PARTNER SELECTION AND NETWORK RESOURCES: HOW FIRMS USE ALLIANCE NETWORKS TO GAIN COMPETITIVE ADVANTAGE

By

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Researchers believe that participation in a network facilitates the flow of critical resources. Many of these resources are intangible, yet the nature of such intangible resources remains ambiguous. In this paper, I classify such network resources based on the source of the resource and the needs of the potential recipient. This paper adds to the social capital literature by explicitly defining the source and nature of network resources and considering the life cycle dynamics of the potential recipient in terms of the benefits accrued by them.
It seems like networks are everywhere these days. It’s not that networks are something new – they are an integral part of most natural and social systems. It’s also not that academics have just discovered network studies. Thousands of network articles have been written in the fields of sociology, anthropology, communications, organizational studies and psychology over the past 50 years. What I mean is that networks have caught the imagination of both the academic community and the general public as never before in the past couple of years.

Consider the field of organizational studies. In the past two years, the top journals in the fields have published over 50 articles with social or interfirm networks as the subject\(^a\). The theme of the 2002 Academy of Management annual meeting was “Building Effective Networks” and featured 231 sessions devoted to the conference theme. Since 2002, another ten network articles have appeared in *Academy of Management Review* and *Academy of Management Journal* alone. To demonstrate the scope of topics to which researchers have applied network concepts, here is a non-random sample of recent articles:


The popular press has also jumped onto the network bandwagon. A quick search of the LexisNexis Academic Universe for the previous six months turns up hundreds of articles using

network concepts related to, among other things: dating, terrorist organizations, office design, the internet and job searching. The following is another non-random sample:


We Can Beat Terror at Its Own Game: Networks are both the problem and the solution. - Los Angeles Times, 4/25/04

The Power of the Network Spreads Beyond the Old Boys: Why businesses are increasingly becoming female-friendly - Financial Times, 5/10/04

Social Networks Could Prove a Powerful Connecting Tool - South China Morning Post, 5/11/04

And yet, for all of the academic interest and the broad applicability of the concepts, there are some glaring holes in our understanding of how networks operate. For one thing, although there is general agreement that intangible resources flow through networks, the nature of those resources is not well understood. Such intangible resources are often called “social capital,” a term that is frequently used with a variety of sometimes confusing meanings (Adler & Kwon, 2002). The confusion is perhaps not surprising since the resources in question are not quantifiable or, in most cases, even measurable. The confusion is compounded by the fact that such resources will have different meanings for different network actors depending on their existing resource stocks and needs as well as their position in the network. Since social capital has not been clearly defined, how network actors should select partners in order to configure their network most efficiently and effectively is an open empirical question.

These are the issues that this paper addresses. It is a perplexing problem. There is an implicit assumption in much of network research, and also by the general public, that participation in a network is positive, or even necessary for success. Yet there are many ways to participate. How does an actor develop an effective network strategy? In this paper, I will
develop a classification of network resources that considers the needs of the actor as well as the
network position and role of the potential alliance partner. I arrive at this taxonomy by reframing
a basic paradigm of network studies – that embeddedness in a network involves a delicate
balance between opportunities and constraints for the actor. This perspective has led to a
dichotomous view of optimal alliance network configuration, with some authors suggesting that
network actors should seek to maximize their network ties and others suggesting that a more
limited opportunistic network is most desirable.

One major implication of this taxonomy is that a partner who seems to be highly
desirable on the surface may have drawbacks, while a partner who appears to have little strategic
value may possess resources that can lead to competitive advantage. These resources will differ
depending on the needs of the agent and their position in the network. Recognizing partners who
possess valuable but non-obvious intangible resources may be a critical firm capability.

Although this paper will focus on interfirm networks, the general model should apply to other
kinds of networks as well.

This paper will add to the interfirm alliance network literature in several ways. For one
thing, I will explicitly define network resources – the intangible resources that accrue to an actor
due to network ties. I will then show how network resources have been operationalized in the
past and use these dimensions to develop a classification of network resources. I will also add a
dynamic element to the discussion of optimal network configuration by considering the specific
needs of potential entrants to the network as well as current network participants.

The paper proceeds as follows. I first review the strategic alliance literature to show the
logic by which participation in an alliance network has been linked to firm success. I then define
network resources – the firm level equivalent of social capital. I show how network resources
have been operationalized in previous work, and build upon this work by formally categorizing potential network partners. I describe how both new entrants and existing network participants may benefit from relationships with each type of network partner. In lieu of formal propositions, I provide a hypothetical “thought experiment” of how this taxonomy may apply in practice. I close by discussing the implications of this work and providing some directions for future research.

IN SEARCH OF NETWORK RESOURCES

Interfirm Alliance Networks

It is generally accepted by researchers in strategic management that alliance formation is associated with increased firm performance, particularly in high technology firms (Hagedoorn & Schakenraad, 1994). Alliance groups that link all complementary products and markets critical for a focal product may be an inevitable and necessary response to changes in the external business environment such as increased globalization, increased complexity of products and services, and new technologies that create links between formerly separate industries (Gomes-Casseres, 1994).

However, governance costs for alliance networks are higher than for hierarchical firms due to managerial constraints – there is simply more to organize and supervise, and member firms have to give up some autonomy and control. Firms must share critical information with each other, which requires trust. The unpredictability of partner behavior can impose significant costs to the alliance if the partner free rides or behaves opportunistically. If a firm is embedded in a rich social context in which information and opportunities are exchanged, partner risk is reduced (Gulati & Singh, 1998). Dyer and Singh (1998) contended that firms can even generate
“relational rents” – supernormal returns achieved through relations with other firms. This led Gulati (1999) to speculate that a firm can possess network resources in the sense of the resource-based view of the firm (Barney, 1991; Wernerfelt, 1984).

Network Resources

But what are these network resources? Gulati (1999) defined network resources as intangible firm resources that exist outside the firm boundary. They result from information advantages one firm has over others, and they act to alter the firm’s opportunity set. For example, a firm’s network may allow it access to information that can provide it with opportunities in the future. The alliance network is a channel for other resources as well, including financial and human capital (Gnyawali & Madhavan, 2001). Financial capital is exchanged for equity in the company via direct investments or for access to intellectual property via licensing agreements. Human capital includes personal knowledge, skills and capabilities. These resources can be exchanged via R&D alliances, joint development projects, or through the interactions of top management teams.

Network resources can be considered the firm level equivalent to social capital. Coleman (1988) developed the term “social capital” and contrasted it with human and financial capital. Social capital is the value that a social structure offers to actors as resources that they can use to achieve their interests. Social capital is manifested as a relationship between actors, unlike human and financial capital, which are more concrete resources. Some common forms of social capital are information and norms. Social capital is dependent on the trustworthiness of actors and obligations held between them. Coleman envisioned trust developing between individuals as a process of reciprocation. If one actor does something for another, the second actor now “owes” the first actor. If the second actor reciprocates, the basis for trust is established. Thus a system of
obligations and expectations is created. This system is aided by norms and sanctions, which are most effective when information flows freely throughout the network.

Burt (1992) suggested that social capital included access to information, timing of information receipt and referrals gained via reputation or association with prestigious or trusted partners. Burt (1992) agreed that trust plays an important role in extracting information benefits from the network. However, he did not feel that the value of social capital arises solely from trust. From Burt’s (2000) perspective, a separation between non-redundant contacts (a “structural hole”) creates social capital for the actor who bridges the gap. Such an actor creates a brokerage opportunity between the contacts on either side of the hole, giving the actor potential information and control benefits. This stands in opposition to Coleman’s (1988) view that network closure (i.e. eliminating structural holes) is necessary to maximize the social benefits that are derived from a tight, cohesive, trusting network.

Another way to think of social capital in general terms is as a stock of goodwill that is built up for a network actor based on the social structure in which they are embedded. These stocks of goodwill enhance the flow of information and other intangible benefits to the network actor (Adler and Kwon, 2002).

What is most notable about these definitions of network resources or social capital is their relative ambiguity. “Relationships,” “goodwill,” and “information” do not shed a lot of light on what network actors are looking for when they assess potential alliance partners. Not all potential partners will possess the same network resources. Furthermore, not all actors will find all network resources equally valuable. This variability in resource needs and actor types indicates that there can be no simple, universal definition of a network resource. The nature of network
resources suggests that a classification into groups or divisions is required to fully understand them. I will call this classification a taxonomy.

In attempting to develop a taxonomy of the different types of network resources, my first step was to determine how these resources have been operationalized in the past. Network resources have been typically viewed in two ways – by the structure of the individual network of the focal firm, and by the role played by the alliance partners of the focal firm. I now turn to a discussion of these two topics.

Alliance Network Structure

In the introduction to a special issue of the Strategic Management Journal on strategic networks, Gulati, Nohria & Zaheer (2000) contend that a firm’s performance cannot be understood without taking into account the network structure in which it is embedded. The overall network structure of the industry and where the firm is situated in this network are now understood to have profound implications for firm profitability.

Much of this effort stems from what Granovetter (1985) referred to as the problem of embeddedness. Although networks are critical for the firm, network relationships can also be viewed as a constraint since social ties among firms can prevent the rational, self-interested, utility-maximizing behavior that economists have traditionally ascribed to firms. Because of this tension between network opportunities and network constraints, questions of optimal structure have become questions of what the minimal number of network ties are to achieve the desired ends.

The focus on network structure as a source of critical resources is central tenet of network theory (Adler & Kwon, 2002). To a network theorist, structural studies are related to the construct of centrality. Centrality can be measured in a variety of ways, but usually involve some
kind of analysis of the number of network connections an actor has, or the density of the actor’s connections. High centrality is usually taken as a measure of the prestige or prominence of an actor in a network (Wasserman & Faust, 1994). Higher centrality actors are assumed to have greater access to all of the resources that flow through networks (Gnyawali & Madhavan, 2001).

Centrality is so highly correlated with firm success in the minds of strategic alliance researchers that measures of centrality have been used as dependent variables in lieu of firm performance (i.e. Ahuja, 2000; Walker, Kogut & Shan, 1997).

Powell, Koput & Smith-Doerr (1996) found that collaboration increases organizational learning in knowledge-intensive and broadly distributed environments such as biotech industry. In such an environment, a densely connected network of ties (i.e. having higher network centrality) is positively related to firm performance.

High centrality may also be associated with increased future collaboration. Ahuja (2000) found that firm centrality was positively related to number of new technological alliances formed in the future. Gulati (1999) found that several measures of centrality were positively related to future alliance formation. Furthermore, high centrality firms may be more likely to form alliances with other high centrality firms (Gulati & Gargiulo, 1999).

The Role of the Alliance Network Partner

A second stream of the alliance literature concerns the attributes of the alliance partner. Such exchange studies examine the network role of firms to which the focal firm maintains a connection, and how this role impacts the focal firm’s performance. In other words, who your partners are may be just as important as how many of them you have. This stream of work stems from the intuition that purely structuralist views are implausible since only the existence of a tie
is considered relevant, devoid of any context about the nature of the tie or of the partner (Adler & Kwon, 2002).

To a network theorist, social role refers to the actor’s pattern of relations (Wasserman & Faust, 1994). Network theorists use complex algebra to arrive at mathematical definitions of an actor’s social role. For example, Burt (1992) believed that structural equivalence, or the degree to which two network actors shared the same set of connections, was an important determinant of resource exchange in a network. However, the way in which the term is used in organization science is often difficult to quantify. Role can refer to an organization type. For example, a venture capitalist or a large established firm (e.g. Baum, Calabrese & Silverman, 2000). Role can also refer to status or prestige (Stuart, Huang & Hybels, 1999) or to the technological space in which the firm operates (Stuart, 1998). Finally, role can refer to a unique set of connections in the network. For example, an actor can be connected to two distinct clusters of actors which are otherwise unconnected (Colwell, 2003). Studies of alliance partner role have a large degree of overlap with studies of alliance structure, but the two issues are distinct. Structural studies are concerned with who has ties to whom. Role studies are concerned with the attributes of the alliance partner.

Arora & Gambardella (1990) found that universities, new biotech firms (NBF’s) and large corporations might have complementary skills and resources that encourage collaboration. Universities are skilled in basic scientific research. NBF’s are skilled in more applied research, often centered on a specific technology. Larger corporations possess financial resources and knowledge of how to commercialize pharmaceutical products. Shan, Walker & Kogut (1994) proposed that alliances between small startups and large firms could be a way to exploit new technologies and transfer resources efficiently for product commercialization. Biotech startups
perform better when they form alliances with large pharmaceutical companies and research labs. They perform worse when they ally themselves with potential rivals (Baum, Calabrese & Silverman, 2000).

Stuart (1998) found that firms were more likely to collaborate when they were in crowded technological spaces, and when they possessed prestigious technologies. Stuart, Huang & Hybels (1999) found that the commercial and technical prominence of various alliance partners impacts startup performance by shortening their time to IPO.

What Moderates the Efficacy of Network Resource Exchange?

The number of alliance ties the firm maintains and the nature of its partners are the network attributes most commonly associated with firm performance. However, the effect of a network tie can be moderated by a number of things. In general, these can be categorized as the nature of the tie itself and the nature of the network.

Granovetter (1973) believed that the relative strength of network ties were an important structural consideration. He defined tie strength as a combination of the amount of time, emotional intensity, intimacy and reciprocity that characterize the tie. Strong ties promote cohesion and decrease governance costs, but weak ties may be more effective for disseminating certain kinds of information.

Gulati (1995) found evidence that indirect ties and common third partners increased the probability of alliance formation in his longitudinal study of several industrial sectors. However, both strong and weak ties play an important role in network function. Uzzi (1997) examined interfirm networks in the apparel industry and found evidence for two types of network exchange: market (“arm’s length”) ties and embedded ties. Market ties lack trust and reciprocity and are based on purely economic exchange. Embedded ties are based on ongoing social
relationships and are characterized by high degrees of trust and reciprocity. These relationships involve high degrees of information exchange and joint problem solving. Hansen (1999) found that weak ties were more effective for transferring simple knowledge but that strong ties were more effective for transferring complex knowledge in his study of new product development projects at a large electronics firm.

Another moderator is the nature and purpose of the network in question. Networks can run the gamut from very formal to highly informal. They can be very tightly connected or very dispersed. Actors can have a wide variety of reasons to participate in a given network.

Stevenson and Greenberg (2000) pointed out that different network actors have different goals. The aims of potential partners and the opposition that an actor faces in achieving their goals may impact resource flows through the network.

Kilduff and Tsai (2003) suggested that network structure would be influenced by whether the network was formed with specific goals in mind by the actors or was simply serendipitous. Goal directed networks may develop higher centrality, and serendipitous networks may be more diffuse with more structural holes developing.

The overall density of the network connections may also moderate the exchange of network resources. For example, the positive effects of centrality may be diminished as overall network density increases (Gnyawali & Madhavan, 2001).

Another critical moderator is the accessibility of the potential partner. This can take several forms. One is opportunity – the potential network partner may not be reachable due to structural constraints (Adler & Kwon, 2002; Ahuja, 2000). Another is inducement – the potential partner may be unwilling to collaborate. Some potential partners will not see the benefit in forming a relationship due to their own needs and perspectives (Ahuja, 2000). Another
accessibility issue is attention – the potential partner does not engage in a symmetric exchange of resources. A partner may form a relationship, but not provide the agreed upon resources (Gulati & Singh, 1998). Other partners may form a formal tie, but not devote enough resources to its maintenance for it to be effective for either partner.

So what is the network actor to do? If we accept the fact that different resources are exchanged through different kinds of network ties, and that the actor’s position in the network also strongly influences that flow, how should the actor situate itself in the network to best advantage? I contend that the answer to this question should be determined by considering what resources the actor needs, and what resources potential network partners are likely to possess.

Configuring Network Structure to Achieve Competitive Advantage

It is a standard tenet in the field of strategic management that a key goal of the firm is to create a competitive advantage. Barney (1991) suggested that the path to competitive advantage is to acquire resources that are strategically valuable. Network resources, although intangible, can nonetheless be firm resources that lead to competitive advantage. Therefore, firms should, and do, seek to acquire network resources.

Framing the network configuration process as a search by firms for valuable resources means that partner selection becomes a critical issue in a firm’s quest for competitive advantage. Firms are looking for partners who can confer network resources that lead to improved performance. The centrality and network role of a focal firm’s partners will ultimately impact its performance by affecting its access to opportunities. There are two ways in which access to opportunities can be impacted - information and legitimacy. Information is the awareness that an opportunity exists, or the knowledge of how to exploit an opportunity. Legitimacy encompasses trust and the perception of acceptability as a partner.
Access to information can take many forms. The information can be simple know-how, or knowledge of how to perform critical tasks. This may be more important for new entrants than existing network participants. Information can also be of brokerage opportunities (Burt, 1992). Network connections can provide information about potentially profitable deals or sources of tangible resources such as financial or human capital.

Legitimacy also has several forms from a resource perspective. For a new network participant, entrée into the network or introductions to valuable potential partners is important. Also, associating with a well-known partner may confer prestige upon a relatively unknown network participant. Being a member of a densely interconnected alliance network in which trust and reciprocity are featured may help an existing network participant maintain or enhance their standing. However, the same configuration may constrain a new entrant’s ability to operate effectively due to their lack of understanding about the network and their power differential with more established network participants.

Network resources can take the form of information or legitimacy, but are valuable to the extent that they provide access to opportunities. Ultimately, the actors participate in the network because they believe that participation enhances their prospects of success. In interfirm networks, success is generally measured in economic terms. However, success may entail finding a job, finding a mate, or enhancing one’s social status. The chance of success in any of these disparate endeavors hinges upon access to valuable opportunities. These opportunities may be for investment, collaboration or resource exchange. Such opportunities lead to survival, growth and success.

The two attributes of the potential partner discussed above – position and role in the network – lead to stocks of intangible and transferable resources. These network resources can
be categorized as information or legitimacy. Network resources flow through network ties, but the extent to which they flow is moderated by the strength of the tie, the position of the focal firm, and the configuration and purpose of the network itself. Network resources are valuable to the extent to which they lead to increased opportunities to the focal firm, which ultimately lead to success for the possessor of these resources. These relationships are depicted in Figure 1.

As a network actor considers which relationships to pursue or develop, they are implicitly moving through the steps shown in Figure 1. All firms are seeking to acquire resources that can be developed into competitive advantage. The benefits that a firm receives from its alliance network include access to many kinds of resources – human, financial and network. Firms may form more effective alliance networks if they consider the intangible network resources that may come from a potential alliance partner as well as the more tangible human and financial resources.

Network resources lead to increased access to opportunities. I use opportunities here in a very broad sense. Examples of opportunities include establishing a new supplier or customer relationship, introductions to an investor or partner, acquiring critical human resources, or accessing new technologies. All such opportunities come through participation in the relevant network. In order to increase their chances of gaining access to such opportunities, firms seek to form relationships with firms who can provide them with network resources as described above.
Firms look for clues that a potential network partner possesses such resources. The relevant signals are the potential partner’s position and role in the network. In the next section, I develop two taxonomies of network resources based on these two parameters. The first is for a new entrant to the network and the other is for an existing network participant. These two types of actors have very different needs and thus may increase their likelihood of success if they seek out different network partners.

A TAXONOMY OF POTENTIAL ALLIANCE NETWORK PARTNERS

In the previous section, I suggested that firms search for network partners based on the potential partner’s ability to provide needed resources. Some of these critical resources are intangible, or network resources. Network resources are derived from a potential partner’s centrality in the network or their specific role in the network. Central actors are presumed to have more status and prestige as well as greater access to information than more peripheral actors. Furthermore, the dense connections that they maintain may lead to greater trust and reciprocity from other network actors. All of these things make them attractive network partners. However, actors with lower centrality may be attractive partners as well, particularly if they hold an important role in the network.

The type of resource that is important for a potential partner differs depending on whether they are attempting to join the network or if they are current network participants. Although all firms have the same ultimate goal of access to opportunities leading to competitive advantage, each individual firm has specific needs based on their network position and existing stock of resources. New entrants will be more interested in entrée, introductions and basic information about the network. Existing participants will seek to enhance their status, locate specific resources to meet their needs and gain access to lucrative opportunities.
One possible way to maximize network resources is to maximize network links, but that is neither the most efficient nor the most effective strategy (Burt, 1992). For one thing, not all actors in the network are created equal. Some are vastly more densely interconnected to the network than the average actor, and form the center of clusters of organizations in the network. These high centrality organizations are called hubs (Colwell, 2003). Forming alliances with a hub organization attaches a firm to the center of a cluster of allied organizations. Being part of a densely interconnected cluster may help a firm maximize the exchange of social capital by creating relations that emphasize trust, reciprocity, norms, expectations and sanctions (Coleman, 1988). Hub actors are the most obvious source of network resources due to their high centrality and high status network role.

Another attractive partner is a actor that does not have high centrality, but has a high network status due to either some attribute of the actor itself, or something unique about the configuration of their individual (“ego”) network. Such actors are called connectors (Colwell, 2003). Connectors are not as densely interconnected as hubs, but still play a critical role in the network. For example, the actor could link two or more clusters that would otherwise not be in contact with each other. Connectors may also provide unique information or confer legitimacy based on their role in the network apart from their centrality. For example, they may have a strong or prestigious reputation, or they may be able to provide access to unique knowledge or opportunities that are desirable for the potential partner.

Linking to a connector may provide important information benefits that are not available to firms that are only connected to a single hub cluster (Granovetter, 1973). Such a link may also facilitate brokerage opportunities between members of different clusters who share common interests, but otherwise wouldn’t have contact with each other (Burt, 1992).
There are two other categories of actor who may seem at first to be less attractive network partners, but still may possess valuable resources. I will call actors with low status but high centrality shadows. I will call actors with low centrality and low network status peripherals.

Together, these four types of network actor – hubs, connectors, shadows, and peripherals – comprise a taxonomy of potential partners based upon the two commonly used dimensions of network position and role. These two dimensions are associated with stocks of the network resources information and legitimacy. Possession of these resources can help a network actor gain access to opportunities and thus achieve competitive advantage in their field. Therefore, it may be useful for a network actor to consider this taxonomy when searching for partners. This basic taxonomy is depicted in Figure 2.

This taxonomy suggests that the decision to form an alliance with an organization should involve more than just an assessment of the proposed tangible resource exchange between the individual firms. The actor to which the organization links itself can also provide network resources based on how it is connected in the network. If it is high centrality firm with high network status (a hub), it can connect the organization to an embedded cluster of organizations with strong ties based on trust and reciprocity. However, just having a lot of direct connections does not make an organization a hub. A shadow firm maintains many network connections, but has relatively low network status. Such a firm may provide introductions and information about the network, but does not facilitate embeddedness in a central hub cluster.
A connector may possess valuable network resources that are based on its role, not its centrality. Connectors may be able to provide unique information and knowledge from other clusters that the organization would not otherwise have access to. It may also confer prestige or legitimacy based on its own network status. A peripheral firm has low network status and low centrality. It may not be able to directly provide any network resources such as legitimacy, although it could well possess other critical information or knowledge that may lead to access to opportunities.

Although a given network actor may possess a set of potential network resources, the meaning and usefulness of these resources will differ depending on the needs of the potential partner. To illustrate this point, the next two sections show how the taxonomy may be applied to two types of network actor: a new entrant and a current participant.

Network Resources for New Entrants

Figure 3 characterizes the intangible resources that are valuable for a potential entrant to the network. A typical example of this type of actor in an interfirm network is a startup firm hoping to gather resources via the alliance network of their organizational field. The intangible resources most valuable to a firm in this position are such things as entrée, access and legitimacy. The nascent actor must form a relationship with an existing actor in order to join the network. The initial instinct may be to seek out a hub. Higher centrality actors with important network roles (lower right quadrant) are more visible and attractive partners due to their prestige and the high number of network connections they maintain. However, they may be more difficult to form relationships with due to their high status. Even if a relationship is formed, the resources that accrue to the nascent partner may not be an equal exchange for the resources provided. This is
because the high centrality partner has many relationships to maintain. Each of these relationships requires time and effort, and may stretch the available resources of the partner. The lower status partner may not receive as much time and attention as they wish.

On the other hand, high centrality partners that do not enjoy high network status (upper right quadrant) may be more accessible to the nascent actor. Such shadow actors have high centrality and may be able to provide entrée into the network and critical introductions and information. However, due to their lower status, may not confer as much legitimacy as the previous actor. Shadows maintain numerous ties in the network, but do not play an important role in it.

Lower centrality actors may not appear to be attractive partners, but may still provide important intangible resources. For instance, a peripheral actor with low centrality and status (upper left quadrant) may still provide valuable information. Particularly if they have recently joined the network, they may have a good understanding of how to achieve entrée. They may be very aware of the network structure and who the key actors are and have less constraints than more central actors (Stevenson & Greenberg, 2000). They may provide mutual support for other newer actors, or have information that is of particular value to a new actor. Newer actors may also work together to act as change agents within the network, or to form new clusters (Leblebici, Salancik, Copay & Ting, 1991).

The remaining quadrant in Figure 3, the lower left, shows potential partners with lower centrality, but who have an important role in the network. Such connectors may possess valuable information or enjoy high status or prestige in the network without maintaining a large number of ties. Forming a relationship with a connector may provide many unique network resources. Although such partners would normally be highly sought after, in some cases they may prove
difficult to access or even recognize. The information that they possess or the advantageous nature of their ego network may be non-obvious or even tacit.

Network Resources for Existing Actors

Figure 4 characterizes the potential intangible resources that are valuable for an existing actor in the network. For an existing actor, forming ties with a high status, high centrality actor (lower right quadrant) provides the opportunity to participate in the type of densely interconnected network with ties based on trust and reciprocity envisioned by Coleman (1988). Such an alliance may enhance the actor’s status in the network and increase their own centrality. High centrality actors are more visible in the network, and may be more likely to form alliances with other high centrality actors (Gulati & Gargiulo, 1999).

On the other hand, an alliance with a low centrality but high status partner (lower left quadrant) may provide access to unique information and brokerage opportunities. Such an alliance may lead to the kind of network resources envisioned by Burt (1992). Such a partnership may be more efficient and less constraining than the higher centrality alternative.

As with new entrants, existing participants should not overlook potential partnerships with lower status or centrality actors. However, the resources they possess that are of interest to an established actor are more likely to be tangible than intangible since they either do not have a large number of relationships in the network, or they do not have an important network role. In particular, newer entrants may possess unique information that may be useful to an existing actor
such as cutting edge technologies or new processes and fresh ideas (Ahuja, 2000; Shan, Walker & Kogut, 1994).

A THOUGHT EXPERIMENT: AN ALLIANCE NETWORK IN A HIGH TECHNOLOGY DOMAIN

To see how this taxonomy may apply in practice, we can create a thought experiment by imagining two firms involved in the same high technology organizational field. Firm A is a startup that has developed an exciting new technology with the potential to revolutionize the field. Its goal is to enter the alliance network for the field in order to gain access to resources and opportunities afforded to network participants. We will call this firm NanoBioGenomics, or NBG for short. Firm B is a mid-sized existing network participant with a solid, profitable product line. Its goal is to grow into a major industry player by gaining access to next generation technology. We will call this firm MicroGen. Representatives from both firms are attending an industry conference, which provides a major networking opportunity since most of the network participants have some sort of presence there. The setting is conducive to forming relationships due to the informal atmosphere. The representatives of both firms face a similar problem: What is the most effective way to spend their time?

Firm A: Entrée and Legitimacy

NanoBioGenomic’s main goal is to establish itself as a network participant in order to create access to the lucrative opportunities that network membership provides down the road. It
is looking for introductions to network participants and acceptance as a member of the community. A secondary goal is to gain information about sources of tangible resources that it needs to grow, particularly capital. It must find partners that can provide these resources in exchange for resources that it possesses. The most attractive and visible potential partners are hubs. Hubs have both high centrality and high prestige. Association with such a partner would undoubtedly confer immediate legitimacy and access to numerous valuable channels of information. However, such a partnership may prove problematic. For one thing, hubs may be difficult to access. They are already maintaining a large number of network connections. They may not have the time or attention to add more. Another consideration is the nature of the resource exchange. The main resource possessed by the startup may be their technical knowledge. Since this is their main source of competitive advantage, giving it up in exchange for hard-to-quantify intangible resources may prove to be disadvantageous in the long run.

As it turns out, one of the conference keynote speakers is the CEO of NanoNexGen Systems. This firm was spun out of a major research university five years ago by a scientist with two previous startups to her credit. It is backed by the top venture capital firms in the country, and enjoys strong collaborative relationships with a number of major corporations. NanoNexGen is clearly a hub in this network. The founders of NBG would like to meet this CEO, but she spends the conference surrounded by an entourage of partners, acquaintances and well-wishers. There is no opportunity to make meaningful contact.

As the founders of NBG make their way around the cocktail party circuit, one can imagine any number of network actors who may fill the connector role. In some cases, they may be obvious, such as a famous scientist who has published extensively in NBG’s field and could confer legitimacy by joining their scientific advisory board, or an investor who has worked with
firms who could become key partners with NBG. However, there may be just as many
participants who possess valuable network resources that would not be obvious to either party.
For example, a participant may maintain a social connection with a potential partner, or know of
a critical industry event that is not yet public. Such resources will not become apparent until a
relationship is formed. NBG’s founders would be well advised to cast a wide net as they sample
the cheese puffs and chardonnay.

There are often network participants who maintain a large number of network
connections, but do not seem to have an important network role. In the context of an interfirm
alliance network, these shadow actors may be established firms that lack cutting edge products or
access to the latest technology. They may also be professional service providers (lawyers,
headhunters, etc.) or representatives of nonprofit economic development groups. Such partners
may be able to provide entrée and valuable information because of the large number of
connections they maintain. They are often very approachable and eager to form relationships.
However, because of their relatively low status, they may not confer as much legitimacy as hubs
and connectors. If they are firms and they lack cutting edge technology, their motives to
collaborate should be carefully considered as well. Such actors are plentiful at our hypothetical
conference, and are not difficult to approach. In fact, they may be the most enthusiastic and
experienced networkers in the room.

Finally, NBG could choose to form a connection with another peripheral organization.
This organization may be another startup or just a firm that has not formed many network
connections. Such organizations may not seem like attractive partners, particularly if they are
potential competitors. However, firms can and do regularly form alliances with competitors and
allying with peripheral firms may confer some unique advantages. For example, other new
entrants may be especially attuned to the needs of another new entrant, and be willing to supply network resources that are of particular interest to them. Other peripheral organizations may also not be as constrained by existing norms and be more willing to work together as change agents, or to adopt new technical standards.

**Firm B: Influence and Deal Flow**

As an existing network participant, MicroGen has much different network resource needs than NanoBioGenomics. MicroGen is interested in growth. As a known entity, they have less need of legitimacy, but are in a much better position to exploit access to lucrative deals. It may be more in their interest to work in a highly interconnected network in which they can exploit their position using trust and reciprocity in a highly interdependent environment. In this case, collaboration with a hub may make a lot of sense. Tying to a hub makes them part of an industry cluster and enhances their legitimacy. They are in a good position to use the information that they receive from such an arrangement without being exploited. In the context of our experiment, the CEO of NanoNexGen may be more approachable because MicroGen is a known player. MicroGen’s size and experience may also make them better able to benefit from a relationship without being exploited.

Similar to NBG, MicroGen may find a less central actor that nonetheless possesses valuable intangible resources. Once identified, such a partner may prove very advantageous. In particular, connectors may prove to be sources of information regarding unique brokerage opportunities for existing network participants. If identified, MicroGen is much more likely to be able to understand and exploit a brokerage opportunity than the new entrant to the field.

On the other hand, MicroGen may not glean as many intangible resources from shadow or peripheral firms. New entrants may be a source of cutting edge technology, but cannot provide
existing network participants much in the way of information about opportunities or legitimacy. Shadow actors have a propensity to maintain a high number of network connections, but their value as partners should be carefully considered. Both types may seem useful if MicroGen would like to become a hub in their own right, but prior work (Barabasi & Albert, 1999) has shown that hubs may arise in many networks due to initial conditions that are difficult to duplicate once the network is established. MicroGen may be better off linking to an existing cluster than attempting to form their own.

DISCUSSION

A network is a set of actors and the ties among them, yet a simple map of actors and ties does not give a particularly profound view of how the network operates. Interactions can and do act as channels for resource flows, but it is important to carefully examine why some interactions exist and some do not (Salancik, 1995). Furthermore, if network theory is truly going to contribute to the field of strategic management, researchers must suggest ways in which organizational actors can develop effective alliance networks. In this paper, I have developed a taxonomy of the different types of intangible resources available to network actors, and suggested ways in which these different resources may be useful to two very different classes of actor – a new entrant and an existing participant.

I have framed the issue as a question of partner selection, which is a departure from the more typical strategic alliance model which views a firm’s set of relationships as part of its resource endowment. The model shows firms engaging in active search for partners that can provide a wide variety of critical resources. The resources required are different for different firms depending on their existing resource stocks and their life cycle position. In this sense, it is more dynamic than models which represent firms as endowed with a fixed set of relationships.
Partner selection is a real and vital issue faced by firms. Top management teams must make these sorts of decisions on a daily basis. Firms amass resources in order to gain competitive advantage in their markets (Barney, 1991). Partner selection precedes and is directly related to the accumulation of stocks of network resources. Although there may be a tendency by top management teams to focus on gathering tangible resources such as capital and talented employees, the intangible network resources discussed in this paper – information and legitimacy leading to access to opportunities – are just as important. In fact, it is difficult to imagine a firm being successful without solid stocks of such resources (Gulati, 1999; Gulati, Nohria & Zaheer, 2000). Viewed in this way, the ability to discern valuable network partners and form effective relationships with them may be a critical firm capability (Teece, Pisano & Shuen, 1997).

There is general agreement in many social science disciplines that network ties act as channels for resources flows, and that a great deal of these resources are intangible. However, less attention has been paid to the exact nature of these intangible resources, or how network actors can use them most effectively. Previous work has operationalized such network resources either based on the focal actor’s position in the network (centrality) or their potential partner’s role in the network (unique set of ties or actor attribute). In the taxonomy presented in this paper, I have suggested that potential network partners can be categorized along both of these dimensions, and that the four resulting configurations each represent unique bundles of potential network resources. Furthermore, each configuration may provide different network resources and different levels of attractiveness based on the focal actor’s position in the network. A new entrant may have far different resource needs than an existing actor. When looked at from this point of view, studies that link one sort of network measure such as centrality to actor success may be too simplistic.
It may prove useful for a network actor to link to a hub in order to tap into resource flows to the hub actor. Recognition of where the hubs are and how to use them may well be a strategic advantage for a new entrant. Forming a tie with a hub may connect a firm to a dense cluster of actors that provide each other with social capital benefits. For example, association with a hub may confer prestige on the network partner, allow them access to information not shared outside the cluster, or provide them with strong ties to other cluster members that are maintained by norms of trust and reciprocity (Coleman, 1988).

It may also be an advantage to form alliances with actors that play a connector role in the network. Connectors may not have as many ties in the network as hubs have, but their ties have unique value to firms with whom they have relationships. Connectors have ties to clusters of actors that would otherwise not be attached. Thus, connectors have a very diverse set of relationships that can span different functional or geographic niches. By maintaining ties with clusters that are distant from them, connectors possess information and other resources that are not received by their immediate neighbors. Connectors can be important sources of new information and new ideas (Granovetter, 1973). It may also be a strategic benefit to become a connector and take advantage of the gap between two clusters by brokering a relationship between two actors that have some common interest, but do not have an existing relationship with each other (Burt, 1992). Irregardless of any benefit to an individual actor, connectors impact the entire network by shortening the average path length between actors, which makes a very diverse and geographically dispersed network seem like a “small world” (Watts, 1999).

This argument reframes the “Burt vs. Coleman” debate that has been prevalent in the strategic alliance literature over the past several years. The debate centers on what Granovetter (1985) called “the problem of embeddedness.” Networks are environments that provide both
opportunities and constraints for the actors. Being in the network provides opportunities in the form of information, access to information, and referrals (Burt, 1992). On the other hand, close network ties based on trust and reciprocity reinforced by social norms constrain opportunistic behavior. Therefore, the debate has centered on optimal alliance network structure – should firms look for a densely interconnected network, or a loosely connected network full of potential brokerage opportunities? I am suggesting that all of these things are network resources that can be valuable to a network actor depending on their needs and current network position. Referrals, access to information and brokerage opportunities are network resources, but so are prestige, trustworthiness and strong ties. Firms may employ different strategies to gain different network resources depending on their particular needs and goals as well as the characteristics of the actors to which links are formed.

The taxonomy presented in this paper may also help address an important theoretical issue that has not received a great deal of attention. That is the question of how interfirm networks emerge and evolve. Although some studies have looked at the dynamics of network connections, they have generally assumed that a network already exists. To gain an understanding of how networks emerge, it is important to examine the network characteristics that are important to entering actors and how these characteristics change over time (Hite & Hesterly, 2001). By addressing the changing intangible resource needs of firms in an alliance network, the model presented in this paper may form a starting point for this work.
REFERENCES


FIGURE 1

How Network Resources Lead to Competitive Advantage

Partner Attributes
Network Position
Network Role

Intangible Resources
Information
Legitimacy

Relationship Moderators
Tie Strength
Partner Accessibility

Network Moderators
Purpose
Structure

Outcomes
Access to Opportunities
Success
FIGURE 2

A Taxonomy of Potential Partners Based on Network Resources

Centrality

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Peripheral</td>
<td>Shadow</td>
</tr>
<tr>
<td>High</td>
<td>Connector</td>
<td>Hub</td>
</tr>
</tbody>
</table>

Network Status

Low

High
FIGURE 3

Network Resources of Potential Partner – New Entrant

<table>
<thead>
<tr>
<th>Centrality</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td>Peripheral</td>
<td>Shadow</td>
</tr>
<tr>
<td></td>
<td>Mutual support, act as change agents, accessibility, relevant information about entrée</td>
<td>Introductions, entrée, useful basic information, accessibility</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>Connector</td>
<td>Hub</td>
</tr>
<tr>
<td></td>
<td>May provide resources including legitimacy and unique information May be difficult to identify</td>
<td>May provide many different kinds of network resources. Difficult to access. Resources may come at the price of constraints and exploitation</td>
</tr>
</tbody>
</table>
Network Resources of Potential Partner – Existing Network Participant

<table>
<thead>
<tr>
<th>Centrality</th>
<th>Network Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Peripheral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May have some unique resource to exploit, but not as likely to possess valuable network resources</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Shadow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May have some unique resource to exploit, but not as likely to possess valuable network resources</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>Connector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermediary, unique information, brokerage opportunities. May be difficult to identify</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Hub</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaboration, high task interdependency, trust, reciprocity</td>
</tr>
</tbody>
</table>