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COLLABORATING AND COMPETING? UNCOUPLING VALUE CREATION AND VALUE APPROPRIATION IN STRATEGIC ALLIANCES

By

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ABSTRACT

COLLABORATING AND COMPETING? UNCOUPLING VALUE CREATION AND VALUE APPROPRIATION IN STRATEGIC ALLIANCES

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A broadly supported general finding from collaboration research is that organizations involved in inter-firm collaboration usually achieve above average performance and survival, although with substantial variation in outcomes (Burt, 1983; Hagedoorn & Schakeraad, 1994; Mitchel & Singh, 1996; Owen-Smith & Powell, 2003; Singh & Mitchell, 2005; Stuart & Podolny, 1999; Uzzi, 1997). Explanations for those large variations in outcomes (e.g., structural and capability based approaches) offer conflicting predictions and findings as to their effect on alliance performance (Ahuja, 2000; Bae & Gargiulo, 2004; Burt, 1992; Chung, Singh, & Lee, 2000; Coleman, 1988, 1990; Gulati & Singh, 1998; Hargadon & Sutton, 1997; Stuart, 2000; Walker, Kogut & Shan, 1997). I identify two distinct theoretical dimensions of strategic alliances: collaboration (i.e., value creation) and competition (i.e., value appropriation) (Burt, 1991; Hamel, Doz, & Prahalad, 1989; Inkpen, 2001; Lax & Sebenius, 1986; Teece, 1986). In the literature these dimensions are combined in the construct of performance and yet often have opposite effects on an organization's ability to derive value from an alliance. By formulating and testing models for these two dimensions of performance I provide an explanation to resolve the conflicting guidance of both the structural and the capability based approaches about alliances effect on performance. For example, I theoretically develop and test the idea that network closure may result in value creation within alliances while structural holes may facilitate value appropriation by individual partners.

Similarly, I study how a firm's partners' resources may predict value creation but differential resource endowments between partners may result in dissimilar value appropriation potential by individual partners.

I test these models on a large longitudinal sample of strategic alliances with sequential cross-nested multilevel techniques. This analytical approach addresses methodological difficulties implicit in the study of networks data (e.g., dependencies among observations, cross-level interactions) that are not addressed in previous strategic alliances research and is capable of dealing with the interdependencies between firms in the sample. My reformulation of theory and methods to study alliance performance contributes to realizing the potential of resource based and structural approaches as powerful explanations and sources of guidance for firms' strategic alliance choices.

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CHAPTER 1

INTRODUCTION

What explains differences in value creation that result from inter-firm collaboration and the successive appropriation of that value by particular firms involved in collaborative strategies? A broadly supported general finding from collaboration research is that organizations involved in inter-firm collaboration usually achieve above average performance and survival, although with substantial variation in outcomes (Burt, 1983; Hagedoorn & Schakeraad, 1994; Mitchel & Singh, 1996; Owen-Smith & Powell, 2003; Singh & Mitchell, 2005; Stuart & Podolny, 1999; Uzzi, 1997). In this dissertation, I explore the conditions that shape value creation and value appropriation that result from inter-firm collaboration strategies. I adopt a social networks framework to theorize and test a multilevel model of value creation and value appropriation in inter-firm collaborations

Inter-firm collaboration is a broad concept that includes the many, usually formal, external linkages that may connect organizations for the purpose of cooperation. These linkages can take many forms (e.g., vertical relationships, research consortia, joint ventures, strategic alliances). In this study I focus on strategic alliances, defined as voluntarily initiated cooperative agreements between firms for the purpose of exchanging, sharing, or co-developing resources or capabilities towards an alliance goal (Harrigan, 1985; Gulati, 1999).

As organizations commit to differential arrays of alliances, some patterns of alliance strategy are likely to produce more value than others. The goal of this

dissertation is to account for the value of alliance strategy choices by showing how partner specific attributes (i.e., firm level attributes, such as capabilities), and particular combination patterns of such partner attributes in alliances (i.e., alliance level attributes, such as tie strength) interact to impact the value creation resulting from alliances and the subsequent appropriation of that value by firms. For example, a partner's specific endowment of resources and capabilities may (Stuart, 2000; Zaheer & Bell, 2005) or may not (Bae & Gargiulo, 2004) explain value creation in alliances, depending on the strength of the tie between the partners, the relative commitment of the partners to this particular alliance as opposed to other alliances, and the level of interconnection (density) of the overall network of alliances that surrounds this particular alliance.

In this study, I address five main limitations and contradictory findings of previous research with the goal of explaining the value of alternative alliance strategy choices for firms. In the next few paragraphs, I outline these limitations and contradictory findings of previous research and the related new directions I propose for advancing the discussion of the relationship between alliances and firm performance.

First, previous research on the relationship between alliances and performance failed to address the implications of alliances being simultaneously cooperative and competitive relationships (Burt, 1991) for firm performance. This characteristic of alliances may help understand better the differences in findings of previous research. Firm attributes, alliance attributes and network positions may each have differential effects on value creation and value appropriation for firms that engage in a strategic alliance. While an alliance is a cooperative agreement by definition, it is also necessary to recognize that "all alliances involve a negotiated bargain between the partners" (Inkpen,

2001: 418). By focusing exclusively on firm outcomes, previous research on alliances assumes full capture of value created in alliances by participating firms. This assumption hides two distinct theoretical dimensions of strategic alliances, collaboration (i.e., value creation) and competition (i.e., value appropriation) (Burt, 1991; Hamel, Doz, & Prahalad, 1989; Inkpen, 2001; Lax & Sebenius, 1986; Teece, 1986), which the literature combines in firm performance outcomes of alliances. Yet, these dimensions often have opposite effects on an organization's ability to derive value from an alliance. For example, having a partner with large marketing capabilities may imply better potential for distributing a firm's product through that alliance, but may also imply that the large partner has a strong bargaining position in the alliance to capture most of that value. The size of the appropriation of value that each firm derives from an alliance is the result of a cooperative game (Brandenburger & Stuart, 2001; Lippman & Rumelt, 2003) between partners who cooperate and compete simultaneously (Lax & Sebenius, 1986; Hamel, Doz, & Prahalad, 1989) and, therefore, is the outcome of exchange processes, bargaining, competition, relative power, information differences and the overall structure of the relationship.

To deal with this limitation of previous research, in this study I separate value creation from value appropriation by making predictions at both the alliance and the individual firm level. I ask: what explains differences in value creation that result from strategic alliances? And then, I further specify the effects of alliances for firms by questioning: What explains the successive appropriation of that value by the particular firms involved in strategic alliances? Separating these questions has early antecedents in Teece's (1986) discussion of complementarities and appropriation, and in Lippman and

Rumelt's (2003a; 2003b) payments and bargaining perspectives. Their work implies the need to recognize that alliances are not all created equal. As organizations enter alliances, some of their alliances will do better than others. I explain dyadic level outcomes with multilevel explanations that take into account partners' attributes, dyadic attributes and their interaction within a complete network of alliances. By explaining dyadic level outcomes, I take a first step to identify and explain the conditions under which alliances have more potential to create value, and the differential appropriation of value among the partners in the alliance.

Second, I integrate structuralist and resource based approaches to address two main criticisms of collaboration research: (a) criticism by critics claiming that the tendency of network analysis to focus on the structure of relationships (e.g., density of firm's alliances network) and neglect the content of ties (i.e., capabilities of the partners in a firm's alliances network) leads to treating all ties as comparable and thus disregarding networks' content or context (Goodwin & Emirbayer, 1994; Smith-Doerr & Powell, 2005; Stinchcombe, 1990); and (b) criticism by critics claiming that an overemphasis on the content of ties leads to treating all relationships as comparable (Granovetter, 1985; Gulati, 1995). Recent work on alliances has produced some steps in addressing these critiques by providing a series of studies that integrate the strategic needs (i.e., external resource based view) approach with the structural approach to understand the outcomes of alliances (Ahuja, 2000; Bae & Gargiulo, 2004; Stuart, 2000; Zaheer & Bell, 2005). They do this by bringing together partners' attributes and firm specific alliance network attributes in explaining firm performance. I extend these efforts and model inter-firm collaboration with multilevel techniques to allow explanations at

different levels to affect each other in clarifying the relationship between firm and network capabilities and value creation.

Previous research fails to take advantage of one of the key benefits of network's approaches: the multilevel nature of the data (e.g., the firm, the alliance, the network). For the purpose of analysis most networks data are analyzed separately at different levels precluding theoretical developments across levels (Jones, Hesterly, & Borgatti, 1997; Monge & Contractor, 2003). For example, all of the studies that have addressed the need to integrate RBV and network constructs to explain firm performance resulting from alliances (e.g., Ahuja, 2000; Bae & Gargiulo, 2004; Stuart, 2000; Zaheer & Bell, 2005) have done so by constructing network variables as firm level predictors (the density of a firm's network), therefore rendering themselves unable to explain the value of specific alliance choices. This single level approach accounts, in part, for the contradictions in their findings. I believe the recent literature on alliances has paid more attention to portfolios of alliances at the expense of individual choices in a way that may have obscured some of the potential drivers of the value of alliances for firms. By aggregating their explanatory variables at the individual (i.e., firm) level of analysis, explanations based on the overall network of alliances of a firm has been inadequately utilized to provide explanations for the value of specific alliance choices. There are no studies of alliances, to the best of my knowledge, which develop their theory and tests to take advantage of the multilevel benefits of network data. Understanding, for example, how both individual partners' attributes (i.e., firm level constructs) and the alliance configuration (i.e., alliance level constructs) interact to produce alliance outcomes within a large array of other alliances in which both partners also benefit has not been addressed

by the alliances literature to date. In this study I explicitly model alliance outcomes through a multi-level approach that fully recognizes the role of firm and structural attributes within firms' alliance networks.

Third, I seek to reconcile the contradictory predictions and findings about the impact of network closure and structural holes on the performance effects of alliances (Ahuja, 2000; Burt, 1992; Coleman, 1988, 1990; Gulati, 1995; Gulati & Singh, 1998; Hargadon & Sutton, 1997; McEvily & Zaheer, 1999; Uzzi, 1997; Walker, Kogut & Shan, 1997; Zaheer and Venkatraman, 1995). Specifically, I address contradictory findings in previous research, some finding a positive relationship between structural holes and firm performance (e.g., Hargadon & Sutton, 1997; McEvily & Zaheer, 1999) and contradictory research that suggests closure enhances performance (Ahuja, 2000; Zaheer & Venkatraman, 1995). I propose that, instead of being contradictory, these results reflect different processes operating at different levels. By formally recognizing the multi-level nature of strategic alliances' outcomes these apparent contradictions can be resolved.

Fourth, I seek to understand the degree to which alternative combinations of partner capability endowments could be appropriately regarded as the normative ideal (Bae & Gargiulo, 2004; Chung, Singh, & Lee, 2000; Stuart, 2000; Walker, 1889). Findings about the capability endowments of partners are also conflicting in the alliances literature, showing that capability endowment of partners may (e.g., Stuart, 2000) or may not (e.g., Bae & Gargiulo, 2004) be significant for firm performance. I argue that capability endowments have multiple meanings for the performance of firms that participate in an alliance. Related with the distinction between value creation and value appropriation, I theorize that a firm's partners' capabilities may have distinct implications

for value creation at the alliance level and for value appropriation at the firm level that may help explain the contradictions in previous findings. For example, partners' resources may predict value creation, but differential resource endowments between partners may result in differential value appropriation by individual partners. I provide an explanation to resolve the apparently contradictory implications of partners' capability endowments for firm performance.

In addressing these initial four main limitations and contradictory findings of previous research I develop two conceptual models to explain the value of alternative alliance strategy choices for firms. In the first model, I develop and test a multi-theoretic explanation for which alliances are likely to create more value. In developing this model, I build on several theoretical traditions in developing my arguments for this model. Since resources and capabilities are critical to the pursuit of competitive advantage (Henderson & Cockburn, 1994; Nelson, 1991; Teece, Pisano, & Shuen, 1997, Barney, 1991), I start by building on both internal and external capability based approaches in developing arguments to explain alliance outcomes. Traditional internal RBV approaches focus on resource and capability endowments within the firm, and view differences in firm capabilities to be a result of imperfections in factor markets, chance, resource immobility (Barney, 1986, 1991), path dependence (David, 1985; Penrose, 1959), or causal ambiguity (Lippman & Rumelt, 1982; Red & DeFillippi, 1990; Rumelt, 1984). More recently, research has focused on external RBV arguments that take into account the resources and capabilities that firms may be able to access through their external networks (Gulati & Gargiulo, 1999; Gulati, Nohria, & Zaheer, 2000; McEvily & Marcus, 2005; Nohria, & Garcia-Pont, 1991; Rao, 1994; Zaheer & Bell, 2005).

Next, I draw from on social capital theory (Burt, 1992, 1997, 2001; Coleman, 1988, 1990; Granoveter, 1973, 1985; Lin, 2001; Simmel, 1955) to explore how the strength of the ties between partners with particular capability endowments and how the density (i.e., closure and structural holes) of the networks in which the alliances are embedded jointly affects the value generated in particular alliance arrangements. Finally, I use density dependence arguments from ecological processes theorizing (Hannan & Freeman, 1987, 1988, 1989; Hannan & Carroll, 1992) to support predictions for a curvilinear relationship between the number of alliances partners are involved in and the value creation within a strategic alliance.

In the second model, I examine how partner and alliance characteristics enhance a partner's ability to appropriate more value from the alliance. In this model, I use a bargaining perspective (Lippman & Rumelt, 2003a, 2003b), to confront arguments from structural holes and closure perspectives in social capital theorizing (Burt, 1992, 1997; Coleman, 1988, 1990), and resource based and social exchange theorizing (Bae & Gargiulo, 2004; Gulati & Gargiulo, 1999; Gulati, Nohria, & Zaheer, 2000; Zaheer & Bell, 2005), in explaining value appropriation by individual firms. In addition, I draw on social exchange theory (Blau, 1964; Emerson, 1962; 1972a, 1972b; Homans, 1950, 1974) and its more recent developments known as Network Exchange Theory (NET) (Cook & Whitemeyer, 1992; Markovsky, Willer, & Patton, 1988; Skvoretz & Willer, 1993; Willer & Skvoretz, 1997; Willer, Walker, Markovsky, Willer, Lovaglia, Thye, & Simpson, 2002), to develop predictions about relative bargaining power between alliance partners and their ability to appropriate the value created in an alliance.

Finally, the fifth limitation of previous research on alliances is it's failure to address some methodological issues that emerge from alliances data. Since alliance (e.g., network, dyads) data is relational, it is composed, by definition, of non-independent observations. Also, alliances data is essentially multilevel. Therefore, "standard" statistical approaches that assume independent subjects, such as regression analysis and ANOVA are not appropriate (Holland & Leinhardt, 1981; Lazeaga & Van Duijin, 1997; Van Duijin, 1995; Wasserman & Pattison, 1996). To analyze and understand the multilevel explanations in my proposed models, and to acknowledge the issues of interdependence in network data, I use an innovative set of methods. My first conceptual model is a multilevel cross-nested random effects model with predictions at the dyadic level (i.e., the alliance) of analysis. The cross-nested structure is necessary to reflect the fact that lower-level units (i.e., firms) in the study of alliances are usually cross-classified by two or more higher-level units (i.e., alliances). A firm may take part in more than one alliance at a time, therefore making it necessary to cross-nest that firm within the multiple alliances it takes part in. In this way, the model can provide explanations based on firm or alliance level predictors, while accounting for the overall network of relationships in which each firm is involved. Multilevel methods in networks analysis have only recently been developed and have basically addressed the issue of selection (who selects whom for a relationship of any sort), with individual level (usually binary) dependent variables. I build on the logic of such models (e.g. the p_1 model (Holland & Leinhardt, 1981), the p^* model (Wasserman & Pattison, 1996), and the p_2 model (Van Duijin, 1995; Lazeaga & Van Duijin, 1997)) and develop a multilevel performance model (MPM) with dyadic level dependant variables that is fully estimable with likelihood multilevel algorithms.

My second conceptual model is also multilevel but has directed predictions. I utilize a multilevel selection model with predictions at the individual level that can be fitted using linear mixed model algorithms.

In summary, in this dissertation I attempt to explore two basic questions: First, I ask: What explains differences in value creation that result from inter-firm collaboration? And then I further specify the effects of alliances for firms by questioning: What explains the successive appropriation of that value by the particular firms involved in collaborative strategies? To achieve this, this dissertation is organized as follows.

Chapter 2 of this dissertation discusses how different partners' attributes (e.g., capability endowments, size, experience in alliances, industry they belong in) combine both between partners and with alliance level attributes (e.g., level of commitment to the alliance of partners, size differences between partners) to influence value creation at the level of the alliance. Hypotheses regarding multilevel main and interaction effects of firms and alliance level attributes on alliance value creation are then advanced.

Chapter 3 of this dissertation discusses how different partners' attributes (e.g., capability endowments, size) combine both between partners and with alliance level attributes (e.g., structural position of the alliance in the overall partners' alliance network, size differences between partners) to influence value appropriation for the firms involved in alliances. Hypotheses regarding multilevel main and interaction effects of firms and alliance level attributes on firm specific performance are then advanced.

Chapter 4 describes the methods used to test this dissertation's predictions. Sampling, data collection, measures, and data structure decisions are first explained and discussed. Then, analytic strategies for both studies are described in detail.

Chapter 5 describes the study results and discusses the extent to which the dissertation's hypotheses are supported. Finally, Chapter 6 then provides an in-depth discussion of the findings, what they mean for the larger literatures on alliances, resources and capabilities, networks and social exchange, and what they suggest in terms of avenues for future research.

CHAPTER 2

THE IMPACT OF PARTNERS' AND ALLIANCE ATTRIBUTES ON ALLIANCE VALUE CREATION: BACKGROUND AND PREDICTIONS

What explains differences in value creation that result from inter-firm collaboration? In this chapter I present arguments and develop hypothesis for the effect of five firm or alliance attributes on alliance value creation. I start by discussing previous findings based in resource approaches for alliance value creation. Then I develop arguments for how the strength of the relationship implied by the alliance (i.e., strength of ties approaches, Granoveter, 1985; McEvily & Zaheer, 1999) may have direct and interaction effects on value creation for the alliance. Third I discuss structural positions of partners' in the alliance (i.e., closure and structural holes) and their effect on alliance value creation. Finally, I discuss how the size of partners' networks may also affect the value created in alliances.

Capabilities and Alliance Value Creation

Resource-based views (RBV) of the firm have a long tradition of research in strategic management and provide one of the core explanations for differential firm performance (Barney, 2001; McGahan & Porter, 1995; Peteraf, 1993; Rumelt, 1991). The focuses of this literature are resources and capabilities that are internal to the firm and that provide the firm with sustainable competitive advantages resulting in differential rents (Makadok, 2003; Miller & Shamsie, 1996; Yeoh & Roth, 1999). However, competitive or rapidly changing environments make it difficult for a single firm to own all resources and capabilities needed to develop and sustain actual and future competitive

advantages (Child & Faulkner, 1998; Dyer & Singh, 1998; Harrison, Hitt, Hoskisson, & Ireland, 2001; Pfeffer & Salancik, 1978). Therefore, recent research has explored the strategic value of external resources available to the firm through its alliances (Bae & Gargiulo, 2004; McEvily & Marcus, 2005; Gulati 1999; Stuart, 2000; Zaheer & Bell, 2005).

Collaborative relationships provide access to a wider scale and scope of external resources and capabilities (e.g., information, technology, manufacturing or marketing capabilities, and financial resources) than is normally available to purely internally focused firms (i.e., firms that rely exclusively on their own resources and capabilities rather than seeking external resources and capabilities through alliance strategies). The co-specialization of these external resources and capabilities with firm specific resources and capabilities either in the form of pooling or provision is a fundamental reason to enter an alliance. It is important to look at how these external resources and capabilities may offer a complementary explanation to the purely internal nature of co-specialization studied by traditional resource based views. As such, external resources become a fundamental strategic choice for organizational decision makers. If alliances are a means to co-specialize firm resources and capabilities with resources and capabilities that are accessed through the alliances in order to better achieve firm objectives, their effectiveness should be contingent upon the size and quality of the resources and capabilities of the alliance partners (Bae & Gargiulo, 2004; Chung, Singh, & Lee, 2000; Stuart, 2000; Walker, 1889). In this line of thought, recent research (Stuart, 2000) finds that sales growth and innovation rates for firms in a large sample of semi-conductor producers were positively related with the size and innovativeness of their aggregate pool

of partners. Similarly, Zaheer and Bell (2005) find that innovative capabilities of both the focal firm and its alliance network have a positive relation to performance in Canadian mutual fund companies. In contrast, Bae and Gargiulo (2004), fail to find a relationship between partners' resource or capability endowments and firm performance.

A major limitation of these studies is that virtually all of them make predictions at the firm level, potentially confusing value creation and value appropriation effects. In order to decouple these two effects, I argue that larger capability endowments of partners may not only result in more value creation at the level of the alliance but also result in more appropriation of that value by partners with larger capability endowments relative to a focus firm. Note here that large firms are also more likely to ally with partners that have larger capability endowments therefore confounding these two drivers of alliance performance in previous research. Moreover, by analyzing capabilities in a one level model of performance, it is difficult to separate the direct effect of capabilities on performance from the effects of capabilities on performance that may be attributed to the alliance. I therefore create a series of capability based explanations for alliance performance in this paper. In this section I discuss how the combination of each partner's capabilities may affect alliance value creation. Later, in the value appropriation section of the paper, I will discuss how relative endowments of capabilities between partners may have an effect on how much of that value is likely to be appropriated by each partner in the alliance.

I define capabilities, following Amit and Schoemaker, as "capacity to deploy resources ...using organizational processes" (1993:35) to produce outcomes. Given that the amount or the quality of each of the partner's capabilities (Stuart, 2000; Zaheer &

Bell, 2005) and the organized interaction between their capabilities in an alliance should have positive effects on value creation that is independent of the direct effect of capabilities in each firm's performance, I predict that partners' individual capabilities will have a positive effect on value creation at the level of the alliance.

Hypothesis 1A: The value created at the alliance level of analysis increases with the capabilities controlled by each alliance partner.

Additionally, it is important to note that partner's capabilities in an alliance do not only operate independent of each other, but are co-specialized to achieve the alliance purposes. Therefore, it is important to consider that this co-specialization should produce additional value up and above the value the resources of each partner could have produced in an arm-length relationship. Therefore, I argue that the dyad level interaction of the partners' capabilities, will have a separate positive effect on value created at the alliance level of analysis. The co-specialization of a firm's capabilities with better partner's capabilities should have more than a pure additive effect on value creation given that better partner's capabilities should allow for more productivity of a firm's own capabilities in the alliance. Therefore, I hypothesize that the value created in alliances is as much a result of the capabilities of each of the alliance partners as of the co-specialization of the capabilities of both partners in the alliance. I call alliance capabilities to the co-specialization of each of the partner capabilities in the alliance.

Hypothesis 1B: The value created at the alliance level of analysis increases with the alliance capabilities controlled by both partners in the alliance.

Strength of Ties and Alliance Value Creation

The idea of tie strength (Granoveter, 1973, 1974, 1982) is a foundational element of network research that focuses on the ties level within networks. When there is a tie or a relation between two actors (e.g., an alliance between two firms), tie strength indicates the quantity of the relation (i.e., amount of, for example, interaction, intimacy, or reciprocal services between actors in a tie or partners in an alliance) (Monge & Contractor, 2003). Tie strength has been typically understood as a function of frequency of interaction (Granoveter, 1973, 1974, 1982), reciprocal obligations, commitment and investment in close relationships (Lund, 1985), empathy and unconditional regard (Cramer, 1986), and intimacy (Wegener, 1989). Strong ties represent particularistic relationships and particularistic knowledge (Marsden, 1990). When ties are stronger, liking, information about the other, and trust create informal interdependence (Marsden & Campbell, 1984; McEvily & Zaheer, 2005b; Mitchell, 1987; Podonly & Baron, 1997). In contrast, weaker ties are lower in intensity. They are less personal, less reciprocal, and more substitutable (Granovetter, 1973, 1982; Lin, Ensel, & Vaughn, 1981).

Many researchers in the interorganizational networks literature have recently emphasized the importance of strong ties (Kraatz, 1998; Lazerson, 1995; McEvily & Zaheer, 1999, 2005; Suarez, 2005; Uzzi, 1997) to access both redundant and non-redundant capabilities. For example, McEvily and Zaheer (1999) demonstrated that new ideas, information, and opportunities can be sourced through contacts that are simultaneously strong and non-redundant. Similarly, long-term relationships (i.e., strong ties) between large manufacturers and small family run artisanal knitwear firms in Italy resulted in a successful value strategy for the fashion industry (Lazerson, 1995).

Alliances that imply strong ties are therefore better able to create more value since trust, commitment of resources and capabilities, and reduced opportunistic behavior, allow for more productive interactions between the firms in such alliances. This may lead to increased commitment of valuable resources to the alliance and, thus, greater value creation potential. Firms can reduce uncertainty and create more predictable environments (Cook, 1977), develop trust, commitment and responsiveness (Dore, 1983) as in the "just in time" strategies of Japanese manufacturers, and, in general, facilitate organizational attempts to adapt to environmental change (Kraatz, 1998), by developing strong ties with other organizations. Based on these arguments, I hypothesize that strength of ties between partners (i.e., Alliance Strength) should have a positive effect on value creation at the level of the alliance.

Hypothesis 2a: The value created at the level of the alliance increases with the tie strength between the partners in the alliance.

Furthermore, since as hypothesized in hypothesis 1 the value created in an alliance should be positively affected by alliance capabilities, and since tie strength may be a relevant measure of the commitment of partners to that interaction, I also argue here that the impact of alliance capabilities on value created at the level of the alliance will be enhanced by the strength of the relationship between the partners. For example, in an alliance, the strength of the tie between partners may result in improved commitment of the existing resources or capabilities, therefore promoting the creation of value at the level of the alliance. When ties are stronger, interpersonal commitments and trust create informal interdependence (Marsden & Campbell, 1984; Mitchell, 1987; Podonly &

Baron, 1997) therefore promoting a larger specific commitment of partners capabilities and resources to the alliance.

Hypothesis 2b: The relationship between alliance capabilities and the value created at the level of the alliance is positively affected by tie strength between the partners in the alliance.

Structural Positions and Alliance Value Creation

Several studies have indicated that the position firms occupy in inter-organizational networks influences firm behaviors and outcomes (Gulati et al., 2000; Portes, 1998, Powell, Koput, & Smith-Doerr, 1996; Reagans & Zuckerman, 2001, Tsai, 2002; Walker, Kogut, & Shan, 1997; Zaheer & Bell, 2005) and therefore should be relevant to the analysis of value creation in strategic alliances. As to the form of network structures that can appropriately be regarded as beneficial, guidance from the literature is unclear. Two main conflicting theories provide opposite claims on how network structure affects the relationship between alliances and performance: network closure and structural holes theory. According to the former view, densely interconnected networks with many connections between a firm's partners, or "network closure" are seen as advantageous (Ahuja, 2000; Coleman, 1988, 1990; Gulati, 1995; Gulati & Singh, 1998; Walker, Kogut, & Shan, 1997; Uzzi, 1997; Zaheer & Venkatraman, 1995). Partners in "closed" networks can better trust each other to fulfill ex-ante commitments or go through with greater relationship-specific investments (Walker, Kogut, & Shan, 1997; Zaheer & Venkatraman, 1995). They are also more likely to develop and accept shared norms and interaction routines that improve knowledge and information sharing,

understanding, and joint problem solving (Ahuja, 2000; Dyer & Noboeka, 2000; Gulati, 1999; Uzzi, 1997; Walker, Kogut, & Shan, 1997). Closed networks, therefore, generally reduce opportunistic behavior (Coleman, 1988; Rowley, Behrens, & Krackhart, 2000; Walker, Kogut, & Shan, 1997).

In contrast, according to structural holes theory (Burt, 1992), actors that can develop networks of disconnected partners may obtain structural advantages derived from the brokerage opportunities available to them. Burt (1992) built on the concept of the "Tertius Gaudens" (i.e., the third who benefits) (Simmel, 1950) to develop the concept of the structural hole. Structural holes are the borders in social space, gaps in resources or capabilities (e.g., information) flows between firms or clusters of firms that are linked to a focal firm but not linked to each other (Burt, 1992). Burt uses the expression "structural hole", both for the gap between two entities or clusters of entities and for the ties between those two entities and a third entity that "bridges" the gap. Some scholars prefer to separate both into the structural hole itself and the bridging tie (McEvily & Zaheer, 1999). For clarity, I use this last approach through the paper. A structural hole indicates that firms or people on different margins of the hole have access to different flow of resources and capabilities (Ahuja, 2000; Burt, 1992; Hargadon & Sutton, 1997) through their networks. A bridging tie refers to people or organizations that bridge these structural holes by obtaining information, capability and control advantages over others and in so doing gain improved performance.

As stated, the value of structural holes versus network closure remains unclear. For example, Ahuja (2000) finds that increasing structural holes has a negative effect on innovation, and Zaheer and Venkatraman (1995) find that network closure allows for

greater relationship specific investments and lower monitoring costs. Alternatively, Hargadon and Sutton (1997) show how firms may exploit their position as bridging ties to develop new products, and McEvily and Zaheer (1999) find that structural holes improve firms' ability to acquire capabilities. Also, both Bae and Gargiulo (2004) and Zaheer and Bell (2005), find a significant positive relationship between structural holes and firm performance.

To solve such contradictory predictions, previous research has relied on a contingency approach (Ahuja, 2000; Rowley et al., 2000), or on an interaction effect between the structural component and the partners' attributes (Bae & Gargiulo, 2004). For example, Ahuja (2000) discusses how the contradictory results may be due to differences in contexts. By contrasting his results with those of Hargadon & Sutton (1997), he concludes that the explanation of the differences in results may be due to the fact that his sample, contrary to the non-adversarial nature of Hargadon and Sutton's sample, includes alliances between competitor firms in the same industry. Therefore, the adversarial nature of his sample may have resulted in a greater need for trust in alliances and therefore in a positive effect for network closure. Alternatively, Bae and Gargiulo (2004) looked at the interaction between the importance of a firm's partners (e.g., the shares of resources in an industry controlled by alliance partners) and network closure. In their study, network closure makes the relationship between partner importance and performance positive and significant. Both the contingency view and the exploration of the interaction between partner attributes and network structure point to the same solution: namely that closure matters more when there are more reasons for opportunism.

In this study, I propose a third approach to address the contradictory predictions in the literature. Specifically, I suggest that network closure promotes firms and overall network fulfillment of ex-ante commitments that may result in value creation. In contrast, structural holes may be more relevant to the distribution or appropriation of value created between firms that are partners in an alliance. Although operationalizations of both structural holes and closure tend to use the same measures (e.g., density of a firm's alliance network) but with opposite signs in most of the alliances literature (e.g., Zaheer & Bell, 2005), there exists a fundamental difference in the mechanisms by which both create advantages for network members.

The structural holes argument describes the value of bridging ties as a function of brokerage opportunities. Structural holes are thus an opportunity to broker the flow of resources and capabilities between organizations or people, and to control the projects that bring together people or organizations from opposite sides of the hole (Burt, 2000). For example, production studios in the film industry may have power in their negotiation with independent producers due to their access to distribution channels. Therefore, the value of structural holes can be said to correspond with that of "control over the negotiation" (Burt, 1992:83) of a transaction. A firm bridging structural holes has control and information advantages over its partners that allow it to appropriate more value, give it bargaining power, or in Burt's terms determine it's "share of that profit" (Burt, 1992:83).

Alternatively, closure has two main effects for people in a closed network. First, it has stabilizing value, in that more consistent flows of resources (e.g., information) are available to participants in a closed network. For example, Baker (1984) argues that

markets with more closed networks between producers stabilize market prices. Second, and the most emphasized aspect of closed networks is the fact that network closure facilitates the development of norms and sanctions and makes it less risky for participants in closed networks to trust one another (Biggart, 2000; Burt, 2000; Coleman, 1988, 1990;). For example, Zaheer and Venkatraman (1995) find that network closure allows for greater relationship specific investments and lower monitoring costs.

There is an important conceptual difference between bargaining and norms. Bargaining is agent based and therefore individualistic in nature. Norms are group-based and therefore less purposeful or agent driven and more socially constructed. Because of this distinction, structural holes may be more relevant to the distribution or appropriation of value created between firms (that I discuss in chapter 3 of this dissertation) through individual strong bargaining power or brokerage positions. Burt (1992), for example, considers the situation of two firms negotiating a transaction and how the relative amount of holes bridged by each firm, may result in control over the negotiation of outcomes. Closure, instead, should be more relevant to the normative effects that promote firms and overall network fulfillment of ex-ante commitments that may result in more value creation for the alliance. Therefore I argue that network closure should promote value creation at the level of the alliance. I will explore the effect of structural holes in value appropriation in the next chapter when dealing specifically with appropriability issues. My prediction for value creation at the level of the alliance is consistent with findings linking closure to greater relationship specific investments (Walker, Kogut, & Shan, 1997; Zaheer & Venkatraman, 1995), lower monitoring costs (Zaheer & Venkatraman, 1995), and the development of shared norms and routines (Ahuja, 2000; Dyer &

Noboeka, 2000; Gulati, 1999; Uzzi, 1997; Walker, Kogut, & Shan, 1997) therefore improving performance for alliances. Closure at the alliance level, should promote normative fulfillment of ex-ante commitments by organizations and their network of partners and therefore more value creation at the level of the alliance.

Hypothesis 3: The value created at the alliance level of analysis increases with the alliance network closure.

Network Size and Alliance Value Creation

Two alternative approaches have been used to explore the relationship between the number of alliances firms have and alliances value creation. First, if valuable resources, such as information (Dyer & Singh, 1998), and unique capabilities (Gulati, 1999) may be inherent within the collaborative relationships between firms, then more alliances imply that, other things equal, an organization is more likely to receive more and less redundant access to external resources and capabilities resulting in strategic advantage (Burt, 2000). In fact, the extent of a firm's alliance network has been often understood as a result of the organization's effort to control uncertainty and to bring together large sets of resources and capabilities (Baker, 1990; Burgers, Hill, & Kim, 1993. For example, Stuart, Hoag and Hybels (1999) find a positive relationship between number of alliances they hold (a control measure in their study) and the performance of entrepreneurial ventures. Similarly, Goerzen and Beamish (2005) control for network size and find a strong positive relationship between network size and performance in a multinational alliance sample, and Ahuja (2000) finds positive relationships between number of network ties and innovation.

Alternatively, both transaction costs economics and, population ecology perspectives, would suggest inverted-U relationships between the addition of new alliances to a firm's alliance portfolio and value creation in the alliance. Transaction cost economics (Coase, 1937; Williamson, 1985) argues for a positive relationship between numbers of alliances and performance but only up to the point at which the cost of organizing an additional alliance (i.e., to produce a transaction) becomes equal to the cost of carrying out the same transaction through a market relationship (Williamson, 1985), and flat to negative thereafter. Population ecology (Hannan & Freeman, 1987; 1988; 1989; Hannan & Carroll, 1992) makes a similar prediction regarding the expected drivers of alliance value creation; Resource, legitimacy and capability rich organizations attract alliance opportunities. As alliances unfold, the resources and the legitimacy of the focal organization increase but only up to a point. Further increases beyond that point increases competition for resources, capabilities and managerial attention by partners, therefore decreasing the value creation of alliances. As Baum and Oliver (1992) note, there is a carrying capacity to alliances in that most organizations can successfully support only a limited amount of connections. The argument, similar to that of transaction cost economics, specifies an inverted u-shaped curve to describe the relationship between number of alliances and alliance value creation. For example, Goerzen and Beamish (2005) hypothesize such an inverted u-shaped relationship for the relationship between the number of unique partnerships a firm has and performance.

However, alliances, by definition, have at least two partners, and value is created in the interaction between these two partners. The implication of this is that resource constraints in one partner firm may be compensated by its partner's slack resources.

Therefore, alliance specific resources needed for value creation can originate from both sides of the alliance. At the level of the alliance, the interaction between the levels of commitment to other alliances of both partners is, therefore, the construct of interest to explore the inverted u-shaped relationship between partners' commitment to other alliances and value created at the alliance level of analysis.

Thus, I argue here that value creation at the level of the alliance will be positively related to the number of alliances each partner holds, up to a point at which capabilities at the alliance level may become overstretched with respect to the capabilities partners involved in many alliances can bring into each new alliance. Indirect support for this argument can be found in Ahuja (2000), who finds a negative relationship between the interaction of direct and indirect ties, and performance (e.g., innovation). Direct ties are the amount of partners a firm has and indirect ties are the amount of alliances the firm's partners hold. Therefore, I predict an inverse-U shaped relationship between the total commitment to new alliances by both partners (a dyadic or alliance level explanation) and alliance value creation. Commitment to new alliances is defined here as the combined commitment to new alliances by the partners in an alliance relative to their overall commitment to alliances. It is a construct that intends to reflect the weight of the partners' commitment to new alliances relative to their overall pool of alliances.

Hypothesis 4: The value created at the alliance level of analysis has an inverse-U shaped relationship with the partners' commitment to new alliances.

CHAPTER 3

THE IMPACT OF PARTNERS' ATTRIBUTES IN PARTNER'S VALUE APPROPRIATION: BACKGROUND AND PREDICTIONS

In this chapter I adopt a bargaining perspective to explain what the differential appropriation of alliance value by partnering firms. As stated in the previous chapter, valuable resources, such as information (Dyer & Singh, 1998), and unique capabilities (Gulati, 1999) are inherent in the collaborative relationships that firms hold with other firms, making alliances a source of access to external resources and capabilities to complement strategic needs (Burt, 2000; Eisenhardt & Schoonhoven, 1996) and create value. But also, alliances are an attempt to maximize surplus by assigning or reassigning a firm's resources and capabilities to tasks (Lippman & Rumelt, 2003) for a pay. "All alliances involve a negotiated bargain between the partners" (Inkpen, 2001: 418). The size of that payment, the appropriation of value that each firm derives from an alliance is the result of a cooperative game (Brandenburger & Stuart, 2001; Lippman & Rumelt, 2003) between partners who cooperate and compete simultaneously (Lax & Sebenius, 1986; Hamel, Doz, & Prahalad, 1989).

The appropriation of value by each partner in an alliance is a function of both the value created in the alliance, as discussed in the previous chapter, and the bargaining power of each partner to capture a portion of that value. To discuss value appropriation, I will start by discussing the theoretical antecedents that may help explain the outcomes of an exchange between partners in an alliance. Exchange theory (Blau, 1964; Emerson, 1962; Homans, 1950, 1974) provides the core theoretical foundation up on which rests

my reasoning about value appropriation in alliances. Exchange theory was originally a dyadic level formulation attempting to explain both the likelihood and the outcomes of exchanges based on the resources that each part of any relationship, whether it be a transaction or an alliance, had to offer. Emerson's (1972b) chapter on exchange relations and exchange networks introduces social structure as a primary variable in exchange theory and suggested the need to examine contextual power influences arising from the broader network in which relationships are usually embedded. Specifically within the management literature, Resource Dependency Theory (Pfeffer & Salancik, 1978) extended some of these ideas to the organizational level. By applying exchange theory to the broader social context, Emerson's (1962, 1972a, 1972b) work became the antecedent to what is now commonly referred to as network exchange theory (Cook & Whitmeyer, 1992; Cook & Yamagishi, 1992; Markovsky, Willer, & Patton, 1988; Skvoretz & Willer, 1993; Willer, Walker, Markovsky, Willere, Lovaglia, Thye, & Simpson, 2002; Yamagishi, Gillmore, & Cook, 1988).

In its latest formulation, network exchange theory argues that bargaining power is a function of the extent to which actors in a relationship are vulnerable to exclusion from exchanges within the network. In other words, the bargaining power of a firm with respect to a partner in an alliance is related to the likelihood that it will exclude that partner by selecting another partner ex ante, or exclude it by replacing the partner ex-post (Markovsky, Willer, & Patton, 1988; Willer, 1999). Bargaining power refers to a bargainer's ability to influence the outcome of a negotiation (Schelling, 1956) or to obtain benefits from the other party (Dwyer & Walker, 1981; Tung, 1988).

When focusing on the dyad, several factors have been identified as influencing bargaining power of the partners. First, the stakes (i.e., the level of dependence) of the bargainers in a negotiation will help shape their bargaining power (Bacharach & Lawler, 1984). For example, a firm that is experiencing bankruptcy risk and depends on the access to resources through a particular alliance to avoid bankruptcy may have little bargaining power at the time of negotiating the alliance due to its high dependence on the deal going through. Second, the possession or control of critical resources (Pfeffer & Salancik, 1978; Harrigan, 1986; Harrigan & Newman, 1990) and the availability of alternative sources of critical resources to both parties (Bacharach & Lawler, 1984; Fisher & Ury, 1981; Root, 1988:76) will also help determine their bargaining power. Third, the position in the exchange network may provide bargaining power to a person or organization, like in the case of organizations that occupy structural holes (Burt, 1992). In this chapter, I develop hypotheses for how the relative strategic stakes, availability of alternative partners, partners' capabilities, and the structural positions of the partners in an alliance, may help determine the bargaining power of alliance members in appropriating value from alliances relative to their partner.

Relative Strategic Stakes and Firm Value Appropriation

A high payoff for cooperation is likely when firms are in vulnerable strategic situations (Eisenhardt & Schoonhoven, 1996). When firms are in difficult market situations or are engaging in large or particularly risky investments (Conner, 1994) alliances can provide needed resources and capabilities (e.g., cost sharing, legitimacy, knowledge). Empirical evidence shows that such situations promote the development of

strategic alliances. For example, Shan (1990) found that entrepreneurial firms in highly competitive environments were more likely to enter more alliances, and Singh (1992) found that the vulnerability of late entrants into the medical diagnostics industry was positively associated with alliance formation.

Vulnerable strategic situations raise the strategic stakes for firms intending to engage in alliances that may support their position. I define relative strategic stakes as the relative importance of the alliance to a focal partner with respect to the importance of the alliance to the other partner involved in the alliance. Firms with high strategic stakes will have lower bargaining power in alliances because they are relatively more dependent on the alliance (Bacharach & Lawler, 1984; Yan & Gray, 1994). But the effect of strategic stakes depends on the strategic stakes that the alliance implies for both partners involved in forming the alliance. Therefore, bargaining power will depend on the relative strategic stakes on firms intending to organize an alliance. That is, when alliance partners have unequal stakes they have unequal bargaining power. The higher the strategic stakes implied by an alliance in a particular market situation for one of the potential partners with respect to the other, the lower its bargaining power, and therefore the weaker it's bargaining ability to appropriate value in the alliance.

Therefore, I hypothesize that higher relative stakes in an alliance for a partner with respect to the other will result in lower relative appropriation of value in the alliance for that partner

Hypothesis 5: The value appropriated from an alliance by a partner will be negatively associated with the relative strategic stake of that partner.

Relative Partner Capabilities and Firm Value Appropriation

Resource dependence theory (Pfeffer & Salancik, 1978) suggests that the possession and control of key resources and capabilities by one firm in an alliance may make that firm's partner dependant on that firm. If a firm brings more critical resources and capabilities to an alliance than its partner, it's option of contributing or withholding its cooperation in the alliance can be used by the firm as leverage in bargaining with its partner (Pfeffer, 1981), therefore shaping the distribution of value between the partners. The previous hypothesis about strategic stakes and the resource dependence theorizing that supports this section may seem similar in nature but there is a basic difference between both approaches. Strategic stake refers to the implicit value of the alliance to a firm given the firm's situation and refers to bargaining implications of a firm's situation independent of the value it brings to an alliance. Resource dependence refers to what each partner contributes to the alliance and therefore to proportionality between value drivers and payments in a relationship. For example, a firm going into a partnership to distribute its products in another region through a partner that has the best distribution network in that region is dependent on that partner for such an extensive distribution and therefore may have to forgo more margin in the deal.

The distribution of value between partners is determined by what each brings to the alliance (Harrigan, 1986; Schelling, 1956; Yan & Gray, 1994). I use the expression relative capabilities here to refer to the relative capabilities that one firm involved in an alliance has with respect to the total capabilities of both firms involved in the alliance. Therefore, I argue that the relative capabilities and resources between firms involved in

an alliance should be positively related to their individual value appropriation from the alliance.

Hypothesis 6: The value appropriated from an alliance by a partner will be positively associated with the relative capabilities of that partner.

Relative Availability of Alternative Partners and Firm Value Appropriation

Several theoretical traditions suggest that the availability of alternative partners with access to the quality and amount of resources and capabilities needed by a firm is another important determinant of a firm's bargaining power in an alliance. In other words, it is not only the need for a partner's resources but also the absence of alternative sources for those resources that determines the bargaining power of the partners in an alliance. This view is core to all periods and fashions of exchange theorizing including Social Exchange Theory (Emerson, 1971, 1972), bargaining theory (Bacharach & Lawler, 1981; Lawler & Bacharach, 1979), resource dependence theory (Pfeffer & Salancick, 1978), and more recently in networks exchange theory (Willer, 1999).

The essential argument is that if a partner of a focal firm has control over critical resources and capabilities, and those resources and capabilities are difficult to replace for the focal firm because of the lack or shortage of alternative partners, that partner will be able to appropriate extra value from the alliance (Root, 1988; Bae & Gargiulo, 2004; Fisher & Ury, 1981; Yan & Gray, 1994). A firm that has more alternatives with which to partner, relative to the alternatives available to their alliance partner has more power in the relationship and should appropriate more value from the alliance. The Relative availability of alternative partners is defined as the availability of alternative partners for

a firm relative to the availability of alternative partners for its partner in the alliance. Therefore:

Hypothesis 7: The value appropriated from an alliance by a partner will be positively associated with the relative availability of alternative partners.

Relative Structural Holes and Firm Value Appropriation

In Chapter 2, I presented both structural holes and network closure arguments and discussed the contradictory predictions and findings that the literature presents with regards to these structural descriptions. Briefly stated, according to network closure view, densely interconnected networks with many connections between a firm's partners, or "network closure" are seen as advantageous (Ahuja, 2000; Coleman, 1988, 1990; Gulati, 1995; Gulati & Singh, 1998; Walker, Kogut, & Shan, 1997; Uzzi, 1997; Zaheer & Venkatraman, 1995). Partners in "closed" networks can better trust each other to fulfill ex-ante commitments or go through with greater relationship-specific investments (Walker, Kogut, & Shan, 1997; Zaheer & Venkatraman, 1995), develop and participate in shared norms and interaction routines that improve knowledge and information sharing, understanding, and joint problem solving (Ahuja, 2000; Dyer & Noboeka, 2000; Gulati, 1999;Uzzi, 1997; Walker, Kogut, & Shan, 1997), and, in general, reduce opportunism (Coleman, 1988; Rowley, Behrens, & Krackhart, 2000; Walker, Kogut, & Shan, 1997).

Alternatively, according to the structural holes view, actors that can develop networks of disconnected partners may obtain structural advantages derived from the brokerage opportunities available to them (Burt, 1992). A structural hole indicates that firms or people on different margins of the hole have access to different flow of resources

and capabilities (Ahuja, 2000; Burt, 1992; Hargadon & Sutton, 1997) through their networks. People or organizations that bridge these structural holes may obtain information, capability and control advantages over others.

As stated, the value of structural holes versus network closure in the alliance literature remains unclear, with empirical support for both the network closure (Ahuja, 2000; Zaheer & Venkatraman, 1995) and the structural holes arguments (Hargadon & Sutton, 1997; McEvily & Zaheer, 1999; Bae & Gargiulo, 2004; Zaheer & Bell, 2005). As noted earlier, a potential resolution to this contradiction results from a better understanding the mechanisms implied by both arguments and their implications at different levels of analysis. Specifically, I hypothesized that network closure and not structural holes should be more relevant to value creation at the level of the alliance where the normative effects of a closed network may promote firms and overall network fulfillment of ex-ante commitments. In contrast, I suggest that structural holes may be more relevant to the appropriation of value created by firms participating in the alliance through individual strong bargaining power or brokerage positions.

Therefore, the relative amount and importance of the structural holes that a focal firm in an alliance has with respect to a partner will be related to its value appropriation from the alliance. In line with social exchange (Emerson, 1972) theorizing and research, firms that mediate the access of partner firms to more external capabilities (i.e., firms that bridge more structural holes relative to a partner) can derive bargaining power from their position in the overall network structure that surrounds the alliance. Also, structural holes theorizing (Burt, 1992) supports the idea that there are control and information

advantages available to firms that bridge structural holes, which provide those firms with control over the negotiation of the share of the value created through the alliance.

But as holes around partners provide information and control benefits that result in negotiation power for a focal firm, holes around the focal firm can also benefit potential partners in the negotiation. Higher negotiation control for a firm depends on having numerous structural holes around partners but none attached to itself. Therefore, it is important to consider the availability of structural holes a firm has around an alliance with respect to the holes it's partner has around that firm. Said another way, the firm that bridges more structural holes in an alliance should have superior bargaining power. Therefore, firms with more structural holes around an alliance relative to their partners in the alliance will appropriate more value in alliances.

Hypothesis 8: The value appropriated from an alliance by a firm in the alliance will be higher for firms that bridge more structural holes relative to their partner.

CHAPTER 4

METHODS

Data and Sample

I used four criteria in selecting alliances for this study. First, I restricted the population of interest to public firms (Bae & Gargiulo, 2004). I chose to focus on publicly traded firms to guarantee consistent criteria in the financial data utilized in the study. Second, each firm selected from the population had to have engaged in at least one marketing alliance with another public firm between 1988 and 2002. Considering 15 years provides sufficient length of time to cover different macroeconomic environments, providing generalizability to other periods, and to capture multiple alliance events by most firms in the sample. I included information for all firms in the sample for up to four years before the period of interest to control for possible left-censoring of the data and forward up to the latest data available for 2004 so as to allow for lagged performance effects. Therefore, the population of interest included data from 1984 to 2004. Third, given my research questions, it was necessary to define an initial population of firms that operate in industries where alliances are generally considered an important element of firm strategy. The following industries have been identified in previous research as falling into this category: telecommunications, chemicals, electronics, and services (Culpan & Eugene, 1993; Kale, Dyer, & Singh, 2002; *Alliance Analyst*, 1996) Industry categories were identified on the basis of SIC codes (e.g., sic code 357 for computer hardware). Fourth, I utilized a two wave snowball sampling design (Capobianco & Frank, 1982; Frank, 1979, 2005) to develop a random sample of alliances for the study.

Snowball designs are of particular interest in network research. Conceptually, a wave of snowballing implies determining an initial random sample of individual firms, called a seed sample, and then identifying all their direct relationships or partners that are not part of the seed sample. The first wave sample is then the sum of all the individuals in the seed sample plus their direct relationships. A second wave identifies the direct relationships or partners of the firms identified in the first wave. Thus, the final sample includes the initial random selection of firms, all their alliance partners, and all the partners of these partners. Specifically, I did the following. First, I selected a random sample of alliances in which at least one firm was included in my basic set of industries for the study and identified those firms as my seed sample for the snowball sampling scheme. Second, I looked for all their alliances in the period of interest with firms that fulfill the criteria for being in the population of interest. I aggregated the firms in those first two groups and then looked for all the alliances the firms in this new data set have for each period in which they are part of the sample and restricted to those alliances that fulfill my first two criteria (i.e., public and having a marketing alliance in the period) for being in the population of interest. The final sample, then, includes all the alliances the sample members have that fulfill the criteria for each period in which they appear in the sample. Formally, letting S_0 be a random seed sample chosen from a population of interest, S_1 be a sample after snowball 1, and S_2 be the sample after the second wave of snowballing, we can describe it as:

$$S_1 = S_0 \cup A(S_1) S_1 \neq S_0$$
$$S_2 = S_1 \cup A(S_2) \text{provided } S_2 \neq S_1, \text{ where}$$
$$A(S_1) = \{j \in A(S_1) \text{ iff } Z_{ij} = 1 \text{ for some i} \in S_0\} \text{ and}$$
$$A(S_2) = \{j \in A(S_2) \text{ iff } Z_{ij} = 1 \text{ for some i} \in S_1\}$$

where $A(S_n)$is the sub-sample originated in a snowball wave and $Z_{ij} = 1$ implies the existence of a tie between two firms in the population.

The resulting sample includes a total of 495 alliances among the firms sampled. This data was organized in a matrix representing the existence or absence of an alliance between each pair of firms for each year in which they are included in the sample. Data on alliance and firm characteristics was collected from two primary sources: Mergers, Acquisitions and Alliances' database of the Securities Data Corporation (SDC Platinum) provided by Thompson Financial and COMPUSTAT by Standard and Poors. The SDC Platinum data has been used extensively to study alliances (Bae & Gargiulo, 2004; Casciaro & Piskorski, 2005; Sampson, 2005) and maintains an extensive list of reported alliances for all years beginning in 1988. Two limitations need to be noted about this data source. First, companies do not necessarily report all alliances they engage in (Kale, Dyer, & Singh, 2002), and SDC is likely to under represent small private organizations due to its public sources of information (e.g., corporate gazettes, business journals) (Anand & Khanna, 2000). Alliances that are not reported by companies due to tactical or strategic reasons are not likely to be quoted in the press or elsewhere and are therefore beyond the scrutiny of this research. Also, since my sample is restricted to alliances between public firms, the potential under representation of alliances with small partners is not likely to have any significant influence in the results of this research. It does however limit generalizability to alliances between public firms. Second, SDC is likely to report the same alliance multiple times (Bae & Gargiulo, 2004). To minimize reporting errors I crosschecked SDC reports with those of Lexis-Nexis, and verify the nature and existence of reported alliances.

Constructing the dataset for this study presented several challenges (e.g., integrating data from multiple sources, constructing the networks). First, I used CUSIP information for integrating the alliances and financial data. Second, I developed yearly adjacency matrixes or sociograms (Moreno, 1938; Wasserman & Faust, 1994). An adjacency matrix is a two way matrix or sociogram for a dichotomous relationship. I created matrixes that include data for each alliance and its partners for each alliance event in the year it starts. Data was organized to represent alliance (pair level) factors, and partner level attributes in three separate sets, on for alliances and one for each partner in an alliance.

Measurement

In this section I describe the variable used in the study. Table 1 summarizes the variables and their formal measurement.

Table 1: Variable Names and Descriptions

Variable name	Label	Level	Variable Description
Capabilities	Cp	Level 2 (firm)	Market Share
Tie strength 1	TS1	Level 1 (Pair)	Dummy denoting that partners were partners in the past 4 years
Tie strength 2	TS2	Level 1 (Pair)	Number of actual alliances between the partners
Network Closure (alliance network overall constraint)	CLOSE	Level 1 (Pair)	Count of complete minimum sub-graphs with a maximum of four nodes in the overall alliance network
Commitment to alliances	COMM	Level 1 (Pair)	(Count of new alliances for Firm *i* * Count of new alliances for Firm *i'*) / (Count of total alliances for Firm *i* * Count of total alliances for Firm *i'*)
Relative Stakes[4]	ASTKPRD		Ordinal variable where:
		Level 1 (Pair)	2: indicates performance above the Aspiration level[1] for Firm *i* versus Bankruptcy risk[2] by Firm *i'*.
		Level 1 (Pair)	1: indicates either performance below aspiration level[3] by Firm *i* versus Bankruptcy[2] risk by Firm *i'* or Performance above aspiration level[1] by Firm *i* versus performance below aspiration level[3] by Firm *i'*.
		Level 1 (Pair)	0: indicates similarity in performance situation between partners.
		Level 1 (Pair)	-1: indicates either Bankruptcy[1] risk by Firm *i* versus performance below the aspiration level[3] by Firm *i'* or performance below the aspiration level[3] by Firm *i* versus performance above the aspiration level[1] by Firm *i'*.

[1] Z-scores above the lowest 10% of the sample and lagged performance at or above their aspiration level $\left(\overline{ROA}_{i,t}\right) < \left(ROA_{i,t}\right)$

[2] Z-score in the lowest 10% of sample

[3] Z-scores above the lowest 10% of the sample and lagged performance below their aspiration level $\left(\overline{ROA}_{i,t}\right) > \left(ROA_{i,t}\right)$

[4] Alternatively will consider a similar measure based on Industry average performance.

Variable name	Label	Level	Variable Description
		Level 1 (Pair)	-2: indicates Bankruptcy risk[2] by Firm *i* vs. performance above the aspiration level[1] by Firm *i'*.
Relative capabilities size	ALLCZD	Level 1 (Pair)	(Sales Firm *i* - Sales Firm *i'*) / (Sales Firm *i* + Sales Firm *i'*)
Relative capabilities	ALLCPD	Level 1 (Pair)	(Market Share Firm *i* - Market Share Firm *i'*) / (Market Share Firm *i* + Market Share Firm *i'*)
Relative availability of alternatives	RAAp	Level 1 (Pair)	(∑ Market share of firms in same industry as Firm *i'* with same or larger market share than Firm *i'* (RAMSHi) - ∑ Market share of firms in same industry as Firm *i* with same or larger market share than Firm *i* (RAMSHi')) / (RAMSHi + RAMSHi')
Relative structural holes-direct (directed betweenness centrality with direct constraint)	RSHd	Level 1 (Pair)	(Count of firm's partners not shared (through direct ties) with Firm *i'*) minus (Count of Firm *i'*'s partners not shared (through direct ties) with Firm *i*)
Controls:			
Tie	ALL	Level 1 (Pair)	Dummy indicating a tie between partners
Assets	ASST	Level 2 (firm)	Assets
Advertising expenditures	ADVexp	Level 2 (firm)	Advertising expense
R&D Expenditures	R&D	Level 2 (firm)	R&D Expense
Lagged DV	PredP	Level 1 (Pair)	Lagged DV for each of the models
Leverage	LVGE	Level 2 (firm)	Debt/equity ratio
Alliance type			
Joint Venture	JV	Level 1 (Pair)	Dummy variable indicating Joint Ventures
Supplementary	CA	Level 1 (Pair)	Dummy Variable indicating partners operate in the same industry

Note: All firm level variables are specified for both partner i and partner i' in each alliance.

Dependent Variable

Although it is widely recognized that firms pursue multidimensional goals, and that "performance," "value creation" or "value appropriation" can take many meanings for individuals and organizations, the mainstream view in strategy research, and the focus of this study, is that firms are fundamentally concerned with economic results (Goerzen & Beamish, 2005). A review of alliance studies revealed a set of measures that have become well accepted in the literature: sales (e.g., Stuart, 2000), and profitability expressed as return on assets (ROA), return on investment (ROI), or return on Sales (ROS) (e.g., Bae & Gargiulo, 2004; Goerzen & Beamish, 2005). In this study I use the net income component of the profit measures as my dependent variable (assets are a control in the models). Net Income is the profit from all the company's operations, calculated as total revenues minus total expenses and losses, as reported in the Compustat database. Analyses at the dyadic level use linear aggregation of individual firm level net incomes for both firms in an alliance as the dyadic unit (i.e., the alliance) dependent variable. The dependent variables for both models are defined at the dyadic level. Model 1 uses the linear aggregation of individual firm level net incomes for both firms in an alliance as the dependent variable. Model 2 uses the difference in net Income between firms included in the alliance as its dependent variable.

Explanatory Variables

Table 1 summarizes the description of the explanatory variables in this study. I briefly describe here some of the variable decisions that I make in the study. I argue that partners with more and better capability endowments with respect to a marketing alliance

(e.g., firms with extensive market coverage or firms that have a demonstrated ability to outsell their market) should be better partners with respect to value creation. Two measures of partners' capability endowments that have been used in the alliance literature are Sales (e.g., Stuart, 2000) and Market Share (e.g., Bae & Gargiulo, 2004). I use market share as a measure of capability endowments to reflect the market effectiveness of a partner compared to others in its particular industry. When a firm enters a marketing alliance with a partner that holds large market share in its own market, the firm gains access to a powerful market position, and therefore the opportunity to access that partner's market.

Tie strength reflects the level of commitment, frequency of interaction and trust implicit in a relationship. Therefore, following guidance from the literature I operationalize tie strength as a measure of the number of alliances (for any purpose) that partners have between them concurrently with the actual marketing alliance observation.

I measure commitment to new alliances with the product of the counts of new alliances by each firm scaled by the product of the total number of alliances each firm has. The actual measure is:

$$\frac{\textit{Count of new alliances for partner a} \times \textit{Count of new alliances for partner b}}{\textit{Count of total alliances for partner a} \times \textit{Count of total alliances for partner b}}$$

This measure of commitment to new alliances represents the stress new alliances apply to the carrying capacity of the firm. I then create a squared version of the variable to model the expected inverted-u shaped relationship between total commitment to alliances at the alliance level and value creation.

For alliance network closure, I use an overall alliance network constraint function based on constrains on entrepreneurial opportunities. The entrepreneurial opportunity of a firm *i* is constrained (e.g., normative pressures emerge) to the extent that (a) a partner *q* of a firm is also (b) a partner of partner *i'* of the firm (Burt, 2000). This implies that constraints emerge from closed subgraphs. I therefore measure alliance network closure as aggregate constraint for the pair's network as a whole. I define an alliance network as the set of alliances in which each or both firms in an alliance are involved. Specifically, the measure for closure is the count of complete minimum sub-graphs with a maximum of four nodes in the overall alliance network or the amount of "closed" triangles (Newman, Watts, & Strogatz, 2002) or quadrangles in the network.

Relative capabilities performance is measured as *(Firm$_i$ Market Share -Firm$_{i'}$ Market Share) / (Firm$_i$ Market Share + Firm$_{i'}$ Market Share)* and is a measure of the relative market power potential a partner brings to an alliance. Both measures are scaled to be complementary between partners.

For relative stakes I first develop a categorical variable based on the relative risk situations of the partners. March and Shapira (1992) model risk as performance variability. Since risk is a possible measure of the strategic stakes involved in a strategy choice (e.g. an alliance) for a firm, I first follow Miller and Chen (2004) and March and Shapira (1992) in their categorization of firm risk into three levels: (a) firms threatened by bankruptcy (TB), (b) firms not directly threatened by bankruptcy but performing below their aspiration levels (LP), and (c) firms not directly threatened by bankruptcy and performing at or above their aspiration levels (HP). For the threat of bankruptcy risk, I

use Altman's Z (Altman, 1983; Deephouse & Wiseman, 2000; Miller & Reuer, 1996). The calculation of Altman's Z is:

(1.2 *X working capital divided by total assets*) +
(1.4 *X retained earnings divided by total assets*) +
3.3 *X income before interest expense and taxes divided by total assets*) +
(0.6 *X market value of equity divided by total liability*) +
1.0 *X sales divided by total assets*)

where lower Z-scores imply higher likelihood of bankruptcy. Following Miller and Chen (2004) I consider firms with Z-scores in the lowest 10% of sample to be firms in the threatened by bankruptcy category (TB). Firms in the remaining 90% of the sample are then categorized based on whether their lagged performance (ROA*i*, *t*-1) was below (LP) or above (HP) their predicted performance ($\overline{ROAi, t-1}$) based on Bromiley's (1991) lagged performance plus growth factor which Miller and Chen (2004) suggest as a reasonable proxy for aspiration level. Alternatively, I develop a similar measure looking at comparisons to their industry performance as the aspiration level point of reference.

Second, I define an ordinal five point variable to represent the relative stakes between partners in an alliance. The five values are defined to represent a measure of the relative stakes a firm experiences in forming an alliance. Therefore, each value reflects the distance in terms of the importance or stakes involved in the alliance for each firm in an alliance with respect to the other firm in the alliance. Therefore, two firms that are in similar situation (e.g., both are operating above their aspiration level, or both are in bankruptcy risk) may not have a bargaining advantage due to their stakes in the alliance with respect to each other (i.e., a value of 0). Alternatively, an alliance between two firms that are in very different situations (e.g., a firm operating above its aspiration level with

respect to a firm in bankruptcy risk) will imply an important bargaining power difference for the firm that is in less need of entering the alliance. The values are created so as to reflect that distance based on the three groups that were definer previously (i.e., firms performing above their aspiration level (HP), firms performing below their aspiration level (LP), and firms threatened by bankruptcy (TB). Table 2 provides a visual representation of the values for this variable. In this ordinal variable, 2 represents HP firms in alliances with TB firms (i.e., the most positive relative stakes); 1 represents HP firms in alliances with LP firms or LP firms in alliances with TB firms; 0 represents firms that are allied to firms with a similar level of risk (e.g., HP allied to HP); -1 represents TB firms allied to LP firms or LP firms allied to HP firms; finally, -2 represents TB firms allied to HP firms.

Table 2: Parameter Development for the *Relatives Stakes* Measure

	HP	LP	TB
HP	**0**	**1**	**2**
LP	**-1**	**0**	**1**
TB	**-2**	**-1**	**0**

Relative availability of alternative partners is a construct that reflects the substitutability of a partner for a firm. It has been previously measured as the proportion of a firm's partners that were incumbent in the firm's industry in a given year (e.g., Bae & Gargiulo, 2004, in a study of alliances between competing firms in one industry). Since my sample includes firms in multiple industries and my model looks at alliances I focus on the existence of similarly or more capability endowed alternative partners within

a partner's industry. If a firm has the alternative to partner with alternative firms in the potential partner's industry that are at least equally capability endowed than the potential partner, then, that partner has a risk of exclusion. The measure compares the relative risk of exclusion of both firms in the alliance. The specific measure is:

(∑ Market share of firms in same industry as Firm i' with same or larger market share than Firm i' (RAMSHi) - ∑ Market share of firms in same industry as Firm i with same or larger market share than Firm i (RAMSHi')) / (RAMSHi + RAMSHi')

Relative measures of Structural Holes (Burt, 1992, 2000) are created comparing the bridging of structural holes for firm $_i$ with respect to firm $_{i'}$, to the bridging of structural holes for firm $_{i'}$ with respect to firm $_i$ (Burt, 1992). The specific measure is:

(Count of firmi 's partners not shared (through direct ties) with firmi') - (Count of firmi' 's partners not shared (through direct ties) with firmi)

Control Variables

Control variables are included at both the firm and alliance levels of analysis to control for firms performance not related to the alliance and to control for alternative explanations for the relationships studied in our models. The complete list is included in Table 1. Beyond the traditional controls for firm performance, several control variables are included to account for relationships that previous alliances literature suggest as relevant to the relationships studied in this paper.

Assets for each of the firms were included in the models as a regressor by itself and in interaction with the firms having an alliance to control for firms' size effects at level 2. Research and Development were included to control for the potential effect of

R&D investments in technological capabilities that might affect a focal firm's profitability at level 2. The Lagged Dependent Variables are included in both models as a regressor to control for previous performance effects that are independent of the alliance under study. Same Industry Dummy Code is a dummy coded variable indicating that both firms in the alliance participate in the same industry. I used this control to indicate that the alliance reflects supplementary joint resources and a joint competitive relationship between the firms in the alliance. Alliance type is dummy variable indicating joint ventures, which I used to control for the type of alliance in the model. Leverage is measured as the ratio of debt to equity. This allowed me to control for potential influence of the capital structure on firms' performance (Buhner, 1987; Goerzen & Beamish, 2005; Jensen, 1989)

Analysis

Hypotheses 1 to 4 relate firm and alliance specific factors to value creation at the alliances level. Hypotheses 5 to 8 relate alliance specific factors to value appropriation at the alliances level. The questions addressed in these hypotheses present two main statistical issues that have recently received considerable attention in the networks methods literature: dependencies among observations and modeling multiple levels of analysis simultaneously. Understanding the multilevel implications of networks (Jones, Hesterly, & Borgatti, 1997; Monge & Contractor, 2003) and simultaneously addressing the fact that network (e.g., alliances) data is relational, and therefore composed, by definition, of nonindependent observations (Holland & Leinhardt, 1981; Lazeaga & Van Duijin, 1997; Monge & Contractor, 2003; Van Duijin, 1995; Wasserman & Pattison,

1996) implies that "standard" statistical approaches that assume independent subjects, such as regression analysis and ANOVA are not appropriate. Therefore, I rely on a novel set of statistical approaches to test my hypotheses. These techniques address the issues of independence and allow me to study the multilevel implications of networks.

Value Creation Model

My first conceptual model is a multilevel selection model with predictions at the dyadic level. Multilevel methods in networks analysis have only recently been developed and have basically addressed the issue of selection (who selects whom for a relationship of any sort), with individual level (usually binary) dependent variables. I build on the logic of such models (e.g., the p_1 model (Holland & Leinhardt, 1981), the p^* model (Wasserman & Pattison, 1996), and the p_2 model (Van Duijin, 1995; Lazeaga & Van Duijin, 1997)) to develop a multilevel performance model (MPM) fully estimable with maximum likelihood multilevel algorithms and designed to deal with unbalanced data to account for the possibility that some alliances may not have been reported. Essentially, this MPM is a cross-nested selection model for continuous DVs. My model for value creation is formally defined as:

$$\Upsilon ii't+1 = \Upsilon i'it+1 = \mu + \alpha it + \alpha i't + \delta ii't + \varepsilon ii't+1 \quad \textit{for } i'=1,\ i'\neq 1,\ \textit{to } n. \tag{1}$$

where $\Upsilon ii't+1$ is the performance at the dyad (alliance) level at time t+1, μ is a mean, αit is a vector containing firm level effects for one of the partners in the alliance and $\alpha i't$ is a vector containing firm level effects for the other partner in the alliance, and $\delta ii't$ is a vector containing dyadic level effects (i.e., alliance –pair- level effects). Note

that $\Upsilon ii't+1 = \Upsilon i'it+1$ since this is not a directed model and therefore the alliance has one performance (i.e., the aggregate performance of both firms in the alliance) regardless of the ordering of the partners in the matrix.

At the firm level (individual partners' level) the model is further specified so that vectors for individual actors are expressed as:

$$\alpha it = \Gamma i\gamma i$$
$$\text{and} \qquad (2)$$
$$\alpha i't = \Gamma i'\gamma i$$

where Γi and $\Gamma i'$ are matrices with covariates for partner firm's effects with coefficients γin and $\gamma i'n$.

Similarly, at the alliance level (pair or dyadic level) the model is further specified so that vectors for dyadic attributes are expressed as:

$$\delta ii't = Zii'\zeta ii' \qquad (3)$$

where Zii' is a matrix with covariates for dyadic (alliance) effects with coefficient. The actual models at the pair and individual levels are:

Alliance (pair) level effects:

$$\begin{aligned}
&\delta ii't = \zeta ii'1(\textit{Alliance Capabilities}ii't) + \zeta ii'2(\textit{Alliance Tie Strength}ii't) + \\
&\zeta ii'3(\textit{Alliance Capabilities}ii't \times \textit{Alliance Tie Strength}ii't) + \\
&\zeta ii'4(\textit{Alliance Closure}ii't) + \zeta ii'5(\textit{Change in commitment to alliances}ii't) + \\
&\zeta ii'6(\textit{Change in commitment to alliances}ii't^2) + \qquad (4)\\
&\zeta ii'7(\textit{Market Share}it \times \textit{Alliance Tie}ii't) + \zeta ii'8(\textit{Market Share}i't \times \textit{Alliance Tie}ii't) + \\
&\sum_{n=9}^{11} \zeta ii'n\ (\text{Controls}ii't)
\end{aligned}$$

Individual level effects:

$$\alpha it = \sum_{n=1}^{6} \gamma in\left(\text{Control}Sit\right) \tag{5}$$

$$\alpha i't = \sum_{n=1}^{6} \gamma i'n\left(\text{Control}Si't\right) \tag{6}$$

Appropriation Model

The appropriation model is designed to explore the explanations for value appropriation at the level of the individual firm. The model is specified as:

$$\Delta \Upsilon ii't+1 = \mu + \alpha it + \alpha i't + \delta ii't + \varepsilon ii't+1 \qquad \textit{for } i'=1,\ i'\neq 1,\ \textit{to } n. \tag{7}$$

where $\Delta \Upsilon ii't+1$ is the difference in performance between firm we and firm i' (i.e., alliance level) at time t+1, μ is a mean, αit is a vector containing firm level effects for one of the partners in the alliance and $\alpha i't$ is a vector containing firm level effects for the other partner in the alliance, and $\delta ii't$ is a vector containing dyadic level effects (i.e., alliance –pair- level effects).

At the firm level (individual partners' level) the model is further specified so that vectors for individual actors are expressed as:

$$\begin{aligned} &\alpha it = \Gamma i \gamma i \\ &\text{and} \qquad (8) \\ &\alpha i't = \Gamma i' \gamma i \end{aligned}$$

where Γi and $\Gamma i'$ are matrices with covariates for partner firm's effects with coefficients γin and $\gamma i'n$.

Similarly, at the alliance level (pair or dyadic level) the model is further specified so that vectors for dyadic attributes are expressed as:

$$\delta ii't = Zii'\zeta ii' \tag{9}$$

where Zii' is a matrix with covariates for dyadic (alliance) effects with coefficient. The actual models at the pair and individual levels are:

Alliance (pair) level effects:

$$\begin{aligned}\delta ii't = {} & \zeta ii'1(Relative\ Stakesii't) + \zeta ii'2(Relative\ Capabilitiesii't) + \\ & \zeta ii'3(Relative\ Availability\ of\ alternative\ partnersii't) + \\ & \zeta ii'4(Relative\ Structural\ Holesii't) + \sum_{n=5}^{7} \zeta ii'n\ (\text{ControlS}ii't)\end{aligned} \tag{2}$$

Individual level effects:

$$\alpha it = \sum_{n=1}^{12} \gamma in(\text{ControlS}it) \tag{3}$$

$$\alpha i't = \sum_{n=1}^{12} \gamma in(\text{ControlS}i't) \tag{4}$$

Results for these models are described and explained in Chapter 5. In the next chapter I present and discuss the results for this dissertation.

CHAPTER 5

RESULTS

Tests for the hypothesis are presented in Table 3. In Table 3, the first column is the number of the hypothesis being tested, the second in the name of the explanatory variable in that hypothesis, the third column is the value of the coefficient for the hypothesis to be in the right direction and the last column is the test of significance for the hypothesis. The appropriate test for all single parameter tests (Raudenbush & Bryk, 2002) is based on the T-ratio; that is, I compute the ratio of the estimated coefficient to its estimated standard error. Formally, this statistic is asymptotically unit normal and under large-sample theory is tested against the Z distribution. Therefore, values of $|\text{T-ratio}| \geq 2$ are considered significant for the models studied in this dissertation. Tables 4 and 5 present my findings for the predictions studied in this dissertation. In the next paragraphs I present the results for each of the hypotheses included in this dissertation. Overall, Model 2 in Table 4 shows support for hypotheses 2B and 3, and Model 4 in Table 5 shows support for hypotheses 5, 7 and 8 of this dissertation.

Table 3: Tests for Hypotheses

Hypothesis	Variable	Coefficient	*TEST*
H1a	*Market Share$_i$ * Alliance Tie*	$\gamma_{i1} > 0$	*T-ratio* ≥ 2
	*Market Share$_{i'}$ * Alliance Tie*	$\gamma_{i'1} > 0$	*T-ratio* ≥ 2
H1b	*Alliance Capabilities*	$\zeta_{ii'1} > 0$	*T-ratio* ≥ 2
H2a	*Tie Strength*	$\zeta_{ii'2} > 0$	*T-ratio* ≥ 2
H2b	*Alliance Capabilities * Tie Strength*	$\zeta_{ii'3} > 0$	*T-ratio* ≥ 2
H3	*Alliance Closure*	$\zeta_{ii'4} > 0$	*T-ratio* ≥ 2
H4	*Commitment to New Alliances*	$\zeta_{ii'5} > 0$	*T-ratio* ≥ 2
	Squared Commitment to New Alliances	$\zeta_{ii'6} < 0$	*T-ratio* ≤ -2
H5	*Relative Stakes*	$\tau_{ii'1} > 0$	*T-ratio* ≥ 2
H6	*Relative Capabilities*	$\tau_{ii'2} > 0$	*T-ratio* ≥ 2
H7	*Relative Availability of Alternative Partners*	$\tau_{ii3} > 0$	*T-ratio* ≥ 2
H8	*Relative Structural Holes*	$\tau_{ii'4} > 0$	*T-ratio* ≥ 2

Table 4 presents the results for the hierarchical cross-nested linear analysis for the value creation models. Model 1 in Table 4 shows the results for a model that includes all the controls of the value creation model. In line with the strategic management theory, control variables that were included to account for previous performance, and size and capability direct effects on performance independent of the alliance, were significant and in the expected positive direction. Joint venture and supplementary alliance dummies do not seem to make a difference on the predictions of the model. Model 4 in Table 5 shows the results for the full value creation model.

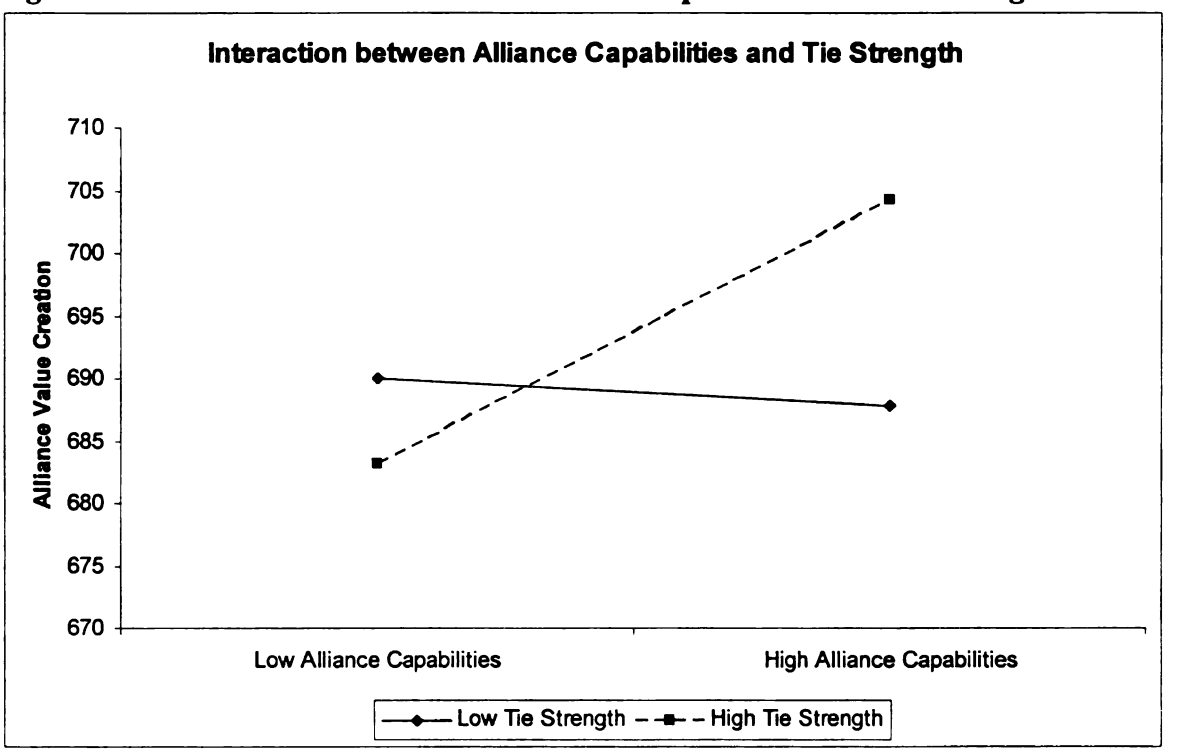
Hypotheses 1A and 1B are not supported. In H1A, I predicted that the value created at the alliance level of analysis increases with the capabilities controlled by each partner. For H1A, the results show no significant effect of each firms' capabilities (T-ratios = -1.423 and -1.400) on the value created at the alliance level of analysis.

H1B predicted that the value created at the alliance level of analysis increases with the alliance capabilities controlled by both partners in the alliance. For H1B, the result is significant but the coefficient has the opposite direction (see Table 3) to the hypothesized relationship (T-ratio = -2.676). This result implies that larger combined capabilities by both partners seem to have a negative effect on the value created at the alliance level of analysis.

Hypothesis 2A stated that the value created at the level of the alliance increases with the tie strength between the partners in the alliance. Hypothesis 2A is not supported. The effect of the tie strength on value creation at the level of the alliance is not significant with a T-ratio of -0.759.

In Hypothesis 2B, I predicted that tie strength would positively affect the relationship between alliance capabilities and value created at the level of the alliance. Hypothesis 2B is supported (T-ratio = 3.277). Therefore, as represented in Figure 1, the strength of the tie between the partners in the alliance positively affects the effect of their combined capabilities on value created at the level of the alliance. While the interaction effect representation may seem to have a positive mean or main effect for capabilities, the actual weighting of the data accounts for the negative main effect since the low strength population is much larger than the high strength population in the sample.

Figure 1: Interaction Effect Between Alliance Capabilities and Tie Strength



Hypothesis 3 stated that the value created at the alliance level of analysis increases with the alliance network closure. As expected, Model 2 in Table 4 shows that the relationship between the amount of closure in an alliance network and the value

created at the level of the alliance is positive and significant (T-ratio = 3.41). Thus H3 is supported.

Finally, Hypothesis 4 predicted an inverse U-Shaped relationship between the combined change in commitment to alliances of the firms in the alliance and value created in the alliance. Therefore I expected a positive relationship between the commitment to new alliances variable and value created at the level of the alliance and a negative relationship for the squared term of the explanatory variable. Model 2 in Table 4 shows that H4 is not supported. The results were actually not significant for both the natural and the squared terms (T-ratios: -1.163 and 0.910, respectively).

Table 4. HCM2 Results for Models 1 and 2 (Dependent Variable = $\Upsilon_{ii't+1}$)

MODEL	1		2	
	Coefficient	*T-Ratio*	*Coefficient*	*T-Ratio*
Alliance Level				
Alliance Capabilities			-6282.16**	**-2.67**
Tie Strength			-96.55	-0.76
Alliance Capabilities * Tie Strength			4032.74***	**3.28**
Alliance Closure			8.32***	**3.41**
Commitment to New Alliances			-931.41	-1.16
Squared Commitment to New Alliances			582.76	0.91
Controls alliance level				
Lagged DV	0.555***	88.18	0.56***	88.23
Joint Venture	-119.701	-0.44	17.70	0.07
Same Industry Dummy Code	180.722	0.79	176.32	0.80
Intercept	693.868***	69.55	690.02***	59.41
Firm Levels *i* & *i'*				
Market Share$_i$ * Alliance Tie			-8.163	-1.42
Market Share$_{i'}$ * Alliance Tie			3.766	0.74
Controls firm levels i & i'				
Market Share$_i$	-1.798**	2.93	1.961**	3.17
Assets$_i$	0.015***	20.36	0.015***	20.43
Research & Development Expenditures$_i$	-0.073***	-3.86	-0.078***	-4.13
Leverage$_i$	5.102***	3.37	5.103***	3.37
Assets$_i$ * Alliance Tie	-0.001	-0.17	0.002	-0.48
Market Share$_{i'}$	-0.94	-1.64	1.246*	2.37
Assets$_{i'}$	0.02***	-31.74	-0.012***	20.77
Research & Development Expenditures$_{i'}$	-0.65***	-27.12	-0.083***	-5.09
Leverage$_{i'}$	5.42**	2.79	4.355**	2.42
Assets$_{i'}$ * Alliance Tie	-0.000	-0.064	-0.004	-1.40
Alliance Tie, Intercept	-26.838	-0.257	173.701	-0.67
Total Variance & Covariance Components	3386874		3024079	
Δ Variance & Covariance Components			0.107	

Significant at *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$: two tailed tests.
Degrees of freedom model 1: Level 1: 19936; Level 2*i*: 360; Level 2*i'*: 375.
Degrees of freedom model 2: Level 1: 19928; Level 2*i*: 360; Level 2*i'*: 375.

Table 5 presents the results of the hierarchical cross-nested linear analyses for my value appropriation set of hypotheses. Model 3 in Table 5 shows the results for a model

management theory, control variables that were included to account for previous performance, and size and capability direct effects on performance independent of the alliance, were significant and in the expected direction. Joint venture and supplementary alliance dummies do not seem to make a difference on the predictions of the model. Model 2 in Table 5 shows the results for the full value creation model.

In Hypothesis 5 I predicted that the value appropriated in an alliance by a partner will be negatively associated with the relative strategic stake of that partner. Hypothesis 5 is supported. I found a significant (T-ratio = 2.05) positive relationship between the relative strategic stake of a partner and the difference in value appropriated in the alliance by that partner.

Hypothesis 6 stated that the value appropriated from an alliance by a partner will be positively associated with the relative capabilities of that partner. Hypothesis 6 is not supported. Model 4 in Table 5 shows that the relationship between the relative capabilities of a partner in an alliance and value appropriation is not significant (T-ratio = -0.48).

Hypothesis 7 predicted a positive relationship between the relative availability of alternative partners and value appropriation. Model 4 in Table 5 shows that the relationship is positive and significant (T-ratio = 3.35), therefore supporting H7.

Finally, in Hypothesis 8 I predicted that the value appropriated from an alliance by a firm in the alliance will be higher for firms that bridge more structural holes relative to their partner. Hypothesis 9 is also supported. Firms that bridge more structural holes relative to a partner in an alliance are able to appropriate more value in the alliance (T-ratio = 3.09).

relative to a partner in an alliance are able to appropriate more value in the alliance (T-ratio = 3.09).

Table 5. HCM2 Results for Models 3 and 4 (Dependent Variable = $\Upsilon_{i-i't+1}$)

MODEL	*3*		*4*	
	Coefficient	***T-Ratio***	***Coefficient***	***T-Ratio***
Alliance Level				
Relative Stakes			229.149*	2.05
Relative Capabilities			-77.989	-0.48
Relative Availability of Alternative Partners (Mktshare)			956.801***	3.35
Relative Structural Holes			14.108**	3.09
Controls alliance level				
Lagged DV	0.548***	87.01	.547***	86.94
Joint Venture	-75.429	-0.27	-146.690	-0.54
Same Industry Dummy Code	-199.663	-0.87	-173.746	-0.78
Intercept	-55.534***	-5.72	-55.095***	-5.68
Firm Levels *i* & *i'* *(all controls)*				
Market Share$_i$	4.972***	8.27	4.992***	8.30
Assets$_i$	0.017***	23.12	0.017***	23.22
Research & Development Expenditures$_i$	-0.132***	-7.11	-0.135***	-7.27
Leverage$_i$	-1.120	-0.76	-1.116	-0.76
Market Share$_i$ * Alliance Tie	-8.62	-1.65	-27.216***	-3.96
Assets$_i$ * Alliance Tie	0.003	0.64	0.002	-0.47
Market Share$_{i'}$	-1.999***	-3.90	-2.013***	-3.93
Assets$_{i'}$	-0.012***	-20.03	-0.012***	-20.14
Research & Development Expenditures$_{i'}$	0.059***	3.75	0.062***	3.89
Leverage$_{i'}$	-3.245	-1.85	-3.210	-1.83
Market Share$_{i'}$ * Alliance Tie	-0.666	-0.14	13.228*	2.24
Assets$_{i'}$ * Alliance Tie	0.003	0.80	0.008*	2.12
Alliance Tie, Intercept	-89.383	-0.85	-105.153	-1.03
Total Variance & Covariance Components	3379458		3184443	
Δ Variance & Covariance Components			0.058	

Significant at *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$: two tailed tests.
Degrees of freedom model 1: Level 1: 19934; Level 2*i*: 360; Level 2*i'*: 375.
Degrees of freedom model 2: Level 1: 19930; Level 2*i*: 360; Level 2*i'*: 375.

I graphically assessed the normality assumption for errors at level 1 by looking at a normal probability plot for the residuals pooled across units. Non-normality of errors at

to outliers. If the distribution of errors were grossly non-normal, a poisson model would be indicated. The normal residual plot served for checking normality and for the identification of outliers. The resulting plot is not grossly non-normal. It was a slightly leptokurtic normal curve with some outlier values on both tails. To check for the influence of the outliers I identified the outlier values in the residual data set and I re-run the model without the outlier observations. The results of this control model are similar to the complete dataset model indicating that the results are not grossly affected by the larger residual values in the sample.

I ran the value creation model with alternative measures for tie strength and capabilities. If tie strength is specified as the existence of an alliance between the partners in the past, both tie strength and the interaction of alliance capabilities and tie strength do not seem to have a significant relationship to alliance value creation. The model including capabilities measured as Sales, has near singularity issues and therefore does not run because it is multicollinear. I also ran the value appropriation model with an alternative measure for relative stakes. In this case, I characterized performance aspirations as related to industry performance instead of previous firm performance. The relationship between this measure and the dependent variable is not significant and the inclusion does not improve the model.

The next section organizes and elaborates the implications of these results, which help to explain differences in value creation that result from inter-firm collaboration and the related competition for value appropriation between firms involved in marketing alliances.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

This study examined the impact of three broad aspects of alliances – structural, resource, and power issues - on the performance implications of alliances for their partners. Previous approaches to the structural aspects of alliances had tried to understand the degree to which closed or open networks could be appropriately regarded as the normative ideal (Ahuja, 2000; Bae & Gargiulo, 2004; Burt, 1992; Coleman, 1988; Walker, Kogut, & Shan, 1997; Zaheer & Bell, 2005). However, prior research on the impact of alliance network structure on performance produced conflicting results. To resolve this debate, I proposed that alliance network closure should be more relevant to value creation at the level of the alliance while bridging structural holes should produce an advantage in terms of value appropriation within the alliance. The results of my tests show, in line with my theory, that network closure surrounding a marketing alliance enhances the creation of value (i.e., aggregated performance) of partners in that alliance (H3). I also found support for the prediction that the more structural holes a firm can bridge relative to its alliance partner, the larger the portion of alliance value that firm will appropriate from that alliance (H8).

The second aspect of alliances that has drawn attention in the alliance literature concerns the role of firm capabilities in alliance performance. Previous approaches to the study of the importance of partners capabilities in alliances had tried to understand the degree to which the capability endowments of partners in alliances had a significant effect on performance (Bae & Gargiulo, 2004; McEvily & Marcus, 2005; Gulati 1999;

Stuart, 2000; Zaheer & Bell, 2005). In this study, taking a multilevel approach to the issue, I did not find support for the hypothesized relationships between each partner's capabilities (H1A) or the combined capabilities of partners (H1B) and value creation at the level of the alliance. I did, however, find that the relationship between the combined capabilities of the partners and value creation at the level of the alliance is positively affected by the presence of a strong tie between allies (H2B). Thus, higher capabilities of each firm alone or in combination lead to higher value creation in alliances only when the alliance partners were linked by multiple ties.

Finally, I found mixed support for the predictions about the importance of firm power on the firm's ability to appropriate value from their alliances. I found support for this idea when power was expressed as the relative availability of alternative partners (H5) or as the relative stakes (H7) between partners in the alliance, but did not find support when the test was based on differential capabilities each firm brings into the alliance. These findings have important theoretical and practical implications.

Structure

The results in this study support the idea that alliances are simultaneously cooperative and competitive relationships (Burt, 1991) for firm performance. Taken together, Hypotheses 3 and 8 talk to the importance of understanding the mechanisms that underlie the performance implications of structural positions in an alliance's network. These predictions imply that there may be an alternative to trying to understand the degree to which closed or open networks (as competing explanations) could be appropriately regarded as the normative ideal (Ahuja, 2000; Bae & Gargiulo, 2004; Burt,

1992; Coleman, 1988; Walker, Kogut, & Shan, 1997; Zaheer & Bell, 2005). In strategic alliances, the benefits of increased trust and reduction of opportunism that result from more closed or interconnected networks around the partners in the alliance result in more potential for the alliance to produce aggregate value for alliance members. But also, firms that bridge structural holes seem to have an advantage at the moment of appropriating the value created in alliances. It appears that the key principle for improving performance through collaboration has to do with the ability to simultaneously develop normative pressures on an alliance's partner (i.e., to increase the potential for the alliance to create value) and some relative structural advantage in the relationship with that partner (i.e., to maximize the ability to appropriate that value). Instead of one or the other, the optimizing strategies seem to point to one and the other: closure and structural holes. Looking for a sufficient level of closure to guarantee value creation and simultaneously developing sufficient advantage in terms of structural holes to optimize the appropriation of that value. Thus, it appears that the optimal choice of alliances for firms may have to do with alliances that are neither overembedded in overly closed networks nor overly constrained by bridging too few structural holes.

This view departs from previous approaches that confronted (a) the view that networks with many connections between a firm's partners, or "network closure" were advantageous to strategic alliance performance (Ahuja, 2000; Coleman1988, 1990; Gulati, 1995; Gulati & Singh, 1998; Walker, Kogut & Shan, 1997; Uzzi, 1997; Zaheer & Venkatraman, 1995) to (b) views that supported the idea that structural holes was actually better for alliance performance. (Burt, 1992; Hargadon & Sutton, 1997). Theorizing about the different mechanisms that underlie closure and structural holes predictions

allowed me to predict and test a more integrative view that helps to explain the contradictory findings of previous research in the management and sociology literatures.

Turning to the control variables in models 1 and 2, I also found an interesting result related to the structural argument. A previous explanation for the contradictory findings with respect to closure and structural holes relied on a contingency approach (Ahuja, 2000; Rowley et al., 2000). Ahuja (2000) discussed how the contradictory results may be due to differences in contexts. By contrasting his results with those of Hargadon and Sutton (1997), he concluded that the explanation of the differences in results may be due to the fact that his sample, contrary to the non-adversarial nature of Hargadon and Sutton's sample, includes alliances between competitor firms in the same industry. Therefore, the adversarial nature of his sample may have resulted in a greater need for trust in alliances and thus created a positive effect for network closure. To account for this possibility, I included a control for alliances between partners in the same industry (i.e., supplementary alliances). Results did not support this contingency argument in that I did not find a significant relationship between participation in the same industry (and therefore potential competitiveness between partners) and alliance value creation. This finding calls into question the contingency explanation for the contradictory results in the previous literature. In particular, it raises questions about explanations that suggest that alliances between competitors may be more likely to benefit from closure in the network while alliances between firms that do not participate in the same industry may benefit more from the availability of structural holes. While the study did not include any measures of within industry munificence, this finding provides some initial evidence of some possible limitations of that contingency argument.

Firms' Capabilities

The results for the capability hypotheses of this study (H1A, H1B) are surprising. Based on previous findings in the alliances literature I predicted that a multi-level exploration of the phenomena would also show positive effects of each partner's capabilities and of the combined partners' capabilities on value creation at the level of the alliance. Instead, the results showed no significant effect of each firm's capabilities on the value created at the alliance level of analysis. Alternatively, the result for combined firm capabilities is significant but in the opposite direction to my prediction. Curiously this finding implies that larger combined capabilities by both alliance partners have a negative effect on the value created at the alliance level of analysis. I offer three possible explanations for these surprising findings.

First, it is certainly plausible that my measure of capabilities is underspecified. Relying on a proxy like market share to capture a firm's marketing capabilities presents a possible limitation of this study. However, since proxies like market share and sales have been shown to predict performance in previous studies (e.g., Bae & Gargiulo, 2004; Stuart, 2000), this explanation will not explain away the difference between these findings and previous results.

Second, previous results relied on a single level approach that may have confounded the direct effect of capabilities on performance with the alliance level effect of capabilities on performance in the previous literature (e.g., Ahuja, 2000; Bae & Gargiulo, 2004; Stuart, 2000; Zaheer & Bell, 2005). Previous research fails to take advantage of one of the key benefits of network's approaches: the multilevel nature of the data (e.g., the firm, the alliance, the alliance network). This single level approach may

account, in part, for the different findings. By modeling capabilities in a multilevel approach, my model may have eliminated the confusion between direct capability effects on performance and alliance related capability effects on performance that may have arisen from looking at the effect of own and partner capabilities effects on performance at a single level of analysis. Note that, as reported in the results in Model 2 of table 4, the relationships between *Marketshare * Alliance Tie* for each one of the partners (i.e. my tests for hypothesis 1A) and value creation at the level of the alliance are non significant. But the direct effects of *Market Share*$_i$ and *Market Share*$_{i'}$ on performance (i.e., the market share measures for each firm that are included as controls in the model) are both positive and significant. Therefore, the single level approaches of previous research may have captured some of the actual effect of firm capabilities on firm performance that is independent of those firms' being in an alliance. The multilevel approach has therefore allowed me to separate market share effects within the alliance (not significant) from market share direct effects (significant) on performance. This demonstrates the need of a multilevel approach to theorizing and testing when dealing with multilevel phenomena like strategic alliances. In this study I offered a hierarchical cross-nested model (Raudenbush & Bryk, 2002; Van Duijin, 1995; Lazeaga & Van Duijin, 1997) as such an approach. This approach allows researchers to acknowledge the non-independent nature of alliance data and to investigate how, for example, both individual partners' attributes (e.g., capabilities of each partner in an alliance), the alliance configuration (i.e., alliance level constructs) interact to explain alliance outcomes within the larger set of alliances in which both partners may also participate. Thus, this study demonstrates how hierarchical cross-nested linear methods may be used to investigate the effect of alliance specific

factors within each level in the alliance (e.g., partner A, Partner B, alliance effects and alliance by partner effects). I hope this study will help guide future multilevel research in this area.

Finally, a third explanation for the results from my tests of firm capabilities takes form when looking at hypothesis 2B. While the combined capabilities of the partners seem to have a negative effect on the value created at the alliance level of analysis, this relationship gets reversed when moderated by the strength of the tie between the allies. This finding points to an integration between relational and capability issues in predicting overall alliance performance. Previous studies generally have relied on small samples of alliances and have not controlled for the strength of the tie between the alliance partners. Therefore, previous tests may be underspecified and the results may be influenced by relational issues between allies in the samples.

In conclusion, the capabilities of both partners in an alliance seem to have a positive effect on alliance value creation at the level of the alliance only when combined and moderated by the strength of the tie between the firms in the alliance. This finding is consistent with a broad process literature in alliances that emphasizes the role of trust and commitment between the allies in alliance performance (tie). It is plausible that the larger and more successful the firms entering an alliance, the more important the strength of the relationship is for alliance performance. Partners with large capability endowments are by definition, less dependant on alliance performance for overall firm success and therefore may need to rely on more relational factors for their alliances to create value. Large partners that have strong ties between the, may develop joint routines or work mechanisms by working together through several alliances and these routines may help

them overcome the problems of getting two large firms working together with one another.

Firm Power

Finally I tested the role of firm power on value appropriation in alliances. The mixed results for the relative power set of hypotheses in the study are also very interesting. I examined three potential causes of bargaining power: relative availability of alternative partners, relative capabilities and relative stakes. Of the three hypotheses I found support for the roles of the relative stakes of partners and the relative availability of alternative partners, on value appropriation from alliances. However, I did not find support for the role of the differences between the capabilities of each partner and the appropriation of value. That is, firms with more capabilities than their partner do not appropriate a disproportional share of value with respect to their partners. These results suggest that not all sources of power over a partner explain value appropriation.

A common aspect of both relative availability of alternative partners and relative stakes (both of which have significant effects on firm value) is that both imply conditions of vulnerability. First, for relative availability of alternative partners, the vulnerability arises from the risk of exclusion. Network exchange theory (Willer, Walker, Markovsky, Willere, Lovaglia, Thye, & Simpson, 2002; Yamagishi, Gillmore, & Cook, 1988) argues that bargaining power is a function of the extent to which actors in a relationship are vulnerable to exclusion from exchanges within the network. Therefore, when there are many alternatives to a partner for a firm to engage in an alliance, that partner is vulnerable because it risks being excluded from the alliance in favor of another

alternative partner. Second, firms with high strategic stakes will have lower bargaining power in alliances (Bacharach & Lawler, 1984; Yan & Gray, 1994) because high payoff for cooperation is likely when firms are in vulnerable strategic situations (Eisenhardt & Schoonhoven, 1996).

Difference in capabilities is less an expression of vulnerability and has more to do with potential contributions of the firms to the alliance. Given no other vulnerabilities or, better said, when bargaining power issues related to vulnerability factors are accounted for, appropriation may be expected to be somewhat proportional to contributions and, therefore, have no significant effects on value appropriation within alliances. It is not the capabilities that a firm may contribute but the lack of alternatives or urgency to go through with a collaboration that drives power relationships, and therefore value appropriation, in strategic alliances. Consistent with this explanation, the hypotheses in this study that represent vulnerable situations for firms going into an alliance explain differential value appropriation, while the one that is a mere description of potential contributions does not have a significant effect on the results. Here, a plausible extension to the paper would be to explore the interaction between differential capabilities and the availability of alternative partners. It may well be that differential capabilities become important when no alternative partners are available, but do not matter as much when there are many alternative partners from whom to get access to similar marketing capabilities.

Limitations

This dissertation, like any other, has several limitations that open avenues for future research. First, although I examined an important set of complementary outcomes, the impact of alliances on conjoint performance and differences in performance between firms in an alliance within a marketing alliances network, it is important to consider alternative aspects of firm value (e.g., the sustainability of alliance effects on performance) that may also be affected by the predictors included in this study. For example, exercising power in a relationship to appropriate more value in an alliance may have long term effects on the relationship between firms and, therefore, on the medium term value of the alliance. Also, appropriation practices may lead to reputational issues that may affect the willingness of potential partners to form an alliance with a firm in the future.

Second, it would be important to test the generalizability of the findings to alliances beyond marketing alliances. While marketing alliances are a significant proportion of the alliances firms engage in, research and development alliances may be an interesting ground to test the generalizability of these findings since they usually imply more specific sets of capabilities, longer terms to achieve results and, therefore, more issues of trust and commitment to the investment than the marketing alliances that are the focus of this study. As such, research and development alliances may need more trusting relationships and tie strength or closure may therefore have an even larger impact on their performance. Also, it may be the case that, given the long term demands of such alliances, contractual issues or cross-ownership may play an important role in such projects.

Third, this research takes into account the formal network that is determined by the alliances that firms form. Future research should analyze the intersection between these formal expressions of relationships and informal networks that may be acting as antecedents to the formal alliances the firms go into, or of complementary effects on the influence that formal networks have on performance. Formal and informal networks usually co-evolve allowing, also, for further research on the determinants of alliance network structures for firm. It would be important to understand if informal networks or previous alliances performance as explained by the model I present in this study, independently or together, provide a more complete explanation of the alliances choices that firms make than previous research. Longitudinal selection models can be used to study the dynamic implications of informal and performance issues on the alliances choices that firms make.

Finally, this model is surely incomplete and underspecified. While I think this is an important step in unifying the findings in the alliance literature, future developments should try to understand how other aspects of partners, alliances, or their interaction, may help determine the long term value of alliance strategy choices for firms.

Conclusions

The findings of this study are relevant for management research for a number of reasons. The main implication of this dissertation is that firms' decisions regarding alliance choices should be sensitive to collaborative and competitive conditions that characterize each potential alliance choice. In contrast to previous studies of performance in the alliance literature that focused exclusively on individual firm outcomes (i.e.,

assuming full capture of value created in alliances by participating firms), this dissertation considered value creation and value appropriation as two different components of alliance performance each with it's own set of relevant predictors. While value creation results from aspects of firms and their alliances' choices that promote collaboration (e.g., network closure), value appropriation results from differential exchange conditions for partners in an alliance (e.g., relative availability of alternative partners) that define the outcomes of their competition to appropriate the results of those alliances. The size of the appropriation of value that each firm derives from an alliance is the result of a cooperative game (Brandenburger & Stuart, 2001; Lippman & Rumelt, 2003) between partners who cooperate to create value and compete to appropriate that value simultaneously (Lax & Sebenius, 1986; Hamel, Doz, & Prahalad, 1989) and, therefore, is the outcome of exchange processes, bargaining, and the overall structure of the relationship.

Second, this study contributes to the integration of structuralist and resource based approaches, therefore addressing some criticisms of previous collaboration research. This study is able to take an integrated view of firm characteristics and the structure of the relationships they are embedded in by taking advantage of multilevel analytical tools and theory. Taking advantage of the multilevel nature of alliance data, this study is able to show how structural and firm specific characteristics and the interaction between them, determines the creation and appropriation of value in alliances. In contrast to previous research that has tried to integrate firm and structural factors by constructing network variables as firm level predictors and aggregating portfolios of alliances (as averages), this dissertation has been able to integrate them by cross-classifying the alliances between

the firms that form them and to provide a cleaner set of explanations for the impact of both firm and structural factors in an alliance.

Third, this dissertation contributes to the alliances, sociology and network literatures by providing a synthesis of Structural Holes and Closure perspectives with the intention of helping to unify and redirect the network capital (i.e., social capital, relational capital, cooperative exchanges) agenda. I provide a first set of results that show how closure and structural holes may not be directly contradictory in the effects of alliances on firms' performance. This finding stands in contrast to the divided belief that either closure or structural holes can be good for collaboration, but not both. Despite a large tradition of studies that have tested these perspectives as contradictory, little effort has been made to understand the potential interplay of both factors in promoting the value of a relationship for a firm. I hope this dissertation may help promote research that seeks to further understand the structural holes and closure constructs in the context of alternative outcomes and contexts. For example, it would be interesting to analyze if these findings hold for social capital implications of informal networks or for outcomes related to information production and distribution. Indeed, I am hopeful that the present dissertation will also motivate additional work, importantly, including qualitative research that might provide insight into the mechanisms of value appropriation and value creation in strategic alliances, and simulation research that might provide optimizing hypothesis through agent based models to test in the field.

Fourth, this study contributes to the capabilities literature as it pertains to alliances by providing a first multilevel test of the effect of capabilities on the impact that alliances have on firms. Contrary to some of the most recent results in this literature, this

dissertation shows that previous research may have confounded direct effects of firm or partner capabilities on alliance driven performance, because of their single level approach. In this study, partner capabilities do not seem to have a positive impact on the performance of alliances for firms, while they do have a direct impact in the performance of firm. Previous findings that had relied on a single level approach should then be re-examined in light of these findings. Future developments may want to take a more case based approach to the capabilities issue to understand if there is an issue of specificity of the resources to the alliance that is essential for performance. A case specific finding, though, would be seriously impaired for quantitative testing of the sort that I performed in this dissertation.

Finally, this study contributes to the methodological study of alliances by providing a multilevel approach to the study of alliance performance. For the purpose of analysis most networks data have been analyzed separately at different levels precluding theoretical developments across levels (Jones, Hesterly & Borgatti, 1997; Monge & Contractor, 2003). For example, some recent studies that have addressed the need to integrate RBV and network constructs to explain firm performance resulting from alliances (e.g., Ahuja, 2000; Bae & Gargiulo, 2004; Stuart, 2000; Zaheer & Bell, 2005) have done so by constructing network variables as firm level predictors (the density of a firm's network), therefore rendering themselves unable to explain the value of specific alliance choices. This single level approach accounts, in part, for the contradictions in some previous findings that these study may help resolve. In this study I offered a hierarchical cross-nested model (Raudenbush & Bryk, 2002; Van Duijin, 1995; Lazeaga & Van Duijin, 1997) as an improvement over previous approaches. This approach

allowed, for example, to understand how capabilities may have different meaning within the alliance than within the firm, and therefore qualified findings of previous research about the value of larger capabilities of partners for alliance success. I hope this demonstration of how hierarchical cross-nested linear methods may be used to investigate the effect of alliance specific factors within each level in the alliance (e.g., partner A, Partner B, and alliance effects) will guide future multilevel research in this area.

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