marketing and strategy scholars have turned to even more extensive surveys, which have been administered to the individual managers responsible for the alliance from each partner (Heide and Minor, 1992; Parkhe, 1993). Such approaches enable the collection of a host of measures, subjective and objective, on which performance can be assessed, as well as an examination of dyadic asymmetries in perceptions.

While there have been advances in assessing the performance of alliances, few of these efforts have considered the impact of social networks in which firms are placed on the relative performance of their alliances. Once we acknowledge the importance of the multiplicity of social networks in which firms are placed, we can overcome such dyadic reductionism and examine whether alliances that are embedded to a greater or lesser degree in various networks perform better or worse than others and why. While there have been several efforts to explore differences in 'embedded' ties between firms and those that are less proximate they tend to infer and don't directly assess whether embedded ties themselves perform any better than other ties. The inference is based on an aggregate assessment of the sur-

vival properties of firms and its association with the extent of embedded ties those firms have entered and not on a direct assessment of the relative success of individual alliances. Furthermore, such approaches generally treat embeddedness as an either–or proposition and have focused primarily on relational embeddedness resulting from proximate ties, while paying less attention to the importance of structural embeddedness.

While such studies have advanced our understanding of the nature and importance of embedded ties, an important extension would be to focus directly on the performance of alliances and whether the extent of embeddedness in social networks is an important factor. The extent to which an alliance is embedded is likely to influence its performance for several reasons. By being proximately situated in an alliance, the partnering firms are likely to have greater confidence and trust in each other, both because they have greater information and because the network creates a natural deterrent for bad behavior that will damage reputation. Trust not only enables greater exchange of information, it also promotes ease of interaction and a flexible orientation on the part of each partner. All of these can create enabling conditions under which the success of an alliance is much more likely.

There is some evidence that alliances with embedded ties may perform better or last longer than others. One of the first set of studies on the factors associated with alliance terminations found that alliances between firms with a prior history of ties were less likely to terminate (Kogut, 1989). In another important set of studies, Levinthal and Fichman (1988) and Seabright, Levinthal, and Fichman (1992) found that the duration of exchange relationships is not only influenced by changes that may occur in task conditions that alter the extent of resource interdependence, but there may be 'dyadic attachments' between firms that lead to the persistence of such ties. Such attachments are conditioned by the social structure in which firms are embedded and include individual attachments resulting from the continuity of boundary spanners in the partnering organizations and structural attachments arising from the history of interaction between the organizations. Such social structures can limit organizational perceptions of likely opportunistic behavior by partners and, as a result, firms may be more willing to make nonrecoverable investments, which can enhance the performance of the alliance. Survey-based evidence further confirms that both interpersonal and interorganizational-level trust can be influential in the performance of exchange relationships (Zaheer, McEvily, and Perrone, 1997).

More recently, in a study of supplier relationships in the automotive industry, a colleague and I directly examined the performance differences across various types of exchange relationships (Gulati and Lawrence, 1997). This study was distinctive in that it used a detailed survey to explicitly measure the performance of each relationship with both subjective and objective measures and examine its connection with precise measures of the extent of embeddedness. We found that, on average, more embedded tie relationships performed better than alternative sourcing arrangements but were particularly effective in situations of high uncertainty. Furthermore, there were performance differences across embedded ties as well, which resulted from how they were organized.

As firms have entered alliances with growing frequency, many prominent firms, such as General Electric, Corning, Motorola, IBM, and Hewlett-Packard, have found themselves in hundreds of alliances. While issues concerning the management of individual alliances are still important and merit further consideration, new issues resulting from managing a portfolio of alliances have arisen. This opens up numerous questions about the cooperative capabilities of firms. Evidence suggests that there may be systematic differences in the cooperative capabilities that firms build up as they have more experience with alliances and that the extent of this learning may affect the relative success of those firms with alliances (Lyles, 1988). This poses questions about what such capabilities are and what might be some systematic tactics firms use to internalize such capabilities. At least some of these capabilities include: identifying valuable alliance opportunities and good partners, using appropriate governance mechanisms, developing interfirm knowledge-sharing routines, making requisite relationship-specific asset investments, and initiating necessary changes to the partnership as it evolves while also managing partner expectations (Doz, 1996; Dyer and Singh, 1997). The fact that a firm may have entered a wide array of

alliances also suggests that it has to simultaneously manage this portfolio and address conflicting demands from different alliance partners. Furthermore, if the firm is at the center of a network, it must pay particular attention to a series of strategic and organizational issues (Lorenzoni and Baden-Fuller, 1995). Developing such a portfolio perspective on alliances merits further consideration, especially since many firms are now situated in an array of alliances.

The performance of alliances remains one of the most interesting and also one of the most vexing questions. We now know that embedded ties differ in fundamental ways from other ties and that there may even be an association between the extent of embedded ties a firm enters and its survival, but we have less understanding of the extent to which alliances with embedded ties actually perform better or worse than other alliances and why. Furthermore, the focus has primarily been on the effects of relational embeddedness and we know little about the consequences of structural embeddedness on the performance of alliances. This and the question of the capabilities firms may need to manage a multiplicity of alliances are important items for a future research agenda.

Alliances and performance consequences for firms

Do firms benefit from entering strategic alliances? This question is distinct from the previous one which looked at the performance of alliances themselves, and instead, it focuses on the performance consequences of alliances for the firms entering them. Since many other activities besides alliances can also influence the performance of firms, it can be difficult to empirically link the alliance activity of firms with their performance. As a result, scholars have looked for a variety of direct and indirect means to test this relationship.

To estimate the effect of individual alliances on firm performance, several researchers have conducted event study analyses on the stock market effects of alliance announcements (e.g., Koh and Venkatraman, 1991). This connection has been further refined as scholars have examined the differential benefits firms receive from different types of alliances and how this is influenced by the conditions under which they have been formed (e.g., Balakrishnan and Koza, 1993; Anand and Khanna, 1997). Inasmuch as the stock market reactions portend the likely future outcome from alliances, these results provide mixed evidence of the beneficial consequences of alliances for firms entering them.

Researchers have also looked at the performance consequences for firms from their social network of cumulative alliances. One approach has been to try to explain the performance of firms by the extent of their alliance activity, after controlling for other possible factors that may influence firm performance. In an early study, Berg, Duncan, and Friedman (1982) found a negative relationship between joint venture incidence and firms' rates of return in the chemical industry but could not definitively establish the causal relationship between the two—did joint ventures lead to poor performance or vice versa? More recently, some researchers have also narrowed the domain of performance explained by alliances and focused on the consequences from technology alliances for the patenting activities of firms and for their performance (Hagedoorn and Schakenraad, 1994; Mowery, Oxley, and Silverman, 1996). This has been extended by linking firm performance not only to the frequency of past alliances but also to the firm's position in interorganizational networks (Zaheer and Zaheer, 1997; Ahuja, 1996).

Yet another approach to assess the aggregate influence of alliances on firm performance has been to examine the relationship between the extent to which firms are embedded in alliances and the likelihood of their survival. Thus, survival of firms is considered as a proxy for performance (e.g., Baum and Oliver, 1991, 1992; Uzzi, 1996). The alliances studied on which firm survival may depend have been those with vertical suppliers and with key institutions in the environment. The results of these studies suggest that such ties are generally beneficial in enhancing survival chances. This may not always be the case and numerous contingencies that may alter this relationship have been also proposed (Singh and Mitchell, 1996). The challenge has been to separate out factors beyond embeddedness that may also have an influence on survival and look at this in a longitudinal setting.

There have been several studies that have documented the varying performance benefits that Japanese firms, as well as those of other national origins, have received from their vertical alliances

in particular (Helper, 1990; Cusumano and Takeishi, 1991; Dyer, 1996). Several of these studies have not only directly examined the relative performance of individual alliances, but have tried to ascertain their effects on the performance of firms entering them. These studies suggest that close vertical ties that are characterized by rich information exchange and long-term commitments can lead to greater cooperation and joint activities between the partners and higher levels of asset-specific investments, all of which translate into concrete performance benefits for the firms forming such ties (Helper, 1991; Heide and Miner, 1992). Extensive empirical evidence in the automotive industry suggests there are significant differentials in cost, quality, and new product development across automotive manufacturers that are driven primarily by the extent to which they outsource and the nature of those relationships.

The approaches to studying alliances and firm performance discussed thus far have paid scant attention to the overarching networks in which firms may be embedded. Even studies connecting the cumulative number of prior alliances with the survival of firms have only considered relational embeddedness, or the proximate ties in which firms are placed, and not the overall network and the position of firms in that network. This is not only a question of whether the sum is more than its parts, for by examining the entire social network one can also examine the possible deleterious consequences of competitive networks formed by rival firms. Such extensions can easily be made. For instance, rather than focusing only on the proximate ties a firm has entered, it is also possible to isolate the network to which the firm primarily belongs and examine whether membership in certain networks is more beneficial than others. This shifts the analytical focus away from simply the number of prior ties to membership in particular networks.

Gomes-Casseres (1994) has looked at several industries in which networks, rather than firms, have become the organizing level at which firms compete with each other. As a result, the performance of a firm is influenced by the networks to which it belongs. This has been enlarged to consider the relative success of competing networks of firms in particular geographic regions (Saxenian, 1990; Gerlach, 1992). Such approaches which highlight the relative success of particular networks can be further refined to identify the specific characteristics of the network that may enable the network to provide positive benefits to its members. For instance, in a study of hospitals and health care networks, my colleagues and I suggest that not all networks provide equal benefits to their members, and some networks are better than others (Gulati, Shortell, and Westphal, 1997). We further identified several key network factors that may mediate the effect of network membership on firm performance and explain why some networks provide greater benefits to their members than others. Two natural extension of these studies would look not only at the network characteristics but also the position of individual organizations within the network in which they are placed. This could alert us both to possible informational benefits and to control benefits that may result from particular locations in specific networks. Furthermore, it would be fruitful to assess the performance effects across the multiplicity of networks in which firms are embedded. Other possible concerns include who controls the network and why and possible limits and constraints to the growth of networks.

CONCLUSION

The primary focus of research on alliances has been to ask the 'why' question, which focuses on understanding some of the reasons firms enter alliances, structure them in certain ways, manage and change them, and the performance benefits sought from them. One of the problems with an orientation toward 'why' questions is that they are syntactically inclined to teleological or functional answers (Granovetter, 1994). More important, this leads to an avoidance of the 'how' question, which focuses on some of the conditions under which certain behavior and performance outcomes are likely (Oliver, 1990). This paper poses the 'how' question for alliances and highlights an important set of conditions deriving from the social networks in which firms come to be placed that influences their behavior and performance related to alliances. It demonstrates how social networks can be influential in the creation and success of alliances and shows how a perspective informed by the structural embeddedness of firms can provide important new insights into some of the key current issues on strategic alliances.

This paper suggests that social networks are

valuable conduits of information that provide both opportunities and constraints for firms and have important behavioral and performance implications for their alliances. By channeling information, social networks enable firms to discover new alliance opportunities and can thus influence how often and with whom those firms enter into alliances. Once two firms decide to enter an alliance, their relative proximity in the network may influence the specific governance structure used to formalize the alliance. The extent to which two partners are socially embedded can also influence their subsequent behavior and affect the likely future success of the alliance. A firm's portfolio of alliances and its network position in an industry can have a profound influence on its overall performance. I highlight several recent studies, including some of my own, that have developed a socially informed account of the alliance behavior by firms and examined some of these issues. Table 1 summarizes the comparison I draw between dyadic and network perspectives for each of the key questions on alliances.

This table highlights each of the five key issues on alliances identified in this paper and the related empirical questions. It illustrates how the consideration of the role of social embeddedness of firms enlarges the realm of inquiry away from dyads towards broader units which include economic relationships and the overall networks in which firms are placed.

Introducing social networks to the study of strategic alliances can provide valuable insights into strategic alliances but can also make an important contribution to the study of social networks. The creation of an alliance is an important strategic action, yet the cumulation of such alliances also constitutes a social network. Given our limited understanding of the dynamics of networks, alliances provide a unique arena in which action and structure are closely interconnected and the dynamic coevolution of networks can be examined (e.g., Gulati and Gargiulo, 1997). Furthermore, the study of interorganizational networks is now a burgeoning field of inquiry in and of itself, and strategic alliances have become an important set of ties in which firms have become engaged and that thus merits further examination (for a collection of articles on interorganizational relationships, see Mizruchi and Schwartz, 1987). Combining insights on alliance networks with those on interpersonal networks can result in an important cross-level perspective of interorganizational relationships (Galaskiewicz, 1985b; Zaheer *et al*., 1997; Gulati and Westphal, 1997).

The theoretical orientation guiding this paper has been the embeddedness perspective, which highlights the significance of the social relationships in which actors are situated for their future behavior and performance. I would like to emphasize that introducing such a perspective does not preclude the possibility of traditionally examining strategic imperatives or diminish their importance. These are indeed complementary elements and in fact blend together if we consider the creation and manipulation of networks to be part and parcel of strategic behavior (Burt, 1992). Furthermore, the embeddedness of firms can be more broadly defined than its social relationships or structural embeddedness to include institutional, cultural, and political elements (Zukin and DiMaggio, 1990). Each of these other facets can have consequences for the study of strategic alliances, both independently and together, and remain to be thoroughly examined. Ultimately, it is important to develop a more complete, socially informed account of each of the key issues outlined here that relate to strategic alliances.

A social network perspective on alliances can have both descriptive and normative outcomes that provide valuable insights for theories of strategic management, organizational theory, and sociology. Incorporating social network factors into our account of the alliance behavior of firms not only provides us with a more accurate representation of the key influences on the strategic actions of firms, but has important implications for managerial practice as well, many of which have yet to be explored. For instance, an understanding of the network dynamics that influence the formation of new alliances can provide insights for managers on the path-dependent processes that may lock them into certain courses of action as a result of constraints from their current ties. They may choose to anticipate such concerns and proactively initiate selective network contacts that enhance their informational capabilities. Thus, by examining the specific way in which social networks may constrain firms' future actions and channel opportunities, firms themselves can begin to take a more forward-looking stance in the new ties they enter. They can be proactive in designing their networks and con-

Table 1. Dyadic and network perspectives on key issues for strategic alliances

Research issue	Empirical questions	Dyadic perspective	Network perspective
1. The formation of alliances	Which firms enter alliances? Whom do firms choose as alliance partners?	Financial and technological imperatives that lead firms to enter alliances Complementarities that lead them to choose specific partners (e.g., Pfeffer and Nowak, 1976a; Mariti and Smiley, 1983)	Social network factors that may constrain and also create opportunities for firms to discover alliance prospects and choose specific partners (e.g., Kogut *et al*., 1992; Gulati, 1995b; Gulati and Westphal, 1997)
2. The governance of alliances	Which *ex ante* factors influence the choice of governance structure?	Transaction costs, interdependence, and power asymmetries (e.g., Pisano *et al*., 1988; Harrigan, 1987)	Social networks that may mitigate *ex ante* appropriation concerns and coordination costs that can affect the choice of governance structure (e.g., Zajac and Olsen, 1993; Gulati, 1995a; Gulati and Singh, 1997)
3. The evolution of alliances and networks	Which *ex ante* factors and evolutionary processes influence the development of individual alliances and networks?	Social and behavioral dynamics between partners in alliances (e.g., Ring and Van De Ven, 1994; Doz 1996)	Social, behavioral and competitive dynamics that occur across organizational boundaries among groups of firms in alliances (Nohria and Garcia-Pont, 1991; Gomes-Casseres, 1994) The emergence and development of a social network (e.g., Gulati and Gargiulo, 1997)
4. The performance of alliances	How should the performance of alliances be measured? Which factors influence the performance of alliances?	Examination of terminations as alliance failure (e.g., Kogut, 1988b) Partner characteristics and evolutionary dynamics that affect the success of alliances (e.g., Harrigan, 1986)	Firm capabilities that enhance the success of alliances (Doz, 1996; Dyer and Singh, 1997) Influence of comembership of partners in social networks on the success of their joint alliances (e.g., Levinthal and Fichman, 1988; Kogut, 1989; Zaheer *et al*., 1997; Gulati and Lawrence, 1997)
5. Performance advantages for firms entering alliances	Do firms receive social and economic benefits from their alliances?	Event studies of stock market reactions to alliance announcements (e.g., Anand and Khanna, 1996) Survival of firms entering alliances (e.g., Baum and Oliver, 1991, 1992)	Influence of membership in social networks and relative position in the network on the performance and survival of firms (e.g., Dyer, 1996; Gulati *et al*., 1997)

sidering the ramifications on their future choices of each new tie they form. They may also selectively position themselves in networks to derive possible control benefits as well. Similarly, there are numerous insights that result from understanding the complexities associated with managing a portfolio of alliances and the relational capabilities required to do so successfully. Ultimately, managers want to know how to manage individual alliances, and a recognition of some of the dynamics at both the dyadic and network levels that influence the evolution and eventual performance of alliances can be extremely beneficial. The challenge for scholars studying networks and alliances is to bridge the chasm between theory and practice and translate some of their important insights for managers of the alliances we study.

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