

*STRATEGIC NETWORKS*¹

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Abstract

This paper introduces the important role of strategic networks resulting from interfirm ties for fundamental issues in strategy research. It extends prior research, which has primarily viewed firms as autonomous entities striving for competitive advantage from either external industry sources or from internal resources and capabilities, and paid less attention to the networks of relationships in which firms are embedded in influencing their conduct and performance. It identifies five key issues in strategy research in which there is immense potential for incorporating strategic networks: (1) industry structure, (2) positioning within an industry, (3) inimitable firm resources and capabilities, (4) contracting and coordination costs, and (5) dynamic network constraints and benefits. For each of these issues, the paper outlines some of the new and important insights that result from introducing the role of strategic networks.

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A key question in strategy research is why firms differ in their conduct and profitability. In answering this question, researchers have typically chosen to view firms as autonomous entities, striving for competitive advantage from either external industry sources (e.g. Porter, 1980), or from internal resources and capabilities (e.g. Barney, 1991). The image of atomistic actors competing for profits against each other in an impersonal marketplace is increasingly inadequate in a world in which firms are embedded in networks of social, professional, and exchange relationships with other individual and organizational actors (Granovetter, 1985; Gulati, 1998; Galaskiewicz & Zaheer, 1999). Such strategic networks encompass a firm's set of relationships, both horizontal and vertical, with other organizations -- be they suppliers, customers, competitors, or other entities -- including relationships across industries and countries. They are composed of interorganizational ties that are enduring and are of strategic significance for the firms entering them and include strategic alliances, joint ventures, long-term buyer-supplier partnerships and a host of similar ties.

Our contention in this paper is that the conduct and performance of firms can be more fully understood by examining the network of relationships in which firms are embedded. By adopting a relational, rather than an atomistic, approach, we can deepen our understanding of the sources of differences in firm conduct and profitability. In particular, we highlight that strategic networks provide a firm with access to information, resources, markets, and technologies; with advantages from learning, scale, and scope economies; and allow firms to achieve strategic objectives, such as sharing risks and outsourcing value-chain stages and organizational functions. Networks also have a potential dark side and may lock firms into unproductive relationships or preclude partnering with other viable firms. In this way, a firm's network of relationships is a

source of both opportunities and constraints. As the economic environment becomes sharply more competitive, the firm's network of relationships assumes enhanced strategic importance.

There is a growing body of research in strategy that is coming to terms with the economic consequences of firms participating in strategic networks. Research on joint ventures (e.g. Harrigan, 1985; Kogut, 1988) was among the first in the field to pay systematic attention to the growing trend in the formation of interfirm partnerships. More recently, research on strategic blocks (Nohria and Garcia Pont, 1988), strategic supplier networks (Jarillo, 1988), learning in alliances (Hamel, 1990), interfirm trust (Gulati, 1995a; Zaheer & Venkatraman, 1995), and network resources (Gulati, 1999) have examined interfirm relationships from a variety of theoretical perspectives, levels of analysis, and outcomes. This considerable and growing research tradition in the strategic management field attests to the importance of interfirm relationships generally within the conversation of strategic management, and highlights the need for coalescing and focusing the research in this area.

Concurrent with the interest in interfirm relationships in the strategy literature is a growing interest in understanding how the social context in which firms are embedded influences 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, our focus in this introduction will be on the structural context, which highlights the significance of the social networks in which economic actors may be placed.

While there has been growing attention paid to understanding the formation of interorganizational ties including the motivation of firms entering them and explaining the differential proclivity of firms to enter them, less attention has been paid to the strategic implications of such networks for the firms embedded in them. In particular, strategy research has generally not looked to place the source of differences in interfirm profitability as arising from the varying participation of firms in strategic networks. For example, traditional models of competition (e.g. Porter, 1980) have simply focused on strategic variables such as scale, advertising intensity, product similarity and interdependence along value chains to understand interfirm profitability differences. However, the location of firms in interfirm networks are another important element of competition, since competition, for example, is more intense among actors who occupy a similar location relative to others and is mitigated if actors are tied to each other (Garcia-Pont & Nohria, 1999; Zaheer & Zaheer, 1999). This heightened competition between firms occupying similar *network* positions, not merely market positions, is missed in more traditional approaches. Similarly, while the transaction cost perspective stresses the efficiency benefits from reducing the governance cost of a transaction, a network approach allows consideration of the strategic benefits from optimizing not just a single relationship but the firm's entire network of relationships (see Nobeoka & Dyer in this issue).

Given the rapid proliferation of alliances and other forms of interfirm relationships in recent years, neglecting the strategic networks in which firms are embedded can lead to a very incomplete understanding of firm behavior and performance. The example of one industry, the US automobile industry, suggests how industries can no longer be meaningfully analyzed without considering the strategic networks that bind firms within them. Changes in this industry include fewer suppliers, longer-term relationships, and greater supplier involvement in the design

process, all of which have significantly improved the competitiveness of US automakers (Dyer, 1991; Gulati and Lawrence, forthcoming). Examples abound of other forms of interfirm collaboration and of their strategic importance for firms within this industry (Womack, et al, 1990). In the current business context, therefore, a heightened awareness of the strategic networks in which firms are situated becomes a central, rather than a peripheral, exercise to understanding firm strategy and performance.

We illustrate the importance of network effects by considering five traditional sources of differential returns to firms in strategy research. These are: 1) Industry structure including the degree of competition and barriers to entry; 2) Positioning within an industry including strategic groups and barriers to mobility; 3) Inimitable firm resources and capabilities; 4) Contracting and coordinating costs; and 5) Dynamic and path dependent constraints and benefits. In each of these five cases, we discuss how by incorporating a heightened awareness of strategic networks we gain insights into firm conduct and performance. This list is by no means comprehensive nor necessarily mutually exclusive and simply reflects broadly defined areas in strategy research where we see some of the greatest potential from applying a network lens. It is important to emphasize that taking a network perspective to strategy research does more than merely add additional explanatory power to our existing models of strategy. Such an outcome may in and of itself be a worthwhile academic endeavor. However, as we aim to show in the sections that follow, adopting a network lens to explaining differential firm profitability changes our basic understanding of the sources of interfirm differences from an atomistic to a relational model – and therein lies its true power.

1) Industry Structure

The industrial organization school, which has had a major impact on the field of strategy, began with models of perfect competition and argued that oligopoly, or greater concentration generally, led to increased profitability for the firms in an industry (Scherer and Ross, 1990). In this way, industry structure -- which is characterized by the extent of concentration, market power relative to upstream or downstream industries, and the extent of collusion, tacit or otherwise -- jointly have a pervasive influence on industry profitability. The entry of new firms into profitable industries is impeded by the presence of barriers to entry and thus the differences in profitability across industries can be sustained (Porter, 1981).

We propose that a consideration of strategic networks allows a more refined understanding of industry structure – since industry participants can be seen as embedded in networks of resources, information, and other flows. Such networks can influence the nature of competition in the industry and the degree of profitability beyond traditional measures of industry concentration. For instance, tacit collusion is far easier to sustain in an industry in which the major players are connected in a dense network of interfirm ties than in one in which they are disconnected.

In order to illustrate the implications of viewing the industry level of analysis from a network perspective, we consider three types of relational characteristics: network structure, network membership, and tie modality, (Galaskiewicz & Zaheer, 1999). Network structure refers to the overall pattern of relationships within which the industry is embedded. By network membership we mean the composition of the network – the identities, status, resources, access, and other characteristics of the focal industry's alters and other nodes. Tie modality is the set of institutionalized rules and norms that govern appropriate behavior in the network. While these

are sometimes spelled out in formal contracts, most often they are simply understandings that evolve within the dyad and the network (Laumann, Galaskiewicz, & Marsden, 1978)

There are numerous structural network characteristics that can affect the profitability of the firms in an industry. Network scholars have identified various factors such as network density, structural holes, structural equivalence, and core versus peripheral firms, each of which can affect the profitability of industries and of the firms within them. For instance, dense interfirm ties within the industry may be conducive to oligopolistic coordination, tacit or otherwise (Scherer and Ross, 1990). Research by Eccles and Crane (1988) and Podolny (1993) vividly shows how the ties among the top-tier investment banks sustain the high returns characteristic of that industry. Similarly, research by Baker and Faulkner (1991) shows how changes in the pattern and density of ties in the US movie industry over the years has influenced the rate of entry and profitability of the firms in the industry.

Structural holes can be another important factor in influencing industry returns. They exist when two industry trading partners are connected only through the focal industry. Structural holes in an industry's customer-supplier network may confer power through control, and ultimately profitability. Based on an analysis of input-output tables that define the network of flows among industries, Burt (1992) has shown that industries that occupy structural holes enjoy greater returns by being able to appropriate a larger share of the resources that flow through them.

Network membership also influences the location of an industry in a broader network of resource flows that might influence its profitability. For example, the status of the alters (i.e. the industries the focal industry is tied to) can influence the focal industry's profitability. One need look no further than the declining fortunes of defense contractors (supplying a contracting

military) or the buoyant future of the network server industry (tied to booming internet businesses) to confirm the value of market status at the industry level. Moreover, network ties to certain favorable supplier industries may preclude access by other firms or industries, and thus maintain high profits in the focal industry by imposing limits on firm entry into the industry.

At the level of the ties that form the network, we could consider tie modalities such as the strength of the connections and the nature of the ties, both within the industry and across to supplier and customer industries. Collusion may be facilitated to a greater degree by the *strength* of the ties between the firms in an industry. For example, strong ties might enhance the likelihood of oligopolistic coordination more than weak ties (Galaskiewicz and Zaheer, 1999). The nature of the relationships themselves could be either collaborative or opportunistic, setting the tone for the form of interactions among the players in the industry as either benign or rivalrous (Khanna, Gulati, and Nohria, 1998). This set of tie characteristics can also be applied to explain industry profitability by looking *across* industries. For example, relationships of the focal industry with supplier or customer industries may be strong or weak, and collaborative or competitive, each with implications for the focal industry's profitability. The strong, relational ties of the Japanese automobile industry with their suppliers, for instance, clearly played a role in its profitability (Cusumano, 1985).

Overall, using network concepts in this manner provides a valuable complement to explanations that simply focus on concentration and market power in ascribing profitability differences at the industry level of analysis (Richardson, 1972). They illuminate our understanding of industry structure by incorporating the role of important strategic networks in which firms may be situated that may in turn alter the influence of this structure on industry

performance. Furthermore, network concepts extend the underlying mechanisms guiding such outcomes beyond conventional notions of market power as well.

2) *Intra-industry structure*

Another set of traditional strategy models recognizes that industries are not homogeneous; rather within the same industry, some firms are more alike than others, and can be grouped together. Strategic groups in industries can be identified based on similarities in firm scale, similarity of products and services in terms of price, features, and quality; similarity in technology, or the similarity in customers served, among other dimensions. Strategic groups boundaries are difficult for firms to traverse due to mobility barriers (Caves and Porter, 1977) and have been used to explain differential firm behavior and performance within industries (Cool and Schendel, 1988). However, empirical and theoretical questions remain about the existence and consequences of strategic groups (Thomas & Venkatraman, 1988; Peteraf & Shanley, 1998).

We suggest that a network perspective offers the potential for mapping intra-industry structure in novel ways. Strategic groups could be identified, for example, among firms that share common attributes, through the use of network methodologies. However, this approach would not be conceptually different from traditional methods of clustering firms into intra-industry groups based on their attributes. Perhaps a more interesting approach would be to use firm interactions and relationships to identify intra-industry grouping, or cliques, as Nohria and Garcia-Pont (1991) did for the global automobile industry, labeling them ‘strategic blocks’. These cliques or blocks are groups of firms with alliances with each other but not to others in the industry. For instance, blocks of alliances formed around GM, Ford, and Chrysler, the three major US manufacturers, that each included a major Japanese manufacturer and a major Korean

partner. Partners in any one block were locked in to cooperate with each other and locked out of cooperating with others. It is easy to see how membership in such cliques or blocs can lead to differences in profitability among the firms in the industry. Building on these ideas, Piskorski (1999), who has studied strategic networks within the venture capital industry, has found significant profit differentials among firms depending on the cliques to which they belong. Zaheer and Zaheer (1999) have used the interactions between banking firms in a global electronic network to assess the structure of competition in the global currency trading industry. The authors have employed the notion of competition as deriving from the structural equivalence of firms, or the extent to which they share the same customers.

Another way to think about networks and intra-industry structure is to recognize the potential of networks of relationships to create mobility barriers for firms trying to cross strategic groups, just as networks may serve as entry barriers for firms trying to enter the industry. The network of ties among firms in the strategic group a firm is trying to leave, or in the group a firm is trying to enter, or both, may impede the movement of firms within an industry. Thus, networks can serve as a source of both opportunity and constraint, a consistent theme in our discussion. More generally, a network perspective highlights the idea that similarity in relational space (as opposed to similarity in attributes) is an important way to think about patterns of competition and differences in the profitability of firms within an industry.

3) Inimitable resources and capabilities

The resource-based view of the firm (RBV) has highlighted that resources owned or controlled by the firm have the potential to provide enduring competitive advantage when they are inimitable and not readily substitutable (Peteraf, 1993). Typically, scholars have looked

within the firm for these valuable and inimitable resources (Barney, 1991). However, the process by which firms create value-generating resources has not been given much attention in the RBV literature. It has been generally assumed that firms ‘somehow’ develop such resources internally.

The notion that the search for the source of value-creating resources and capabilities should extend beyond the boundaries of the firm presents a novel perspective for the RBV and answers an important question emanating from the literature as to the *origin* of value-generating resources (Gulati, 1999; Ahuja, this issue; McEvily & Zaheer, forthcoming). In fact, a firm’s network can be thought of as creating inimitable and non-substitutable value (and constraint!) in several ways: as an inimitable resource by itself, and as a means to access inimitable resources and capabilities. Gulati (1999) refers to these as “network resources”. Thus, from the perspective of the RBV, an important source for the creation of inimitable value-generating resources lies in a firm’s network of relationships. In order to assess the strategic implications of such networks, this time at the level of the firm, we can use the same conceptual frame as we have above – in terms of network structure, membership, and tie modality and show how one might view each of these aspects of a network as inimitable resources (for a fuller discussion see Galaskiewicz & Zaheer, 1999).

Our primary contention in this section is that a firm’s networks allows it to access key resources from its environment, such as information, access, capital, goods, services and so on that have the potential to maintain or enhance a firm’s competitive advantage. By virtue of such firm networks being idiosyncratic and created through a path dependent process (Gulati, 1995b; Gulati and Gargiulo, 1999; McEvily & Zaheer, forthcoming), they are difficult for competitors to imitate or substitute. Moreover, since the resources being accessed are themselves idiosyncratic,

generated as they are through the combination of unique networks the firm possesses, they too are relatively inimitable and non-substitutable. Thus together, the firm's networks, and the resources they allow the firm to tap into, can serve as a source of sustainable competitive advantage.

Network structure as a resource. The key idea here is that the structural *pattern* of a firm's relationships is unique and has the potential to confer competitive advantage. Of course, the firm's network structure may equally lock a firm into undesirable strategic situations. Recently, a number of researchers have examined different aspects of a firm's network and related it to performance, implicitly or explicitly invoking RBV. Gulati (1999) suggests that resources may inhere in the networks in which firms are situated by providing them with valuable information that in turn provides strategic advantage by allowing them to act quicker than rivals. Zaheer and Zaheer (1997) conceptualize firm capabilities of alertness and responsiveness in the context of information networks in the global currency trading industry. Firms are highly alert when they create and utilize wide-ranging information networks with plentiful weak ties, high centrality, and wide geographical scope, and together with responsiveness, this capability translates into superior performance. The private and invisible nature of the ties renders the network inimitable, and thus too the information that it provides. McEvily and Zaheer (forthcoming) compare the interfirm information networks of firms in geographical clusters and find that those networks with greater redundancy (fewer structural holes) tend to acquire fewer competitive capabilities. Rowley, Behrens, and Krackhardt (this issue) compare the performance outcomes for firms from different types of structural and relational embeddedness and find contingent effects.

There are other aspects of a focal firm's network of ties that can influence its behavior and performance, such as the pattern of direct and indirect ties. Gulati and Garguilo (1999) show

how firms benefit not just from their direct ties, but from the ties of the actors to whom they are connected. Such two-step leverage can have important performance consequences, although we recognize that beyond the firm's set of first-level contacts, in terms of engineering the wider network, there is a limited amount of intentionality possible on the part of the focal firm.

Network membership as a resource. The membership of a firm's network is nearly always idiosyncratic as well. In fact, this aspect of the firms' network is perhaps more inimitable than the structure, which, in theory, may be mimicked for certain types of networks. Thus, for example, the existing choices partner firms – either as buyers, suppliers, or alliance partners – can both restrict and enlarge the opportunity set of future relationships available to the focal firm (Gulati, 1995b). For non-participants or new entrants the network provides no information at all, which may lock them out of new opportunities. Westney (1993), for instance, has shown how the R&D subsidiaries of US companies located in Japan were often ineffective because they were locked-out of the local networks that tied Japanese R&D labs to suppliers and customers. One way in which she recommends that firms might overcome this problem is to ally with a local firm rather than try and go it alone. Clearly, a resource-rich partner with the right capabilities, has the potential to provide a focal firm with an inimitable source of valuable resources and capabilities. Afuah (this issue) focuses his research on precisely this issue when he examines how much a focal firm's *suppliers'* capabilities influence the performance of the firm. Other researchers have looked at the advantages from the market status of the entire set a firm's alters (firms in its network) (Podolny, 1993).

Tie modality as a resource. The modality of the ties that a firm creates and maintains in its network, whether cooperative or opportunistic, strong or weak, multiplex or single, have clear implications for a firm's strategic behavior and performance. It is not difficult to see how certain

tie characteristics might not only be valuable but also difficult for competitors to imitate, due to the history and reputation of the focal firm. In fact Dyer and Nobeoka (this issue) provide a powerful illustration of just such a resource when they examine Toyota's supplier network in the US and benefits that accrue to both Toyota and its suppliers as a result of the trust and complex incentives that Toyota uses in its network. Interestingly from the perspective of this argument, they also show how an attempt to replicate some aspects of the network by the competition failed. At the same time, network ties can have a dark side: too close ties with customers can cause performance disadvantages as well (Christensen, 1997). Gulati and Lawrence (forthcoming) have found considerable differences in performance across supplier ties in the automotive sector. They have identified some of the key facets underlying each tie along with the nature of the commodity being sourced through the tie to play a critical role in explaining these performance differences.

Beyond network structure, membership, and tie modalities, scholars have also identified the capability that firms possess, to a lesser or greater extent, to *manage* the firm's network. Kale, Singh and Perlmutter (this issue) refer to this as a firm's alliance capability. Quite obviously, firms' alliances are complex organizational arrangements that can require multiple levels of internal approval, search issues in identifying partners, and detailed negotiations and contracts (Ring and Van de Ven, 1994). Managing the network involves using appropriate governance mechanisms, developing interfirm knowledge sharing routines, making appropriate relationship-specific investments, and initiating necessary changes to the partnership as it evolves while also managing partner expectations (Dyer and Singh, 1998). The possession of alliance formation capabilities can therefore be a significant resource for firms due to the managerial challenges associated with forming and managing networks of alliances. Indeed,

there is clear support for the economic advantages of such experience effects or alliance formation capabilities. The paper by Anand and Khanna (this volume) provides compelling support for the existence of experience effects in alliances. Firms that forge a greater number of alliances appear to extract more value from their alliances over time. They not only form alliances that are perceived by the financial markets as more value creating, but they also extract more of the value created relative to their partners. These results suggest that firms can get better at forging alliances and extracting returns from them as they gain more experience. From a strategic standpoint, this suggests that experience with alliances can be a source of strategic advantage.

The foregoing discussion illustrates the many ways in which a firm's network of ties represent a valuable resource or capability that can yield differential returns in the same way as other tangible and intangible assets such as brands or R&D capabilities (Itami, 19xx).

4) Contracting and Coordination Costs

The question of whether a firm should make-or-buy a particular commodity or service has a long history in the strategy literature (e.g., Walker and Weber, 1984). More recently this literature has been extended to examine how alliances, which can be a substitute for acquisition, divestiture, or internal development, may also be an important alternative (Gulati and Lawrence, forthcoming; Piskorski and Nohria, 1999).

Prior research on the make-or-buy question has been heavily influenced by transaction cost economists who emphasize the contracting hazards inherent in any transaction (Williamson, 1985). According to this view, hierarchical governance structures should be favored when opportunism is likely and transaction costs are high. Market exchange should be preferred when

contracts are readily written and enforced and transaction costs are low. If we extend this for alliances, then alliances make sense in more intermediate situations when transaction costs are not so severe as to require hierarchical control but are not so low as to enable market based exchange.

An important limitation of this research tradition has been its implicit treatment of each transaction as a discrete event. If we recognize that any transaction is embedded in a history of prior relationships and a broader network of relationships, our analysis of transaction costs and contracting issues needs to be significantly revised (Gulati, 1995a). One important implication of the embeddedness of firms in social networks is the enhanced trust between firms that can in turn mitigate the moral hazards anticipated at the outset. Trust between firms refers to the confidence that a partner will not exploit the vulnerabilities of the other (Barney and Hansen, 1995). Social networks promote trust and reduce transaction costs in several ways. First, networks enable firms to gather superior information on each other (Gulati, 1995b). Network ties are important sources of referrals that enable prospective partners to identify and learn about each other's capabilities. They can also facilitate due diligence so that each partner has greater knowledge about the other's resources and capabilities and greater confidence in their mutual assessments. In short, networks can greatly reduce the informational asymmetries that increase contracting costs.

Social networks can further mitigate transaction costs by making opportunism more costly because of reputational effects (Gulati and Gargiulo, 1999). The costs of opportunistic behavior in a network are more costly because the damage to one's reputation can influence not just the specific alliance in which one behaved opportunistically, but all other current and potential alliance partners. Networks can also mitigate opportunism by making it more likely that

such behavior will be discovered and that the information will spread rapidly through the network. Because reputation takes time to build but can be destroyed quickly, networks can create strong disincentives for opportunistic behavior.

As the foregoing discussion indicates, strategic networks can create both knowledge-based trust resulting from mutual awareness and equity norms and deterrence-based trust arising from reputational concerns. These mutually reinforcing safeguards can decrease the contracting and transaction costs associated with any specific exchange relationship and potentially enhance the returns that both partners can extract from their relationship. Where there is trust, appropriation concerns are likely to be mitigated and organizations may not choose to rely on detailed contracts that are costly to write, monitor, and enforce (Gulati, 1995a).

In addition to reducing transaction costs and addressing appropriation concerns, social networks can also enhance the value created in alliances by improving coordination between the firms involved in an alliance. The presence of inter-firm trust is an extraordinary lubricant for alliances that involve considerable interdependence and task coordination between partners, (and) firms with prior network connections are likely to have a greater awareness of the rules, routines, and procedures that each needs to follow. Such a social structure can thus enable them to work closely without the need for costly formal hierarchical controls (Gulati & Singh, 1999).

5) Network Dynamics & Economic Returns

Though some networks can be quite stable, changing very little over time, networks typically tend to be more dynamic (White, 1992). Both exogenous and endogenous forces shape how networks evolve over time. Exogenous forces include environmental jolts and changes (Madhavan, Koka, and Prescott, 1998). For instance, the rise of Japanese competition followed

by the threat of US and European trade protectionism triggered the pattern of strategic alliances observed in the global automobile industry during the 1980s (e.g., Nohria & Garcia-Pont, 1990). The discovery of recombinant DNA and other biotechnologies that were exploited by new biotech firms triggered the extensive pattern of alliances that characterize the modern biotechnology industry (see Powell et al, 1992). The convergence of industry boundaries across computers, telecommunications, and media companies have shaped the strategic networks that have come to bind previously autonomous firms in these areas. The rise of the Internet is presently reshaping the whole landscape of strategic alliances.

Exogenous environmental forces can also trigger the disbanding of strategic alliances. The decline of UNIX as a standard operating system has led to the disbanding of several strategic networks that were designed to win the UNIX wars (Gomes-Casseres, 1994). More liberal foreign direct investment policies have led to the dismantling of networks that linked first world multinationals to third-world local strategic partners.

Networks also evolve endogenously. The ties formed or disbanded by any actor influence not only their own behavior in subsequent periods but also those of others to whom the actor is connected. One actor forms an alliance. Others match this action. Before you know it, a dense network forms. This is precisely what happened in the global automotive industry during the 1980s (Garcia-Pont & Nohria, forthcoming). Other mechanisms for endogenous evolution include the pathways of information that each tie represents, which alters the opportunity structure of a focal actor as any new tie is formed or disbanded (Gulati & Gargiulo, 1999).

These exogenous and endogenous dynamics can have significant consequences for the strategic advantages of any actor in a network. We discuss two ways in which such network

dynamics can influence the competitive advantage enjoyed by the firms in the network. We label these (1) lock-in and lock-out effects and (2) learning races. These are simply two of the more common consequences of network dynamics and are intended to be illustrative rather than comprehensive.

Lock-in and Lock-out Effects. Lock-in and lock-out effects occur because in many situations, ties formed with one actor place constraints on ties with others. These constraints may arise for several reasons. The first is simply a resource constraint. Any actor has limits on the resources it can devote to creating ties. A firm may only have the time and resources to form and satisfy the expectations of a limited number of alliances. By making choices to ally with some partners, others are ipso facto excluded.

A different kind of constraint is the expectation the alliance partner may have for fidelity to the alliance, including the exclusion of other partners. Many alliances are explicitly monogamous and preclude the parties from allying with similar others. Even when such exclusive stipulations are not contractually or explicitly specified, there is an implicit expectation of loyalty. For these reasons, the choices made by a focal actor in any given period can lock them into or lock them out of certain alliance choices. These constrained choices in turn can have significant performance consequences.

A clear example of the competitive consequences of early alliance choices that lock a firm into a particular trajectory is provided by Gomes-Casseres (1994) in his discussion of the minicomputer industry. He describes the evolution of multiple clusters of alliances that formed. Over time, the competitive dynamics within this industry became a competition for survival not between individual firms but between these different alliance clusters. Here the economic consequences of the lock-in and lock-out that resulted from initial alliance choices were severe.

When RISC “won” the UNIX wars, all the partners who had joined up to support the alternate standard “lost”.

Firms, especially those with superior bargaining power, often attempt to isolate themselves from such lock-in effects by refusing to sign exclusive alliances and forging multiple alliances, each of which is viewed as a “real option”, the value of which will depend on how the network and the competitive landscape evolves. Microsoft, for instance, is considered a master at maintaining its flexibility by using alliances as a portfolio of options. But even they have not been immune to the dynamics of lock-in and lock-out as is evident by the recent rise of the LINUX operating system which is challenging Windows by creating a rival network of independent developers and clients who want to challenge Microsoft’s domination of the operating system market.

As these above examples illustrate, the lock-in and lock-out that can result from networks evolving over time can be a significant source of differential returns. Depending on which network sub-graph you are locked-in to or locked-out of, your returns may vary. This is because it is neither easy nor costless to shift across network sub-groups. Even if an actor has the ability to forge a number of alliances that represent real options, the value of these options will vary depending on how the network evolves. The value of these “options” will depend on the position of the “options” in an evolving network structure. Because the evolution of network structures is not subject to the control of any single actor, the choices made by actors early in the evolution of a network will shape differences in the return they enjoy over time.

Learning Races. The consequences of learning races for the economic returns of actors in a strategic network can be understood at two levels of analysis, the dyad level and the portfolio level. First, we need to remember that any strategic network can be decomposed into a variety of

dyadic links. In most strategic networks, each of these dyadic relationships is neither strictly competitive nor strictly cooperative. Typically they involve mixed-motives in which the partners have private and common interests (Gulati, Khanna, and Nohria, 1994). In most situations, partners ally with each other because by working together they hope to generate some common returns that they can share in an agreed-upon way. But the knowledge or information, or access each partner obtains can also potentially have purely private benefits that accrue to one partner alone. Indeed, in some situations the partners may find themselves engaged in a race to learn or exploit as much as they can the other's assets and then exit the alliance. Such races are most likely to occur when the private benefits that can accrue to any of the partners after they have learned from the other partner outweighs the common benefits of the alliance. In a provocative article, Hamel, Doz, and Prahalad (1989) argued that in many alliances between Japanese and US firms, the US firms were left at a competitive disadvantage because their Japanese partners learned all they had to offer and then disbanded the alliance to exploit their newly learned knowledge independently. The idea that any dyadic relationship must be viewed as a learning race in which one partner will capture the greater share of economic returns over time because of superior learning skills or absorptive capacity has since been accepted and elaborated by several scholars (Cohen and Levinthal, 1990; Mody, 1993.).

While most of the learning race literature has been focused on the dyadic level of analysis, Khanna, Gulati and Nohria (1998) suggest that the dynamic of these races can be influenced by each partner's portfolio of other activities outside the alliance, or what can be considered their relative scope. For instance, if one of the partners has only the one alliance and no other business segments in which to exploit what they learn from the alliance, they are likely to view the common benefits of staying in the alliance high relative to the private benefits of

learning quickly and bailing out. But if the other partner has a number of other alliances or business interests in which the lessons learned from this particular alliance can be exploited, its private benefits might potentially exceed the common benefits, creating incentives for that partner to leave quickly and defect. Since networks determine the extended choices available to any partner, the broader network level structure will determine the relative ratio of potential private and common benefits that each partner will have and can thus influence their incentives to race, cooperate, or compete. These racing dynamics will thus influence the returns that different actors can extract from the strategic networks of which they are a part.

Conclusion

Our primary objective in this paper was to highlight how the conduct and performance of firms is influenced in important ways by the strategic networks in which they are embedded. We argued that incorporating strategic networks into our analysis leads to a more comprehensive view of the strategic behavior of firms. Traditional strategy research has viewed firms as autonomous entities seeking to build resources and stake out market positions that lead to sustainable competitive advantage. An understanding of the consequences of the ubiquitous growth of strategic networks highlights that firms are more properly viewed as connected to each other in multiple networks of resource and other flows. These linkages bind them in complex relationships that are simultaneously competitive and cooperative. As several papers in this volume highlight, the rents that accrue to firms is partly the result of their own unique resource endowments, but partly derived from the structure of the network to which they belong.

To show the promise of comprehending strategic networks, we highlighted several areas where such an understanding can complement and extend traditional strategy frameworks and perspectives. For instance, we showed how the overall network structure of an industry that can be analyzed by considering such elements as its density, or the extent to which the industry is more or less constrained in its exchange relations with other upstream or downstream industries, and these can be an important complement to traditional models that have focused on concentration or other measures of market power. For strategy scholars who focus on the industry as their unit of analysis, we believe a network perspective can add an important new dimension to explore differences in profitability across industries.

For strategy scholars whose interests center on positioning within an industry as a unit of analysis, we suggest that in addition to using similarities in firm attributes such as scale, scope and technology in constructing strategic groups, they should also consider similarities among firms in relational space. Firms that are in the same clique or are structurally equivalent may behave similarly and enjoy similar returns. An interesting research question would be to examine whether groups defined on the basis of attributes overlap with those defined on the basis of relational similarities. It would also be interesting to study whether firm conduct and performance was more or less contingent on these different ways of grouping.

A network perspective can also provide new insights for strategy scholars who are proponents of a resource-based view of the firm. A comprehensive view of a firm's rent-

generating resources would not only include elements such as brands, technological capabilities, management talent, and so forth, but would also include the network resources or social capital of the firms. The relationships a firm has are a unique and inimitable asset. Both the specific network to which a firm belongs and also its relative location in that network are likely to be important. Firms whose relationships allow them to occupy a more central place in the strategic networks they are a part of enjoy superior returns because of access to better information and opportunities than those firms that are more peripheral.

A network perspective is also useful to strategy scholars who focus on contracting and governance issues and how these choices influence firm performance. A network perspective suggests that both contracting and coordinating costs can be influenced by viewing each transaction as simply an event in an evolving network of relationships. A new transaction with someone with whom one has a history of prior relationships or who has ties with others to whom one is also connected poses far lower transaction and coordination costs than might be expected within a more traditional analysis.

Finally, we also showed the promise of a network perspective in the dynamics or evolution of firms and industries over time. There has been a great deal of attention paid recently to how disruptive technologies or other shocks can alter the competitive landscape of industries over time. A network perspective can provide important insights to better comprehend these dynamics because they provide a way of understanding why

some firms get locked-in and why others get locked-out of old and new dominant designs.

Our objective in this brief recapitulation of the themes and ideas we have advanced in this paper is to show the enormous promise that lies in incorporating a deeper understanding of strategic networks into the mainstream of strategy research. The points of opportunity we have identified are but the tip of the iceberg. We believe there is much more to be learned by adopting such a relational perspective in strategy research. The papers in this special issue are a great illustration of the insights that can be gained by adopting such a perspective. We hope this paper will provide a further impetus for this growing body of research.

In an oft-cited volume titled, *Fundamental Issues in Strategy Research* (Rumelt, Schendel and Tece, 1994) the authors laid out a research agenda for the field to pursue. There are many promising paths identified that have since been much discussed. We hope to extend this comprehensive agenda by proposing that another important direction for strategy research lies in adopting a relational or network perspective. This not only constitutes an independent research agenda in its own right but cuts across many of the themes that are fundamental to past and present strategy research.

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