



Alliance capability as mediator between experience and alliance performance: an empirical investigation into the alliance capability development process

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**ALLIANCE CAPABILITY AS MEDIATOR BETWEEN EXPERIENCE AND
ALLIANCE PERFORMANCE: AN EMPIRICAL INVESTIGATION INTO
THE ALLIANCE CAPABILITY DEVELOPMENT PROCESS**

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ABSTRACT

This study centers around the way in which firms can enhance alliance performance through the development of an alliance capability. Whereas most research has focused on inter-firm antecedents of alliance performance (i.e. factors influencing the quality of the relationship), research on intra-firm antecedents points to prior experience and internal mechanisms fostering knowledge transfer. As little is known about how firms need to develop an alliance capability, this study aims to uncover the relationships between critical concepts underlying the alliance capability development process. To this end, the results of a worldwide survey among 151 firms and expert interviews yield a number of findings. First, a model of alliance capability development is proposed which is derived from a multitude of theories and links experience, micro-level mechanisms, routines, capabilities and performance. Second, whereas prior research has shown that experience is a key determinant of alliance performance, our study finds that alliance capability mediates between experience and performance. These results provide empirical evidence of the need for firms to leverage prior experience by dispersing and sharing knowledge through micro-level mechanisms. These results extend current understanding of the critical intra-firm determinants of alliance performance and the underpinnings of capability development research in general. Moreover, they also enable firms to take appropriate action at the micro-level.

INTRODUCTION

Over the past years, the number of publications based on the resource-based and dynamic capability view has grown exponentially (Helfat, 2000). Viewing firms as a bundle of organization-specific resources, capabilities, routines and competences, these theories try to explain persistent heterogeneity in firm performance as well as firm dynamics (Hitt and Ireland, 1985). Moreover, they suggest that a firm's ability to create and leverage new knowledge and capabilities may be a more important determinant of competitive advantage than its current resource base, in particular in dynamic industry settings (Sanchez et al. 1996; Teece et al., 1997; Merali, 2001)¹. However, scholars have also referred to other streams of literature in order to understand how capabilities should be built and leveraged (Anand and Vassolo, 2002). Research on capability development has increasingly recognized the role of knowledge management as a key managerial determinant of competitive advantage (Argote and Ingram, 2000; Raub, 2001). Consequently, the role of knowledge-based resources are deemed critical in the process of value creation (Itami, 1987). Also, the role of knowledge integration is increasingly found to be a key determinant of the competitive position of companies (Grant, 1996a). Moreover, organizational learning theory and evolutionary economics have been occupied with the ability of the firm to develop new knowledge and skills over time and the role of routines in this process (Cyert and March, 1963; Levinthal and March, 1993). Hence these theories have also been given extensive attention in this respect.

¹ . For a more extensive discussion on the contribution of different theories, we refer to Mahoney and Pandian (1992) and Sanchez and Heene (1997).

This study aims to analyze the role of experience and alliance capability in understanding persistent firm differences in alliance performance. As has been done in previous studies (e.g. Lambe et al., 2002), we build on a mix of theories which consists of the resource-based view, dynamic capability view, the knowledge-based view, organizational learning theory and evolutionary economics. Taken together, these perspectives allow us to investigate the process which lies at the root of a firm's ability to integrate, acquire and develop capabilities through organizational learning (Mowery et al., 1996). From these theories two main streams of research have emerged (Hamel, 1991; Ranft and Lord, 2002): a body of research which has been referred to as external and internal sources of capabilities (Grant, 1998), knowledge acquisition and knowledge internalization (Hamel, 1991), learning outside and inside the firm (Leonard-Barton, 1995), or vicarious learning and experiential learning (Burley, 1991).

In line with the first stream of literature, various studies have examined the acquisition of capabilities through alliances (e.g. Powell et al., 1996; Inkpen, 1998; Inkpen and Dinur, 1998; Khanna et al., 1998; Kale et al., 2000; Makhija and Ganesh, 1997; Tsang, 2002a). Alliances have been found to foster a decrease in organizational inertia by stimulating environmental adaptation (Doz, 1996) and are shown to foster an increase in a firm's strategic flexibility by increasing the number of available strategic options (Harrigan, 1986). These studies center around the dyadic factors influencing the alliance process (e.g. Doz, 1996; Lassar and Kerr, 1996; Mowery et al., 1996; Olk, 1998; Das and Teng, 2002) and the creation of collaboration-specific rents (Khanna et al., 1998; Madhok and Tallman, 1998). In general, the individual alliance is the level of analysis and the topic under investigation is concerned with the

transfer of knowledge in the particular alliance (see e.g. Kumar and Nti, 1998).

Overall, these studies view alliances as external learning tools used to complement internal learning (Powell and Brantley, 1992). However, these studies have been unable to explain a large degree of the observed persistent firm heterogeneity with respect to alliance performance (Anand and Khanna, 2000).

The second stream of literature pays particular attention to internal sources of capabilities. More specifically, it focuses on processes within the individual firm that foster knowledge dissemination and integration (e.g. Henderson and Clark, 1990; King and Zeithalm, 2001). Whereas the first stream specifically looks at the ability of firms to learn from experience of others (Darr et al., 1995), the second stream pays attention to the role of experience in intra-firm capability development. Moreover, in contrast to the first stream, the second stream of research allows us to generate insight into concepts that enable firms to leverage the alliance performance of their entire alliance portfolio rather than the individual alliance. It aims to answer questions relation to experiential learning and transfer and internalization of knowledge (Inkpen and Crossan, 1995; Tsang, 2002a). In this stream of alliance research, the building blocks of an alliance capability are the main topic of research (Gulati, 1998). In these studies, it is suggested that the level of firm's alliance capability and its prior experience are accountable for the persistent heterogeneity in performance differences among firms.

This study builds on the concepts underlying the second stream of research.

Notwithstanding the significant contribution of both streams, so far neither of the two streams has been able to explain how experience can be translated into a capability

(Simonin, 1997; Kale et al., 2002). Contributions aimed at enlightening the process underlying the development of capabilities and the potential micro-level mechanisms to be used have been limited in number and tend to lack micro-level detail (Grant, 1996b; Williamson, 1999; Eisenhardt and Martin, 2000). Simonin (1997) concludes that collaborative experience should first be internalized by a firm before the lessons learned become useful for a firm's future alliances. The use of micro-level or intra-organizational mechanisms for selection and diffusion of certain experiences and specific knowledge can be critical for the evolutionary process of the firm (Fujimoto, 2000). Consequently, as the insights generated via these studies tend to remain anecdotal in origin and little specific as to how to solve the matter (Park and Ungson, 2001), firms are left in the dark about the adequate actions that can be taken at the micro-level (Johnson et al, 2003). As firms continue to ally at an increasing rate (Khanna et al., 1998), the relevance of successfully managing alliances and knowing the underpinnings of alliance capabilities becomes ever more important for firms. Hence, there is an evident need to understand *how* firms can internalize their acquired experience in order to develop an alliance capability. More specifically, insight into the building blocks of an alliance capability should be created (Gulati, 1998). This paper intends to fill this void by investigating the role of experience, micro-level mechanisms and alliance capabilities in the quest for enhanced alliance performance.

The aim of this study is threefold. First, we wish to extend the current understanding of the process underlying alliance capability development. Therefore, we will introduce a model in which the concepts of experience, micro-level mechanisms, routines and capabilities are linked. By linking these key concepts, we hope to enhance our understanding of the underlying process of experience leveraging and the

creation of organizational routines and capabilities (Helfat, 2000; Sanchez, 2001). Second, having defined the model and the key concepts, we will empirically investigate the role of experience and mechanisms in alliance capability development. To realize this, we analyze relationships between alliance experience, capability and performance. Third, as a consequence of the two former goals, we aim to provide firms with critical concepts and relationship to ease their efforts in developing their alliance capabilities through which they can potentially improve their alliance performance.

This study is divided into a number of parts. First, we describe a model for alliance capability development. Second, we empirically analyze the hypotheses that are derived in the first part. This enables us to gain a better understanding of how the micro-levels mechanisms help firms increase their alliance performance. Furthermore, it enhances our current understanding of the interactions between experience, mechanisms, alliance capability and performance. In this study, we make use of data from 99 global companies that is gathered via a surveys and in-depth expert interviews.

A MODEL OF ALLIANCE CAPABILITY DEVELOPMENT

Although concepts such as resources, capabilities and competences have been extensively described, their terminology has been subject to a lot of confusion (Dosi et al., 2000:3; Priem and Butler, 2000; Williamson, 1999; Sanchez, 2001).

Increasingly, a growing body of literature is directed towards identifying micro-level factors to explain performance differences among firms (Dierickx and Cool, 1989;

Levinthal and March, 1993; Sanchez et al., 1996). This fostered an interest in the interplay between organizational capabilities, knowledge and learning (Prahalad and Hamel, 1990). In these studies, experience (Nelson and Winter, 1982; Pisano, 2000) and mechanisms (Zahra and Nielsen, 2002; Zollo and Winter, 2002) have been put forward as important antecedents which can be used to explain persistent performance differences across firms.

In the area of alliance research, recent investigations have tried to unravel the underpinnings of structural fixed-firm alliance performance differences by researching the role of alliance experience (see e.g. Powell et al., 1996). Although alliance experience is likely to have a direct and positive influence on alliance performance (Deeds and Hill, 1996), a more subtle process is expected to underlie this relationship. Some recent studies have suggested that certain critical mechanisms are needed before alliance experience can lead to increased alliance performance (Kale et al., 2002; Bamford and Ernst, 2003; Draulans et al., 2003). These structural micro-level mechanisms can help leverage and disperse alliance knowledge when and where necessary. However, the precise interplay between the micro-level constructs experience, mechanisms, routines, capabilities and performance has remained obscure (King and Zeithaml, 2001; Shafer et al., 2001)². Following Zollo and Winter (2002: 340), we argue that learning mechanisms, dynamic capabilities and routines are inherently linked. However, we extend their model by suggesting that experience is an essential antecedent of micro-level mechanisms (see figure 1).

-- insert figure 1 about here --

The process reflects the particular role that alliance experience plays in explaining alliance performance via the development of an alliance capability. Although alliance experience is likely to have a direct and positive influence on alliance performance, we propose a more subtle process by suggesting that the effect of alliance experience is explained by a firm's alliance capability. Merely referring to experience as the explanatory variable for sustained heterogeneity in firms' alliance performance seems to be an overly simplistic representation of reality. Therefore, using experience as a single means to explain performance limits our understanding of how firms can leverage their experience and our understanding of how firms can develop their alliance capability. We expect the process to be subject to iterations because learning is an inherently interactive and volatile process (Argyris, 1977; Vicari and Troilo, 1998), which in our model is represented by the dotted lines. Moreover, the model suggests that a firm's alliance capability is a mediating variable (Asher, 1976; Lehmann et al., 1998). This implies that the effect experience has on alliance performance is explained via a company's alliance capability. For instance, codification of individual experience makes it easier to apply, which helps accelerate the development of firm-wide routines (Argote, 1999; Zander and Kogut, 1995). This implies that certain micro-level mechanisms help transfer knowledge throughout the firm to induce the creation of organizational routines (Nelson and Winter, 1982; Eisenhardt and Martin, 2000). Consequently, the model suggests that alliance capabilities mediate between a firm's alliance experience and performance as experiences are captured in micro-level mechanisms which induces the transfer and replication of experiences and knowledge thereby fostering the creation of firm-wide knowledge-sharing routines (Helleloid and Simon, 1994; Grant, 1995; Dyer and

² . As it is not our intention to provide an overview of concept definitions, we refer to Dosi et al. (2001)

Singh, 1998). Hence, we expect that an alliance capability is an important variable explaining why alliance experience positively influences alliance performance, since it can induce the development of firm-wide routines.

However, given the complex nature of both alliance management (Park and Ungson, 2001) and capability development (Dosi et al., 2000), we do not pretend provide an eclectic model of alliance management nor to provide a full-grown model containing all possible relationships. However, the model intends to shed new light on the process underlying the development of an alliance capability, thereby contributing to the current understanding of the development process of alliance capabilities. More specifically, the study analyzes three critical relationships. First, alliance experience is expected to positively influence a firm's alliance performance. Second, we argue that a firm's alliance capabilities influence its alliance performance. Third, we suggest that the concepts of experience, capabilities and performance are related, thereby analyzing the interaction effects of alliance experience and capabilities and the latter's mediating effect.

THEORY AND HYPOTHESES

Experience

The impact of 'experience' on firm performance has been investigated in various empirical settings (e.g. Ingram and Baum, 1997; Simonin, 1997; King and Tucci, 2002). Borrowing mainly from evolutionary economics and organizational learning

and Sanchez (2001) for more elaborated reviews.

theory, various studies have linked experience and learning curves to productivity gains and rent generation (Dutton and Thomas, 1984). The majority of these studies suggests a positive relationship between experience and performance, suggesting experience to be the predominant explanatory variable for capability development (Teece et al., 1997; King and Tucci, 2002). Lack of experience and ignorance are said to be a critical cause for alliance failure (Lei and Slocum, 1992). Furthermore, as firms gain experience, they can afford to devote less attention to solving a particular problem (Bereiter and Scardamalia, 1993, in: Koka and Prescott, 2002, pp. 800), providing the firm with standardized solutions. Gaining experience allows firms to become more effective at managing particular processes than less experienced firms (Das and Teng, 2002).

In line with these studies, some scholars have investigated differences in learning curves among firms (e.g. Lapré and Van Wassenhove, 2001). These studies generally refer to the need of using experiences to enhance a firm's leaning curve (Stata, 1989). Mukherjee et al. (1998) make a distinction between operational and conceptual learning, thereby referring to respectively input-output understanding or know-how and the acquisition of cause-and-effect relationships or know-why. In similar vein, King and Tucci (2002: 172) refer to these two types as static and transformational experience. Differentiating between these different types of experience or ways of learning enables us to understand that on the one hand experience fosters inertia and routinization (Lorenzoni and Lipparini, 1999), while on the other hand it enables a firm to adapt and create routines that enable organizational change (Katz and Allen, 1982; Amburgey et al., 1993).

In line with previous research, we define alliance experience as the lessons learned, as well as the know-how generated through a firm's former alliances (e.g. Gulati, 1995; Kale and Singh, 1999; Kale et al., 2002; Reuer et al., 2002b). These lessons and know-how are likely to become embedded in the minds of individuals involved. This provides a basis for an organizational routine with respect to performing a certain task or activity (Nelson and Winter, 1982). Certain mechanisms for learning, such as an alliance database or gathering best practices, may enhance a firm's ability to implement and embed the lessons and know-how in existing practices (Hamel, 1991; Inkpen and Dinur, 1998).

Various researchers have investigated the role of alliance experience as an antecedent for alliance performance. Although the majority of the studies find positive linear relationships (Anand and Khanna, 2000), other studies suggest curvilinearity (Draulans et al., 2003). They come up with an inverted U-shaped relationships between experience and alliance performance (Deeds and Hill, 1996; Hoang, 2001; Hoang et al., 2002). Overall, these studies suggest a positive relationship between experience and performance. A number of reasons account for this positive relationship. First of all, previous research suggests that experience enables firms to better understand the critical processes and issues in alliance management. Not only does it allow firms to select more appropriate partners and enables them to manage the alliance process more effectively (Simonin, 1997), it also increases their ability to for instance ease conflict situations (Mohr and Spekman, 1994).

Second, shared experience engenders the development of 'common perspectives' (Nonaka, 1994: 24), enabling a firm to absorb new knowledge more effectively

(Grant, 1996b). In this context, various studies have analyzed the role of absorptive capacity to understand differences in rates of learning in alliances (Hamel et al., 1989; Shenkar and Li, 1999; Lane et al., 2001). Obviously, absorptive capacity is a key determinant of the input provided for through ‘experience’, as it permits the assimilation and exploitation of new knowledge (Cohen and Levinthal, 1990: 135). Stressing the need to thoroughly embed knowledge in the organization’s routines and practices to be optimally leveraged (Merali, 1997), prior experience is often suggested to shape future firm capabilities (Helfat, 2000: 955). Overall, these arguments suggest that alliance experience fosters a firm’s ability to consciously foresee and act upon earlier trials and tribulations. On the basis of these arguments, we posit that alliance experience will engender more positive outcomes of a firm’s alliance performance.

H1: Prior alliance experience has a positive impact on alliance performance.

Capabilities

As mentioned earlier, a large body of research has emerged in the area of resources, capabilities and competences over the past years (Dosi et al., 2000). Various theoretical perspectives have been used to explain persistent alliance performance heterogeneity among firms. The perspectives mainly refer to the resource-based view (Pfeffer and Salancik, 1978; Barney, 1991) and the dynamic capability view (Teece et al., 1997; Eisenhardt and Martin, 2000). Although many of the studies point to experience as explanatory variable, it has remained unclear how a firm can develop an alliance capability.

Various scholars have proposed different constructs to underline distinct differences between resources and capabilities. Building on Penrose (1959), who separated management *of* resources from management *as* a resource *per se*, scholars have described the differences between resources and capabilities as lower and higher order resources (Hunt and Morgan, 1996) and component and architectural competence (Henderson and Cockburn, 1994). Fujimoto (1999) differentiates between three levels of capabilities: static, improvement and evolutionary capabilities. The evolutionary capability represents a non-routine metacapability that enables a firm to accumulate capabilities. In the end, these distinctions serve to understand the difference between a firm's ability to pick resources and its ability to deploy resources (Makadok, 2001; Saxton and Dollinger, 2002). Makadok (2001) defined a capability as a special type of resource which is organizationally embedded and nontransferable and improves the productivity of other resources possessed by the firm. Dosi et al. (2000: 2) emphasize that capabilities fill the gap between intention and outcome, thereby referring to the firm's reliable capacity to bring about what has been intended.

Although experience seems to play an important role in increasing our understanding of the antecedents of capability development in alliances, experience *per se* may not be sufficient (Levinthal and March, 1993; Simonin, 1997; Kale et al., 2002). Tsang (2002a) suggests that learning myopia is likely to be a key factor influencing the quality of experiences. Therefore, firms should actively manage their learning processes. In similar vein, Simonin (1997) concludes that experiences have little impact on alliance performance if lessons are not internalized and transferred into know-how. Recently, Kale et al. (2002) analyze the role of an alliance function on a

firm's alliance performance, in order to uncover the performance effects of this intra-firm mechanism.

Building on Eisenhardt and Martin (2000: 1107) and Kale et al. (2002: 750), we define alliance capabilities as the mechanisms that help firms engage in a stable and repetitive activity pattern to capture, share, disseminate and apply alliance management knowledge (or know-how and know-why). In line with the previously mentioned distinction between picking and deploying resources (Makadok, 2001), this definition adds an 'application' element to the 'creation, sharing and disseminating' element of Kale et al.'s (2002) definition. It inherently captures all the ingredients required to develop alliance capabilities by referring to mechanisms as well as to routines as a basis for an alliance capability (Spekman et al., 1999; Dosi et al., 2000; Gittell, 2002; Draulans et al., 2003). Consequently, alliance capabilities consist of mechanisms and routines (Bamford and Ernst, 2003). In order to ameliorate our understanding of the antecedents of capability development, it becomes essential to investigate the mechanisms that firms employ to accumulate and disseminate knowledge.

Micro-level mechanisms can represent 'an intent to learn', thereby referring to a firm's dedication to develop alliance capabilities (Hamel, 1991). This also implies that investment in these mechanisms, which aid in knowledge articulation and codification, seems to reflect a firm's commitment to deliberate learning (Zollo and Winter, 2002; Van der Bij et al., 2003). Nonaka (1994: 17) argues that 'commitment is one of the most important components for promoting the formation of new knowledge within an organization'. Thus, having an alliance department might imply

that firms are consciously paying attention to the integration, internalization or dispersion of alliance-related knowledge. It is likely that the firm would not install such a mechanism if it has not established clear reasons for its existence. We thus presume the firm to be self-reflective in this way.

We define an alliance mechanism as an internal organizational attribute that aids firms in managing their alliance portfolio by capturing, sharing, disseminating or applying alliance management knowledge. Alliance mechanisms can be represented by functions (e.g. alliance department), tools (e.g. alliance training), control and management processes (e.g. alliance metrics) and external parties (e.g. use of external consultants). An overview of these groups and the mechanisms belonging to each group is represented in appendix 1.

Mechanisms are expected to be critical in the capability development process for a number of reasons. First, they allow firms to internalize generated experiences. More specifically, mechanisms allow the firm to embed experiences into stable patterns of behavior by accumulating, articulating and codifying knowledge (Zollo and Winter, 2002). Their ability to embed knowledge in the organization's routines and practices mechanisms forms the basis of organizational routines (Merali, 1997). In this respect, Fujimoto (2000: 276) refers to an 'internal evolutionary mechanism', which ensures the evolutionary process of organization routines. Employees themselves guide this process by creating short-term solutions to a variety of problems that arise, thereby creating dynamic rather static routines and capabilities. However, using these mechanisms enables a firm to standardize or repeat (creating operational effectiveness and efficiency) as well as to diffuse new routines (creating optimal learning potential).

Ultimately, the synthesis of these concepts enables a firm to develop capabilities in a dynamic way, providing the firm with a distinct problem-solving competence (Fujimoto, 2000: 277). In this context, various scholars have recently proposed the meta-capability to change routines (Amburgey et al., 1993; King and Tucci, 2002).

Certain routines can be critical for the evolutionary process of the firm (Fujimoto, 1999). Given the path-dependent and organization-embodied nature of knowledge, organizational routines can store and reproduce problem-solving skills via certain structural mechanisms which then serve as carriers (Coriat and Dosi, 1999). Tsang (2002b), for instance, argues that sharing experience among alliance managers is an efficient way to disperse knowledge. In similar vein, Zahra and Nielsen (2002) suggest that formal coordination mechanisms, such as using specialized task forces to promote active involvement, can be an important way to improve a firm's technology commercialization.

Second, mechanisms help firms to structurally coordinate alliance knowledge within the firm (Kale et al., 2002). Mechanisms facilitate learning and leveraging of lessons by providing feedback throughout the firm (Kale and Singh, 1999; Van der Bij et al., 2003). Not only by stipulating the need to converse tacit into explicit knowledge and vice versa (Nonaka, 1994) but also by providing a platform for the transfer of experience (Brown and Duguid, 1991). For instance, the use of alliance database enables a firm to explicate its experiences and thereafter disperse them throughout the firm. In doing so, a larger number of people has access to lessons learned in earlier alliances. The same holds for formally structured knowledge exchange platforms for alliance managers, which provide a structurally recurring occasion for experiences to

be shared. These processes can have a substantial impact on performance and a firm's learning curve, since by exchanging experiences and lessons managers may become increasingly sensitive to and aware of potential pitfalls in alliance management. In this way, these processes can stimulate the amendment of routines.

Third, day-to-day alliances activities are supported by various mechanisms. Using a partner program or partner selection program will routinize and therefore ease the partner selection process. Moreover, conflict situations can to a certain extent be avoided if a firm makes use of joint business sessions in order to define goals and share expectations (Mohr and Spekman, 1994).

Fourth, mechanisms help spread a message or signal that alliances are deemed important by the firm. The fact that a firm decides to employ a certain set of mechanisms represents a certain degree of commitment to not only the performance of its alliance portfolio, but also to internal knowledge exchange (Inkpen, 1998). This commitment or dedication to alliances can be an important driver to create an alliance capability (Spekman et al., 1999) as employees are more likely to recognize the value of alliances and adopt the proposed routines. Following the logic proposed by Gittell (2002), these mechanisms reflect the way in which firms develop an alliance capability by installing intra-firm stimuli aimed at enhancing alliance performance.

The second part of an alliance capability consists of routines³. As routines are largely 'tacit' and vary between firms, they contribute to our understanding of the persistent differences in firm performance (Coriat, 2000: 216). As mentioned above, the

combination of mechanisms and routines allows for the creation of an alliance capability. Routines are suggested to be critical in the capability development process as they support the interaction between individuals in the absence of rules. Because routines work by enhancing interactions among employees, routines and mechanisms are highly interrelated (Gittell, 2002). Therefore, routines are in many respects seen as the equivalent of individual skills (Nelson and Winter, 1982: 73). They allow firms to successfully apply the knowledge dispersed via mechanisms.

In the context of this study and in line with Dyer and Singh (1998), we define routines as the higher-organizing principles through which knowledge is captured, shared, disseminated and applied, providing the basis for repetitive patterns of actions in alliances. There are a number of reasons why routines are important in the process of capability development. First of all, our definition of routines contains both a problem-solving or learning-oriented aspect and a control-oriented aspect (Coriat, 2000). The problem-solving or learning aspect is evident from the fact that from firms to learn from their experiences, lessons need to be drawn. In order to do so, capturing, sharing and disseminating alliance-related knowledge is essential. For instance, only if firms succeed in creating a successful platform for sharing experiences among alliance managers can knowledge be shared and disseminated. The control-oriented aspect refers to the application of knowledge, since firms should control for the effectiveness of the way in which employees use alliance-related knowledge. This can be done by for instance using alliance metrics to verify progress in the individual alliance to see whether the lessons learned are successfully applied.

³ . For an extensive overview of the concept ‘routines’, I refer to Nelson and Winter (1982), Prahalad

A theme which is related to the dual nature of routines as defined by Coriat (2000) is the way in which firms optimize exploitation via routines (which are sticky by nature) while at the same time realizing optimal exploration by remaining strategically flexible through learning (which is by nature a dynamic process) (Levinthal and March, 1993). Various scholars have argued that routines cause organizational inertia (Hannan and Freeman, 1984), leaving firms resistant to change (Thompson, 1967). Moreover, experience is said to restrict adaptive behavior and reinforce existing practices by its continued reliance on conventional wisdom. With respect to alliances, Eisenhardt and Martin (2000) argue that repeated practices lead to enhanced alliance capabilities as firms learn from their experiences by translating these experiences into processes and routines.

Second, routines compose an essential building block of capabilities (Dosi et al., 2000: 4). More specifically, individual experiences and skills can be thought of as building blocks of organizational routines. They consist of an essential part of the organizational memory and are comprised of a set of repetitive activities ensuring a smooth functioning of the organizational operations (Coriat, 2000: 214).

We therefore hypothesize that the level of a firm's alliance performance depends on the extent to which firms use mechanisms to integrate alliance-related knowledge and which enables them to create routines for managing alliances.

H2: A firm's alliance capability is positively related to a firm's alliance performance.

and Hamel (1990), Cohen et al. (1996) and Coriat (2000).

Interaction between experience and capabilities

With respect to the alliance capability process as presented in the model in Figure 1, one last interaction needs to be addressed. The model tries to describe a more subtle process that we expect to lie at the roots of the causal relationship between alliance experience and performance. Capabilities must be built through experience since they are not easily available in the spot market (Teece et al., 1997: 528) and is an outcome of the firm's ability to integrate knowledge (Grant, 1996b: 116). We have argued above that we expect mechanisms to play an important role in two ways. First, we suggested that the micro-level mechanisms allow firms to leverage their alliance experience. Second, we described the related notion of how firms can develop an alliance capability by proposing that experience provides an essential input to micro-level mechanisms and routines.

Therefore, we expect that a combination of and simultaneous development of a firm's alliance experience and micro-level mechanisms will reinforce a firm's ability to improve its alliance performance. This implies that alliance experience is expected to positively influence alliance performance via its positive impact on alliance capability development (thus alliance capability is a mediating variable). Moreover, it is expected that firms that have extensive experience with alliances and have developed an alliance capability are more likely to be successful in managing alliances.

Therefore, we posit:

H3A: Alliance capability has a mediating effect on alliance experience.

H3B: Firms that combine a high level of alliance experience with a high level of alliance capability are more likely to have a high level of alliance performance than firms that do not.

DATA AND METHODOLOGY

Survey

In order to empirically validate this study's model, a survey method was used which is in line with earlier studies (Beamish, 1984; Tuchi, 1996: in Kale et al., 2002). A survey questionnaire was sent to 500 Vice-Presidents and alliance managers worldwide. The survey was aimed at collecting data on managerial assessments of a firm's alliance portfolio performance. The database of the Association of Strategic Alliance Professionals (ASAP) and the Internet Society (ISOC) were used as primary data source to collect large-sample data. Using these databases, we were able to address the right people who can be considered to be appropriate when gathering data on the performance of alliance portfolios.

After sending a reminding message to all the potential respondents, we received 161 responses⁴. This resulted in a response rate of 32.2%, which is considerably higher than most international mail surveys (Harzing, 2000) but comparable to other studies on alliances (see e.g. Kale et al., 2002; Reuer et al, 2002a; Zollo et al., 2002). After data screening, the final dataset consisted of 99 valid cases from the following

⁴ . In order to ensure that our data was not biased as a result of non-response, various analyses were performed. Chi-square tests allowed us to compare early with late respondents with respect to a number of key variables (i.e. number of employees of parent firm, worldwide sales revenues and alliance performance). The results show that there is no difference between the two categories, which implies that there is no significant non-response bias in our dataset (Kanuk and Berenson, 1975; Armstrong and Overton, 1977).

industries: ICT (25%), ICT services (18%), financial services (7%), other services (e.g. consultancies) (25%), pharmaceuticals and biotechnology (5%), chemicals (3%), other manufacturing (12%) and public sector (e.g. education and non-profit organizations) (5%). Two interesting industry categories can be distilled from this sample: ICT-related (43%) and service-related sectors (55%). The average level of alliance performance of firms included in our sample amounted to 52.03%, which is comparable to other studies (Park and Ungson, 2001). As the firms which are included in our dataset manage an average alliance portfolio of 25 alliances, the total dataset refers to approximately 2475 alliances.

Expert interviews

In addition to this survey, expert interviews were conducted among 10 experts in the field of alliances and capability development. To ensure a balanced mix, we interviewed 5 experts with an academic and 5 experts with a professional background. The experts were selected on basis of their established reputation in the field and ability to sufficiently contribute to the goal of the interviews.

After extensive pre-testing with a panel, the interviews were recorded with consent of the interviewees and thereafter transcribed in order to compare the results. The interviews lasted between thirty and fifty minutes and served two purposes. On the one hand they allowed us to verify the logic of our model. On the other hand they enabled us to verify our findings and the reasons why these findings were adequate. The results were summarized during the interview in order to ensure an adequate representation of the expert's answers.

Explanatory variables

We included three main independent variables in our study. First, in line with earlier studies (Kale and Singh, 1999; Kale et al., 2002; Li and Rowley, 2002; Tsang, 2002b; Zollo et al., 2002), we use the number of alliances that a firm has formed (in our case over the last five years) as a proxy for alliance experience. A 5-point scale defined different categories representing a firm's number of alliances. As the average alliance portfolio of firms in our dataset consisted of 25 alliances, the total dataset refers to 2475 alliances.

Second, in spite of the difficulty of measuring 'capabilities' (Dosi et al., 2000), we expect on basis of our arguments that the alliance mechanisms investigated compose a valid representation of the firm's alliance capability. Consequently, we operationalize a firm's alliance capability as a sum of its alliance mechanisms. This means that a firm can obtain a score which lies between zero and thirty, depending on the number of mechanisms in use. The individual mechanisms then add up to the firm's score representing its score for alliance capability (Gittell, 2002). All mechanisms are calculated as dichotomous variables as a firm either has or does not have a certain mechanism (functions, tools, control or management processes or external parties- see appendix 1). Whereas some earlier studies use alliance experience as a proxy for a firm's alliance capability (Kale et al., 2002), measuring alliance capability in this way allows for a more differentiated picture of differences in alliance capability. Given the inherent complexity of managing alliances, we expect that measuring alliance capability using thirty separate items is more likely to give a solid representation of a firm's ability to fully master all aspects involved in managing alliances.

Dependent variable

Triggered by the dissatisfaction with performance of many alliances (Khanna et al., 1998), the topic of alliance performance and its measurement has been dealt with extensively over the last years. Although this area has been baptized as being ‘challenging’ due to measurement problems and data access (Anderson, 1990; Gulati, 1998), various studies have used different measures and levels of analysis (for a critical review see Gulati, 1998; for an overview see Park and Ungson, 2001). With respect to measurement, Venkatraman and Ramanujam (1986) propose three groups of measures: financial, operational, organizational effectiveness performance. The first group includes measures such as profitability and growth (e.g. Parkhe, 1993; Aulakh et al., 1996). Longevity, survival and duration are part of the second group and are examples of operational performance measures (e.g. Killing, 1983; Harrigan, 1988). The third and most common way to measure alliance performance are organizational effectiveness measures. These measures determine the overall satisfaction with the alliance or the extent to which objectives have been met (e.g. Geringer and Hebert, 1991; Mohr and Spekman, 1994).

Various studies have investigated the need to use objective, subjective or a composite index to measure alliance performance. Geringer and Hebert (1991) have shown that objective and subjective measures tend to have a high correlation. Consequently, in spite of early criticism on the use managerial assessments as a measure for alliance performance, there seems to be an emerging consensus that managerial assessments of performance provides a sound reflection of alliance performance (Kale et al., 2002). Given the fact that companies form alliances for specific reasons, asking alliance managers to what extent the stated alliance objectives were achieved, is an effective

and scientifically established manner to assess the success of an alliance (Geringer and Herbert, 1991; Tuchi, 1995; Kale and Singh, 1999; Dyer et al., 2001).

Consequently, in line with previous studies (Hamel, 1991; Hamel et al., 1989), alliance performance is defined as the percentage of alliances in which the original goals were realized. The dependent variable (alliance portfolio performance), was calculated as a dichotomous measure. We defined a low (0-40%) and high-performing (61-100%) firm category. The respondents having an alliance performance lying between 41 and 60% were left out as this is considered to be the average level of performance in alliances (see Park and Ungson, 2001).

With respect to the level of analysis used, earlier studies relied primarily on measuring the performance of the individual alliance or on measuring the partner benefits from the alliance (Olk, 2002). Using the individual alliance as the unit of analysis provides an indication of how the entity performs, whereas the partner perspective allows researchers to differentiate between the assessments of different partners. Especially the latter type level of analysis has been used in studies focusing on knowledge transfer *between* firms referred to as the first stream of alliance research in the first part of this study (see e.g. Jap, 2001). An obvious detriment to using the level of analysis is that each alliance is treated as a single and independent transaction (Doz and Prahalad, 1991).

As researches have recently started to analyze knowledge transfer *within* firms (earlier referred to as the second stream of alliance research), doubts arise whether an alliance or partner level of analysis remains to be an appropriate level (Levinthal, 2000). As this study builds on the premises of this stream of alliance research, using the

performance of a firm's alliance portfolio as a level of analysis is more likely to be a reliable representation of a firm's average alliance performance because it allows us to analyze the *average* impact of a firm's alliance capability on its alliance performance. Following this approach, measurement errors and performance outliers are more likely to be averaged out, whereas biases are more likely to occur when empirically linking a firm's alliance capability to its performance in one alliance. Moreover, the impact of a firm's alliance capability is by nature not restricted to one alliance but is centered on the creation of a firm-wide ability to deal with its entire alliance portfolio. The performance of a firm's alliance is not an isolated issue, but should be seen in the context of a firm's alliance experience (Gulati, 1998). Moreover, it would be illogical in this study to include additional performance items (such as learning or relationship quality) given the fact that we investigate the performance of a firm's alliance portfolio. These items in general relate to performance in individual alliances and can be considered less useful when analyzing a firm's alliance portfolio. Therefore, following Anand and Vassalo (2002), the performance of the entire alliance portfolio is used rather than the performance of an individual alliance, since it allows for a better understanding of the influence of micro-level mechanisms and routine on alliance performance (Holm et al., 1996).

DATA ANALYSIS AND RESULTS

Several analyses were conducted to test our hypotheses. We used a logistic regression model to test hypothesis 1, 2 and 3b and then applied an ordinary least squares regression model to test hypothesis 3a (because the variable 'mechanisms' or 'alliance capability' is metric rather than dichotomous). Logistic regression was used because

we analyze a categorical dependent variable. A first analysis of the data showed that the independent variables seemed to be highly correlated with the interaction term. This is a recurring problem in extended models containing mediating variables (Mason and Perreault, 1991). In order to solve this problem, we centered our data in order to overcome the problems associated with multicollinearity (see e.g. Aiken and West, 1991). Applying this method allows on the one hand to reduce the correlation between the variables and on the other to render more meaningful results (Aiken and West, 1991; Long, 1997). Table 1 provide the descriptive statistics and the correlation matrix. As alliance performance is represented as a categorical variable in the logistic regression analysis, it is not included in the correlation matrix (Hair et al., 1998).

-- insert table 1 about here --

In order to test this study's hypotheses, we analyzed different models (see table 2)⁵. First of all, we tested a model containing experience as independent variable to verify if experience positively influence alliance performance (H1). The results show that this variable is significant at the 5% level and has a coefficient of 0.914. Second, in order to verify whether our model (as represented in figure 1) is correct, we tested whether alliance capability mediates between experience and alliance performance. Following a procedure suggested by Baron and Kenny (1986)⁶, we find that indeed alliance capability is a mediating variable for two reasons. First, from the regression results, it shows that experience is a significant variable explaining alliance capability.

⁵. When testing the hypotheses 1, 2 and 3b using OLS regression, the results showed comparable significance levels for the independent variables.

⁶. For this purpose, we used ordinary regression instead of logistic regression as formula two of this procedure involves a metric dependent variable. This procedure test the following formulas: $Y_{\text{success}} = \text{fn}(\text{experience})$, $Y_{\text{mechanisms}} = \text{fn}(\text{experience})$ and $Y_{\text{success}} = \text{fn}(\text{experience}, \text{mechanisms})$. We also tested

Second, the results of model II show that the coefficient of experience as well as its significance decreases if we include mechanisms in the analysis. And third, the residual variance represented by R-squared decreases (Cote, 2001; Baron and Kenny, 1986). From these results, we can conclude that alliance capability is indeed a mediating variable.

-- insert table 2 about here --

Thereafter, we defined model III containing all three independent variables: experience, alliance capability and their interaction effects (Heath, 2001). The results indicate that all independent variables except for the interaction effect between experience and alliance capability are significant at the 5% level.

In order to verify the validity of our results, we controlled for a number variables: industry (using ICT-related and service-related sectors) and firm size (using sales revenues). ICT-related sectors consist of ICT and ICT-service sectors (43% of the total sample). Service-related sectors were defined as ICT-services, financial services, other services and public sectors (55% of the sample). With respect to firm size, sales revenues were defined as the total worldwide sales of the parent firm in 2000 (measured as categorical variable).

Again we used a logistic regression on all the variables, including the control variables. Our findings are listed in table 2, model IV. From the results presented in this model, it follows firm size (measured by the firm's sales volume) does not yield

whether alliance capability has a moderating effect on experience. Following the procedure suggested

any significant results nor do industry controls. Therefore, we do not find any support for differences, which pertain to firm size or sector.

The expert interviews allowed us to verify our findings and to nurture a better understanding of the complex nature of alliance management in general. A number of relevant contributions were made with respect to the different hypotheses. First, the results of the expert interviews demonstrate that alliance experience was considered to be a synonym for learning-by-doing. More specifically, various experts underlined the fact that experience allows firms to improve their understanding of the alliance process, such as partner selection, execution and evaluation. In addition, some experts underlined the need to disperse experience in order to be optimally leveraged.

Second, alliance mechanisms were viewed as an adequate and highly useful representation of a firm's alliance capability. More specifically, one expert indicated that these mechanisms represent 'physical artifacts' of a capability, implicitly representing and referring to an essential element of organizational memory and routines as defined by Moorman and Miner (1997). Not only because they represent a firm's intent to learn, but also because they comprise an essential element to foster a firm's capability development. Although the academic literature provides various examples of firms developing alliance capabilities in very different ways (e.g. Hill and Helriegel, 1994; Alliance Analyst, 1995; Takeishi, 2001), various experts emphasized the fact that *all* of the pre-defined mechanisms were important to develop alliance capabilities. All experts confirmed that the specific contribution of mechanisms was evident from their ability to disseminate experience throughout the

by Sharma et al. (1981), we did not find support for that position.

firms. This process, they confirmed, induces a potential basis for the creation of repeatable patterns of actions.

DISCUSSION AND CONCLUSION

This study was aimed at investigating the influence of mechanisms and routines on developing an alliance capability. Considering the asymmetries in firm's capability acquisition in alliances (Mowery, 1988) and rates of organizational learning (Pisano et al., 2001), we proposed a novel manner for measuring a firm's alliance capability. So far, alliance experience (measured as the number of a firm's prior alliances) has often been used as a proxy for a firm's alliance capability (Kale et al., 2002: 754).

However, as firm's make use of various mechanisms (e.g. alliance manager, database, training) to enhance their alliance performance, this study's purpose was to gain a more detailed understanding of the antecedents of alliance performance. By using a firm's alliance portfolio performance as the dependent variable and by measuring alliance capabilities by a company's alliance mechanisms, we were able to direct attention to the micro-level process of alliance capability development (Grant, 1996b). Moreover, in this way we were able to empirically differentiate between the role of a firm's experience and a firm's alliance capability obtained via its intra-firm mechanisms in the alliance capability development process.

The results of our study show that both experience and alliance capabilities are important antecedents of alliance performance. In line with earlier studies (Anand and Khanna, 2000; Hoang et al., 2002), we find that experience is indeed an important

antecedent of alliance performance. While the large majority of previous studies focused on individual alliance performance, this study confirms that experience also is an important antecedent of a firm's entire alliance portfolio.

With respect to hypothesis 2, which states that alliance capability is an important antecedent of alliance performance, we find moderate support. Model I shows that alliance capability is a significant predictor of alliance performance. However, when controlling for a firm's sales, number of employees and industry, we only find support at the 10% level. Thus, this study's results moderately confirm Kale and Singh's (1999) and Kale et al.'s (2002) findings who argue that processes supporting the accumulating, codification and sharing of knowledge are an important determinant of fixed-firm differences in alliance performance.

Moreover, following Cote (2001) and Baron and Kenny (1986), we found that indeed alliance capability is a mediating variable in explaining alliance performance. These results provide convincing support for hypothesis 3A and confirm the importance of dispersing gained experience through micro-level mechanisms in order to create firm-wide routines, thereby foster the firm's alliance capability (Bamford and Ernst, 2003). This is in line with Gittell (2002: 1423), who finds that coordinating mechanisms and routines improve performance by facilitating interaction among employees in the work process. Being one of the first to empirically test the role of routines and mechanisms (Gittell, 2002: 1423), she finds that mechanisms and routines play a mediating role in the structure, process, outcome model. Consequently, although the interaction effect as defined in hypothesis 3B was not supported, we find convincing support for the argument that alliance capabilities mediate between a firm's alliance

experience and performance. Micro-level mechanisms indeed seem to play an important role in capturing, sharing, disseminating and applying alliance knowledge.

The importance of mechanisms for developing an alliance capability is supported by the results of the expert interviews. All of the 10 experts considered the mechanisms to be of substantial importance to developing a firm's alliance capabilities. More specifically, nine out of ten experts expect the micro-level mechanisms to play an important role in developing an alliance capability. This demonstrates that in order to develop alliance capabilities, these mechanisms are expected to be of significant importance. Various experts however reckoned that merely having these mechanisms in place is insufficient, the use and application of these mechanisms is of prime importance. One of the experts added that it would be very difficult for firms to learn without these mechanisms in place. Overall, we conclude that these mechanisms are not only an important means for firms to develop their alliance capabilities, but also reflect a serious ambition by the firm to capture, share, disseminate and apply alliance management know-how.

In reference to the survey and expert interviews, the results of this study allow us to define a number of important insights on the complex issue of alliance capability.

First of all, as mentioned earlier the results suggest that alliance capabilities mediate between a firm's experience and its alliance performance. An alliance capability can be developed using certain mechanisms, such as an alliance department or alliance manager. In this way, experience gained through prior alliances can be seen as an important input into a firm's alliance mechanisms. This demonstrates that in order to develop alliance capabilities, these mechanisms are of significant importance. The

results of the expert interviews also provide support the positive influence of micro-level mechanisms on alliance performance. Furthermore, they also underscore the mediating effect of alliance capability, as various experts confirmed the fact that experience can be dispersed using the micro-level mechanisms investigated. Overall, micro-level mechanisms are not only an important means for firms to develop an alliance capability, but also reflect a serious ambition by the firm to capture, share, disseminate and apply alliance management know-how.

Second, taking into account the relative infancy of alliance research devoted to intra-firm antecedents of alliance performance, the empirical analyses of this study has sought to uncover the process underlying the development of an alliance capability. Currently, research has fallen short of clearly defining the critical components and their interrelationships which lie at the roots of alliance capability development (Simonin, 1997; Hoang, 2001). This study has tried to counterbalance this shortcoming by paying attention to micro-level mechanisms which are practical in origin and leave firms with the ability to take action at the micro-level (Johnson et al., 2003). It has found that alliance capability is a mediating variable between experience and alliance performance. These results are in line a recent study by Gittell (2002), whose boundary spanning study confirmed that mechanisms are critical in transferring experience in the hospital sector. This study has thus been able to extend current wisdom on capability development in firms, which to date is an emerging scientific field. More specifically, firms are given artifacts with which they can improve their alliance management. As trial and error is an essential process in many instances when managing alliances (Lei and Slocum, 1992), these insights may contribute to the way in which prior experiences can best be leveraged.

OPPORTUNITIES FOR FUTURE RESEARCH

Despite the potential contributions of this study with respect to the process of alliance capability development, it is only a first step towards a more thorough understanding of alliance capability development. First of all, the interaction between mechanisms and routines is an area which should be addressed in future research. This study assumed that micro-level mechanisms and routines are interrelated concepts and that the use of these mechanisms reflects a certain commitment and dedication to the improvement of alliance management on behalf on the firm. In this context, the use of an alliance department proved of importance for firms to enhance performance (Kale et al., 2002), this department not only enables coordination of alliance activities, but also the dispersion of certain alliance-related practices. This indicates that at least to a certain degree the concepts of micro-level mechanisms and routines are related. More specifically, it implies that mechanisms are likely to play an important role in changing and adapting firm routines. However, future research should not only try to add new insights about the exact interplay between the concepts of the capability development process, but also specify the precise role each concept plays. Thus, as we have underlined that the suggested model does not pretend to be eclectic, future research could extend and complement our model.

Second, it would interesting to investigate alliance capability development using longitudinal rather than cross-sectional data. Montealegre (2002: 514) argues that

capability development is an iterative and gradual process that is cumulative, expansive and dependent on the combinations of a firm's resources and actions. Although we expect an iterative and recursive interaction between experience and micro-level mechanisms (as our model indicates through the cyclical arrows in figure 1), our data did not allow us to test this.

Fourth, as '*transferring* knowledge is not an efficient approach to *integrating* knowledge' (Grant, 1996b: 114, italics from original text), the particular contributions of various mechanisms should be further investigated. Minimizing rather than maximizing knowledge transfer should be the firm's main objective. Consequently, possible redundancy or replication effects between the different mechanisms should be analyzed to ensure that the appropriate set of mechanisms is used. For instance, it may suffice for a firm to install an alliance department and an alliance manager, thereby ignoring the other functions.

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Figure 1 Alliance capability development process

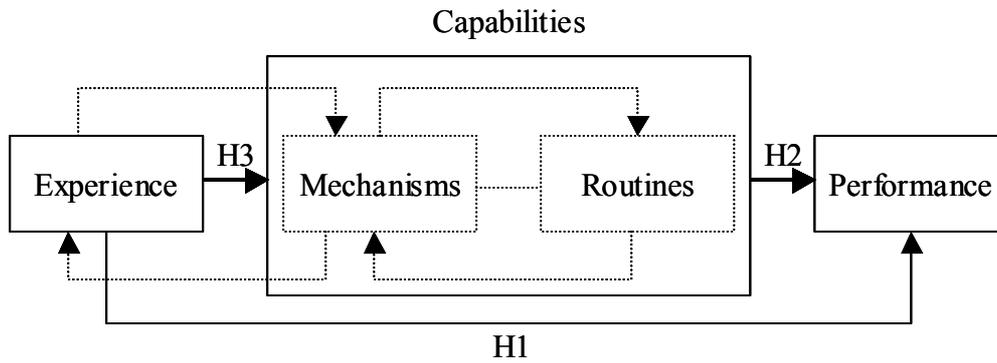


Table 1 Descriptive statistics and correlation matrix

	Mean	S.D.	EXP	MECH	EXP*MECH
SUCADJ	0.5514	0.4997			
EXP	-1.46E-16	0.8546	1		
MECH	9.784E-16	4.7170	-0.305	1	
EXP*MECH	1.6229	3.8156	-0.135	0.107	1

SUCADJ= categorical variable representing alliance success

Table 2 Results of logistic regression analysis

	Model I	Model II	Model III	Model IV
Experience	0.914*** (0.310)	0.704** (0.321)	0.714** (0.330)	0.734** (0.334)
Alliance capability - mechanisms		0.140*** (0.054)	0.125** (0.057)	0.136** (0.065)
Interaction effect			-0.106 (0.070)	-0.111 (0.071)
Service-related sectors (control)				0.124 (0.485)
ICT related sectors (control)				-0.640 (0.496)
Firm size -sales (control)				0.050 (0.190)
R ²	0.132	0.219	0.244	0.267
Number of observations	99	99	99	99

*SE in parentheses; *p<.10; **p<.05, ***p<.01*

Appendix 1 Micro-level alliance mechanisms

Functions	Tools	Control and management processes	External parties
Vice-president of alliances (1)	Internal alliance training (7)	Responsibility level for alliances (20)	Consultants (27)
Alliance department (2)	External alliance training (8)	Rewards and bonuses for alliance manager (21)	Lawyers (28)
Alliance specialist (3)	Training in intercultural management (9)	Rewards and bonuses for business managers (22)	Mediators (29)
Alliance manager (4)	Partner selection program (10)	Formally structured knowledge exchange between alliance managers (23)	Financial experts (30)
Gatekeeper or boundary spanner (5)	Joint business planning (11)	Use of own knowledge about national differences in international alliances (24)	
Local alliance manager (6)	Alliance database (12)	Alliance metrics (25)	
	Use of intranet to disperse alliance knowledge (13)	Country-specific alliance policies (26)	
	Alliance best practices (14)		
	Culture program (15)		
	Partner program (16)		
	Individual evaluation (17)		
	Comparison of alliance evaluations (18)		
	Joint evaluation (19)		



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