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 a firm's 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 a firm's alliance capability and alliance performance.

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

1   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, 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 firms. 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 et al., 2002; Kale, Singh, 1999) 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 (Anand, Khanna, 2000; Kale et al., 2002; Lambe et al., 2002; Simonin, 1997).

Research shows an implicit consensus that an alliance capability constitutes of a firm's ability to manage boundary-spanning activities by specific 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 (Khanna, 1998; Lambe et al., 2002; Simonin, 1997). The development and sustainability of such capabilities is almost always linked to cognition-based organisational learning abilities (Schreiner, 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 (Gulati, 1998; Kale et al., 2001; Simonin, 1997). Moreover, these studies assume a direct relationship between the firm's alliance capability and alliance performance. In this study, however, we question this direct relationship as capabilities refer to the firm's ability to deploy resources (Schreiner et al., 2009; Sirmon et al., 2008) using processes to effectuate a desired outcome (Amit, Schoemaker, 1993). More specifically, we contend that the effect of a firm's alliance capability on alliance performance is mediated through (post) formation process factors such as alliance management and relational quality (Ariño, de la Torre, 1998).

The study's objective is to develop and test a conceptual model relating a firm's alliance capability 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 two principal contributions to the extant literature on alliance capabilities. First, we argue and empirically demonstrate that an alliance capability is related to (post) formation factors and that its effect on alliance performance is mediated by these factors. This way we also contribute 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 possessing resources is not sufficient to attain high levels of performance. Appropriate deployment of these resources is required and the ability to deploy them productively is not uniformly distributed among firms (Ethiraj et al., 2005).

The remainder of the paper is organized as follows. In the next section we outline the theoretical considerations and variables and subsequently introduce the hypotheses. Then we will present the research method followed by the empirical analysis of these hypotheses 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 a firm's alliance capability, alliance management and relational quality in collaborative arrangements.

2 Conceptual background

2.1 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 (Amit, Schoemaker, 1993; Grant, 1991) by arguing that resources can be traded, i.e. financial assets, physical assets, information, whereas capabilities refer to a firm's skills to deploy resources (Ethiraj 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". According to this view, alliance success is achieved at the operational level by means of deploying an alliance capability in the processes that comprehend the lifecycle of the alliance (Doz, Hamel, 1998; Dyer, Singh, 1998; Schreiner et al., 2009. This way our study builds on prior research that emphasizes the process elements of the alliance (Ring, 1994). Moreover, an alliance capability is widely seen as a source of competitive advantage for firms (Dyer, Singh, 1998; Ireland et al., 2002; Schreiner et al., 2009). It meets the RBV criteria for sustainable competitive advantage of being an asset that is valuable, rare, imperfectly substitutable, and imperfectly mobile (Barney, 1991; Ethiraj et al., 2005; Ziggers, Henseler, 2009). Therefore, there will be heterogeneity among firms, which is not a short-term phenomenon, but rather a degree of heterogeneity that tends to be sustained over time (Peteraf, 1993). More recently the deployment of such a resource has been addressed to realize such a competitive advantage (Sirmon et al., 2008; Schreiner et al., 2009).

Accordingly, we conceptualize the notion of an alliance capability by providing a theoretical account of factors that enable a firm to effectively and efficiently manage any given alliance. The conceptualization highlights the emphasis on the following aspects of this capability. First we emphasize the content of such capability, instead of the factors that underlie its development. Second, we emphasize on two post-formation process factors that reflect the deployment of firm's alliance capability: alliance management and relational quality. This implies that its effect on alliance performance is mediated by (post) formation process factors. In the next part of this section we will elaborate on alliance capability, alliance management, relational quality, and alliance performance.

2.2   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. Similar to former alliance studies (Kandemir et al., 2006; Lambe et al., 2002) we distinguish three facets of an alliance capability: (1) alliance experience; (2) management development capability, and (3) partner identification propensity.

Alliance experience is a firm's internalization of its past experiences, successes, and failures with alliances (Kale et al., 2002; Reuer et al., 2002). As firms gain experience, they can afford to devote less attention to solving a particular problem and provide the firm with standardized solutions. Experience enables firms to better understand the critical processes and issues in alliance management. Hence, shared experiences engenders the development of common perspectives (Nonaka, 1994), enabling a firm to absorb new knowledge more effectively (Grant, 1996), and which it can leverage in response to new situations (Kandemir et al., 2006; Simonin, 1997). Moreover, when firms make their experiences more explicit by codifying alliance experience, which involves guidelines, checklists, or manuals, they increase their understanding of what does and what doesn't work and why. Codification assists and enhances a firm's decision-making and actions with regard to alliances (Kale, Singh, 2007).

Management development capability is the firms's skill in developing capable alliance managers that understand and manage the key activities at every stage of the lifecycle of any alliance (Day, 1995; Lambe et al., 2002; Spekman et al., 1996; Kale, Singh, 2007). It requires a deliberate and conscious investment in training and educating alliance managers. If done properly, these managers will be able to broker alliance relationships such that partners develop and transfer knowledge that facilitates the pursuit of commercial opportunities (Simonin, 1997).

Finally, a firm's partner identification propensity is the ability to monitor and identify alliance opportunities (Lambe et al., 2002). It represents a deliberate and conscious investment to monitor the business environment that allows firms to have a more precise view on the kind of partners or resources to generate revenues from and to form alliances with them (Dyer, Singh, 1998; Gulati, 1999).

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 (Dyer, Singh, 1998; 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.

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 deploys its alliance capability. Hence, an alliance capability is idiosyncratic to the firm, whereas for example alliance management is idiosyncratic to a specific alliance.

2.3   Alliance management

We define alliance management as *those tasks that a firm performs to achieve effective coordination and alignment within an alliance*. It involves tasks related to the formal planning, coordination and monitoring of the alliance. More specific, alliance management involves tasks, 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 coordination mechanism to monitor each alliance 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 overcome the tension between cooperation and competition (Douma 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 tasks 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.

2.4   Relational quality

Relational quality is defined as *those activities that a firm performs to make partners feel comfortable and willing to rely on trust in dealing with one and other* (Ariño, 2001). Repeated joint actions involve those exchanges between two parties that cannot be specified a priori by a formal contract (Heide, John, 1992). 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, Florin, 2001). This norm evolves as 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 (Ariño et al., 2001; Ring, Van de Ven, 1992).

In general, empirical research shows that relational quality plays a pivotal role in the development of an alliance and its success (Ariño et al., 2001). 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, 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.

2.5   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, Ramanujam, 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 and net-spill over effects of the alliance on other activities of the firm (Parkhe, 1993). 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.

3   Hypotheses

In this section we present a conceptual model that relates an alliance capability to alliance performance mediated by alliance management and by relational quality. For each different facet of an alliance capability its effect on alliance management and relational quality will be elaborated.

Alliance experience is expected to have a positive effect on the performance of alliance management tasks. Firms that actively acquire, analyze and leverage their alliance experience adapt their alliance routines (Gulati, 1999). They simply know better what it requires to set-up an alliance and which alliance management activities have to be conducted. For example Hewlett-Packard has developed '40 decision-making templates' to help managers understand and manage key activities at every stage of the life cycle of any alliances (Dyer et al., 2001). Also studies by Lyles (1988) and Powell et al. (1996) show that organizations change and improve their approaches towards collaboration on the basis of their previous experiences. Overall alliance experience is expected to enhance a firm's coordinative practices, and consequently over time alliance performance. Firms with a management development capability that results in having competent alliance managers can develop business propositions with clearly articulated and agreed upon responsibilities, achieve faster and coordinated decision making, mobilize and leverage partner resources, enhance organizational learning and adaptation, and monitor and evaluate alliance fit with the changing environment and make the necessary modifications (Ireland et al., 2002; Lambe et al., 2002; Uzzi, 1996). Overall, they perform the managerial tasks more proficiently. Finally, a partner-identity-

propensity capability relates to issues of fit in complementary resources, partnering firm's cultures, decision-making routines, or systems (Kale et al., 2000); or adaptable inter-organizational exchange processes (Zajac, Olsen, 1993). 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) and determines the potential value of the firm's alliance (Sarkar et al., 2001). Overall, an alliance capability will contribute to completing these managerial tasks in a competitively superior manner that will contribute to superior alliance performance. It is not the alliance capability it selves that guarantees success but how this capability is deployed and becoming manifest in the processes, i.e. alliance management.

In sum, both conceptual and empirical studies support the notion that deployment of an alliance capability affects alliance management positively, which in turn is positively related to alliance performance. Therefore, we propose the next hypothesis that reflects these relationships.

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

Alliance experience is expected to have a positive effect on relational quality. Firms with experience simply know better how to deal with the interpersonal relations at the inter-organizational level. It involves tacit knowledge and develops over time (Anand, Khanna, 2000; Day, 1995; Lambe et al., 2002). A firm's management development capability contributes to the development of relational quality, because it provides alliance managers with skills to deal with interpersonal relationships at the inter-organizational level. Skilful managers are capable to establish effective communication and to stimulate joint sense making (Luo, 2000). Furthermore, appropriate and timely sharing of information acts as a bonding mechanism (Mohr et al., 1996) which facilitates the realization of mutual benefits by reducing misunderstandings (Sarkar et al., 2001) resolving disputes, aligning perceptions and expectations (Aulakh et al., 1996; Luo, 2000), and specifying clear roles (Sivadas, Dwyer, 2000). Hence, monitoring based on interpersonal interactions will help to build trust (Aulakh et al., 1996). Finally, a firm's partner identity propensity contributes to the extent to which it can attract partners with congruent organizational cultures and capabilities that reduces relational risk (Das, Teng, 2001a). Without this ability, the firm may choose a socially incompatible partner, which hinders a harmonious alliance relationship and negatively influences collaborative effectiveness because incompatible partners face higher levels of stress when they attempt to blend their values, norms, capabilities, and organizational cultures (Das, Teng, 2001b; Sarkar et al., 2001). These differences hinder role socialization (Smith, Barclay, 1997), which makes it more difficult in turn for the interfacing managers to work together (Ariño, de la Torre, 1998; Sarkar et al., 2001).

In sum, an alliance capability has 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 these relationships.

> *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 mediated through alliance management. Firms who are able to facilitate effective communication and coordination shape alliances in ways that foster trust (Sivadas, Dwyer, 2000). Relational quality depends not only on firm's specific alliance capability, 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 tasks it sends 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. Thus, alliance management tasks, if conducted 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.*

4   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 in agribusiness and food industry. 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, Hayes, 2004).

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

4.2   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 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.

4.3   Dependent variable

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, Hebert, 1989) and constructed a 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.

4.4   Independent variables

The first independent variable is alliance capability. We reviewed prior literature (Kale et al., 2002; Kandemir et al., 2006; Lambe et al., 2002) 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. 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	
AC_2: **Our organization assesses whether new partner opportunities contribute to the core business**	.844	-.124	.029	**0.776**
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	
AC_5: **Our organization does understand the competences needed for managers to successfully manage alliances.**	.029	.833	-.007	**0.608**
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 (Ireland et al., 2002; Spekman et al., 1998) 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 (α = 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, 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, 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 (α = 0.832) were entered into the PLS analysis.

5   Analysis and results

5.1   Measurement model

We used PLS analysis to estimate our model (Hansmann, 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	
AM_2;	Our organization had allocated staff and resources to the alliance prior to formation.	0.7943	0.8343
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	
RQ_2:	Our organization is confident that the partner will stick to the original arrangements.	0.8354	0.9022
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

5.2 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, Kenny, 1986; Shaver, 2005): (1) no measurement error in the mediator, (2) the dependent variable may not cause the mediator, and (3) the errors of the two equations of step three should be uncorrelated. 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, Hayes, 2004) we used a SPSS macro especially developed to generate estimates for indirect effects in a multiple mediator model (Preacher, Hayes, 2005).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.

5.3   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

| Independent Mediators	Dependent	R^2	Standardized Coefficients			Bootstrapping Direct Relations		
			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

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; β = 0.501, p < 0.05). As expected alliance capability is positively related to alliance management (β = 0.340, p < 0.05) as well as to relational quality (β = 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 (β = -0.042, p > 0.05).
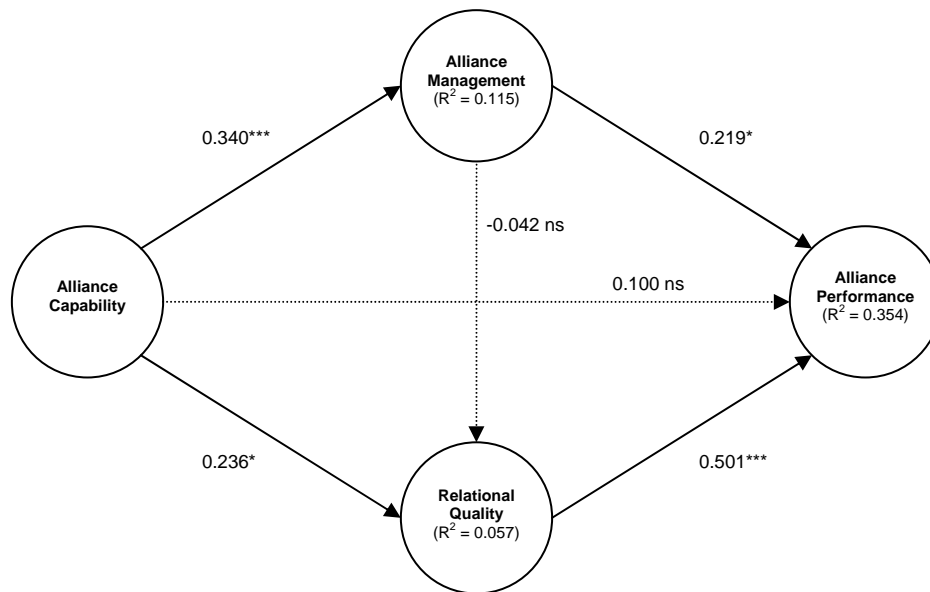
N=84**;** Note: ns = not significant;   * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Figure 1.
PLS structural model

5.4   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, 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 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 testing 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.

6 Discussion

This study examined the relation between a firm's 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 firms in the agribusiness and food industry 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 an alliance capability 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. The results suggest that the deployment of accumulated knowledge and skills has a more profound effect on the performance of management tasks, than on the development of the quality of the relationship. Moreover, the relation between relational quality and alliance performance is much stronger than the relationship between the performance of alliance management tasks and alliance performance. These findings provide support to the relational governance perspective which points out the important role of personal connections and relationships between cooperating firms (Lubatking, Florin, 2001; Ring, Van de Ven, 1992; Ring, Van de Ven, 1994) despite efforts in alliance management tasks. Apparently, repeated interactions over time lead to systematized and shared organizational values, and trust that help the alliance functioning on a day to day basis and realizing alliance performance within contractual alliances (Aulakh et al., 1996). These 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 in time completion of projects. In sum, our findings suggest that both relational quality and alliance management are mediating the relationship between an alliance capability 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 (Schreiner et al., 2009; Sirmon et al., 2008). 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 knowledge and skills. 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, 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 performed. Finally, managing an alliance is not a static event, in contrary it is a process that requires continues managerial attention if done properly firms will accrue the benefits of their alliances.

7   Limitations

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, Teng, 2001)

8   Final remarks

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

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.