# BUILDING FIRM CAPABILITIES THROUGH LEARNING: THE ROLE OF THE ALLIANCE LEARNING PROCESS IN ALLIANCE CAPABILITY AND FIRM-LEVEL ALLIANCE SUCCESS

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*In recent years, academics and managers have been very interested in understanding how firms develop alliance capability and have greater alliance success. In this paper, we show that an alliance learning process that involves articulation, codification, sharing, and internalization of alliance management know-how is positively related to a firm's overall alliance success. Prior research has found that firms with a dedicated alliance function, which oversees and coordinates a firm's overall alliance activity, have greater alliance success. In this paper we suggest that such an alliance function is also positively related to a firm's alliance learning process, and that process partly mediates the relationship between the alliance function and alliance success observed in prior work. This implies that the alliance learning process acts as one of the main mechanisms through which the alliance function leads to greater alliance success. Our paper extends prior alliance research by taking a first step in opening up the 'black box' between the alliance function and a firm's alliance success. We use survey data from a large sample of U.S.-based firms and their alliances to test our theoretical arguments. Although we only examine the alliance learning process and its relationship with firm-level alliance success, we also make an important contribution to research on the knowledge-based view of the firm and dynamic capabilities of firms in general by conceptualizing this learning process and its key aspects, and by empirically validating its impact on performance.* Copyright © 2007 John Wiley & Sons, Ltd.

## INTRODUCTION

Organizations have substantially increased their use of alliances in recent years (Gulati, 1995; Zajac, 1998; Dyer and Singh, 1998; Doz and Hamel, 1998; Gulati, Nohria, and Zaheer, 2000; Das and Teng, 2000). Extant research has made two important observations in the context of this steady uptrend in alliance activity. On the one hand, most research shows that although alliances are increasing in popularity, they are difficult to manage, and that firms generally fail with roughly half the alliances they form (Bleeke and Ernst, 1993; Kogut, 1988; *Alliance Analyst*, 1996). On the other hand, recent work also shows that not all firms suffer from low alliance success rates; firms exhibit significant heterogeneity in terms of their overall alliance success, and some firms are much more successful at managing alliances or creating value from them (Anand and Khanna, 2000; Kale, Dyer, and Singh, 2002) than other firms. Firms such as Corning, Hewlett-Packard, or Eli Lilly are examples of firms that belong to the former category (*Alliance Analyst*, 1996; Sims, Harrison, and Gueth, 2001). Firms with greater alliance success are presumed to have alliance capability.

In light of the growing prevalence of alliances and the generally low success that firms usually achieve with them, a firm can enjoy a significant competitive advantage over its peers or rivals if it can achieve greater overall alliance success (Dyer and Singh, 1998; Gulati, 1999). Hence, academics and managers have become extremely interested in understanding factors that explain how firms have alliance capability and greater alliance success. Earlier work on this topic suggested that having greater alliance experience helped firms develop alliance capability and have greater overall alliance success (Lyles, 1988; Simonin, 1997; Anand and Khanna, 2000). But later work showed that having a dedicated function to oversee and coordinate a firm's overall alliance activity perhaps plays a far more important role in explaining firms' overall alliance success (Kale *et al.*, 2002). Other research and case-based studies (*Alliance Analyst*, 1996; Doz and Hamel, 1998; Dyer, Kale, and Singh, 2001; Sims *et al.*, 2001; Draulans, deMan, and Volberda, 2003; Bamford, Gomes-Casseres, and Robinson, 2002) also have demonstrated that firms with a dedicated alliance function enjoy greater alliance success. This work highlighting the importance of structural aspects as the alliance function in explaining alliance capability and success is certainly important. But researchers (Gulati, 1999, Kale *et al.*, 2002; Hoang and Rothaermel, 2005) have suggested that we need to extend it further by understanding other factors that may also play an important role in this regard. Do firms that are more successful with their alliances also follow other processes or practices that lead to greater alliance success? If yes, what is the relationship between these processes and the dedicated alliance function, which is seen to have a direct impact on a firm's overall alliance success? This paper adopts a 'learning or a knowledge-based perspective' to address these unanswered questions.

Prior strategy research tells us that firms can develop skills to successfully manage any given task by following deliberate, firm-level processes to learn and accumulate knowledge relevant to managing that task (Grant, 1996). The resource-based view of the firm (Barney, 1991; Dierickx and Cool, 1989), evolutionary economics (Nelson and Winter, 1982), research on dynamic capabilities (Teece, Pisano, and Shuen, 1997; Zollo and Winter, 2002; Eisenhardt and Martin, 2000; Helfat, 2007), organizational learning theory (Huber, 1991), and work on the knowledge-based view of the firm (Nonaka, 1994; Grant, 1996) offer useful insights into what some of these processes may be. We build on this literature to develop the notion of 'alliance learning process,' which is a process that involves articulation, codification, sharing, and internalization of alliance management know-how. This process is directed toward learning, accumulating, and leveraging alliance management know-how to develop a firm's alliance management skills. Hence, the more developed a firm's alliance learning process, the greater its overall alliance success. We also suggest that the alliance function is positively related to the alliance learning process in firms, and that the process acts as an important mechanism through which the alliance function influences a firm's overall alliance success. In other words, the alliance learning process partly mediates the direct, positive relationship between alliance function and alliance success observed in prior research (Kale *et al.*, 2002). We use large sample survey and archival data to test our arguments.

Our research contributes to extant alliance and strategy research in important ways. We contribute to the alliance literature by conceptualizing and testing the importance of the alliance learning process in firms and examining how it might lead to greater alliance success; we also show how this learning process partially mediates the impact of other factors, namely the alliance function, in influencing a firm's overall alliance performance. In doing so, we open up the 'black box' between the alliance function and overall alliance success in firms (Gulati, 1999; Mitchell, 1999; Kale *et al.*, 2002). We also contribute to the strategy literature on dynamic capabilities in general. Dynamic capability refers to the capacity of an organization to purposefully create, extend, or modify its resources or skills (Helfat, 2007). The alliance learning process that we conceptualize and empirically test in this paper is akin to a higher-order dynamic capability that is relevant in the context of alliances. This is because it enables firms to achieve greater alliance success by helping them develop or improve their lower-order partnering skills to manage different phases or aspects in alliances more successfully. Finally, by conceptualizing the alliance learning process as one that involves articulation, codification, sharing, and internalization of (alliance management) knowledge, and testing its relevance and importance in firms, we also make an empirical contribution to

the theoretical literature on the knowledge-based view of the firm.

The rest of the paper is organized as follows. In next section, 'Theory and hypotheses,' we first briefly review prior research that has examined factors influencing overall firm-level alliance success. We then conceptualize the notion of alliance learning process in firms and develop hypotheses regarding its relationship with a firm's overall alliance success. We also discuss the relationship between the alliance process and the alliance function, and how it explains overall firm-level alliance success. In the following sections we provide information about the data used to test our hypotheses, and present their analyses. We elaborate on our results in the 'Discussion' section, and we review the limitations and contribution of this work in 'Future research.'

## THEORY AND HYPOTHESES

Academic research that investigates how firms have greater alliance success and alliance capability is fairly recent. Some of the earlier work in this area (Simonin, 1997; Barkema *et al*., 1997; Anand and Khanna, 2000) suggested that firms with greater alliance experience had higher alliance success. They also observed significant fixed firm effects in explaining firms' alliance success; they interpreted them as a measure of firms' alliance capability (Anand and Khanna, 2000: 311) and emphasized the need for future research to explore the organizational determinants of such a capability. Kale *et al*. (2002) investigated this aspect and found that having a dedicated alliance function, which was responsible for overseeing and coordinating a firm's alliance activity, was positively linked to greater alliance success. In other words, they showed that one way of having alliance capability and greater alliance success was to create a dedicated alliance function (Kale *et al*., 2002: 765). This research along with other work (Draulans *et al*., 2003; Gueth, 2001) complemented case-based studies (*Alliance Analyst*, 1996; Harbison and Pekar, 1998; Sull, 2001), which also were done at that time to understand the role of the alliance function in explaining alliance capability and a firm's overall alliance success. An alliance function is essentially a structural mechanism, in the form of a separate organizational unit or team of managers, responsible for managing and coordinating a firm's alliance activity, that

provides several benefits to firms (Dyer, Kale and Singh, 2001). First, it facilitates strategic and operational coordination between the firm's numerous alliances. Second, it becomes a focal point for attracting, screening, and identifying appropriate alliance opportunities. Third, it guides individual business units on a variety of alliance-related issues such as searching and selecting appropriate partners, drafting legal agreements, etc. (Mitchell, 1999; Reuer, 1999). Fourth, it can serve as a focal point for initiating organization-wide efforts to learn and accumulate alliance management lessons and best practices within a firm. Collectively, these actions not only enable better integration across all alliances in a firm, but also help improve its alliance management skills. Hewlett-Packard, Oracle, Siebel, Citibank, and Eli Lilly are some of the companies that have created an alliance function and achieved greater alliance success (Kale, Dyer and Singh, 2001; *Alliance Analyst*, 1996; Sull, 2001).

The above-mentioned research on the alliance function has played an important role in explaining a firm's alliance capability and greater overall alliance success. But in doing so, it has mainly paid attention to some of the structural aspects of alliance capability, and perhaps relatively less attention to the organizational processes that may be involved in this endeavor. Hence, in this paper we attempt to do that, and believe we can understand the nature of these processes by turning to strategy literature that has emphasized the relevance of learning and knowledge accumulation processes within firms to explain firm capabilities (Conner and Prahalad, 1996; Grant, 1996). This literature includes research on the 'knowledge-based view of the firm' (Kogut and Zander, 1992; Nonaka, 1994; Grant, 1996), organizational learning (Argyris and Schon, 1978; Huber, 1991), and 'dynamic capabilities' (Teece *et al*., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002; Winter, 2003).

In proposing the 'knowledge-based view of the firm,' Grant (1996) argues that organizations get better at managing any given task (i.e., they develop capabilities to undertake that task) by accumulating and applying knowledge (Collis, 1996) relevant to the execution of that task; firms learn and accumulate such knowledge by making deliberate associations between past actions, the effectiveness of those actions, and future actions (Fiol and Lyles, 1985). In their work on dynamic

capabilities, Zollo and Winter (2002) propose that deliberate learning efforts to articulate and codify collective knowledge relevant to undertake complex organizational tasks act as a basis for improving a firm's skills to manage those tasks more effectively. In other words, these learning and knowledge accumulation processes reflect a higher-order dynamic capability through which a firm systematically generates and modifies its operating routines or skills in pursuit of improved effectiveness with the task at hand. According to Zollo and Winter (2002) such learning processes may be especially important in the context of building skills to manage tasks or activities that occur repetitively.

We use these ideas to conceptualize the notion of an 'alliance learning process' in firms. In this process, firms undertake deliberate efforts to learn, accumulate, and leverage alliance management know-how. By doing this, firms are able to develop or improve their first-order partnering skills and thereby achieve better alliance performance. These partnering skills are routines or practices to better manage different phases in the life cycle of any alliance they engage in, i.e., alliance formation and partner selection, alliance negotiation, formulation of alliance design, post-formation alliance management, etc. In this manner, the alliance learning process can help firms develop alliance capability and have greater alliance success. Next, we describe the various aspects of the alliance learning process and explain how it relates to greater alliance success in firms.

## The alliance learning process and alliance success

We see the alliance learning process as a process that is directed toward helping a firm (and its managers) learn, accumulate, and leverage alliance management know-how and best practices. We draw motivation from prior research on dynamic capabilities (Zollo and Winter, 2002) and the knowledge-based view of the firm (Grant, 1996; Nonaka, 1994) to suggest that such a process involves deliberate efforts to articulate, codify, share, and internalize alliance management know-how in firms. In the following paragraphs we explain each of these aspects of the alliance process in greater detail and show how they might relate to a firm's overall alliance success.

### *Articulation of alliance know-how*

Individuals in firms are the repositories of know-how and skills related to managing critical tasks (Senge, 1997), including the task of managing alliances. Such knowledge is often 'tacit or personal' in nature (Polanyi, 1966; Badaracco, 1991). Nonetheless, companies can learn much if they can get individual managers to *externalize* their personally held, tacit knowledge. The efforts of accessing and externalizing individually held knowledge into explicit knowledge, to the extent that it is possible, is referred to as 'articulation.' Knowledge can be articulated in many different ways in firms, such as through spoken or written words, or through the use of metaphors, analogies, or models. Articulated knowledge is easy to access and store, and hence it facilitates learning (Nonaka, 1994; Winter, 1987).

In the context of managing alliances, articulation of alliance management knowledge possessed by individual managers can be extremely beneficial. First, it helps a firm create a record of its prior alliance history, which otherwise lapses over time due to personnel turnover. Second, the articulation process itself can facilitate *ex post* sense-making of actions and decisions in prior alliances as managers talk about or reflect on them. This helps a firm (and its managers) better understand the causal relationships that might exist between those actions and their associated outcomes (Zollo and Winter, 2002). Consequently, articulation can help managers identify both effective and suboptimal execution of particular tasks during alliance formation and management, and the practices associated with them. In our fieldwork, we have observed that companies follow numerous practices of articulating alliance management know-how. Some firms formally, and regularly, debrief their alliance managers. In other firms, managers prepare internal reports/presentations pertaining to their alliances. In yet others, managers keep a simple logbook of alliance-related events, decisions, actions, and outcomes. Collectively, these articulation activities facilitate the externalization of individually held alliance know-how and extraction of valuable lessons associated with same. Consequently, this aspect of the alliance learning process leads to more effective management of future or ongoing alliances, and thereby to greater alliance success.

## Codification of alliance know-how

Some scholars have suggested that companies can build their skills or expertise to manage any given task by codifying the task-related knowledge that exists within the firm and its managers (Zollo and Singh, 2004; Hansen, Nohria, and Tierney, 1999). Earlier researchers viewed codification as mere documentation of existing knowledge (Kogut and Zander, 1992; Nonaka, 1994) within firms. But Zollo and Winter (2002) go one step further and see it as a more proactive and deliberate effort that involves *creating and using* codified resources to guide action, based on critical analysis and abstraction of experience associated with a specific activity or task.

We conceptualize codification in the alliance learning process in a similar manner. Codification involves *creating and using knowledge objects or resources such as alliance guidelines, checklists, or manuals to assist action or decision making in future alliance situations*. We also see it as being distinct from the aspect of articulation described earlier. Articulation primarily emphasizes externalizing the content residing within individuals. Codification, on the other hand, focuses on providing the content (*know-what*), the methodology (*know-how*), and even the rationale (*know-why*) for executing and managing various alliance-related tasks. Its 'people-to-documents' approach emphasizes 'reuse economics,' by which a firm reuses the alliance management knowledge that exists within the firm itself, or that resides with firms or people outside the firm (Hansen *et al.*, 1999), to manage future alliances. Although the principal benefits of codification arise from the use of the codified alliance management manuals or tools, it also potentially provides more subtle benefits to managers in a firm. By involving themselves in the effort to codify alliance management knowledge, managers emerge with a crisper understanding of what works, or what does not work and why, in the context of managing certain tasks in alliances. Hence codification not only helps firms replicate and transfer alliance best practices, but also identify or select what those best practices are. In our fieldwork, we observed firms adopt several practices of codifying alliance management know-how. One company has created '35 rules of thumb' for managing alliances. Another company has developed an in-house 'power of partnerships' program that provides its managers with detailed guidelines

and frameworks for managing alliances. Hewlett-Packard has developed '40 decision-making templates' to help managers understand and manage key activities at every stage of the life cycle of any alliances (Harbison and Pekar, 1998; Dyer *et al.*, 2001). Eli Lilly, which is considered a 'premier partner' in the pharmaceutical industry, also has developed several such codified tools and templates to improve its managers' partnering skills (Draulans *et al.*, 2003). Overall, such codification is expected to enhance a firm's decision making and actions in its alliances, and consequently lead to greater alliance success over time.

## Sharing of alliance know-how

According to the knowledge-based view of the firm, the development of organizational skills to manage any particular task also rests upon a firm's ability to share knowledge associated with managing or executing that task with all relevant parts within the organization (Grant, 1996). This is not only true for knowledge that is articulated and codified, but also for 'tacit' knowledge that is less amenable to easy articulation or codification (Winter, 1987).

Knowledge sharing plays an important role in this regard. In the context of the alliance learning process, *knowledge sharing involves exchanging and disseminating individually and organizationally held alliance management knowledge, which is both tacit and/or codified, through interpersonal interaction within the organization.* 'Communities of personal interaction' are a central element of such knowledge sharing within firms (Seely Brown and Duguid, 1991; March, Sproull, and Tamuz, 1991). They provide a means for regularly and systematically sharing alliance management knowledge that has already been articulated or codified by the firm. More important, however, they provide a forum to share individually held tacit knowledge through direct person-to-person interaction between managers since tacit knowledge is more easily shared through dialogue between individuals than through knowledge objects (Hansen *et al.*, 1999). Third, they also play a role in helping managers better conceptualize the alliance knowledge that is being shared or disseminated throughout the firm. Dialogue in the form of face-to-face communication between managers provides them an opportunity to test their hypotheses and assumptions regarding best practices to carry out

alliance-related tasks at hand; consequently it creates a platform for constructing a better, shared understanding of the data and know-how being shared. Also, the redundancy or overlap of information that exists in such sharing processes also helps managers get a better sense of the alliance knowledge that is being shared (Glynn, Lant, and Milliken, 1994). Hence such knowledge-sharing aspects of the alliance learning process play a critical role in the context of learning and accumulating alliance know-how within firms.

In our fieldwork we observed companies using several practices of alliance knowledge sharing. They ranged from using informal mechanisms, such as casual conversations and discussions between alliance managers, to having formal mechanisms such as alliance committees and task forces that meet periodically to review and exchange alliance management experiences and best practices. Some firms also rotate experienced alliance managers across different alliances within their company so that the 'tacit' alliance wisdom of these veterans is shared through their interpersonal interaction with others who work with them. One manager we interviewed said:

> We learned the importance of connecting people who had the expertise and knowledge of handling alliances with managers who required it.

Hence, overall we suggest that the knowledge-sharing aspect of the alliance learning process helps firms build their alliancing skills and thereby manage alliances more successfully.

### Internalization of alliance know-how

Finally, for firms to enjoy repeated success with given tasks, it is important that persons responsible for managing those tasks individually possess the relevant know-how of managing them. Individuals can possess this know-how in the form of personal skills, heuristics, or mental models. Nonaka (1994) has suggested that knowledge internalization, which involves efforts to facilitate absorption of accumulated organizational level know-how by individuals, plays an important role in achieving this. In contrast to knowledge sharing, which focuses more on dissemination of know-how between its source and its receiver, internalization places more emphasis on the absorption of relevant knowledge by individual receivers. The internalization process stresses 'learning how,'

wherein the recipient individual focuses on acquiring a 'recipe' of 'how to do it' and not just why it works. Internalization also enhances the absorptive capacity (Cohen and Levinthal, 1990) of individuals with respect to the task at hand—in this case, the knowledge of managing alliances. By virtue of internalizing existing alliance management knowledge and best practices, managers possess a knowledge base that consequently helps them better absorb any new know-how underlying relevant skills to better manage alliances in the future. Generally, training programs and mentoring are important internalization mechanisms that firms traditionally use (Davenport and Prusak, 1998) to help individuals to absorb specific lessons and best practices.

In the case of alliances, our fieldwork showed that the alliance learning process in companies includes a variety of practices to help managers internalize alliance management know-how. For example, some companies use 'in-house' or 'external' alliance training programs to help their managers learn and absorb relevant alliance know-how and best practices (Harbinson and Pekar, 1998; Draulans *et al.*, 2003). Alliance training programs help managers acquire some basic know-how on alliance management. This knowledge base then provides them a foundation to identify or recognize new and valuable alliance management know-how or best practices that might exist within their own company or externally, assimilate it, and apply it in managing specific alliances they are involved with. One company we studied has also created alliance mentorships for this purpose. Reflecting the usefulness of this practice, one alliance manager we interviewed said:

> At first I was unsure about the usefulness of attending a training program on alliances. But having attended one, I gained a lot. Listening to some of the senior managers talk about our company's alliances made me aware of the specific challenges and pitfalls that we had encountered in our own alliances and how we had overcome them. I can certainly use this knowledge in managing my own alliances in the future.

Overall, knowledge internalization facilitates individuals' absorption of alliance management know-how and thereby helps them manage alliances more effectively.

To sum up the discussion thus far, we suggest that a firm's alliance learning process plays an

important role in explaining its overall alliance success. The alliance learning process is directed toward having alliance capability and greater alliance success by helping firms learn, accumulate, and leverage alliance management know-how. This process involves deliberate efforts to articulate, codify, share, and internalize alliance management know-how as described above. Conceptually, each of these aspects of the alliance learning process is somewhat distinct in terms of the manner in which it facilitates learning and accumulation of alliance know-how. Articulation helps in externalizing individually held alliance management know-how of managers and making it more explicit. Codification helps in creating codified and usable tools, templates, or guidelines to help managers when undertaking specific alliance-related tasks. Sharing helps in disseminating alliance management know-how, both explicit and tacit, throughout the firm. Finally, internalization helps individual managers absorb or retain the alliance management knowledge derived internally from their own firm/colleagues or from external sources. At the same time, each of these aspects is uniformly centered around the learning and accumulation of alliance management knowledge within the firm. In other words, they represent an important facet of the alliance learning process that commonly underlies all of them.

Based on the arguments made in this section, we feel that a firm's alliance learning process that involves articulation, codification, sharing, and internalization of alliance management know-how plays an important role in explaining a firm's overall alliance success. Firms that have a stronger alliance learning process will enjoy greater alliance success. This implies that firms that have higher alliance success, and hence alliance capability, do so by having a stronger alliance learning process in place. Therefore:

> *Hypothesis 1: A firm's alliance learning process is positively linked to its overall alliance success.*

## The alliance learning process and the alliance function

Thus far we have highlighted how the alliance learning process that involves articulation, codification, sharing, and internalization of alliance management know-how is positively linked to greater

alliance success. Understanding the direct relationship between the alliance learning process and overall alliance success is certainly important. We feel, however, that the alliance learning process also provides a means for partially explaining the direct positive relationship between the alliance function and overall alliance success. That is, the alliance learning process potentially represents one mechanism through which the alliance function influences a firm's overall alliance success.

As we noted earlier, prior alliance research shows that firms with an alliance function achieve greater overall alliance success because of the several benefits the function provides. Per this research, one of the main benefits of the alliance function is to act as a focal point for initiating or coordinating the learning and accumulation of alliance management know-how within a firm (Kale *et al.*, 2002; Draulans *et al.*, 2003); firms can learn this knowledge from sources within or outside the firm. Although earlier research has briefly highlighted this important point, it does not provide a detailed theoretical explanation of how the learning actually might occur within firms, and how that might lead to greater alliance success. Our conceptualization of the alliance learning process in firms, and how it leads to greater alliance success, offers that account.

The theoretical account of the alliance learning process suggests that establishing and implementing the alliance learning process within firms can be a fairly complex task. Given the complexity of this task, it seems very likely that firms would be better served by having an entity that is clearly responsible and capable of initiating and coordinating this organization-wide activity on a regular basis. The alliance function, which is a dedicated structural entity explicitly responsible for managing and coordinating firm-wide alliance-related initiatives and activities, seems clearly best positioned to lead and manage this important task in firms. By doing so, the function becomes the focal point for initiating and managing the learning and accumulation of alliance management know-how within firms. Given the critical role of the alliance function in coordinating this important task, it seems firms that have a dedicated alliance function are likely to have a stronger alliance learning process in place; that learning process, in turn, leads to greater alliance success. On the other hand, firms that lack such a function may exhibit relatively poor or lesser developed processes to

learn and accumulate alliance management know-how, and hence enjoy relatively lower success with alliances. This implies that firms with alliance capability enjoy greater alliance success not only because of having a dedicated alliance function to coordinate their overall alliance activity (as prior research showed), but also because the function enables them to have a stronger alliance learning process to improve their partnering skills by articulating, codifying, sharing, and internalizing relevant alliance management know-how and best practices within the company.

Our fieldwork with companies such as Hewlett-Packard, Pfizer Warner-Lambert, and Oracle supports this view. Many of the firms we studied created a dedicated alliance function to manage their alliance activity. This function, as part of its core responsibilities, led the implementation and institutionalization of their firm's alliance learning process to articulate, codify, share, or internalize alliance management know-how and best practices in these firms. Consequently, this learning process enabled these firms to achieve greater overall alliance success by helping their managers acquire or improve their alliance management skills. This suggests that the alliance function is positively linked to the alliance learning process that, in turn, influences a firm's overall alliance success. Thus:

*Hypothesis 2a: The alliance function is positively linked to a firm's alliance learning process.*

*Hypothesis 2b: The alliance learning process partially mediates the relationship between the alliance function and a firm's overall alliance success.*

Prior alliance research has shown that firms that enjoy greater alliance success do so by having a dedicated alliance function to develop their alliance capability. In this paper, we extend that work by proposing the following theoretical arguments. According to the learning and knowledge-based view of the firm (Grant, 1996), a firm can develop its abilities to successfully manage any given activity or task, by learning or accumulating the knowledge or the know-how relevant to managing that task. In the context of alliances, this means that firms that have a strong alliance learning process to learn and accumulate alliance management know-how will have alliance capability

and hence greater overall alliance success. We further suggest that the alliance learning process acts as an important mechanism through which a dedicated alliance function influences a firm's alliance success. By doing so, we provide a partial explanation for the direct positive relationship between the alliance function and alliance success observed in prior alliance research. We present the data and analyses to test our hypotheses in the next section.

# RESEARCH DESIGN AND METHODOLOGY

First, we did a field study with several companies to understand the nature of the alliance learning process in firms. Based on the fieldwork and a thorough study of extant literature, we developed our theoretical arguments and model. This approach provided rich contextual detail, and enabled us to develop grounded specification of the framework and constructs that used the language of the phenomenon. We then collected large sample survey data to validate the theoretical constructs and test the proposed relationships.

## Sample selection

To select the sample, we first identified firms whose annual sales for 1998 were greater than $100 million; we selected these firms from industries where alliances are considered an important part of firm strategy.[1] We then identified appropriate respondents in each firm using two criteria: (a) a person's familiarity with his/her firm's alliances and alliance management practices; and (b) a person's ability to respond comprehensively to the survey questionnaire. Our fieldwork had shown that executives in firms' corporate development or planning departments, or those that belonged to its dedicated team to coordinate/manage alliances, if such a unit existed in the company, usually met these criteria.[2] They were the primary respondents for our study, but they also helped us in coordinating some of the other data collection in their respective companies. We

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[1] Prior research shows that firms in the computer, telecommunications, pharmaceutical, chemical and electronics industries fall within this category (Culpan and Kostelac, 1993; *Alliance Analyst*, 1996). Industry categories were defined using three-digit SIC codes.
[2] We identified such individuals through secondary databases such as Standard & Poor's digest on company executives and through mailings and telephone calls to the companies (*Standard & Poor's*, 1998).

were able to find the contact information for such respondents in 692 out of the 932 companies in our original set, and hence we mailed the survey to them. We received 175 complete responses (response rate 25%). We observed no significant differences with respect to annual sales, employee size, or alliance experience between companies that received the survey and those that did not. Similarly, we observed no differences between the respondent and nonrespondent groups. For the dependent variable, alliance success, managers in each firm evaluated every alliance their firm had formed from 1994 to 1998. Managers in our sample firms were able to provide these data, even though 16 percent of the alliances they had formed had ceased to exist when we collected the data. Exclusion of data on terminated alliances did not change our main results.[3]

## Operationalization of key variables

### Alliance learning process

According to our theory, the alliance learning process involves articulation, codification, sharing, and internalization of alliance management know-how. We used survey-based, multi-item scales to measure each of these aspects of the alliance learning process. In such scales, individual item idiosyncrasies cancel one another, making the measures more reliable (Nunnally, 1978; Marsden, 1990). Since we had little empirical precedent in developing these measures, we selected the scale items through fieldwork and through a study of relevant academic literature. We also pretested the survey instrument with 30 executives and modified items as necessary (refer to Appendix 1A for details.) For each firm in our sample, we calculated the score for each individual aspect of the alliance learning process by taking a mean of the scores it achieved on the different items representing that particular aspect. We then aggregated these mean scores across the four different aspects to get an overall score for that firm's alliance learning process.

### Overall, firm-level alliance success

In this study, we are interested in a firm's success across its entire portfolio or set of alliances over a given time period, rather than the performance of any single alliance.[4] To develop this measure, we first assessed the performance of every alliance belonging to each firm in our sample.[5] We then aggregated these assessments for each firm to create an overall, firm-level measure of alliance success or performance for that firm in the sample.

Over time, alliance researchers have agreed that using managerial assessments to measure alliance performance may be one of the most useful ways to assess alliance success, especially in large sample settings, regardless of some of the limitations of this approach. Such a measure has two advantages. First, it provides a consistent or uniform way to measure performance across a large sample of alliances (Gulati, 1999). Second, the use of this measure has gained acceptance in alliance research after Geringer and Hebert (1991) demonstrated a positive correlation between alliance performance assessments based on this measure, with assessments based on other objective measures that use accounting or financial data. Researchers have measured alliance performance by seeking managers' assessments on a number of different dimensions, such as the extent to which an alliance has achieved its overall objectives, the extent of a parent's satisfaction with the alliance (Killing, 1983; Beamish, 1985; Lyles and Baird, 1994; Mohr and Spekman, 1994; Saxton, 1997;

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[3] The 175 companies in our sample evaluated the 3647 alliances they formed during 1994–98. The industry-wide breakup of firms was as follows: computer (34%), pharmaceutical (20%), chemical (16%), electronics (16%), and communications (14%). Sixteen percent of the alliances assessed were terminated as of the end of 1997, and 37 percent of these were rated as 'successful.'

[4] Our independent variable measures, especially those for learning processes, are also at the firm level and not at the level of each alliance. For this reason, we need an overall firm-level measure of alliance performance.

[5] Measuring alliance performance, even at the level of an individual alliance, has traditionally been subject to considerable debate regarding the appropriate yardsticks to be used, due to the obstacles of assessing performance in a consistent manner across a large sample of alliances (Gulati, 1999). Some early researchers used alliance survival as a measure of performance (Harrigan, 1988). But this measure fails to distinguish between alliances that fail and therefore die and those that accomplish their objectives and thus are terminated (Kogut, 1988). Scholars have also used other objective measures, including accounting measures such as ROI, sales growth, etc. (Kurokawa, 1994; Hagedoorn and Schakenraad, 1994) or financial measures like abnormal stock gains (Koh and Venkatraman, 1991; Anand and Khanna, 2000). Others, however, have argued that these measures too may fail to adequately reflect the extent to which an alliance has achieved its aims (Geringer and Hebert, 1991). Recently, therefore, many alliance researchers have reached a consensus that using managerial assessments to evaluate alliance performance might be a useful approach, especially since studies reveal that such a measure correlates well with other measures of performance.

Child and Yan, 1999), the extent to which the alliance has contributed to the competitive advantage and core competency of the parent firms (Saxton, 1997), and the level of trust and/or harmony between alliance partners (Anderson, 1990; Das and Teng, 2000). However, given the multipurpose nature of alliances, Anderson (1990) suggested that instead of using single-item, managerial assessments of performance, it would be more useful to have a multidimensional scale for performance that included several of these dimensions in it.

Therefore, we developed a multidimensional scale to measure alliance performance using managerial assessments. Performance dimensions were selected on the basis of prior research (see Appendix 1B). A manager who was most closely associated with each specific alliance provided the assessment for that alliance. To avoid common response bias, we ensured that these individuals were different from the primary respondents who provided ratings on the measures for independent variables representing their firms' alliance learning process. Respondents used a simple seven-point Likert scale to give their performance assessments.

For each firm, we first used the multidimensional scale to evaluate the performance of every alliance it had formed during 1994–98. We then used these alliance-level evaluations for that firm to create two measures of its overall, firm-level alliance success. One: we calculated an 'alliance success rate' for each firm by using the following methodology. We first identified each alliance that scored four or more (above-average performance) on any three of the four performance dimensions as 'successful or satisfactory.' We then aggregated these data to calculate an 'alliance success rate' for each firm; it is basically a ratio of a firm's successful or satisfactory alliances to all its alliances during the given time period.[6] (For example, if six out of ten alliances of Company A were identified as 'successful' using the above methodology, its success rate was 60% or 0.60). Two: for each alliance of a firm we also aggregated the performance scores across different dimensions and then took a simple average of these alliance-level scores

across that firm's entire set of alliances to create a firm-level measure of average, alliance performance (we termed this measure AVGPER). The two measures of overall, firm-level alliance success or performance correlate strongly. We also conducted some sensitivity analysis by replicating the analysis with the performance variable calculated in several other ways, but the results did not change substantially.[7]

## Other variables

### Alliance function

Prior research has shown that having a dedicated alliance function to manage alliances is positively linked to a firm's overall alliance success. We first used a dummy variable to measure this variable. Firms that had an alliance function were coded as '1' and others were coded as '0.' We also measured this variable using a seven-point scale to assess the extent to which a firm's overall alliance activity was coordinated by a dedicated function or a team (1 = Very Low and 7 = Very High).

### Alliance experience

Prior research has suggested that a firm's alliance experience has a positive relationship with its overall alliance success, because there is presumably an implicit flow of feedback from prior experience that enables either an improvement in a firm's existing alliance practices or development of new ones (Anand and Khanna, 2000). Recent work has also proposed and found a positive relationship between alliance experience and the alliance function. Hence, we controlled for the impact of this variable in our analyses. We measured a firm's cumulative alliance experience by taking a count of all its alliances formed during 1989–98. The Alliances database of the Securities Data Company (SDC, 1998) was the primary source for these data. We verified these data with the primary respondent in each company and made corrections wherever necessary.

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[6] Besides identifying successful alliances using the methodology described above, we had also asked each respondent to give his/her overall assessment (satisfactory/successful vs. unsatisfactory/unsuccessful) for each alliance based on the various performance dimensions. We found that their assessment usually correlated strongly (0.91) with our own categorization of success/failure for each alliance.

[7] For example, since not all alliances might necessarily involve 'learning opportunities,' we dropped the 'learning item' while assessing alliance and firm-level alliance performance. We also used just the first two dimensions of the performance scale to calculate our performance measures. Our results did not alter substantively when we used these alternate measures of firm-level alliance performance in our analyses.

## ANALYSES AND RESULTS

### Assessment of scale validity and reliability

Before testing the hypotheses, we assessed the validity and reliability of the survey scales used to measure the alliance learning process by following methodologies similar to that in prior research. We have conceptualized the alliance learning process as a process that involves articulation, codification, sharing, and internalization of alliance management know-how within a firm, and we have used survey-based, multi-item scales to measure each of these aspects. We selected individual scale items for each of these aspects on the basis of systematic literature review, fieldwork and pretesting of the survey instrument (refer to Appendix 1A for details of the scale items). This approach ensured *content validity* of the measurement scales. The significant loadings of individual survey items on their underlying factor established *convergent validity* of these scales (refer to Figure 1 for details). We assessed *scale reliability* by computing Cronbach alpha coefficients for each of the underlying factors. They were well above the acceptable threshold level of 0.70 (Nunnally, 1978).

As we explained earlier, each aspect of the alliance learning process is somewhat distinct in terms of how it facilitates the learning and leveraging of alliance management know-how within a firm, and leads to greater alliance success; at the same time, each aspect is commonly directed toward the learning and accumulation of alliance management know-how. Hence they are likely to be correlated with each other, and represent different facets of the alliance learning process that commonly underlies all of them. Thus, we used confirmatory factor analysis to estimate a second-order factor model that best represents these relationships. The four aspects of knowledge articulation, codification, sharing, and internalization represent four, first-order factors; and the alliance learning process represents the broader, second-order factor that commonly underlies all of them. Figure 1 provides an overview of the second-order, four-factor model.

Confirmatory factor analysis (Joreskog, 1969) showed that a second-order, four-factor model corresponding to Figure 1 provides the best fit ($\chi^2 = 143.1$ with $p > 0.05$, GFI = 0.948, AGFI = 0.912, and NFI = 0.957) relative to other models, namely, a null model that assumes no relationship between any of the scale items, a first order, one-factor model that assumes all survey items to be clubbed directly under just one factor/construct ($\chi^2 = 394.3$, GFI = 0.734, AGFI = 0.658 and NFI = 0.749), or a first-order, four-factor model where each of the items loads respectively on the respective factors of articulation, codification, sharing, and internalization as proposed, but there is no second-order, common factor such as the alliance learning process underlying all of them ($\chi^2 = 153.1$, GFI = 0.905, AGFI = 0.886 and NFI = 0.902). Further, in the second-order, four-factor model correlations between the first-order factors are significant ($p < 0.01$), and each of the first-order factors also shows a high factor loading on the second-order factor. Overall, these results confirm that the 'alliance learning process' is indeed a second-order, common factor that underlies the different aspects or factors of articulation, codification, sharing, and internalization that comprise it.[8]

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[8] We also compared the proposed second-order, four-factor model of the alliance learning process with other theoretically plausible models: a second-order, two-factor model where alliance learning process involves just two aspects—one aspect is Codification and the other aspect is a combination of Articulation, Sharing, and Internalization (Zollo and Winter, 2002), and another second-order, three-factor model where alliance learning process involves three aspects: Codification and Internalization are two of them and the third is a combination of Articulation
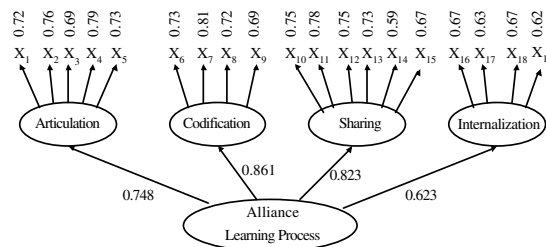


Figure 1. A second-order four-factor model: a confirmatory factory analysis

## Hypothesis testing

Table 1 provides the correlation matrix for the key variables. We observe that the alliance learning process and the alliance function are both positively and significantly correlated with a firm's overall alliance success. We also note the alliance function is significantly and positively correlated with the alliance learning process. We then used structural modeling to test our hypotheses since it enabled us to test all the proposed hypotheses at the same time by simultaneously estimating multiple, dependent relationships between the constructs of interest. In structural modeling, the measurement and structural sub-models are estimated simultaneously. The measurement model uses confirmatory factor analysis to assess the validity and reliability of the scales used to measure the constructs, whereas the structural model estimates the strength and direction of relationships between them (Anderson and Gerbing, 1988; Hair *et al.*, 1998).

The structural model that we tested is presented in Figure 2; we refer to it as the 'Proposed Model.'

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and Sharing (Nonaka, 1994). These models, however, exhibited an inferior fit.

Bold lines in the figure represent the main relationships proposed in this paper: (a) the direct relationship between the alliance learning process and alliance success proposed in Hypothesis 1; (b) the positive relationship between the alliance function and alliance learning process proposed in Hypothesis 2a; and (c) the mediating effect of the alliance learning process proposed in Hypothesis 2b. Dashed lines in the figure represent the relationships that we control for in our study since they have been observed in prior research. These include the direct relationship between the alliance function and alliance success (Kale *et al.*, 2002), as well as the relationship between alliance experience and the alliance function, and that between alliance experience and alliance success (Anand and Khanna, 2000; Kale *et al.*, 2002). Earlier in the paper, we reported the results of the measurement model used to confirm the validity and reliability of the scales used to measure the alliance learning process. Therefore, we do not report it again here. We only report results for overall model fit and structural parameters for the structural sub-model presented in Figure 2.

The dependent variable in our model is a firm's overall alliance success rate. Our analysis showed

Table 1.  Descriptive statistics and correlation matrix

|  |  | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Alliance learning process | 13.68 | 4.60 | 1.00 | | | | | | |
| 2 | Alliance function | 0.59 | 0.46 | *0.44* | 1.00 | | | | | |
| 3 | Alliance experience | 20.84 | 16.87 | 0.17 | *0.37* | 1.00 | | | | |
| 4 | Alliance success rate | 0.56 | 0.15 | *0.422* | 0.38 | 0.31 | 1.00 | | | |
| 5 | Avg. alliance performance | 17.06 | 4.19 | *0.438* | 0.39 | 0.35 | 0.72 | 1.00 | | |
| 6 | Firm size (sales in $ billion) | 4.84 | 7.05 | 0.074 | 0.18 | *0.21* | 0.102 | 0.132 | 1.00 | |
| 7 | Firm size (employees '000) | 18.26 | 26.15 | 0.085 | 0.17 | *0.22* | 0.065 | 0.082 | *0.834* | 1.00 |

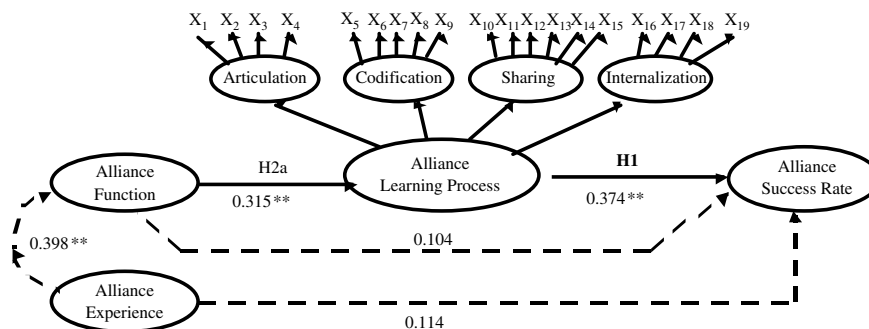Figures in italics are significant at the 0.05 level.



Figure 2.    Structural model. The bold lines represent the relationships proposed in this paper; the dashed lines represent relationships observed in prior research; ** $p < 0.05$

our proposed model fits the data very satisfactorily. Both the absolute and incremental fit indices are above the generally acceptable level of 0.90 ($\chi^2 = 191.05$, GFI $= 0.921$, AGFI $= 0.892$, and NFI $= 0.908$), and the chi-square is nonsignificant at $p > 0.01$. As far as the structural parameters are concerned, we observe the following: (a) the alliance learning process is positively and significantly related to firm-level alliance success; (b) the alliance function is also positively related to the alliance learning process; and (c) the alliance function does not have a very significant, direct relationship with firm-level alliance success when its relationship with success is mediated by the alliance learning process. Overall, the results provide support for Hypotheses 1, 2a and 2b.[9]

We also note some interesting relationships as far as alliance experience is concerned. Unlike prior research, we see that alliance experience ceases to have a significant, direct relationship with a firm's overall alliance success if we include the other variables that might influence alliance success in our model. We note, however, that alliance experience is positively and significantly linked to the alliance function; this result is consistent with that observed in prior research (Kale *et al.*, 2002). We discuss the implications of these results in the next section.[10]

To ensure the acceptability of the proposed theoretical model, we also compared it with several other models that may be theoretically possible (Gerbing and Anderson, 1988; Hair *et al.*, 1998). We briefly discuss those models and their results below.

### Baseline model (Model a)

This model includes only those variables that were deemed important to alliance success in prior alliance research, i.e., a model with only alliance experience and alliance function having a direct relationship with alliance success. The chi-square values and goodness-of-fit indices for this model indicate an inferior fit as compared to our proposed model (GFI $= 0.577$, AGFI $= 0.481$).

### Model b

This model includes all the relationships from 'Model a' described above, as well as an additional relationship between alliance experience and the alliance function that has been observed in some earlier work. However, this model exhibits an inferior fit as compared to our proposed model (GFI $= 0.643$, AGFI $= 0.571$).

### Model c

This model not only has all the relationships from 'Model b' described above, but also includes an additional relationship between the alliance learning process and alliance success, proposed in Hypothesis 1. In this model, however, we do not include the relationship between the alliance function and alliance learning process that we have proposed in Hypothesis 2a. Although the fit of this model improves considerably (GFI $= 0.881$, AGFI $= 0.848$) compared to 'Model b,' it is still inferior compared to our proposed model.

### Model d

This is a 'full' model that is similar to the one in Figure 2, but it also includes an additional direct path between alliance experience and alliance learning process. This direct relationship tests whether firms' alliance experience directly helps them have a stronger alliance learning process without having an alliance function in between. This model was less significant than our 'proposed model' and was also less parsimonious; the direct relationship between alliance experience and the alliance learning process was also not very significant.

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[9] Prior alliance research (Kale *et al.*, 2002) found that the alliance function has a very significant, direct relationship with a firm's overall alliance success ($p < 0.01$). But in our model we see that the direct relationship between the alliance function and alliance success ceases to be very significant ($p < 0.10$) if we also account for the mediating effect of the alliance learning process in between. We also tested for the mediating effects of the alliance learning process using tests based on OLS regressions, as suggested by Baron and Kenny (1986), and we found strong support for it.

[10] After controlling for the relationship between alliance experience and the alliance function, which has been studied in prior research, our figure implies that the alliance function probably mediates the relationship between alliance experience and the alliance learning process. However, one of the reviewers suggested that it might be useful to examine whether the alliance function moderates the relationship between alliance experience and the alliance learning process, instead of mediating it. We tested for such a moderating or interaction effect using structural modeling techniques as well as tests based on OLS regressions as suggested by Baron and Kenny (1986), and we did not find strong support for it. However, when we tested for the mediating effects of the alliance function using OLS regression as suggested by Baron and Kenny (1986), we found strong support for it. This suggests that the alliance function mediates the relationship between alliance experience and the alliance learning process.

Overall, we see that model fit improves considerably (reduction in chi-square and improvement in goodness-of-fit values) when we go from any of the above alternate models to our proposed model presented in Figure 2; this provides strong support for the theoretical relationships proposed in this paper. We noticed that model fit improves even more if we drop the nonsignificant direct relationships of alliance experience and the alliance function with alliance success, respectively, from the proposed model. We also replicated all the analyses using the alternate measure of firm-level alliance success, namely a firm's average alliance performance, and obtained similar results.

## DISCUSSION

Why do some firms have greater, overall alliance success than other firms? In this paper, we provide insight into this issue by investigating the role of some critical organizational learning processes that may play an important role in influencing a firm's overall alliance success. Our work builds upon, and extends, earlier alliance research that has examined factors explaining firms' alliance capability and overall alliance success.

We provide a theoretical account of the alliance learning processes that potentially explain firms' greater overall alliance success. Drawing on the literature on the 'knowledge-based view of the firm' (Nonaka, 1994; Grant, 1996) and 'dynamic capabilities' (Teece *et al.*, 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002), we suggest that the 'alliance learning process' is directed toward learning and accumulating alliance management know-how and best practices in firms. We conceptualize it as a process that involves articulation, codification, sharing, and internalization of alliance management know-how within firms. We describe how each of these aspects of the alliance learning process plays a very important role in helping a firm and its managers develop their alliance management know-how and/or improve their partnering skills. As a consequence, the alliance learning process has a positive and significant relationship with firms' overall alliance success. Our empirical analysis findings support this argument, implying that firms with a stronger alliance learning process to learn and accumulate alliance management know-how and practices have greater alliance success.

Prior research has indicated that a dedicated alliance function has a direct influence on firms' alliance capability and alliance success. However, in our paper we find that the alliance function is also positively linked to the alliance learning process that we have examined here. We further observe that including the relationship between the alliance function and the alliance learning process in a theoretical model that explains firms' alliance success reduces the direct influence of the alliance function on alliance success. Our arguments and findings suggest that the alliance learning process, which we conceptualize and describe in this paper, partially mediates the relationship between the alliance function and alliance success observed in prior research; in other words, the alliance learning process seems to act as one of the main mechanisms through which the alliance function influences a firm's alliance success. By uncovering this relationship, we extend prior research on this subject in important ways because we actually open the 'black box' between the alliance function and alliance success. Prior case studies (*Alliance Analyst*, 1996; Gueth, 2001; Sull, 2001) and academic research (Kale *et al.*, 2002; Draulans *et al.*, 2003) have suggested that the alliance function leads to greater alliance success because of the many benefits it provides, one of them being its potential to act as a focal point for learning and leveraging alliance management lessons and know-how to improve a firm's alliancing skills. Although prior research highlighted this point, it failed to provide a detailed account of how that learning or knowledge accumulation might occur in firms. By conceptualizing the alliance learning process and its different aspects, and by showing not only how this learning process has a direct impact on firms' alliance success but also how it mediates the relationship between the alliance function and alliance success, we address this important gap in the alliance literature.

In our analysis, we have also controlled for the influence of alliance experience on the key variables of interest. Earlier scholars had argued that greater alliance experience is directly linked to greater alliance success of firms (Lyles, 1988; Anand and Khanna, 2000). Subsequent work had also found that firms with greater alliance experience are more likely to have a dedicated alliance function, implying that the effects of alliance experience on firms' alliance success may occur through the choice of having such a function.

Studying the role of alliance experience on firms' overall alliance success was not the primary focus of this paper. However, we feel that it may be worthwhile to briefly discuss the results we observe in this paper after controlling for alliance experience in our model. In our analyses we see that alliance experience is positively and significantly linked to the alliance function, but it has no significant direct relationship with either alliance success or the alliance learning process when we also account for the other proposed relationships in this paper. We also find strong support for our hypotheses even after we account for the relationship between alliance experience and the alliance function; namely, we see that the alliance learning process is positively linked to alliance success, and it seems to mediate the relationship between the alliance function and a firm's overall alliance success. Taken together, these findings suggest some interesting relationships. It seems that firms with more alliance experience are likely to have a dedicated function to manage their alliances; in turn, the alliance function leads to greater alliance success through a strong alliance learning process that is directed toward learning and accumulating alliance management know-how and best practices in firms. This may suggest that alliance experience may not directly affect alliance success, as previously believed, but rather its effect occurs through the intervening factors of the alliance function and the alliance learning process respectively. Future research needs to investigate these relationships by undertaking in-depth case-based research to fully understand the interdependent nature of these relationships and how they evolve over time in firms.

Broadly speaking, this research also contributes to the knowledge-based view of the firm (Grant, 1996; Nonaka, 1994). A central theme of this research is that organizational processes to learn and leverage individually and organizationally held knowledge act as a basis for improving a firm's ability to manage a given task or activity more effectively (Conner and Prahalad, 1996; Grant, 1996; Eisenhardt and Martin, 2000). There is very little research, however, that tries to conceptualize and empirically analyze some of the specific organizational processes through which knowledge is accessed, learned, shared, or leveraged. By using firms and their alliances as a context, and by conceptualizing the alliance learning process that helps a firm have alliance capability and greater overall alliance success, we address this gap in the literature. We develop and validate the measure of the alliance learning process in firms that involves articulation, codification, sharing, and internalization of alliance management know-how, and we illustrate its importance in explaining differential alliance success. Therefore, by using alliances as a context, we empirically assess the existence and importance of some of the learning and knowledge accumulation processes outlined in the knowledge-based view of the firm (Nonaka, 1994; Grant, 1996). Our work also contributes to dynamic capabilities research (Teece *et al.*, 1997, Zollo and Winter, 2002; Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003). Dynamic capabilities are seen as 'higher-order capabilities that help a firm extend, modify, or improve its ordinary or operational capabilities that are relevant to managing any given task.' In the context of alliances, a firm's skills to manage different aspects of any alliance (Gulati, 1999) represent relevant operational skills necessary to manage alliances. But the alliance learning process seems like a higher-order dynamic ability that helps a firm learn, accumulate, and leverage alliance know-how so as to modify or improve its operational alliance management skills and achieve greater overall alliance success. Thus, we contribute to dynamic capabilities research by conceptualizing and validating the relevance of a potential dynamic capability in the context of alliances. We believe that a similar learning process may also be relevant in helping firms develop their operational skills to manage other important organizational tasks such as acquisitions, restructurings, etc (Zollo and Winter, 2002).

This research also contributes to a deeper understanding of the development of competitive advantage by earning relational rents (Dyer and Singh, 1998). From a relational perspective, interfirm knowledge sharing routines are argued to be one of the four major drivers of competitive advantage in individual alliances (along with having complementary capabilities, investing in relationship-specific assets, and choosing appropriate governance mechanisms). Interfirm knowledge sharing routines are important to establish a repeatable process for engagement across organizations. In this paper, by studying the alliance learning process in firms, we focus on some of the intrafirm knowledge processes or routines that involve codification and sharing of alliance management know-how. Using Helfat's definition of capabilities (Helfat,

2007), relational capability can be viewed as the capacity of the organization to create, extend, or modify a firm's resource base, augmented to include preferred access to the resources of its alliance partners. In the context of any specific alliance, a firm's relational capability would get reflected in its ability to implement the four drivers of competitive advantage mentioned above. But the creation of such relational capability in a firm would envision a purposeful process that is more likely to succeed if particular structural and process decisions within the firm are made on the lines we have suggested in this paper, and if there is support for creation of such capabilities at the senior management level.

The managerial implications of 'opening the black box' between the alliance function and overall alliance success are obviously important. Companies that desire to have alliance capabilities and greater overall alliance success certainly need to have a dedicated alliance function to manage their alliances. But, more important, they also need to have a strong alliance learning process to articulate, codify, share, and internalize alliance management know-how since it has a direct impact on firms' alliance capability and overall alliance success, and it acts as one of the main mechanisms through which the alliance function leads to greater alliance success.

## FUTURE RESEARCH

This research, like any other, has some limitations that future work can address. First, in this paper we suggest that a firm's alliance learning process leads to greater overall alliance success by presumably improving its first-order alliance management skills. But we do not directly measure a firm's alliance management skills (i.e., skills required to manage any particular aspect of the alliance life cycle). It would have been very difficult and time consuming to get these data for the large number of firms in our sample. In the future, however, scholars could attempt to do that either through case-based research or by collecting detailed data on these practices for a small subset of firms and their alliances. Second, it would be useful to examine whether the alliance learning process has any adverse or declining effects in firms. Given the high levels of investments that may be involved in having a strong alliance learning process, would the costs of this endeavor outweigh the benefits

at any stage? Our preliminary analysis showed that the square term of alliance learning process has a negative, but insignificant relationship with a firm's overall alliance success. Third, there are some limitations in how we have measured alliance success in firms. In this paper we have used managerial assessments on a multidimensional scale to measure alliance performance, and we have aggregated these scores to get an overall firm-level measure of alliance success. Future work could conceptualize alliance success at the firm level in different ways, such as using measures based on financial or accounting data, and replicate our research to examine the robustness of our measures and findings.

## CONCLUSION

This paper makes several contributions to alliance and strategy research. It contributes to alliance research by showing how the alliance learning process that involves articulation, codification, sharing, and internalization of alliance management know-how leads to greater, overall alliance success of firms. It also suggests that the alliance learning process may, in fact, mediate the impact of the alliance function on firms' alliance success. That is, the alliance learning process acts as one of the main mechanisms through which the alliance function leads to alliance success. Earlier research (Kale *et al.*, 2002) opened up the 'black box' between alliance experience and alliance success by highlighting the role of the alliance function in explaining alliance capability and alliance success. In this paper, by conceptualizing the alliance learning process and its effect on a firm's alliance success, we carry that work forward by further opening up the 'black box' between the alliance function and alliance success. Finally, by using a knowledge-based approach to conceptualize the alliance learning process, and by empirically validating and testing its impact on firms' alliance performance, this research also contributes to literature on the knowledge-based view of the firm and dynamic capabilities in general.

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## REFERENCES

*Alliance Analyst*. 1996. Managing alliances: skills for the modern era. March.

Anand B, Khanna T. 2000. Do firms learn to create value? The case of alliances. *Strategic Management Journal* **21**(3): 295–316.

Anderson E. 1990. Two firms, one frontier: on assessing joint venture performance. *Sloan Management Review* **31**(2): 19–30.

Anderson J, Gerbing D. 1988. Structural equation modeling in practice: a review and recommended two-step approach. *Psychological Bulletin* **103**(3): 411–423.

Argyris C, Schon D. 1978. *Organizational Learning*. Addison-Wesley: Reading, MA.

Badaracco JL. 1991. *The Knowledge Link: How Firms Compete through Strategic Alliances*. Harvard Business School Press: Boston, MA.

Bamford J, Gomes-Casseres B, Robinson M. 2002. *Mastering Alliance Strategy: A Comprehensive Guide to Design, Management, and Organization*. Jossey-Bass: San Francisco, CA.

Barkema HG, Sheker O, Vermeulen F, Bell JH. 1997. Working abroad, working with others: how firms learn to operate international joint ventures. *Academy of Management Journal* **40**(2): 426–442.

Barney J. 1991. Firm resources and sustained competitive advantage. *Journal of Management* **17**(1): 99–120.

Baron RM, Kenny DA. 1986. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51**(6): 1173–1182.

Beamish PW. 1985. *Joint Venture Performance in Developing Countries*. University of Western Ontario: London, Canada.

Bleeke J, Ernst D (eds). 1993. *Collaborating to Compete: Using Strategic Alliances and Acquisitions in the Global Marketplace*. Wiley: New York.

Child J, Yan Y. 1999. Predicting the performance of international alliances: an investigation in China. Working paper, Chinese Management Centre, University of Hong Kong.

Cohen W, Levinthal D. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* **35**(1): 128–152.

Collis D. 1996. Organizational capability as a source of profit. In *Organizational Learning and Competitive Advantage*, Moingeon B, Edmondson A (eds). Sage: London; 139–163.

Conner KR, Prahalad CK. 1996. A resource-based theory of the firm: knowledge versus opportunism. *Organization Science* **7**(5): 477–501.

Culpan R, Kostelac EA Jr. 1993. Cross-national corporate partnerships: trends in alliance formation. In *Multinational Strategic Alliances*, Culpen R (ed). Haworth Press: Binghamton, NY; 103–122.

Das TK, Teng B. 2000. Instabilities of strategic alliances: an internal tensions perspective. *Organization Science* **11**(1): 77–101.

Davenport T, Prusak L. 1998. *Working Knowledge: How Organizations Manage What They Know*. Harvard Business School Press: Boston, MA.

Dierickx I, Cool K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science* **35**(12): 1504–1511.

Doz Y, Hamel G. 1998. *Alliance Advantage: The Act of Creating Value through Partnering*. Harvard Business School Press: Boston, MA.

Draulans J, deMan A-P, Volberda HW. 2003. Building alliance capability: management techniques for superior alliance performance. *Long Range Planning* **36**(2): 151–166.

Dyer J, Singh H. 1998. The relational view: cooperative strategy and sources of international competitive advantage. *Academy of Management Review* **23**(4): 660–679.

Dyer J, Kale P, Singh H. 2001. How to make strategic alliances work. *Sloan Management Review* **42**(4): 37–43.

Eisenhardt K, Martin J. 2000. Dynamic capabilities: what are they? *Strategic Management Journal*, Special Issue **21**(10–11): 1105–1121.

Fiol CM, Lyles MA. 1985. Organizational learning. *Academy of Management Review* **10**(4): 803–813.

Gerbing DW, Anderson JC. 1988. An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research* **25**(2): 186–192.

Geringer JM, Hebert L. 1991. Measuring performance of international joint ventures. *Journal of International Business Studies* **22**(2): 249–263.

Glynn M, Lant T, Milliken F. 1994. Mapping learning processes in organizations. In *Advances in Managerial Cognition and Organizational Information Processing*, Vol. 5, Stubbert C, Meindl JR, Porac JFA (eds). JAI Press: Oxford, UK; 43–83.

Grant RM. 1996. Toward a knowledge-based theory of the firm. *Strategic Management Journal*, Winter Special Issue **17**: 109–122.

Gueth A. 2001. Entering into an alliance with big pharma: benchmarks for drug delivery contract service providers. *Pharmaceutical Technology* **25**(10): 132–135.

Gulati R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal* **38**(1): 85–112.

Gulati R. 1999. Network location and learning: the influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal* **20**(5): 397–420.

Gulati R, Nohria N, Zaheer A. 2000. Strategic networks. *Strategic Management Journal* **21**(3): 203–215.

Hagedoorn J, Schakenraad J. 1994. The effect of strategic technology alliances on company performance. *Strategic Management Journal* **15**(4): 291–309.

Hair J, Anderson R, Tatham R, Black W. 1998. *Multivariate Data Analysis.* Prentice-Hall: Upper Saddle River, NJ.

Hansen M, Nohria N, Tierney T. 1999. What's your strategy for managing knowledge? *Harvard Business Review* March–April: 106–116.

Harbison J, Pekar P Jr. 1998. *Smart Alliance: A Practical Guide to Repeatable Success.* Jossey-Bass: San Francisco, CA.

Harrigan KR. 1988. Strategic alliances and partner asymmetries. *Management International Review* **28**: 53–72.

Helfat C. 2007. Relational capabilities: drivers and implications. In *Dynamic Capabilities: Strategic Change in Organizations*, Helfat CE, Finkelstein S, Mitchell W, Peteraf M, Singh H, Teece DJ, Winter SG (eds). Blackwell: Oxford, UK; 65–80.

Helfat C, Peteraf M. 2003. The dynamic resource-based view: capability lifecycles. *Strategic Management Journal* **24**(10): 997–1010.

Hoang H, Rothaermel FT. 2005. The effect of general and partner-specific alliance experience on joint R&D project performance. *Academy of Management Journal* **48**(2): 332–345.

Huber GP. 1991. Organizational learning: the contributing processes and the literatures. *Organization Science* **2**(1): 88–115.

Inkpen A, Crossan M. 1995. Believing is seeing: joint ventures and organization learning. *Journal of Management Studies* **32**(5): 595–619.

Joreskog KG. 1969. A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika* **34**: 183–202.

Kale P, Singh H, Perlmutter H. 2000. Learning and protection of proprietary assets in strategic alliances: building relational capital. *Strategic Management Journal* **21**(3): 217–237.

Kale P, Dyer J, Singh H. 2001. Value creation and success in strategic alliances. *European Management Journal* **19**(5): 463–471.

Kale P, Dyer J, Singh H. 2002. Alliance capability, stock market response, and long-term alliance success: the role of the alliance function. *Strategic Management Journal* **23**(8): 747–768.

Khanna T, Gulati R, Nohria N. 1998. The dynamics of learning alliances: competition, cooperation and relative scope. *Strategic Management Journal* **19**(3): 193–210.

Killing JP. 1983. *Strategies for Joint Venture Success.* Routledge & Kegan Paul: New York.

Kogut B. 1988. A study of the life cycle of joint ventures. In *Cooperative Strategies in International Business*, Contractor FK, Lorange P (eds). Lexington Books: Lexington, MA; 169–186.

Kogut B, Zander U. 1992. Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science* **3**: 383–397.

Koh J, Venkatraman N. 1991. Joint venture formations and stock market reactions: an assessment in the information technology sector. *Academy of Management Journal* **34**: 869–892.

Kurokawa S. 1994. Technological alliance strategies in Japanese manufacturing firms. Paper presented at the annual meeting of the Academy of Management, Dallas, TX.

Lyles MA. 1988. Learning among joint venture sophisticated firms. *Management International Review*, Special Issue **28**: 85–98.

Lyles MA, Baird IS. 1994. Performance of international joint ventures. *International Management Review* **34**(4): 313–329.

March JG, Sproull LS, Tamuz M. 1991. Learning from samples of one and fewer. *Organization Science* **2**(1): 1–13.

Marsden PV. 1990. Network data and measurement. *Annual Review of Sociology* **16**: 435–463.

Mitchell W. 1999. *Alliances: Achieving Long-term Value and Short-term Goals.* Mastering Strategy Series. Financial Times: London.

Mohr J, Spekman R. 1994. Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal* **15**(2): 135–152.

Nelson R, Winter S. 1982. *An Evolutionary Theory of Economic Change.* Belknap Press: Cambridge, MA.

Nonaka I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science* **5**: 14–37.

Nunnally JC. 1978. *Psychometric Theory* (2nd edn). McGraw-Hill: New York.

Polanyi M. 1966. *The Tacit Dimension.* Routledge & Kegan Paul: London.

Reuer J. 1999. *Collaborative Strategy: The Logic of Alliances.* Mastering Strategy Series. Financial Times: London.

Saxton T. 1997. The effects of partner and relationship characteristics on alliance outcomes. *Academy of Management Journal* **40**(2): 443–461.

SDC. 1998. Securities Data Company, Thomson Financial. New York.

Seely Brown J, Duguid P. 1991. Organizational learning and communities-of-practice: toward a unified view of working, learning, and innovation. *Organization Science* **2**(1): 40–56.

Senge P. 1997. Sharing knowledge: the leader's role is key to a learning culture. *Executive Excellence* **4**(11): 17–18.

Simonin BL. 1997. The importance of collaborative know-how: an empirical test of the learning organization. *Academy of Management Journal* **40**(5): 1150–1174.

Sims N, Harrison R, Gueth A. 2001. Managing alliances at Lilly. *In Vivo* **19**(6): 71–77.

*Standard & Poor's Register of Corporations, Directors and Executives.* 1998. McGraw-Hill: New York.

Sull D. 2001. Siebel Systems: partnering to scale. *Harvard Business School Press Case 9-802-029*; 1–24.

Teece DJ, Pisano G, Shuen A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* **18**(7): 509–533.

Winter SG. 1987. Knowledge and competence as strategic assets. In *The Competitive Challenge:*

*Strategies for Industrial Innovation and Renewal*, Teece DJ (ed). HarperCollins: New York; 159–184.

Winter SG. 2003. Understanding dynamic capabilities. *Strategic Management Journal* **24**(10): 991–995.

Zajac EJ. 1998. Commentary on 'alliances and networks' by R. Gulati. *Strategic Management Journal*, Special Issue **9**(4): 319–321.

Zollo M, Singh S. 2004. Deliberate learning in corporate acquisitions: post-acquisition strategies and integration capability in U.S. bank mergers. *Strategic Management Journal* **25**(12): 1233–1257.

Zollo M, Winter S. 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization Science* **13**(3): 339–351.

## APPENDIX 1A: LIST OF ITEMS USED TO MEASURE DIFFERENT ASPECTS OF THE ALLIANCE LEARNING PROCESS

The following items were used in the survey questionnaire to measure each aspect of the alliance learning process. Respondents used a seven-point Likert-type scale to indicate his/her disagreement or agreement with the statement that represented each item, such that '1 = Strongly Disagree' and '7 = Strongly Agree.'

| Item no. | Construct items | Theoretical reference |
|---|---|---|
| | *Knowledge articulation* | |
| X1. | Managers involved with the company's alliances are regularly debriefed about their prior and/or current alliance experience. | *Alliance Analyst* (1996); Harbison and Pekar (1998); Nonaka (1994); Davenport and Prusak (1998); Winter (1987) |
| X2. | Managers responsible for the company's alliances maintain a record (in the form of a memo, note, report, or presentation) of all major incidents, decisions, or actions associated with their respective alliance(s). | |
| X3. | Alliance managers regularly report on the progress and performance of their respective alliance(s). | |
| X4. | The company maintains a 'repository' or database containing factual information of each of its alliances (e.g., date and purpose of alliance formation, name of the alliance partner, names of managers/executives who manage that alliance, etc.). | |
| X5. | The company maintains a directory or 'contact list' of individuals from within the company or outside who can potentially provide inputs or assistance on alliance management. | |
| | *Knowledge codification* | |
| X6. | Company managers follow a well-defined 'process' to guide the formation or management of any alliance. | *Alliance Analyst* (1996); Badaracco (1991); Winter (1987); Zollo and Singh (2004) |
| X7. | Resources such as checklists or guidelines are developed and used to assist managerial decision making and actions while forming or managing strategic alliances. | |
| X8. | Resources such as alliance manuals (containing tools, templates, or frameworks) are developed and used to assist managerial decision making and/or actions while forming or managing alliances. | |
| X9. | The company updates the alliance checklists, guidelines or manuals that have been developed and are in use. | |
| | *Knowledge sharing* | |
| X10. | Company management conducts a 'collective review' to assess the progress and performance of its strategic alliances. | Glynn, Lant, and Milliken (1994); Huber (1991); Nonaka (1994); Seely Brown and Duguid (1991); Senge (1997) |
| X11. | Alliance managers participate in forums such as committees or task forces to take stock of their alliance management experience and practices. | |
| X12. | Company managers participate in forums such as meetings, seminars, or retreats to exchange alliance-related information, experiences, war stories, etc. | |

| Item no. | Construct items | Theoretical reference |
|---|---|---|
| X13. | Company managers engage in informal sharing and exchange of alliance-related information and know-how with peers or colleagues within the organization. | |
| X14. | Company managers with substantial prior experience in managing alliances are usually rotated across some of the company's key alliances. | |
| X15. | Managerial incentives are used to encourage individual managers to share their personal alliance management experience and know-how with other managers within the company. | |
| | *Knowledge internalization* | |
| X16. | Company managers attend 'in-house' training programs on 'alliance management' whenever they are assigned to manage or work with any alliance. | Davenport and Prusak (1998); Nelson and Winter (1982); Nonaka (1994); Teece *et al.* (1997) |
| X17. | Company managers attend externally conducted training programs on 'alliance management' whenever they are assigned to manage or work with any alliance. | |
| X18. | The company provides opportunities for 'on-the-job' alliance training to individuals who are relatively new to managing alliances. Here, individuals are assigned to work in existing alliances, especially with managers who have substantial experience in managing such relationships. | |
| X19. | The company provides managers access to documented and codified information and know-how on its prior and ongoing alliance experience. | |

## APPENDIX 1B: LIST OF ITEMS USED TO ASSESS ALLIANCE PERFORMANCE

The following items were used to assess the performance of an individual alliance within each company. The alliance was assessed by the manager/individual who was responsible for managing the alliance or was associated closely with it. These individuals have been referred to as secondary respondents. Respondents used a seven-point Likert-type scale to give their assessment on items 1–4 and item 5, such that '1 = Strongly Disagree' and '7 = Strongly Agree.'

| Item no. | Items for assessing the performance of each alliance | Theoretical reference |
|---|---|---|
| 1. | The alliance is characterized by a strong and harmonious relationship between the alliance partners. | Anderson (1990); Child and Yan (1999); Geringer and Hebert (1991); Inkpen and Crossan (1995); Saxton (1997); Khanna, Gulati and Nohria (1998); Kale, Singh, and Perlmutter (2000) |
| 2. | The company has achieved its primary objective(s) in forming this alliance. | |
| 3. | The company's competitive position has been greatly enhanced due to the alliance. | |
| 4. | The company has been successful in learning some critical skill(s) or capabilities from its alliance partner (s). | |
| 5. | An overall assessment of this alliance, based on all the above dimensions. Check (a) or (b):<br>(a) Satisfactory/Successful OR<br>(b) Unsatisfactory/Failure | |