

**Contractual Alliance Governance:
Impact of Different Contract Functions on Alliance Performance**

Dries Faems
d.l.m.faems@utwente.nl

Rutger Alberink
r.alberink@student.utwente.nl

Aard Groen
a.j.groen@utwente.nl

Rosalinde Klein Woolthuis
r.kleinwoolthuis@feweb.vu.nl

**Contractual Alliance Governance:
Impact of Different Contract Functions on Alliance Performance**

ABSTRACT

Recent research on alliance governance has emphasized that contracts can have both a control and coordination function. In this paper, we test the impact of these different contract functions on alliance performance. Conducting structural equation analyses on a sample of 270 Dutch technology alliances, we disentangle the relationship between different contract functions, partner cooperation and alliance success. Our data show that different contract roles have a different impact on partner cooperation within the alliance. In addition, we find strong indications that the presence/absence of prior trustful collaboration and the number of alliance partners moderate the relationship between contract functions and partner cooperation. Finally, our data provide evidence that contract functions indirectly influence alliance success via partner cooperation.

Contractual Alliance Governance: Impact of Different Contract Functions on Alliance Performance

Alliances have become an increasingly popular strategy for organizations to complement and supplement their internal activities (Doz & Hamel, 1998; Kale & Singh, 2009; Hagedoorn, 2002). Although popular, their failure rates are high (Bleeke & Ernst, 1991), instigating numerous scholars to study the governance of alliances (Faems, Janssens, Madhok & Van Looy, 2008). In this research stream, contracts or ‘agreements in writing between two or more parties, which are perceived as legally binding (Lyons & Mehta, 1997: 241)’ have been identified as an important mechanism to effectively govern alliances.

Whereas alliance contract research has traditionally focused on the complexity of the contract (i.e. the amount of clauses in the contract), some scholars (e.g. Faems et al., 2008, Hagedoorn & Hesen, 2007; Mayer & Teece, 2008; Klein Woolthuis, Hillebrand & Nooteboom, 2005) have recently started to also consider the content of the contract. In this way, these scholars managed to identify that contracts can both (i) allow for formal control of the partner’s behavior; and (ii) facilitate coordinated action. However, research on the impact of such different contract roles on the performance of the alliance has remained absent (de Jong & Klein Woolthuis, 2008).

In this paper, we therefore explore the impact of different contract functions on alliance performance. In order to do so, we rely on a sample of 270 Dutch technology alliances. Conducting structural equation analyses, we explore the relationships between contract functions, partner cooperation and alliance success. Our data provide strong indications that different contract functions can significantly influence partner cooperation during the alliance. For instance, we find that the more important the contractual control function, the lower the partner cooperation within

the alliance. In addition, we find that the presence/absence of trustful prior collaboration and the number of alliance partners moderate the relationship between contract roles and partner cooperation. In particular, we find that the negative impact of the contractual control function on partner cooperation disappears when partners share a history of trustful collaboration. In addition, we observe that, in the setting of dyadic alliance, the contractual coordination function has a significant negative impact on partner cooperation. Finally, our data provide consistent evidence that contract roles indirectly influence alliance success via partner cooperation.

The remainder of this paper is structured in four sections. First, we position our study in the existing alliance governance literature. Subsequently, we discuss the methodology that we applied to examine the impact of contract functions on alliance performance. Next, we present the main findings of our study. Finally, we discuss the main theoretical and managerial implication of our findings, discuss the main limitations of this study and identify several avenues for future research.

THEORETICAL BACKGROUND AND HYPOTHESES

Contractual alliance governance: complexity versus content of the contract

Whereas alliance governance research has long been dominated by a concern for the choice between equity or non-equity structures, scholars have also started focusing on the role of specific structural and relational governance mechanisms (Arino & Reuer, 2005). In this literature stream, contracts have been recognized as an important structural governance mechanism. Alliance contract studies (e.g. Anderson & Dekker, 2005; Luo, 2002; Parkhe, 1993; Poppo & Zenger, 2002; Reuer, Arino & Wellewigt, 2006; Ryall & Sampson, 2006) have mainly focused on the complexity of the contract or the amount of clauses that are present in the contract. In particular these studies examined 1) the impact of several transactional and relational conditions on the

amount of clauses that are present in the contract; 2) the impact of contract complexity on alliance performance, and 3) the relationship between contract complexity and trust or ‘a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behavior of another’ (Rousseau, Sitkin, Burt & Camerer, 1998: 395).. However, these studies often provided inconsistent results. For instance, whereas some scholars (e.g. Luo, 2002; Poppo & Zenger, 2002) provided evidence for a complementary relationship between contract complexity and trust others (e.g. Lyons & Mehta, 1997; Malhorta & Murnighan, 2002) pointed to the existence of a substitutive relationship between these structural and relational governance mechanisms.

Several scholars (e.g. Faems et al., 2008, Hagedoorn & Heslen, 2007; Mayer & Teece, 2008; Klein Woolthuis, Hillebrand & Nooteboom, 2005) have therefore started exploring not only the complexity of the contract, but also the actual content of the clauses that are defined in alliance contract. Based on this content-based assessment, these scholars came to the conclusion that contracts might play different roles in the governance of alliances. Mellewigt, Madhok and Weibel (2008) identify two different contract roles. First, in line with insights from transaction cost theory (e.g. Williamson, 1985), they emphasize that alliance contracts might have a control role, reducing the risk that one of the partners will abuse the alliance for opportunistic reasons. Second, in line with organizational theory (e.g. Galbraith, 1977; Thompson, 1967), they stress that the contract might also contain clauses that facilitate coordinated action between the partners. Other scholars have come to similar conclusions. Klein Woolthuis et al. (2005) argue that contracts might have a

safeguarding or coordination function in alliances¹. Examining the 88 strategic alliances, Reuer and Arino (2007) empirically demonstrate that contractual clauses in alliance contracts can have both enforcement and coordination functions.

Impact of contract roles on alliance performance: A conceptual framework

Whereas scholars have provided valuable insights into the different functions that contracts may have in governing alliances, they remain silent on how these contract roles influence alliance performance. Below, we develop a conceptual framework in which we (i) link the different contract functions to partner cooperation and alliance success and (ii) hypothesize on the potential moderating effects of history of trustful collaboration and number of alliance partners (see Figure 1).

----- Insert Figure 1 about here -----

Impact of contractual control function on partner cooperation. One key difference between single-firm strategies and interfirm alliances is the uncertainty attending the cooperation among partners. When independent firms collaborate together, there is the risk of the partner not cooperating in good faith in addition to the usual risk of unsatisfactory business performance (Das & Teng, 2001: 253). Applying a transaction cost framework, scholars have referred to this kind of behavioral uncertainty in terms of opportunistic behavior or ‘seeking self interest with guile’ (Williamson, 1985). Opportunistic behavior in alliances is exemplified by ‘cheating, shirking, distorting information, misleading partners, providing substandard products/services, and appropriating partners’ critical resources’ (Das & Teng, 1998: 492).

In line with transaction cost theory, numerous alliance governance scholars have argued that alliance partners can negotiate safeguarding clauses, inflicting

¹ Klein Woolthuis et al. (2005) identify a third contract role. They stress that contracts may also serve as a tangible expression of partners’ trust in each other and their intention to be loyal partners. In other words, the contract might also function as a signal of commitment.

penalties for the omission of cooperative behaviors or commission of violative behaviors (Parkhe, 1993). As a result, the cost of self-interest activities subsequently increases, curbing partners' willingness to act opportunistically (Dyer & Singh, 1998). In other words, safeguarding clauses allow for formal control or the utilization of formal rules, procedures, and policies to monitor and punish undesirable behavior and/or outcomes (Anderson & Dekker, 2005; Das & Teng, 2001), reducing the likelihood of opportunistic behavior. First indications are also present that, when the contract has a strong control function, knowledge transfer between the partners will be more open and transparent. Examining three R&D alliances, Faems, Janssens & Van Looy (2007), for instance, observed that, in cases where explicit contractual clauses were present that controlled the exchange of knowledge, partners were much more willing to disclose sensitive knowledge to the other partner.

In sum, we expect that, the more alliance partners rely on contracts as a mechanism to control for opportunistic behavior, the lower the probability that opportunistic behavior will occur and the higher the willingness to transfer knowledge between the partners. We therefore formulate the following hypothesis:

Hypothesis 1: The more important the control function of alliance contracts, the higher the partner cooperation within the alliance.

Several scholars have argued that the relevance of the contractual control function might be dependent on alliance partners' history of prior collaboration. When partners share a history of successful prior collaboration, they are likely to have build up 'resilient trust' or a psychological state between collaborating partners, characterized by shared norms, values and beliefs that emphasize faith in the moral integrity or goodwill of others (Ring, 1997). Looking from a social exchange perspective (e.g. Blau, 1964), several scholars (e.g. Inkpen & Currall, 2004; Das & Teng, 1998, 2001; Dyer & Singh, 1998; Jones and George, 1998; Ring & Van de Ven,

1994) argued that the presence of resilient trust influences how partners work together in alliances. First, under conditions of resilient trust, ‘shared valued underlying trust provide individuals with the assurance that knowledge and information will be used for the greater good and that one need not exercise power to protect one’s own interests’ (Jones & George, 1998: 542). In other words, when resilient trust is present, the perception of opportunistic hazards is likely to be reduced. In the alliance literature, these dynamics have been referred to in terms of ‘social control’ (Inkpen & Currall, 2004; Das & Teng, 2001). Opposite to formal control, emphasizing rules, procedures and policies, social control tries to minimize divergence of preferences among participants by relying on the development of shared values, beliefs, and goals among members (Eisenhardt, 1985; Ouchi, 1979). In such circumstances, partners’ incentives to behave opportunistically are reduced (Das & Teng, 2001; Dyer & Singh, 1998).

In sum, in case of prior trustful collaboration, alliance partners do not need formal control because they can rely on social control to mitigate opportunistic behavior and stimulate open knowledge exchange. We therefore expect that the contractual control function is especially relevant for stimulating partner cooperation in settings where a history of trustful prior collaboration is absent:

Hypothesis 2: The positive impact of the contractual control function on partner cooperation is stronger when alliance partners do not share a history of trustful collaboration.

In the alliance literature, a distinction is made between dyadic alliances, in which only two organizations collaborate, and multilateral alliances, in which the collaboration involves more than two partners. Moreover, some scholars (e.g. Garcia-Canal et al., 2003; Gong, Shenkar, Lou & Nyaw, 2007) provide first indications that the impact of the contractual control function on the quality of interaction might differ

in dyadic and multilateral alliances. Both Garcia-Canal et al. and Gong et al. (2007) provide empirical evidence that, in multilateral alliances, contract complexity has a significant positive impact on alliance performance, whereas such a relationship is not present in the setting of dyadic alliances. To explain these findings, these scholars argue that, the more partners are present in an alliance, the more difficult it becomes to monitor the actions of all different parties and to align the partners' goals. In such a setting, partners' incentives to engage in opportunistic behavior are likely to increase (Das & Teng, 2002), which increases the relevance of using the contract as a formal control mechanism. We therefore hypothesize:

Hypothesis 3: The positive impact of the contractual control function on partner cooperation is stronger in multilateral alliances.

Impact of contractual coordination function on partner cooperation.

Whereas transaction scholars focus on the behavioral uncertainty of alliances, other scholars, applying insights from organization theory (e.g. Lawrence & Lorsch, 1967; Thompson, 1967), emphasize the difficulty of achieving coordinated action in alliances. Two main reasons have been mentioned to explain the difficulties of coordination in alliance. First, alliances can not make an appeal to all hierarchical structures and systems that are available within organizations to achieve coordinated action (Gulati & Singh, 1998). Second, differences in national context as well as differences in corporate cultures further complicate the coordination between collaborating partners (Parkhe, 1991).

At the same time, the alliance contract has been identified as a viable mechanism to improve coordination. In particular, through extensively defining performance control systems, action planning systems, and standard operating procedures in the formal contract, the division of labor and the interactions between partners become more predictable and joint decisions can be made more by rules than

by exception (Klein Woolthuis et al., 2005; Mellewigt et al., 2008; Reuer & Arino, 2007). In other words, a contract allows for standardized coordination (Mintzberg, 1979), facilitating cooperation between the involved partners:

Hypothesis 4: The more important the coordination function of alliance contracts, the higher the partner cooperation within the alliance.

Based on a longitudinal study of contracting in the personal computer industry, Mayer and Argyres (2004: 394) concluded that contracts may also function as ‘repositories for knowledge about how to govern collaborations.’ In particular, they argue that when collaborative partners share a history of previous collaboration, they are likely to adjust the content of the contract based on their mutual learning experiences in their previous collaborative transactions. In addition, Faems et al. (2008) empirically illustrate that this contract learning effect is particularly important for coordination clauses in the contract. Based on these observations, we expect that, when partners share a history of trustful collaboration, they will be able to define in the contract more fine-grained coordination clauses, which will reinforce the positive impact of contractual coordination function on partner cooperation:

Hypothesis 5: The positive impact of the contractual coordination function on partner cooperation is stronger when alliance partners share a history of trustful collaboration.

Focusing on the distinction between dyadic and multilateral alliances, several scholars (Das & Teng, 2002; Garcia-Canal et al., 2003; Gong et al., 2007) argue that multilateral alliances do not only imply a higher risk of opportunistic behavior, but also entail a higher risk of problematic coordination. After all, the more alliance partners, the more likely substantial differences will be present in terms of organizational culture, structure and strategic vision, which complicate achieving coordinated action. At the same time, it is argued that, in dyadic alliances, partners do not need standardized coordination, but can rather rely on coordination by mutual

adjustment (Mintzberg, 1977). In sum, the relevance of the contractual coordination function seems to be higher in multilateral alliances compared to dyadic alliances. We therefore hypothesize:

Hypothesis 6: The positive impact of the contractual coordination function on partner cooperation is stronger in multilateral alliances.

Impact of partner cooperation on alliance success. According to existing alliance research (e.g. Dyer & Singh, 1998; Madhok & Tallman, 1998; Zajac & Olsen, 1993), the extent of partner cooperation has a strong impact on alliance success or the degree to which partners manage to realize or even exceed the initial expectations. In particular, it is argued that the more cooperative behaviors (e.g. open exchange of knowledge between partners, joint sensemaking, joint problem solving) are present and the more non-cooperative behaviors (e.g. shirking, stealing knowledge, hiding information) are absent, the higher the ability of partners to come to synergistic value creation within the alliance. We therefore expect that:

Hypothesis 7: Higher partner cooperation increases alliance success.

METHODOLOGY

Research design and sample

To test our hypotheses, we use a sample of Dutch firms that participated in technology alliances. The sample was constructed with the help of Senter Novem, an agency of the Dutch ministry of Economic affairs. The main goal of Senter Novem is to support the development and innovation activities of Dutch firms on both domestic and international markets. Among other things, Senter Novem manages a funding scheme (i.e. WBSO) that allows firms, knowledge institutes, and individuals to receive tax compensation for technological innovation projects. The research sample for this studies consists of firms that (i) made use of this particular funding scheme for technological innovation project, (ii) indicated that they formally collaborated with

other partners for this particular innovation project, and (iii) indicated that this particular innovation project was recently finished or was in the final stage of being finished. The initial sample consisted of 648 firms that had filed for tax compensation for a particular technological innovation project in 1999. 391 organizations eventually responded to the survey. Because of missing values on the variables that we constructed, the size of our sample was further restricted. In total, the sample of this study consists of 270 collaborative innovation projects. Table 1 gives some additional information about the survey response rate.

----- Insert Table 1 about here -----

An external research organization was made responsible for the data collection phase. This research organization made use of telephone surveys to collect the needed information. The responding firms were active in the areas of: biotechnology, new materials, information technology, maritime technologies, chemicals, and environmental technologies.

Measures

Contract roles. Whereas previous alliance contract research has focused on measuring the complexity of the contract through counting the number of contractual clauses or evaluating the presence/absence of a set of predefined contractual clauses, we wanted to measure to which extent respondents used the contract as a control and/or coordination mechanism. In order to do so, we asked respondents to indicate on a five point Likert scale (i.e. 1 = strongly disagree; 5 = strongly agree) (i) whether the contract functioned as a guarantee against opportunistic behavior of the other partner(s), and (ii) whether the contract functioned as a plan of action in order to streamline the collaboration. The scores on these items were used to measure the

importance of the contractual control function and the contractual coordination function.

Partner cooperation. In line with Luo (2002) and Gong et al. (2007), we measured partner cooperation through evaluating the absence or presence of specific cooperative situations. In particular, we asked respondents to rate on a 5 point Likert scale (1 = strongly disagree, 5 = strongly agree) the degree to which three cooperative situations and two non-cooperative situations characterized the relationship among partners (see Table 2). Subsequently, we conducted an explorative factor analysis, indicating that all items loaded on one single factor (see Table 2). In line with our expectations, the cooperative situations loaded positively on this factor, whereas the non-cooperative situations loaded negatively on this factor. Next, we relied on the standardized factor score for each case to construct the variable ‘partner cooperation.’

----- Insert Table 2 about here -----

Alliance success. Alliance scholars (e.g. Geringer & Hebert, 1991; Arino, 2003) have provided evidence that subjective measures of alliance success highly correlate with objective measures of success. Following previous alliance research (e.g. Geringer & Hebert, 1991; Gong et al., 2007) we adopt a multidimensional approach to measure alliance success. We asked respondents to rate on a 5 point Likert scale (1 = totally disagree, 5 = totally agree) the following three aspects: (i) the project has become a technological success; (ii) the project has lead to lower development costs than if we would have done the project alone or if we would have done the project with another partner; (iii) the result of the collaboration has exceeded my expectations. Subsequently, we conducted an explorative factor analysis, indicating that all items loaded on one single factor (see Table 3). Next, we relied on the standardized factor score for each case to construct the variable ‘alliance success.’

----- Insert Table 3 about here -----

History of trustful collaboration. Previous alliance research (e.g. Garcia-Canal et al., 2003; Gulati, 1995; Mellewigt et al., 2008) has relied on the presence of prior collaboration as an indicator of resilient trust. However, these studies ignore that prior collaboration might have been unsuccessful, which might even trigger negative trust dynamics (Faems et al., 2008). In this study, we therefore rely on a more fine-grained measure of prior collaboration. In particular, we asked respondents whether a friendly connection already existed before the project. Based on this question, we constructed a dummy variable, representing the absence (value = 0) or presence (value =1) of ‘prior trustful collaboration.’ In our sample 176 (65.2%) of the observed alliances had a history of trustful collaboration.

Number of alliance partners. In the survey, respondents had to indicate the amount of partners that were involved in the alliance. Based on this information, we constructed a dummy variable ‘number of alliance partners’, representing the difference between dyadic alliances (value = 0) and multilateral alliances (value = 1). In our sample 96 (35.6%) alliances were of a dyadic nature whereas 174 (64.4%) were of a multilateral nature.

Contract complexity. Although we focus in this study on the different functions of the contract, we also wanted to control for contract complexity. In line with previous alliance contract research (e.g. Parkhe, 1993; Poppo & Zenger, 2002; Reuer & Arino, 2007), we therefore provided respondents with a list of 13 specific contractual clauses and asked them to indicate whether or these contractual clauses were present in the contract. Based on this information, we constructed the variable contract complexity, representing the sum of these 13 items.

Alliance objectives. Firms can rely on collaboration with external partners for both explorative and exploitative innovation projects (Faems et al., 2005; Lavie & Rosenkopf, 2006; Rothaermel & Deeds, 2004). Explorative innovation projects refer to projects in which the focus is on fundamental research in order to generate new technological capabilities. Exploitative innovation projects are defined as projects in which the focus is on applied research in order to leverage existing technological capabilities. In the alliance literature (e.g. Bijlsma-Frankema & Costa, 2003; Koza & Lewin, 1998; Faems et al., 2006) first indications have been provided that explorative and exploitative collaborations are characterized by different interaction patterns and have different success rates. We therefore wanted to control for the objective of the collaboration in our analyses. In the survey, we asked respondents to indicate whether the collaborative innovation project was (i) very fundamental; (ii) rather fundamental; (iii) in the middle between fundamental and applied research; (iv) rather applied; (v) very applied. Based on this information, we constructed the variable ‘Exploitative orientation.’

RESULTS

Descriptive statistics and analyses

Table 4 gives an overview of the most important descriptive statistics. This table shows the presence of a significant positive correlation between the contractual control function and the contractual coordination function. This indicates that alliance partners can simultaneously apply the contract as a mechanism to safeguard against opportunistic behavior and, at the same time, rely on it as a tool to facilitate coordinated action.

----- Insert Table 4 about here -----

To test the hypotheses, we used structural equation modeling (SEM) with manifest variables. Compared to ordinary linear regression models, this technique has two advantages (Sels et al., 2006). First, the method enables to define and test hypothesized relationships between variables. The output indicates whether the model is supported by the data as a whole and gives a significance test for the various individual relationships. Second, a variable in a SEM model can either be dependent or independent. This allows testing the indirect influence, if any, of certain variables.

We relied on the Calis procedure in the SAS software package to conduct our SEM analyses. First, we analyzed the relationship between contract functions, partner cooperation and alliance success on the full sample. In this model, we did not take into account the potential moderating impact of history of trustful collaboration and number of alliance partners. Instead, we integrated these latter variables as control variables in addition to contract complexity and exploitative orientation. Subsequently, we did split the full sample based on the variable ‘history of trustful collaboration’ in order to test the moderating impact of it. After splitting the sample we ran one SEM analysis for the cases that lacked a history of trustful collaboration and one analysis for the cases that were characterized by the presence of prior trustful collaboration. A similar procedure was conducted to test the moderating impact of the number of alliance partners. In all models, we programmed the existence of a significant correlation between the contractual control function and the contractual coordination function. The goodness-of-fit overview (see Table 5) indicates that the different analyzed models were adequately supported by the data.

----- Insert Table 5 about here -----

Below we interpret and explain the effects. First, we look at the effect of the contractual control function on partner cooperation. Second, we assess the impact of

the contractual coordination function on partner cooperation. Third, we evaluate the indirect effect of these contract functions on alliance success via partner cooperation. Fourth, we discuss the impact of our control variables. For the different models, the standardized path coefficients are listed in Table 6, Table 7, Table 8, Table 9, and Table 10. The results are also represented in Figure 2 and Figure 3. The control variables have been omitted in this graphical representations in order not to overload the figures.

----- Insert Table 6, Table 7, Table 8, Table 9, and Table 10 about here -----

----- Insert Figure 2 and Figure 3 about here -----

Impact of contractual control function on partner cooperation

In our first hypothesis, we expected a positive impact of the importance of the control function of the contract on partner cooperation. Our findings in model 1 (see Table 6 and Figure 2), however, suggest the existence of a significant negative effect of the contractual control function on partner cooperation. This means that, the more the contract was used as a mechanisms to control the behavior of the partners, the less (more) likely (non)-cooperative behaviors were to emerge within the alliance.

In hypothesis 2, we also expected a moderation effect of the presence of prior trustful collaboration. Model 2 and Model 3 (see Table 7, Table 8 and Figure 3) provide strong indications that prior trustful collaboration indeed moderates the relationship between the contractual control function and partner cooperation. In particular, we observe that the significant negative impact of the contractual control function on partner cooperation disappears when a history of prior collaboration is present.

Finally, we also find that the number of alliance partners has a moderating impact on the relationship between contractual control function and partner

cooperation. However, whereas we expected in hypothesis 3 that the contractual control function has a more positive impact on partner cooperation in the setting of a multilateral alliance, Model 5 (see Table 10 and Figure 3) points to a significant negative impact of the contractual control function on partner cooperation in this particular setting. At the same time, Model 4 (see Table 9 and Figure 3) indicates that the contractual control function has no impact on partner cooperation in dyadic alliances.

Impact of contractual coordination function on partner cooperation

In contrast to our hypothesis 4, we do not find a significant impact of the contractual coordination function on partner cooperation for the full sample (see Table 6 and Figure 2). In addition, we do not find that the relationship between the contractual coordination function and partner cooperation is moderated by the presence or absence of prior trustful collaboration (see Table 7, Table 8 and Figure 3). At the same time, we find strong indications that the number of alliance partners moderates the relationship between contractual coordination function and partner cooperation (see Table 9, Table 10 and Figure 3). Whereas Model 5 indicates that the contractual coordination function has no significant impact on partner cooperation in multilateral alliances, Model 4 points to a significant negative impact of the contractual coordination function on partner cooperation in dyadic alliances.

Impact of partner cooperation on alliance success

In line with hypothesis 7, we find in all different models a significant positive impact of partner cooperation on alliance success. This significant effect also implies the existence of some indirect effects between the contractual control/coordination function and alliance success in different models. An overview of these indirect effects can be found in Table 11. This overview of the indirect effects shows that the

actual impact of the contractual control/coordination functions on alliance success is close to zero or negative.

----- Insert Table 11 about here -----

Impact of control variables

In the different models, we controlled for contract complexity, exploitation orientation, presence of prior trustful collaboration and number of alliance partners. For the full sample, we observe that multilateral alliance have a significant higher alliance success rate than dyadic alliances (see Table 6). If we only consider the alliances in which a history of trustful collaboration is lacking, this positive effect of multilateral alliances on alliance success becomes even more pronounced (see Table 7). At the same time, we do not find a significant effect of the number of alliance partners on alliance success for alliance that are characterized by a history of trustful collaboration (see Table 8).

In the full sample, we do not find an effect of exploitation orientation on alliance success (see Table 6). However, we also observe that exploitation orientation has a positive impact on alliances success for 1) alliances that are characterized by a history of trustful collaboration (see Table 8) and 2) dyadic alliances (Table 9). In other words, we find that the impact of the exploitation orientation on alliance success depends on the presence/absence of prior trustful collaboration and the number of alliance partners.

Previous studies (e.g Luo, 2002; Poppo & Zenger, 2002) have examined the impact of contract complexity on alliance success. However, our study indicates that, when we also consider the actual functions of the contract, the explanatory value of contract complexity becomes rather low. We only find a significant negative effect of contract complexity of partner cooperation for alliances in which partners lack a

history of trustful collaboration. In the other models, no significant impact of contract complexity on partner cooperation or alliance success was observed.

DISCUSSION AND CONCLUSION

In this section, we first discuss our main findings. Subsequently, we present their main managerial implications. Finally, we point to the main limitations of this study and suggest interesting avenues for future research.

Contractual control function and partner cooperation

Previous research has provided evidence that, in settings where the risk of opportunistic behavior is high (e.g. high asset specificity, high uncertainty), alliance partners are likely to negotiate more complex contracts (Parkhe, 1993) and are likely to pay more attention to control clauses in such contracts (Reuer & Arino, 2007). Based on these findings and in line with transaction cost theory, these scholars pointed to contracts as an important control mechanism in alliance settings.

In this study, we actually tested the impact of this contractual control function on partner cooperation. In contrast to our expectations, we found that the more important the contractual control function, the less (more) likely (non)-cooperative behaviors are to emerge in alliances. This unexpected result can be explained in different ways. A first explanation might be that when partners pay a lot of attention to negotiating control clauses, they actually signal to each other that they expect the manifestation of opportunistic or non-cooperative behavior. Subsequently, it might be that partners will act in line with these initial expectations, engaging in opportunistic actions. In other words, negotiation of control clauses might function as a self-fulfilling prophecy where the announcement of the risk of opportunistic behavior will indeed become true.

A second potential explanation is that, when partners emphasize the control function of the contract, they actually create a foundation of distrust. In such a setting, it might be that alliance partners are more likely to link the emergence setbacks during the alliance to the endogenous behavior of the other partner (i.e. opportunistic action) instead of attributing such negative events to exogenous conditions. Our observation that the negative impact of the contractual control function on alliance contracts disappears when partners share a history of prior trustful collaboration seems to support this latter reasoning.

Contractual coordination function and partner cooperation

Adopting insights from organization theory, several scholars (e.g. Mellewigt et al., 2008; Reuer & Arino, 2007) have stressed that contracts can not only used as a formal control mechanisms, but can also be used as a mechanism to facilitate coordinated action. Our analyses, however, suggest that the actual impact of the contractual coordination function on partner cooperation is quite limited. This result might suggest that contractual coordination clauses mainly have an informational purpose (i.e. they inform partners about how they will perform the tasks), but do not really have a facilitating impact (i.e. they do not really stimulate more cooperative behavior).

In addition, we observe a significant negative effect of the contractual coordination function on partner cooperation in the particular setting of dyadic alliances. This latter finding might be explained by the fact that the standardized coordination, which is imposed on the alliance via contractual coordination clauses, might actually obstruct the emergence of coordination by mutual adjustment that is easily established in dyadic alliances.

Managerial implications

In the alliance governance literature, numerous scholars have argued that, when managers are able to adjust the complexity of the contract to the transactional and relational conditions in which the alliance is embedded, the contract can have a positive impact on the success of the alliance. Based on our findings, we rather caution managers for the potential negative impact of contracts on the success of alliances. In particular, we emphasize that negotiating a strong contractual control function is likely to have a negative impact on alliance performance especially when no history of trustful collaboration is present. In addition, we warn for the use of contracts as mechanisms for achieving standardized coordination in the setting of dyadic alliances.

Limitations and future research

Although the goodness-of-fit of the tested models turns out to be very satisfactory, there is a lot of potential to improve the explanatory power of the models. For instance, we only could find significant effects of the contractual functions on partner cooperation, whereas all the control variables did not have a significant impact on this variable. These results suggest that there are other transactional and/or relational characteristics that determine the level of (non)-cooperative behaviors during the alliance. A more fine-grained assessment of the determinants of partner cooperation in alliances therefore seems to be necessary.

Our research was situated in a very particular setting. More specifically, we focused on subsidized technological innovation projects in which different firms were involved. This particular setting might limit the generalizability of our findings. Additional survey research on the impact of contractual functions on performance in other interfirm settings therefore seems to be necessary.

A final limitation of our study was that we could only survey one partner of the alliance. However, it might be that different partners have different opinions about the function of the contract, the nature of partner cooperation and the success of the alliance. We therefore encourage future research on alliance governance that incorporates the opinions of all involved partners.

Despite these limitations, this study has triggered first insights in how different contractual functions influence alliance performance. We hope that our findings might help alliance managers in optimizing their contractual governance strategies. In addition, we hope that our insights might motivate other scholars to further examine the governance of interfirm relationship in a wide variety of organizational settings.

REFERENCES

- Anderson, S. W. & Dekker, H. C. 2005. Management control for market transactions: The relation between transaction characteristics, incomplete contract design, and subsequent performance. *Management Science*, 51: 1734-1752.
- Ariño, A. & Reuer, J.J. 2005. Alliance contractual design. In O. Shenkar, & J.J. Reuer (Eds.) *Handbook of Strategic Alliances*, 149-167. Sage.
- Ariño, A. 2003. Measures of strategic alliance performance: An analysis of construct validity. *Journal of International Business Studies*, 34: 66-79.
- Bijlsma-Frankema, K. & Costa, A. C. 2005. Understanding the trust-control nexus. *International Sociology*, 30:259-282.
- Blau, P. 1964. *Exchange and power in social life*. John Wiley & Sons, New York
- Bleeke, J. & Ernst, D. 1991. The way to win in cross-border alliances. *Harvard Business Review*, November-December: 127-135.
- Das, T. K. & Teng, B-S. 1998. Between trust and control: Developing confidence in partner cooperation in alliances. *Academy of Management Review*, 23: 491-512.
- Das, T. K. & Teng, B.S. 2001. Trust, control, and risk in strategic alliances: an integrated framework. *Organization Studies*, 22: 251-283.
- Das, T. K. & Teng, B-S. 2002. Alliance constellations: a social exchange perspective, *Academy of Management Review*, 27: 445-456.
- De Jong, G. & Klein Woolthuis, R.J.A. 2008. Contract research and high-tech alliances: Vistas for future studies. *Scandinavian Journal of Management*, 24: 284-289.

- Doz, Y. & Hamel, G. 1998. *Alliance advantage: The art of creating value through partnering*. Boston: Harvard Business School Press.
- Dyer, J. H. & Singh, H. 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23: 660-679.
- Eisenhardt, K. M. 1985. Control: organizational and economic approaches. *Management Science*, 31: 134-149.
- Faems, D., Janssens, M., Bouwen, R. & Van Looy, B. 2006. Governing explorative R&D alliances: Searching for effective strategies. *Management Review*, 17: 9-29.
- Faems, D., Janssens, M., Madhok, A. & Van Looy, B. 2008. Towards an integrative perspective on alliance governance: Connecting contract design, contract application and trust dynamics. *Academy of Management Journal*, 51: 1053-1078.
- Faems, D., Janssens, M. & Van Looy, B. 2007. The initiation and evolution of interfirm knowledge transfer in R&D relationships. *Organization Studies*, 28: 1699-1728.
- Faems, D., Van Looy, B. & Debackere, K. 2005. Interorganizational collaboration and innovation: toward a portfolio approach. *Journal of Product Innovation Management*, 22: 238-250.
- Galbraith, J.R. 1977. *Organization design*. Reading: Addison-Wesley.
- Garcia-Canal, E., Valdés-Llaneza, A. & Arino, A. 2003. Effectiveness of dyadic and multi-party joint ventures. *Organization Studies*, 24: 743-770.
- Geringer, J.M. & Herbert, L. 1991. Measuring performance of international joint ventures. *Journal of International Business Studies*, 22: 249-264.

- Gong, Y., Shenkar, O., Luo, Y., & Nyaw, M-K. 2007. Do multiple parents help or hinder international joint venture performance? The mediating roles of contract completeness and partner cooperation. *Strategic Management Journal*, 28: 1021-1034.
- Gulati, R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Review*, 38: 85-112.
- Gulati, R. & Singh, H. 1998. The architecture of cooperation: managing coordination costs and appropriation concerns in strategic alliances. *Administrative Science Quarterly*, 43: 781-814.
- Hagedoorn, J. 2002. Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. *Research Policy*, 31: 477-492.
- Hagedoorn, J. & Hesen, G. 2007. Contract law and the governance of inter-firm technology partnerships: An analysis of different modes of partnering and their contractual implications. *Journal of Management Studies*, 44: 342-366.
- Inkpen, A. C. & Currall, S.C. 2004. The coevolution of trust, control, and learning in joint ventures. *Organization Science*, 15: 586-599.
- Jones, G. R. & George, J.M. 1998. The experience and evolution of trust: implications for cooperation and teamwork. *Academy of Management Review*, 23: 531-546.
- Kale, P. & Singh, H. 2009. Managing strategic alliances: What do we know now, and where do we go from here. *Academy of Management Perspectives*: 45-62.
- Klein Woolthuis, R., Hillebrand, B. & Nooteboom, B. 2005. Trust, contract and relationship development. *Organization Studies*, 26: 813-840.

- Koza, M. P. & Lewin, A.Y. 1998. The co-evolution of strategic alliances. *Organization Science*, 9: 255-264.
- Lavie, D. & Rosenkopf, L. 2006. Balancing exploration and exploitation in alliance formation. *Academy of Management Journal*, 49: 797-819.
- Lawrence, P.R. & Lorsch, J.W. 1967. *Organization and environment*. Boston: Harvard Business School Press.
- Luo, Y. 2002. Contract, cooperation, and performance in international joint ventures, *Strategic Management Journal*, 23: 903-919.
- Lyons, B. & Mehta, J. 1997. Contracts, opportunism and trust: Self-interest and social orientation. *Cambridge Journal of Economics*, 21: 239-257.
- Madhok, A. & Tallman, S.B. 1998. Resources, transactions and rents: managing value through interfirm collaborative relationships. *Organization Science*, 9: 326-339.
- Malhorta, D. & Murnighan, J.K. 2002. The effects of contracts on interpersonal trust. *Administrative Science Quarterly*, 47: 534-559.
- Mayer, K. J. & Argyres, N.S. 2004. Learning to contract: evidence from the personal computer industry. *Organization Science*, 15: 394-410.
- Mayer, K.J. & Teece, D.J. 2008. Unpacking strategic alliances: The structure and purpose of alliance versus supplier relationships. *Journal of Economic Behavior & Organization*, 66: 106-127.
- Mellewigt, T., Madhok, A. & Weibel, A. 2007. Trust and formal contracts in interorganizational relationships – substitutes and complements. *Managerial and Decision Economics*.

- Mintzberg, H. 1979. *The structuring of organizations: a synthesis of the research*. N.J.: Prentice-Hall Englewood Cliffs.
- Ouchi, W.G. 1979. A conceptual framework for the design of organizational control mechanisms. *Management Science*, 25: 833-848.
- Parkhe, A. 1991. Interfirm diversity, organizational learning, and longevity in global strategic alliances. *Journal of International Business Studies*, 22: 579-601.
- Parkhe, A. 1993. Strategic alliances structuring: a game theoretic and transaction cost examination of interfirm cooperation. *Academy of Management Journal*, 36: 794-829.
- Poppo, L. & Zenger, T. 2002. Do formal contracts and relational governance function as substitutes or complements? *Strategic Management Journal*, 23, 707-725.
- Reuer, J.J. & Ariño, A. 2007. Strategic alliance contracts: Dimensions and determinants of contractual complexity. *Strategic Management Journal*, 28: 313-330.
- Reuer, J. J., Arino, A. & Mellewigt, T. 2006. Entrepreneurial alliances as contractual forms. *Journal of Business Venturing*, 21: 306-325.
- Ring, P.S. 1997. Processes facilitating reliance on trust in inter-organizational networks. In M. Ebers (Ed.) *The formation of inter-organizational networks*. Oxford: Oxford University Press.
- Ring, P. S. & Van De Ven, A.H. 1994. Developmental processes of cooperative interorganizational relationships. *Academy of Management Review*, 19: 90-118.

- Rothaermel, F. T. & Deeds, D.L. 2004. Exploration and exploitation alliances in biotechnology: a system of new product development. *Strategic Management Journal*, 25, 201-221.
- Rousseau, D. M., Sitkin, S.B., Burt, R.S. & Camerer, C. 1998. Not so different after all: a cross-discipline view of trust. *Academy of Management Review*, 23: 393-404.
- Ryall, M. D. & Sampson, R. C. 2006. Do prior alliances influence alliance contract structure? In: Arino, A. & Reuer, J.J. (eds.) *Strategic alliances: Governance and contracts*. IESE Business School.
- Sels, L., De Winne, S., Maes, J., Delmotte, J., Faems, D. & Forrier, A. 2006. Unraveling the HRM-Performance link: value-creating and cost-increasing effects of small business HRM. *Journal of Management Studies*, 43: 319-342.
- Thompson, J. D. 1967. *Organizations in action*. New York: Mc Graw-Hill.
- Williamson, O.E. 1985. *The economic institutions of capitalism*. New York: The Free Press.
- Zajac, E. J. & Olsen, C.P. 1993. From transaction cost to transactional value analysis: implications for the study of interorganizational strategies. *Journal of Management Studies*, 30: 131-145.

Table 1: Overview Sampling Procedure

Initial Sample	648 firms
Unable to come in contact with project leader	24 firms
Double address in database	18 firms
Project leader has quitted the company	6 firms
Not a cooperative project	28 firms
Total base for response	572 firms
Unable to locate project leader during data collection phase	115 firms
Respondent only wants to answer in written form	6 firms
Respondent does not want to cooperate for various reasons	60 firms
Total response rate	391 firms (68.5%)
Missing values on constructs	121 firms
Final sample	270 firms

Table 2: Exploratory Factor Analysis on Partner Cooperation

	Factor loadings
We and our partner always talked openly and informally about our ideas, feelings, and wishes	0.522
We and our partner always gave each other all information that is relevant for the project	0.874
We and our partner could openly criticize each other when this contributes to the execution of the project	0.601
Our partner tried to get more advantages from the project than could be justified based on her efforts	-0.684
Our partner kept important information hidden for us	-0.788

Table 3: Exploratory Factor Analysis on Alliance Success

	Factor loadings
the project has become a technological success	0.715
the project has lead to lower development costs than if we would have done the project alone or if we would have done the project with another partner	0.640
the result of the collaboration has exceeded my expectations	0.748

Table 4: Descriptive statistics and correlations
 (* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level)

Variable	Mean	S	Partner cooperation	Alliance success	Contractual coordination function	Contractual control function	Exploitation orientation
Partner cooperation	0.00	1.00	1				
Alliance success	0.00	1.00	0.217***	1			
Contractual coordination function	3.34	1.66	-0.027	0.033	1		
Contractual control function	2.03	1.46	-0.150*	-0.077	0.145*	1	
Exploitation orientation	3.56	1.23	-0.057	0.075	-0.022	-0.118	1
Contract complexity	9.17	2.81	-0.034	0.065	0.048	0.213**	-0.290

Table 5: Goodness-of-fit measures

	Model 1: Full sample (n =270)	Model 2: No history of trustful collaboration (n = 94)	Model 3: History of trustful collaboration (n = 186)	Model 4: Dyadic alliances (n = 96)	Model 5: Multilateral alliances (n = 184)
Bentler's Comparative Fit index	1.00	1.00	1.00	1.00	1.00
Bentler and Bonett's Non-normed index	1.26	1.00	0.99	1.09	1.27
Bentler and Bonett's Normed Fit index	0.99	0.98	0.97	0.98	0.98
Chi-Square test (p-value)	0.68	0.37	0.36	0.48	0.60

Table 6: Standardized path coefficients Model 1: Full sample
 (†p<0.10; *p < 0.05; **p<0.01; ***p<0.001)

Path from / to	(3)	(4)
(1) Contractual control function	-0.14*	
(2) Contractual coordination function	-0.01	
(3) Partner cooperation		0.22***
(4) Alliance success		
Control variables		
(6) Exploitation orientation	-0.08	0.10
(7) Contract complexity	-0.03	0.10
(8) History of trustful collaboration	0.05	0.02
(9) Multilateral collaboration	0.04	0.14*

Table 7: Standardized path coefficients Model 2: No history of trustful collaboration
 (†p<0.10; *p < 0.05; **p<0.01; ***p<0.001)

Path from / to	(3)	(4)
(1) Contractual control function	-0.20**	
(2) Contractual coordination function	-0.01	
(3) Partner cooperation		0.20**
(4) Alliance success		
Control variables		
(6) Exploitation orientation	-0.11	0.01
(7) Contract complexity	-0.16*	0.07
(8) History of trustful collaboration		
(9) Multilateral collaboration	-0.02	0.22**

Table 8: Standardized path coefficients Model 3: History of trustful collaboration (†p<0.10; *p < 0.05; **p<0.01; *p<0.001)**

Path from / to	(3)	(4)
(1) Contractual control function	-0.09	
(2) Contractual coordination function	-0.03	
(3) Partner cooperation		0.23***
(4) Alliance success		
Control variables		
(6) Exploitation orientation	-0.05	0.16*
(7) Contract complexity	0.07	0.10
(8) History of trustful collaboration		
(9) Multilateral collaboration	0.08	0.10

Table 9: Standardized path coefficients Model 4: Dyadic alliances (†p<0.10; *p < 0.05; **p<0.01; *p<0.001)**

Path from / to	(3)	(4)
(1) Contractual control function	-0.11	
(2) Contractual coordination function	-0.19**	
(3) Partner cooperation		0.26***
(4) Alliance success		
Control variables		
(6) Exploitation orientation	-0.03	0.21**
(7) Contract complexity	0.04	0.06
(8) History of trustful collaboration	0.00	0.08
(9) Multilateral collaboration		

Table 10: Standardized path coefficients Model 5: Multilateral alliances
 (†p<0.10; *p < 0.05; **p<0.01; ***p<0.001)

Path from / to	(3)	(4)
(1) Contractual control function	-0.17*	
(2) Contractual coordination function	0.09	
(3) Partner cooperation		0.20**
(4) Alliance success		
Control variables		
(6) Exploitation orientation	-0.10	0.03
(7) Contract complexity	-0.04	0.11
(8) History of trustful collaboration	0.09	-0.02
(9) Multilateral collaboration		

Table 11: Indirect of contractual functions on alliance success

	Model 1: Full sample (n =270)	Model 2: No history of trustful collaboration (n = 94)	Model 3: History of trustful collaboration (n = 186)	Model 4: Dyadic alliances (n = 96)	Model 5: Multilateral alliances (n = 184)
Contractual control function	-0.03	-0.04	-0.02	-0.03	-0.03
Contractual coordination function	0.00	0.00	-0.01	-0.05	0.02

Figure 1: Conceptual framework

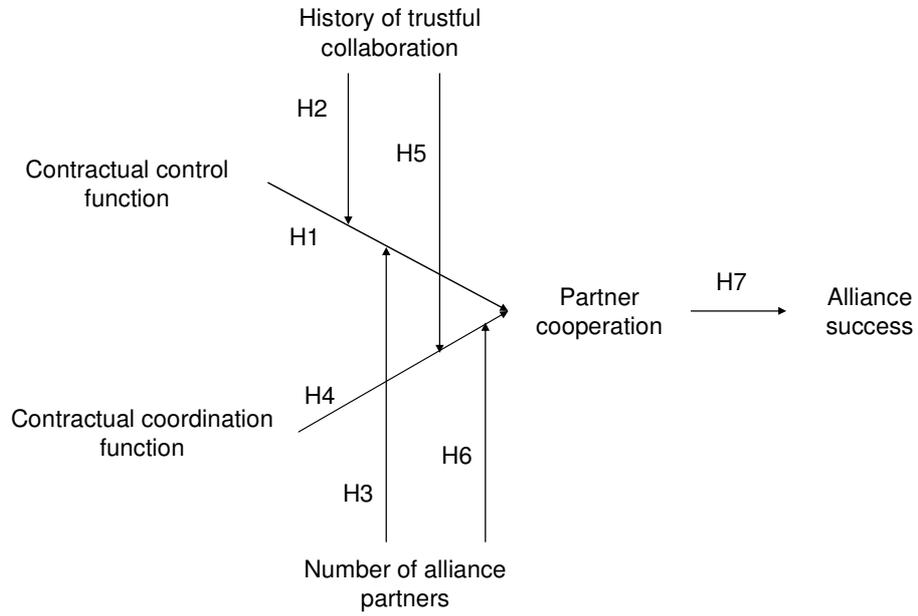


Figure 2: Result for Full sample ($\dagger p < 0.10$; $*p < 0.05$; $p < 0.01$; $***p < 0.001$)**

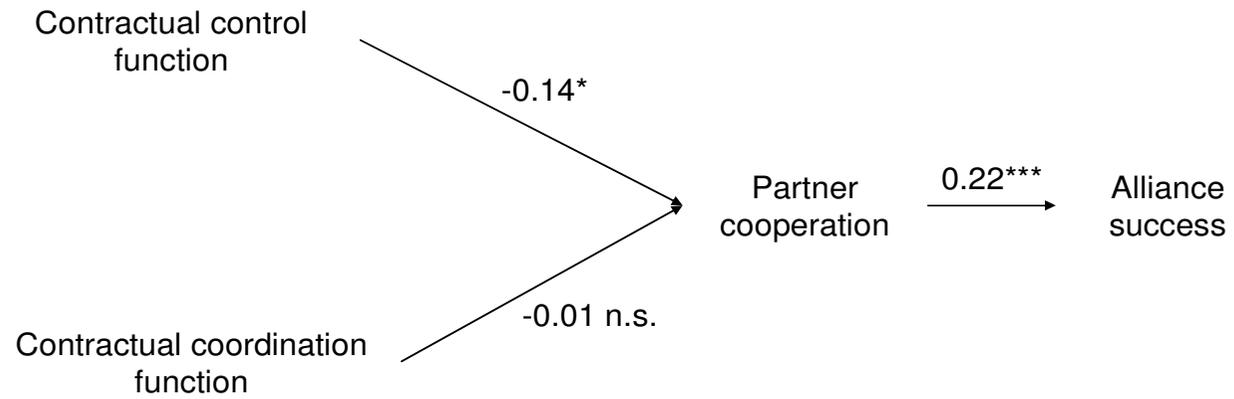
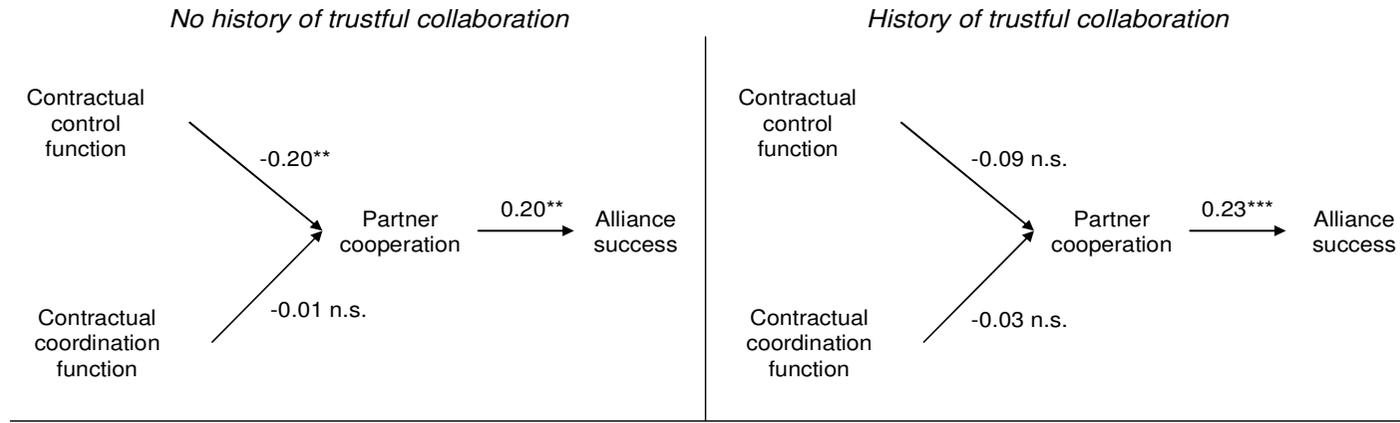


Figure 3: Results for Split samples ($\dagger p < 0.10$; $* p < 0.05$; $ p < 0.01$; $*** p < 0.001$)**

Moderating Impact of Prior Trustful Collaboration



Moderating Impact of Number of Alliance Partners

