Dynamics in Inter-Firm Collaboration: The Impact of Alliance Capabilities on Performance

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Abstract

In this study we question the direct relationship between alliance capability and alliance performance. We contend that this relationship is mediated through post-formation factors such as alliance management and relational quality. Drawing from the Resource Based View a model is presented that explicates these indirect relationships. Partial least squares analysis was used to test three hypotheses, using a sample of Dutch alliance managers responsible for non-equity alliances in agribusiness and the food industry. Our empirical findings affirm the hypothesized indirect relationships between alliance capabilities and alliance performance.

Keywords: *alliance capability, relational quality, alliance management, alliance performance, non-equity alliances, Resource Based View*

Introduction

Over the past decades, we have witnessed an enormous growth of alliance activity (Khanna et al., 1998). Alliances seem to have established themselves as cornerstones for the competitive strategy of many organizations. In spite of this unprecedented increase in alliance activity there is however, strong anecdotal and empirical evidence that alliance performance has remained weak over the years (see Park and Ungson, 2001 for a review). Despite, this overall weak performance it has also been shown that some firms enjoy consistently higher alliance performance levels than others. In spite of many efforts, traditional theories have always been unable to explain these performance differentials among individual companies. More recent theoretical frameworks have however emerged that proved to be much more suited to explain these differences in alliance performance. These studies have pointed in particular at collaborative know-how (Simonin, 1997) or alliance capabilities (Kale and Singh, 1999; Kale et al. 2002) that firms possess in order to create more value from their alliances. This line of thought has generally focused on organizational capabilities rather than on the traditional dyadic and relational characteristics in order to explain (alliance) performance. Conceptual or case based evidence and recent empirical research provides evidence that firms that have build alliance capabilities are more likely to attain high levels of alliance performance (Simonin 1997; Anand and Khanna 2000; Kale et al. 2002; Lambe et al. 2002)

Research shows an implicit consensus that an alliance capability constitutes of a firm's ability to manage boundary-spanning activities by specific routines and processes. Most often, alliance capabilities are associated with the tasks of identifying partners, initiating the relationship, engaging in the ongoing management and the possible restructuring as well as the termination of the relationship (Simonin 1997; Khanna 1998; Lambe et al. 2002). The development and sustainability of such capabilities is almost always linked to cognition-based organisational

learning abilities (Schreiner and Corsten 2003). Such capabilities are build up either as a by-product of boundary-spanning activities or systematically through the use of knowledge management mechanism drawing on past experience (Simonin 1997; Gulati 1999; Kale and Singh 1999; Kale et al. 2001).
Many of these studies assume a direct relationship between the firm's alliance capability and alliance performance. This is for example illustrated by a study of Simonin (1997) who relates collaborative know-how directly to the attainment of intangible and tangible benefits. In other studies a positive relation was found between alliance experience and stock market value which was explained through a assumed direct relation between alliance capability and performance (Anand and Khanna 2000, Kale et al. 2002). However, in this study we question the direct relationship between alliance capability and alliance performance. In line with Amit and Schoemaker (1993) who come up with the argument that capabilities refer to the firm's capacity to deploy resources using processes to effect a desired outcome, we contend that the influence of alliance capabilities on alliance performance is mediated through (post) formation process factors such as alliance management and relational quality.

Alliance management is about formal organizational controls that support the management of information flows to satisfy the needs of the alliance as well as those of its individual partners (Geringer and Hebert 1989). In contrast, relational quality refers to the informal working relationship that exists between cooperating firms (Coleman 1990) and is a reflection of the pattern of interactions that facilitates and allows the effective functioning of the alliance on a day to day basis (Ring and Van de Ven 1994). These two post-formation factors are found to be of importance in alliance development (Ariño and de la Torre 1998).

This study 's objective is to develop and test a conceptual model relating alliance capabilities to alliance performance, mediated by relational quality and alliance management within the context of non-equity arrangements. To our knowledge no study yet has explicitly addressed let alone empirically evaluated such a model. With this study we want to make three principal contributions to the extant literature on alliance capabilities. First, we argue and empirically demonstrate that alliance capabilities are related to (post) formation factors, but not directly to alliance performance. In this manner it also contributes to prior work that found empirical support for the importance of post-formation dynamics (Reuer et al. 2002). Second, consistent with RBV we argue that having resources is not sufficient to attain high levels of performance. Appropriate deployment of these resources is required. This capability to deploy them productively is not uniformly distributed among firms (Ethiraj et al. 2005). Finally, our empirical focus is on utilizing non-equity arrangements compared to joint ventures (Gulati, 1995).

The remainder of the paper is organized as follows. In the next section we outline the theoretical considerations and subsequently introduce the hypotheses. Then we will present the research method followed by the empirical analysis of these hypothesis using data from a survey among non-equity alliances in the Netherlands. We conclude by discussing the results of the analysis and exploring its implications for alliance capabilities, alliance management and relational quality in collaborative arrangements.

Conceptual Background

A Resource Based Perspective on Alliances

The resource-based perspective suggests that the firm is a collection of heterogeneous resources, specifically tangible and intangible assets that are semi-permanently tied to the firm (Wernerfelt 1984). Recent literature on the RBV conceptualizes resources and capabilities along two lines. One line is to define resources rather broadly and to include all assets, capabilities, organizational processes, firm attributes, information, knowledge etc. (Barney 1991, Peteraf 1993). The other line delineates between resources and capabilities (Grant 1991, Amit and Schoemaker 1993) by arguing that resources consist of know how that can be traded, financial or physical assets, etc., whereas capabilities refer to a firm's capacity to deploy resources (Ethiraj, Kale et al. 2005). The latter line of conceptualisation is adopted in our paper.

Amit and Schoemaker (1993, p35) state that "the resource view holds that the type, magnitude and nature of a firm's resources and capabilities are important determinants of its profitability" and "capabilities, in contrast, refer to a firm's capacity to deploy resources, usually in combination, using organizational processes, to effect a desired end". In other words, sustained resource and capability heterogeneity is a potential source of competitive advantage. This view provides an important base for understanding the distinction between having and deploying organizational capabilities.

Cast within the context of our study, this suggests that having alliance capabilities is insufficient to attain high levels of alliance performance. Alliance capabilities should be deployed efficiently and effectively through managing (post) formation factors. The extent to which an organization recognizes opportunities and subsequently uses alliance capabilities to exploit them provides firms with an advantage to reap the benefits from its alliances (Ireland et al. 2002). This distinguishes firms from each other, as the alliance capabilities and the extent to which they are deployed are not uniformly distributed among firms (Ethiraj et al. 2005).

Thus, consistent with this view, we conclude that the utilization of alliance capabilities and its impact on alliance performance is mediated by (post)formation factors. In the next part of this section we will elaborate on alliance capabilities and performance and introduce two mediating factors: alliance management and relational quality.

Alliance capability

In this study we define an alliance capability as *the extent to which a firm possesses unique knowledge, skills, and institutionalized routines in order to form, manage, and evaluate alliances.* Alliance capabilities develop as a result of recombining and/or integrating knowledge which has been accumulated through prior alliance experiences. It is typically created through learning that involves making associations between a firm's past actions, the effectiveness of those actions and future actions (Fiol and Lyles 1985). This in turn results in heterogeneity between firms' alliance capabilities and the consequent differences in their potential to reap the benefits from their alliances.
Firms that have sufficient alliance experience often systematically and proactively scan and identify partners that have the complementary resources that are needed to "develop" a relationship portfolio or mix that complements existing competencies and enables them to occupy positions of competitive advantage (Hunt 1997). Firms that can identify such partners not only enhance their ability to compete but also improve their chances of alliance success (Simonin

1997, Dyer and Singh 1998, Sivadas and Dwyer 2000, Lambe et al. 2002). In addition, Varadarajan and Cunningham (1995) and Day (1995) suggest that firms that scan for promising partners may also often achieve an alliance 'first-mover' advantage that allows them to gain access to and pre-empt competition from scarce resources offered by potential alliance partners. Day (1995) argues that a firm that is adept at identifying, consummating, and managing strategic alliances is likely to have first mover advantage in bringing the best candidates into the relationship. Dyer et al. (2001) found that firms having the ability to form and manage alliances more effectively than their competitors have an important source of competitive advantage. For individual alliance managers, this happens when they learn how to broker alliance relationships such that partners develop and transfer knowledge that facilitates the pursuit of commercial opportunities (Dess and Shaw 2001).

In sum, an alliance capability refers to the institutionalized routines and unique knowledge that firms deploy for the formation, management, and termination of alliances. It implies that two firms may have different opportunities to reap the benefits within the same alliance. However, the extent to which a firm realizes this potential depends on how it uses its alliance capability. Hence, an alliance capability is idiosyncratic to the firm, whereas for example alliance management is idiosyncratic to a specific alliance.

Alliance Management

We define alliance management as *those activities that a firm conducts to achieve effective governance within an alliance*. It involves tasks related to the formal planning, coordinating and monitoring of the alliance. More specific, alliance management involves different stages, including: (1) specifying alliance objectives; (2) assessing the degree of partner fit; (3) analyzing the degree to which alliance outcomes can be expected to create value; (4) determining the anticipated response to stakeholders; (5) evaluating the alliance's progress and performance; and (6) specifying how alliance conflicts regarding strategic issues are to be handled.

Effective management requires that a firm understands the need to install formal coordination mechanism to monitor each alliance management stage. For example, awareness of developing a solid business case is important to assess whether the alliance is performing conform initial expectations. In addition, when conflicts arise a firm needs to find ways to balance their interests with those of their counterparts. The firm may implement reconciliation mechanisms (e.g. periodical meetings) to effectively manage the tension between cooperation and competition (Douma, Bilderbeek et al. 2000). Alliance managers that are capable of facilitating effective communication and coordination shape alliances with less management cost which in turn contributes to the further evolution of cooperative behaviour (Ireland et al. 2002).

In sum, alliance management refers to those formal activities conducted to make the alliance work. It should focus on maintaining or creating fit through specifying objectives, the development of procedures and tools, and on having monitoring mechanisms in place.

Relational Quality

Relational quality is defined as *"the extent to which the partners feel comfortable and are willing to rely on trust in dealing with another"* (Ariño et al. 2001 p. 111). Repeated joint actions involve those exchanges between two parties that cannot be specified a priori by formal contract (Heide and John 1990). According to the relational governance perspective, repeated joint actions and the social content embedded in them allow the alliance partners to develop a norm of

reciprocity (Lubatkin et al. 2001). As this norm evolves the threat of inter-organizational conflict and misunderstanding is mitigated or resolved. Relational norms prescribe acceptable behaviour at the onset of inter-organizational partnerships, which, if considered equitable by partner firms, eventually lead to future expectations of trust (Ring and Van de Ven 1992). In the literature relational quality often is related to the concept of trust (Kumar 1996, Geyskens et al., 1998; Ariño et al. 2001).

In general, empirical research shows that relational quality plays a pivotal role in the development of an alliance. Two dominant perspectives on relational quality can be distinguished. First an (economic) perspective that views it as both existent prior to a relationship and as a result of partner firm interaction. In contrast, the sociological perspective views relational quality as the result of repetitive interactions between actors. The latter approach is adopted in this study. In this case it refers to a cumulative and path-dependent process. These processes induce the development of relational norms (Heide and Miner 1992). These norms serve as an informal guideline for the partner firm on how to interact. For example, Zaheer et al. (1998) demonstrate how relational quality reduces negotiating costs in alliances and also enhances alliance performance. Although relational quality within a relationship attenuates the likelihood for conflict, it does only partially explain why alliances may succeed or fail.

Thus, relational quality is the extent to which partners feel comfortable and are willing to rely on trust in dealing with another. It is the result of repetitive interaction which can be partly managed, and is considered as important for the success of the alliance (Ariño et al. 2001).

Alliance Performance

In this study we define alliance performance as "*the extent to which firm's strategic goals are fulfilled and net-spill over effects of the alliance on other activities of the firm are acquired*". This definition is adapted from the study by Ariño (2003). Her work draws from organizational performance literature and three levels of performance were recognized that depend on the goals of consideration: organizational effectiveness, financial and operational performance (Venkatraman and Ramanujan, 1986). The most commonly used organizational effectiveness measure is an overall assessment of the firm's satisfaction with the alliance performance. Other organizational effectiveness measures used include the degree of fulfilment of strategic goals that the alliance aimed at covering and net-spill over effects of the alliance on other activities of the firm (Parkhe 1993). Financial measures include various measures of profitability, growth and cost position (for a review see Geringer and Herbert, 1991). Frequently used operational measures include stability measures such as longevity of the venture, owner or contract stability and survival. Building on the empirical insights found by Ariño (2003) on the construct validity of alliance performance we adopt two performance dimensions, net-spill over effects, goal-attainment. The third one, satisfaction refers to an overall assessment of the alliance and includes both process and outcome aspects in contrast to the other two outcome dimensions.

Hypotheses

In this section we present a conceptual model that relates alliance capabilities to alliance performance mediated by relational quality and alliance management. In short, our hypotheses build upon the notion that institutionalized organizational experience with alliances contributes to a firm's knowledge of how to successfully form and implement alliances (Simonin 1997, Spekman et al. 1999). Firms having such experience will improve their ability to select, negotiate and structure alliances in a way that allows them to achieve their objectives more effectively (Day

1995, Spekman et al. 1999). Furthermore, it allows them to acquire and combine their most basic resource advantage in a fashion that contributes to alliance success by means of developing relational quality and implementing control mechanisms.

Our view is consistent with findings in other recent studies on the deployment of organizational capabilities. For example, Ethiraj et al. (2005: p43) in their study on project performance in the software services industry stated that project profitability differences could be a function of differences in the way the same resources are deployed by the firm. They also found some evidence that an improvement in the productive deployment of resources over time yielded increases in project profitability. In another study among small firms operating in traditional industries Edelman et al. (2005) found that skills alone do not guarantee success but that skills are mediated by the strategy defined as the resource deployment mechanism. These findings are in line with our key arguments and can be extended to the purpose of this study.

On the one hand, deployment of a firm's alliance capability will lead to improved alliance management which in turn is positively related to alliance performance and the development of relational quality, while on the other hand deployment may lead to a better relational quality, which in turn is also positively related to alliance performance. Thus, the effects of alliance management and relational quality are enabled through the deployment of a firm's alliance capability. Next we present three hypotheses that reflect these indirect relationships between alliance capabilities and alliance performance.

As firms will be heterogenic in their ability to develop an alliance capability there will be differences in the ability to manage the alliance. Experience with alliances is a resource that can be leveraged across an organization, because it contributes to knowledge about how to manage and use alliances (Simonin 1997). Prior experience helps firms to effectively build partner-specific routines of coordinating resources and tasks (Kale et al. 2002). Anecdotal data and case-based studies have also provided support for the argument that some firms learn how to develop and manage alliances more effectively than others (Alliance Analyst, 1996, Dyer, 1996). For example, Day (1995) noted that experience contributes to the quality of a firm's 'alliance management' by, among others, improving their abilities with respect to "selecting and negotiating with potential partners" and "planning the mechanics of the alliance so that roles and responsibilities are clear cut". Much of the knowledge about finding, developing and managing alliances is "tacit" and firms must learn by doing (Anand and Khanna 2000; Lambe et al. 2002). In addition, firms with an alliance capability have the ability to develop capable alliance managers. These managers enable firms to plan and navigate the mechanics of an alliance in a way that allows roles and responsibilities to be clearly articulated and agreed upon. Simonin (1997) stated that the lower-than-average failure rate of joint ventures in the oil industry could be explained by the fact that managers have learned the essentials of collaboration. Lambe et al. (2002) draw the conclusion that competent alliance managers will negotiate structure and operate alliances in ways that allow such firms to secure attractive alliance partners and to minimize the chances of alliance mismanagement. Furthermore, they will work with their partner firms on successfully combining and synthesizing their complementary resources into idiosyncratic resources that may well lead to competitive advantage. In another study Kale et al. (2002) stated that when a firm makes an investment in a dedicated alliance function designed to capture and apply the know-how from its alliance experience, its alliance success rate increases. They come to the conclusion that although alliance experience is important it seems to facilitate through the creation of a dedicated structure to co-ordinate and leverage that experience more effectively. Having such a function can improve firms' alliance abilities to be able to install efficient and effective alliance management control.

Active alliance management is a prerequisite for transforming resources into value. Initial alliance design flaws can be attenuated or even corrected through active alliance management, which is, repairing the possible misalignment in partner fit, which leads to improved performance. For example Dyer et al. (2001) found that an ability to form and manage alliances more effectively than competitors is an important source of competitive advantage. From a transaction cost perspective, the management of alliances creates value when it is both more effective and efficient than alternative organizational hierarchies or the market. Moreover, it reduces the cost of residual uncertainty, the uncertainty remaining after appropriate analyses have been completed when forming and using an alliance (Ireland et al. 2002). Lambe et al (2002) found evidence that partner firms who successfully combine and synthesize their complementary resources into idiosyncratic resources may achieve their objectives. Goal attainment through successful resource integration is the result of active alliance management (Ireland et al. 2002). Completing these managerial tasks in a competitively superior manner contributes to alliance performance.

In sum, both conceptual and empirical studies support the notion that deployment of alliance capabilities affects alliance management positively, which in turn is positively related to alliance performance. In other words, we contend that an indirect relationship exists and therefore, we propose the next hypothesis.

Hypothesis 1: The positive relation between alliance capability and alliance performance is mediated through alliance management

As firms will be heterogenic in their ability to develop an alliance capability there will be differences in the ability to develop relational quality. Organisational experience with alliances contributes to a firm's knowledge of how to successfully develop a good working relationship (Simonin 1997; Spekman et al 1999). Firms having such experience will improve their ability to select, negotiate and structure alliances so that they create a trustworthy climate with their partner (Day 1995). Furthermore, an alliance capability implies that a firm produces capable alliance managers, which have knowledge and skills to interact with their counterparts without inducing conflicts. The latter implies that partner firms develop a willingness to perceive cooperation as an end in itself. It is through relational norms and social control that the alliance is actually enacted and implemented. They facilitate exchange and transfer of information and know-how across the alliance interface (Kale et al. 2002). As in all business interactions, the building of relational quality depends on the partnering signalling to each other and the interpretation and response to this signalling. This process is enhanced by a feedback pattern; a trust cycle (Butler, 1995; Zand, 1972). Having prior experience, accumulated in tacit knowledge or an alliance function, provides firms with an edge compared to those without, in their ability to develop relational quality.

Relational quality is often related to alliance performance and ample empirical studies have found a positive relationship (e.g. Inkpen and Birkenshaw 1994, Aulakh et al. 1996, Zaheer et al. 1998, Lane et al. 2001, Jap and Anderson 2003, Kotabe et al. 2003, Kauser and Shaw 2004, Luo and Park 2004). It's an important attribute for the success of alliances (Ariño et al., 2001 p. 123). Specifically it (1) allows trust to emerge as an important complement to other governance or control mechanisms; (2) encourages collaboration to go beyond the narrow scope of the agreement; (3) promotes the resolution of conflict and the overcoming of normal obstacles in the conduct of the alliance's business; and (4) accelerates actions that may be essential to respond to changes in the competitive and economic environment. The pattern of interaction facilitates and allows the effective functioning of the alliance on a day to day basis through the

role of personal connections between cooperating firms (Palay 1985). The extent to which these social actors interact smoothly has a positive impact on the alliance outcome (Ring and Van de Ven 1994). Strong relational quality usually engenders close interaction between alliance partners and facilitates exchange of information and know-how across the alliance interface that builds in through a feedback pattern of a 'trust-cycle' (Zand 1972, Butler 1995). Thus, the ability to develop relational quality is necessary for alliance performance to be realized (Dyer and Kale. 2001, Ireland et al. 2002).

In other words, alliance capabilities have a positive effect on the development of relational quality and the latter has been found to be positively related to alliance performance. Therefore, we propose the next hypothesis that reflects this indirect relationship.

Hypothesis 2: The positive relation between alliance capability and alliance performance is mediated through relational quality.

The third hypothesis pertains to the relationship between alliance capability and relational quality as mediated through alliance management. As argued earlier, the deployment of alliance capabilities is positively related to alliance management, however mixed evidence is available on the relationship between alliance management and relational quality. Within the literature an on-going debate is dealing with the extent to which formal (i.e. contractual safeguards) and informal control within alliances are substitutes or complements (Das and Teng 1998, Das and Teng 2001, Lui and Ngo 2004, Poppo and Zenger 2002). Generally, these studies refer to issues related to contracts, in contrast to our study in which we define alliance management as activities to achieve efficient governance. In other words, it is an institutional arrangement guiding the development of relational quality.

Firms who are able to facilitate effective communication and governance shape alliances in ways that foster trust (Sivadas and Dwyer 2000). Relational quality depends not only on firm specific alliance capabilities, but also on managerial tasks initiated to make a particular alliance work. As a partner engages into an alliance well prepared with respect to its alliance management activities they send a positive signal to their counterpart. For example, formal mechanisms to resolve disputes, installing evaluation tools and developing business plans may contribute to an open and transparent working climate between the partners. So, alliance management activities, if deployed properly, have a positive affect on the working relationship. Therefore, we propose the next hypothesis.

Hypothesis 3: Besides a direct positive relationship between alliance capability and relational quality, this relationship is also mediated through alliance management.

Research Method

The research involved both a conceptual and an empirical testing phase. Based on an extensive literature review the constructs were identified and hypotheses were developed as presented in the preceding section. Subsequently, operational definitions were developed both using existing measures or newly developed ones. A mail survey was conducted among a sample of Dutch alliance managers responsible for non-equity alliances. We followed the guidelines developed by Baron and Kenny (1986) for testing mediation models. However, responding to critics on this approach (Shaver 2005), we first used Partial Least Squares (PLS) analysis to validate and estimate the proposed model (Hulland 1999) and second we tested for the significance of the total and indirect effects (Preacher and Hayer 2004).

Sample and Data

To test the hypotheses, we collected data using a questionnaire survey of non-equity alliances in the agribusiness and the food industry in the Netherlands. We obtained contact details through three Dutch temporary and subsidized project organisations - KLICT, CONNECT and NIDO - that had the aim to stimulate cooperation between different parties, such as firms, research institutions and other private or public organisations, in order to develop innovative products and services. Each project organisation provided an overview of alliance projects and contact affiliations.

To ensure high response rates several techniques were employed such as the inclusion of a self-addressed reply paid envelop, a head letter referring to both the University and the project-organisation, assuring anonymity and we provided an incentive by donating to a charity organisation for each returned questionnaire. Additionally, each organisation was contacted by phone to assure that the respondent was knowledgeable about the selected alliance. This resulted in the distribution of 248 questionnaires, of which 101 were returned. After checking the responses 17 questionnaires (11 incomplete and 6 outliers) were eliminated, reducing the sample to 84 useable questionnaires (33,9% response rate). The respondents' firms operated in a variety of industries, such as production (12), research (11), government (10), trade (10), transport (8), consultancy (6), construction (6) and other industries (21). Due to the nature of the partnerships, public-private or private-private, our sample contains 20 non-profit organizations and 54 profit-organizations (10 missing). The sizes of the organizations varied from 1 till 27,000 with a median of 300 employees per organization. To assess the quality of the data, three tests were conducted: a non-response bias test, a common method bias test and t-tests to assess the impact of control variables.

To assess non-response bias the sample was split in two groups based on the date on which the questionnaire was returned. The two groups of early and late responders were then compared on all items separately and on the latent scores derived from the PLS analysis (Armstrong and Overton 1977). The results indicate no significant differences between the groups.

Common method bias was assessed with *Harman's single factor test*. This test states that if one component emerges, after conducting a principal component factor analysis without rotation on all questionnaire items, which explains a large part of the variance, common method bias may be present in the data. Results indicate the emergence of four components (eigen values > 1) respectively explaining 26.3, 15.4, 11.3 and 8.6 percent. This suggests limited concerns for common method bias.

The final test assessed whether control variables were related to either the independent or dependent variables. Three control variables were created and t-tests were conducted on both individual items and latent scores derived from PLS analysis. The first variable referred to the profit or non-profit orientation of a firm. Comparison between the two groups for both individual items and the scores derived from the PLS analysis indicated no significant ($p < 0.05$) difference between the two groups. The variable firm size was split into two groups based on the median of the number of staff an organization employed (i.e. 300 employees). A comparison of large organizations and small organizations within the sample indicated no significant differences ($p < 0.05$). The organizations in our sample operated in a variety of industries. A control variable was created that distinguished organizations with production, trade or service orientations from organizations that primarily provided support such as consultancy firms, industry support associations and government. Again, no significant differences were found ($p < 0.05$).

Overall, our tests suggest a representative sample with limited concerns for non-response bias, common method bias and impact of control variables.

Measures and Scales

Building on our literature review we selected existing measures and scales and when necessary adapted them to the idiosyncrasies of our study. The initial questionnaire was pre-tested among experts and alliance managers to increase content validity of the items (Kalafatis et al. 2005). The final questionnaire consisted of items that referred to 6 dimensions; three of them of them part of a formative latent construct (i.e. alliance capability). Each item was assessed with a 5 point Likert scale. See appendix one for the questionnaire.

Dependent variable

Ariño (2003) found in her study on the construct validity of alliance performance that alliance performance is both planned and emergent, consist of a process and outcome aspect and consists of multiple performance dimensions. In this study the firm perspective is adopted and the focus is on alliance outcomes. More precise, alliance performance is measured with the degree of fulfilment of the firm's strategic goals and the net spill-over effects of the alliance on other activities of the firm (Parkhe 1993). Goal attainment refers to the extent to which a firm attains its goals within the alliance. An 11-item measure was used to assess goal attainment versus the importance of that specific goal. We used the product term (Geringer and Hebert 1991) and constructed an one item-measure for goal attainment. Net spill-over refers to the net additional benefits a firm may attain in other activities that are non-related to the alliance. Both items were entered into the PLS analysis.

Independent variables

The first independent variable is alliance capability. We reviewed prior literature (Kale et al. 2002, Lambe et al. 2002, Draulans et al. 2003) and we decided to adapt the dimensions and items as developed by Lambe et al. (2002) to the purpose of our study. They identified three dimensions of "joint alliance competence" and referred to them as "alliance manager development capability", "partner identification propensity", and "alliance experience". As in this study the unit of analysis is the firm, we adapted the original measures. We refer to manager development capability (MDC) as the extent to which the focal firm is capable in training and developing managers that can successfully run alliances. The measure consists of two reflective items. Partner identification propensity (PIP) refers to the extent that the firm is continuously looking for new collaboration opportunities. Our measure consists of three reflective items. Alliance experience (AE) refers to past participation in alliances. The original measure consisted of three items, but in the final analysis we only used two. In our sample alliance experience is not related to the development of a separate alliance function or employee as suggested in prior studies (Draulans et al. 2003).The three dimensions of alliance capability showed both convergent and divergent validity (see table 1). They have good factor loadings on their respective items (> 0.7), and validity is further corroborated by reliability scores of 0.776, 0.608, and 0.791 for PIP, MDC, and AE. Consistent with Lambe et al. (2002) we concluded that the three separate dimensions are formative and hence alliance capability can be measured as the mean of the individual items. We utilized this mean score for further PLS analysis.

Table 1. Factor Analysis

Items	Loading			Alpha
Partner Identification Propensity				
AC_1: Our organization is continuously looking for new partners.	.855	.115	-.002	0.776
AC_2: Our organization assesses whether new partner opportunities contribute to the core business	.844	-.124	.029	
AC_3: Our organization seeks alliances that contribute the competitive advantage	.797	.029	-.040	
Management Development Capabilities				
AC_4: Our organization has specific training programs for managers involved in alliances	-.023	.853	-.002	0.608
AC_5: Our organization does understand the competences needed for managers to successfully manage alliances.	.029	.833	-.007	
Alliance Experience				
AC_6: Our organization has had multiple alliances	.014	-.071	-.933	0.791
AC_7: Our organization has experience with alliances.	-.011	.079	-.882	

* Questions are translated from the Dutch into English for publications purposes only.
** Exploratory factor analysis (principal components with oblique rotation)

The second independent variable is alliance management. Although extensively discussed in the literature (Spekman et al. 1998; Ireland et al. 2002), we could not find an appropriate measure for the purpose of our study. Hence, we developed 6 items that referred to issues related to alliance management. Exploratory factor analysis (principal component with varimax rotation) resulted in four items that emerged as an independent component. The four reflective items refer to developing a business plan, allocation of staff and resources, development of specific tools and instruments and the instalment of rules and procedures for the alliance (= 0.746). These four items were used for the PLS analysis.

The third independent variable refers to relational quality. Relational quality refers to “a type of expectation that alleviates the fear that one’s exchange partner will act opportunistically” (Bradach and Eccles 1989). Following Gulati (1995), we contend that relational quality emerges between two organizations as they repeatedly interact. The idea of relational quality emerging from prior contact is based on the premise that through ongoing interaction, firms learn about each other and develop trust around norms of equity. To capture this notion of pure interfirm relational quality (Currall and Inkpen 2002) we used four items that referred to the level of trust, the extent to which partner would stick to the original agreement, and are sceptical in towards the exchange of information (Aulakh et al. 1996; Sarkar et al. 2001). One item was eliminated from further analysis, as it showed poor reliability and convergent validity. A possible reason could be that the item was intentionally reversely phrased (Podsakoff et al. 2003). The three remaining items (= 0.832) were entered into the PLS analysis.

Analysis and Results

Measurement Model

We used PLS analysis to estimate our model (Hansmann and Ringle 2004). PLS estimates latent variables as exact linear combinations of observed measures and therefore assumes that all measured variance is useful variance to be explained. PLS makes minimal demands on sample size, thus making it especially appropriate for testing structural models with relatively smaller sample sizes. We followed the two stage procedure as suggested by Hulland (1999): (a) the assessment and reliability of the measurement model and (b) the testing of the structural model. The adequacy of the measurement model can be assessed through examining individual-item

reliabilities, the convergent validity of the measures and assessing discriminant validity. We first assessed individual-item reliability by examining the loading of the items on their respective constructs. See table 2 for the items loadings and composite reliabilities. In general, loadings above 0.707 are desired to accept items which suggest more shared variance between the construct and its measures than error variance (Barclay et al. 1995; Hulland 1999). In our study, all loadings were above the cut-off value indicating individual item reliability. Next, we focused on assessing the construct validity of the constructs by computing the composite reliabilities. Following prior research (e.g. Sarkar et al. 2001) we used the internal consistency measure developed by Fornell and Larcker (1981) who argue that their measure of internal consistency is superior to Cronbach's alpha since the loadings estimated within the model are used in its computation. All constructs exhibit reliabilities higher than the cut-off value of 0.7, thus indicating that the reliabilities of all the constructs are adequate (Hulland 1999). Finally, to complete assessment of the model, we examined discriminant validity, which represents the extent to which measures of a given construct differ from measures of other constructs in the same model. Fornell and Larcker (1981) suggested the use of "average variance extracted" to assess discriminant validity. As presented in table 3, the square root of average variances extracted in all constructs was greater than the correlations between the constructs, implying discriminant validity. Additionally, all measures loaded higher on their intended constructs than on other constructs (Hulland 1999). Overall, these statistics indicate that the psychometric properties of the model are sufficiently strong to enable interpretation of structural estimates.

Table 2. PLS Measurement Model

Items		Loadings	Internal Consistency
AM_1:	Our organization has made a business plan for the alliance.	0.7232	0.8343
AM_2;	Our organization had allocated staff and resources to the alliance prior to formation.	0.7943	
AM_3:	Our organization has developed specific instruments to support the collaboration.	0.7324	
AM_4:	Our organization has constructed specific rules and procedures.	0.7349	
RQ_1:	The collaboration is characterized by trust.	0.9080	0.9022
RQ_2:	Our organization is confident that the partner will stick to the original arrangements.	0.8354	
RQ_3:	The collaboration is viewed as a venture with fair and equal interactions.	0.8614	
AP_1;	Goal attainment	0.6488	0.7005
AP_2;	Net spill-over	0.8146	

* Questions are translated from the Dutch into English for publications purposes only
** Alliance capability is not included as it consists of a single item measure

Table 3. Correlation Matrix and Average Variance Extracted

	Construct	1	2	3	4
1	Alliance Capabilities	*1*			
2	Alliance Management	0.340***	***0.746***		
3	Relational Quality	0.222*	0.038	***0.868***	
4	Alliance Performance	0.285**	0.271**	0.531***	***0.736***

N=84
* p 0.05; ** p 0.01; *** p 0.001
** The diagonal shows the square root of the average variance extracted for each construct

Structural Model

To assess mediating effects Baron and Kenny (1986 p. 1177) state that the path coefficient between the independent and dependent variable has to be significant. Secondly, they state that as the mediating variables are included in the model this path coefficient should decrease in size and become (preferably) non significant. Finally, both the path coefficients between independent variable and mediating variable as well as between the mediating variable and the dependent variable should be significant. We followed the Baron and Kenny procedure, however with two extensions that overcome part of the critics on this approach.

First, instead of using multiple regressions we used PLS. This technique has advantages with regards to three assumptions related to indirect relationships (Baron and Kenny 1986, Shaver 2005): (1) no measurement error in the mediator, (2) the dependent variable may not cause the mediator, and (3) if the procedure is followed by Baron and Kenny (1986) the errors of the two equations of step three should be uncorrelated. With respect to the first assumption, a structural model with multiple items is used to calculate the latent scores. The use of multiple items reduces the likelihood for measurement error. In this study we respectively used three items for relational quality and four items for alliance management. Hence, the adopted approach reduced concerns for estimation biases and inconsistencies. In regards to the second assumption, we designed the questionnaire in such a way that the items for the dependent variable were psychologically separated from the independent variables. In this study, we assume that alliance performance is caused by the mediators and not reversely. Concerning the third assumption, we mitigated consequences of measurement error by using multiple items and we assumed that measurement error is the sole driver of the correlation between the error terms in the two equations (Shaver 2005).

Second, the Baron and Kenny (1996) procedure does not provide a statistical test of the size and magnitude of the indirect relationships. Although, such tests for single mediation models have been developed (Preacher and Hayes 2004), we used a SPSS macro especially developed to generate estimates for indirect effects in a multiple mediator model (Preacher and Hayes 2005). This test estimates the effect for the individual indirect relationships, the total effect and it allows pairwise comparisons between the indirect effects. In addition, it presents bias-corrected and accelerated bootstrap confidence intervals to assess the significance of single indirect relationships and the total effect which is a more accurate estimation than if a normal theory approach would have been adopted (Preacher and Hayer 2004).

We are aware, that alternative estimations techniques, such as 2SLS and LISREL, would provide a more comprehensive approach. Also adding additional variables to the model with correlations only to the mediators may improve the quality of the proposed model. However, the nature of the data and the sample size do not allow the application of these techniques (Kline 1998) and adding variables may not solve estimation bias concerns (Shaver 2005 p. 347). As a consequence, the results reported in this study should be interpreted as indicative, which resonates with the research objective and design.

Direct Effects

When estimating a structural model with PLS, it does not attempt to minimize residual item covariance, so there is no summary statistic to measure the overall fit of models as in the case of covariance structure analysis techniques. PLS has as its primary objective the minimization of error in all endogenous constructs. The degree to which any particular PLS model accomplishes

this objective can be determined by examining the R^2 values for the dependent constructs and the sign and significance of path coefficients (Hulland, 1999).We used a bootstrapping method with replacement (200 drawings of the original sample) to assess the statistical significance of the parameter estimates and standard errors were computed on the basis of 5000 bootstrapping runs. Results of the structural model are given in table 4 and visualized in figure 1.

Table 4. PLS Results

			Standardized Coefficients			Bootstrapping Direct Relations		
Independent Mediators	**Dependent**	**R^2**	**Direct**	**Indirect**	**Total[a]**	**Mean of sub-samples**	**Standard deviation**	**T-statistic**
Alliance Capability	Alliance Management	0.115	0.340***		0.340	0.34	0.10	3.36
Alliance Capability	Relational Quality	0.057	0.236*	ns	0.236	0.22	0.12	2.04
Alliance Management			0.042			-0.02	0.13	0.33
Alliance Capability	Alliance Performance	0.354	0.100	0.193	0.193	0.09	0.11	0.90
Alliance Management			0.219*			0.22	0.10	2.08
Relational Quality			0.501***			0.50	0.10	4.82

N=84
Note:ns = not significant
* p 0.05; ** p 0.01; *** p 0.001
a. only statistical significant indirect effects were included in the manual computation

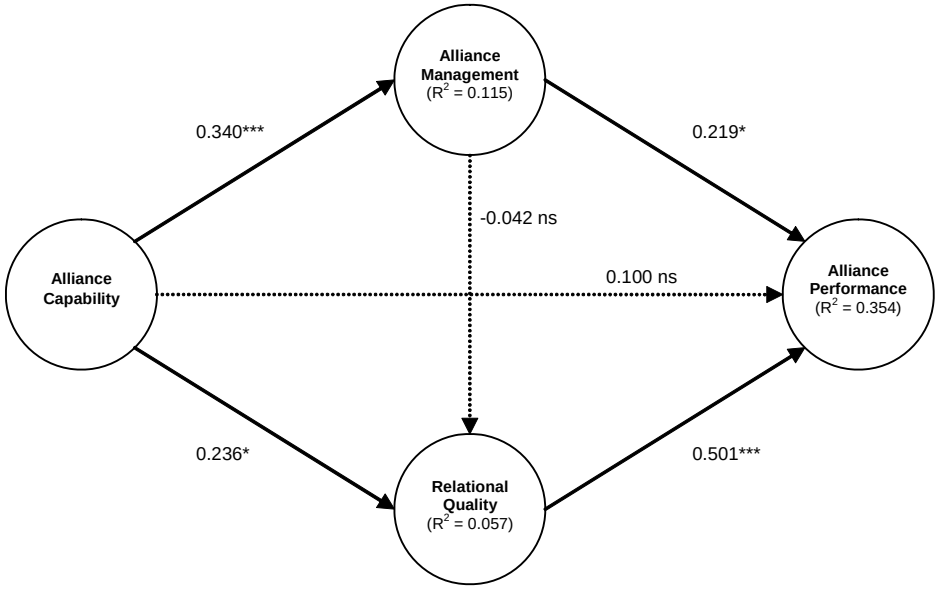

Figure 1. PLS Structural Model

N=84; Note: ns = not significant; * p 0.05; ** p 0.01; *** p 0.001

In order to test our three hypotheses we first needed to estimate the direct effects in our model. The R^2 values for alliance performance, alliance management and relational quality are respectively 0.354, 0.116, and 0.051. The results further indicate that alliance capability is not significantly related to alliance performance (β= 0.100, $p > 0.05$). Both alliance management and relational quality are positively and significant related to alliance performance (β= 0.219, p <

0.05; $\beta = 0.501$, $p < 0.05$). As expected alliance capability is positively related to alliance management ($\beta = 0.340$, $p < 0.05$) as well as to relational quality ($\beta = 0.236$, $p < 0.05$). However, contrary to expectations there was no relation between alliance management and relational quality as the path coefficient is not significant ($\beta = -0.042$, $p > 0.05$).

Mediating effects

A subjective assessment of our results suggests that the conditions stipulated by Baron and Kenny (1986) for a mediating model were satisfied. In other words, empirical results indicated that the relation between alliance capability and alliance performance is mediated by both alliance management and relational quality. In addition, the statistical test of the effect of the indirect relationships corroborates this interpretation. Next we present the results of the Baron and Kenny (1986) procedure and subsequently the results for the significance tests using bias-corrected and accelerated bootstrap confidence intervals with 5000 bootstrap runs (Preacher and Hayes 2005).

The correlation matrix (table 3) shows that alliance capability is positively and significantly related to alliance performance ($r = 0.285$, $p < 0.05$), hence meeting the first Baron and Kenny (1986) condition. The path coefficient of the direct relation between alliance capability and alliance performance becomes non-significant ($\beta = 0.100$, $p > 0.05$), when both mediating variables are included in the model (see figure 1). Additionally, if all the direct paths are significant, the indirect effects can be taken as significant too, which is the case in our study. The path coefficients from alliance capability to alliance management and from the latter to alliance performance are significant, thus providing support for hypothesis 1 (indirect effect = 0.075). Similarly, the path coefficients between alliance capabilities and relational quality and between relational quality and alliance performance are significant, hence corroborating hypothesis 2. The total indirect effect is 0.118. As the path coefficient between alliance management and relational quality is non-significant, no indirect effect exists between alliance capabilities and relational quality, thus rejecting hypothesis 3. Additionally, we investigated the contribution of the alliance management and relational quality variables to the explanatory model. Specifically, we examined the increase in of R^2 alliance performance when these variables were included in the model. The significant increase in R^2 from 0.081 to 0.354 ($F = 14.601$) indicates that both mediating variables contribute substantially to the explanatory power of the model. Additionally, the standardized indirect effect size was 0.193 suggesting a medium effect at the structural level (Cohen 1988) and supporting our hypotheses.

The Baron and Kenny (1986) procedure does not provide a statistical to assess whether the total effect of the indirect relationships is significant. Hence, we corroborated our findings with a significance test following the procedure as suggested by Preacher and Hayes (2005). The results confirm our interpretation of the findings earlier discussed (see table 5). We used the latent scores as generated by the PLS estimation as input for the multiple mediation model estimation. Path coefficients within the model and explained variance for mediators and alliance performance were equal to the results generated by PLS, however minor differences emerged due to rounding errors. The results showed that the direct effect of alliance capability on alliance performance was not significant ($\beta = 0.100$, $p > 0.05$). However, within the full mediation model the total effect of alliance capabilities on alliance performance was significant (0.184, $p < 0.05$), suggesting that mediators cause this effect. The mediation effects of both alliance management (0.774, $p < 0.05$) and relational quality were significant (0.111, $p < 0.05$) supporting our hypotheses one and two. In addition, results showed no significant difference existed between the effects of either meditation variable (0.0336, $p > 0.5$). Unfortunately, macro does not allow to

simultaneously test the third hypothesis. A separate estimation indicated that the mediation effect of alliance management, between the relation of alliance capabilities and relational quality is not significant (-0.0143, $p > 0.05$), hence no support, similar to the PLS outcomes, was found for hypothesis 3.

Table 5. Significance Test Multiple Mediation Model

	Sample	Bootstrap	Bias	Standard Error	Bias-corrected and accelerated bootstrap confidence intervals (95%)[a] Low limit	Upper limit
Total effect: AC → AP	.1854	.1856	.0003	.0809	.0417	.3597
Hypothesis 1: AC → AM → AP	.0744	.0743	.0000	.0418	.0007	.2601
Hypothesis 2: AC → RQ → AP	.1110	.1113	.0003	.0643	.0101	.1796
Comparison H_1 and$_2$	.0366	.0369	.0003	.0723	-.1065	.1862
Total effect: AC → RC	-.0143	-.0158	-.0015	.0407	-.1099	.0590
Hypothesis 3: AC → RQ → AP	-.0143	-.0158	-.0015	.0407	-.1099	.0590

N=84

If confidence interval contains 0, than the estimate is not significant at the 5% level

Taking these findings together, significant indirect paths, substantial increase in R^2, and a significance test of the total and indirect effects indicate an important role for alliance management and relational quality as mediating variables.

Discussion

This study examined the relation between alliance capability and alliance performance mediated by alliance management and relational quality in non-equity alliances. The empirical results from a survey of 84 non-equity organizations in the Netherlands provides evidence that alliance capabilities are related to post-formation factors, but not directly to alliance performance.

Our findings contrast prior work on alliance capabilities, especially studies that have assumed a direct relationship between alliance capabilities and alliance performance. Although our study is explorative, our analysis shows that a significant direct relationship between alliance capabilities and alliance performance disappeared when mediation variables were included into the analysis. This implies that empirical studies that aim to understand this relationship without considering mediating variables could be characterized by conceptual limitations and estimation biases.

Furthermore, a fine-grained examination of the results reveals that a firm's alliance capability deployment has a differential impact on (post)formation alliance processes. In our study alliance capabilities are stronger related to alliance management than to relational quality. This suggests that firms utilize accumulated knowledge and skills on alliances primarily to implement activities to manage the alliance while these capabilities are contributing less to the development of a working relationship. However, the relation between relational quality and alliance performance is much stronger than the relationship between alliance management and performance. These findings provide support to the relational governance perspective which points out the important role of personal connections and relationships between cooperating firms (Palay 1985, Ring and Van de Ven 1994), despite alliance management efforts. Apparently, alliance objectives are achieved within contractual alliance through interpersonal interactions and these repeated interactions over time lead to systematize and shared organizational

values, which help in building trust between partners (Aulakh et al. 1996). For example, our results are in line with Lui and Ngo (2004) who found in their study of contractual architect-contractor partnerships a positive effect of goodwill trust on satisfaction with projects and completion of projects on time. In sum, our findings suggest that both relational quality and alliance management are mediating the relationship between alliance capabilities and alliance performance.

Our findings also support prior work on alliances and are consistent with the RBV's logic that having capabilities is not sufficient to attain superior performance; firms should adequately deploy these capabilities (Edelman et al. 2005). Results suggest that firms that are capable of effectively deploying their alliance capability in the entire alliance process will gain better returns from their alliances. It also implies that firms that learn from prior experience will only have an advantage (e.g. Simonin 1997) if they are capable to deploy their, especially, "tacit" knowledge. Moreover, our findings corroborate work on alliance dynamics as recently alliance studies have shifted focus from initial founding conditions to the importance of (post) formation dynamics (Reuer et al. 2002). This study's results illustrate the importance of relational quality and alliance management as important factors in the development of the alliance (Ariño and de la Torre 1998).

Our results have some important implications for managers. First, it may be important for firms to invest in the development of an alliance capability as findings indicate that there is a relationship with alliance processes that shape the alliance and the performance of it. However, developing an alliance capability is not sufficient. Managers have also to be aware of how this capability can be deployed to effectively manage the alliance. Using the alliance capability to complete managerial tasks involves a managerial logic that governs alliance-related decision-making processes throughout the firm (Ireland et al. 2002). It represents a shared belief about how activities should be accomplished. Finally, managing an alliance is not a static event, in contrary it is a process that requires continues management if done properly it will improve alliance performance.

Several caveats are appropriate in interpreting the results of this study. First, following suggestions within the literature, adding a variable related to the mediator and not to the dependent variable to our model may provide a more precise estimation of the mediation effect (Shaver 2005). In addition, a larger sample would enable the use of more sophisticated statistical analyses. Both suggestions together could provide a more in-depth explanation of the reported mediating effects. Second, further refinement and extension of the used measures and scales could be considered. Although all variables exhibit construct validity, there could be theoretical arguments to include other dimensions. For example, relational quality is conceptualized as the trust that exists between partners. Research of Kauser and Shaw (2004) found that besides trust, factors such as commitment and absence of conflict are related to alliance performance. Third, the nature of our data and data collection approach may cause concerns for biases. Although we accounted for three of them, biases may still be present. Subsequent studies may adopt longitudinal research designs, approach multiple respondents, and collect dyad level data to overcome these biases. Finally, we have limited our sample to non-equity partnerships that had the aim to develop innovative products and services by means of public-private-partnerships. Thus, our findings may not be generalised to other non-equity arrangements or let alone to equity arrangements. Relations between alliance capability, alliance management and relational quality may be different due to variations in risk tolerance associated with different equity arrangements (Das and Teng 2001).

To summarize, this study provides evidence that it is important for researchers to be aware of mediating variables. The presence of indirect effects suggests that any omission of these variables from a theoretical model could lead to an erroneous estimation of the dependent variable(s). It also has shown that the direct relationship between alliance capability and alliance performance is eliminated when mediating variables, such as alliance management and relational quality, are incorporated into the model.

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Appendix 1: Questionnaire

Management Development Capabilities*
1. Our organization has specific training programs for managers involved in alliances.
2. Our organization does understand the competences/requirements for managers to successfully manage alliances.

Partner Identification Propensity*
3. Our organization is continuously looking for new partners.
4. Our organization assess whether new partner opportunities contribute to the core business
5. Our organization seeks alliances that contribute the competitive advantage

Alliance Experience*
6. Our organization has much collaboration.
7. Our organization has experience with alliances.
8. Our organization has a designated employee or department responsible for the organization's alliances.***

Relational Quality*
9.Our organization considers this collaboration as being characterized by trust.
10.Our organization is confident that the partner will stick to the original arrangements.
11.The partners are sceptical about exchanged information (R) ***
12.The collaboration is viewed as a venture with fair and equal interactions.

Alliance Management*
13.Our organization has determined the objectives of the alliance prior to formation ***
14.Our organization has made a business plan for the alliance.
15.Our organization had allocated staff and resources to the alliance prior to formation.
16.Our organization has developed specific instruments to support the collaboration.

17.Our organization has constructed specific rules and procedures.
18.Our organization implemented periodic evaluations.***

Alliance Performance**
19a.Please state the importance of each objective at formation of the alliance?
19b.To what extent did you realize your objectives?

- Decrease production costs
- Increase market power
- Obtain access to new market
- Development of new technology
- Blocking competition
- Meeting government requirements
- Initiate product development
- Improve financial position
- Obtaining new knowledge and skills
- Improve competitive position
- Quality management
- Reduce risks
- Other:……

20.Many collaborative ventures result in SIDE EFFECTS for their parent firms. For example, there are POSITIVE side effects when the skills that are being developed through the venture can be applied profitably to other operations within the company. There are NEGATIVE side effects if the collaboration has damaging repercussions on other activities in the company. In this venture, the net side effects for your firm have been

* 5 point Likert scale: strongly disagree – strongly agree
** 5 point Likert scale: 19a: not important – very important; 19b: not at all – completely; 20: very negative – very positive
*** Item has been removed from final analysis

The questionnaire has been translated into English for publication purposes only.