© Academy of Management Journal
2008, Vol. 51, No. 6, 1053–1078.

TOWARD AN INTEGRATIVE PERSPECTIVE ON ALLIANCE GOVERNANCE: CONNECTING CONTRACT DESIGN, TRUST DYNAMICS, AND CONTRACT APPLICATION

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On the basis of a case study of two sequential alliances between the same firms, we develop a more integrative perspective on alliance governance, providing insights into the interactions between structural and relational aspects, both within and between transactions. In particular, we disentangle (1) how contracts with a similar degree but different nature of formalization (narrow versus broad) trigger different kinds of trust dynamics (negative versus positive) at both operational and managerial levels, (2) how trust dynamics and contract application (rigid versus flexible) coevolve over time, and (3) how relational dynamics in previous transactions influence the design of contracts in subsequent transactions.

During the past two decades, alliances have become an increasingly popular strategy organizations use to complement and supplement their internal activities (Doz & Hamel, 1998; Faems, Van Looy, & Debackere, 2005; Hagedoorn, 2002). Although popular, their failure rates are high (Bleeke & Ernst, 1991), instigating numerous scholars to study the governance of alliances or the process of safeguarding and coordinating them to influence their evolution and performance over time (Doz & Hamel, 1998). In this research stream, two different theoretical perspectives have yielded insights into effective and efficient governance (Madhok, 1995a; Powell, 1998). The first perspective focuses on the structural design of single transactions and emphasizes the importance of contracts, or "agreements in writing between two or more parties, which are perceived as legally binding" (Lyons & Mehta, 1997: 241), as effective and efficient governance mechanisms. The second perspective focuses on relational processes within ongoing interfirm relationships and emphasizes the importance of trust for safeguarding and coordinating alliances, with researchers defining trust as "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).

Although alliance governance scholars have mainly relied on either the structural or relational perspective, we seek to provide a more integrative understanding of alliance governance through exploring how the design and application of structural elements (i.e., contracts) are related to relational processes such as trust dynamics (i.e., how trust evolves over time) at both operational and managerial levels. To accomplish this research objective, we conducted a case study in which we investigated two sequential exploratory R&D alliances between the same pair of firms. Our methodological approach differs from those of previous research on alliance governance in four fundamental ways. First, we conduct an in-depth content analysis of the observed contracts, examining the

Useful comments and suggestions on this article were provided by Associate Editor Chet Miller; three anonymous reviewers; and Africa Ariño, Arvind Parkhe, Henri Dekker, Paul Vlaar, and Brian Tjemkes. The authors gratefully acknowledge the financial support of the Fund for Scientific Research–Flanders (FWO G.0286.06) and the Flemish Government (Policy Research Center 'Entrepreneurship and International Entrepreneurship') for conducting this research.

nature of contractual formalization (i.e., the content of contractual clauses). This focus on content is different from the focus of previous alliance governance research (e.g., Mellewigt, Madhok, & Weibel, 2007; Parkhe, 1993a; Poppo & Zenger, 2002; Reuer & Ariño, 2007) that has only measured the *degree* of contractual formalization (i.e., the number of contractual clauses). Second, previous alliance governance researchers have mainly taken a static view of trust, measuring it at a single point in time (Lewicki, Tomlinson, & Gillespie, 2006); we instead apply a more dynamic view, focusing on trust dynamics, or how expectations about partners' competencies and intentions evolve over time. Third, we deviate from previous research by interviewing both managers *and* engineers in *both* companies involved. This approach allows for a multilevel process analysis of unfolding trust dynamics at both the operational and managerial levels and their connections with contract design and contract application at the governance level. Fourth, previous alliance governance research has focused on either a single alliance transaction *or* on the interfirm relationship (Powell, 1998), but we apply a more combinative approach, observing two alliance transactions that are embedded within one particular relationship. These four points of difference from extant alliance research allow us to extend and deepen theoretical insights into the phenomenon in a novel and distinctive manner that we demonstrate in the ensuing pages.

THEORETICAL BACKGROUND

Structural and Relational Perspectives on Alliance Governance

In the alliance literature, two different perspectives—structural and relational—have contributed to theory building on alliance governance (Madhok, 1995a, Powell, 1998). These two perspectives have their specific assumptions, theoretical bases, and foci of analysis. Accordingly, researchers applying them have proposed different mechanisms for governing alliances, and the two perspectives have consequently been criticized for different reasons. Table 1 presents the main differences between the structural and relational perspectives.

Focusing on individual alliance transactions and relying on transaction cost theory (e.g., Williamson, 1985), the structural perspective rests on the assumption that alliance partners tend to act opportunistically. The higher the level of certain transactional attributes, such as asset specificity and uncertainty,[1] the higher the risk that one or both partners will engage in opportunistic actions (Oxley, 1997; Williamson, 1991). Another structural perspective assumption is that the initial structural design of an alliance transaction is the most crucial factor in explaining alliance performance (Hennart, 2006).

In contrast, the relational perspective focuses on interfirm relationships as they evolve over time and over transactions. Relying on social exchange theory (e.g., Blau, 1964), this perspective contains the assumption that alliance partners tend to behave in a trustworthy manner, especially when a history of successful collaboration is present. In addition, scholars relying on this perspective consider ongoing relational management of an interfirm relationship (i.e., fostering communication and trust) to be more important in explaining alliance performance than crafting the initial structural design (Salk, 2005).

Grounded in these assumptions, each perspective points to different mechanisms for governing alliances. The structural perspective identifies complex contracts, or "contracts with a large number of clauses that are specified in detail" (Ariño & Reuer, 2005: 149), as *safeguarding* devices that mitigate the perceived risk of opportunistic behaviour (Deeds & Hill, 1998). In particular, through specifying what is and what is not allowed and through inflicting penalties for the commission of violating behaviors, complex contracts reduce both the ability and willingness of partners to act opportunistically (Parkhe, 1993a). It is also argued that contracts are *coordination* mechanisms that, through specifying a precise division of labor between partners and providing procedures for the integration of dispersed activities, simplify decision making and prevent disputes on how to achieve tasks (e.g., Mellewigt et al., 2007; Reuer & Ariño, 2007). In sum, those taking the structural perspective argue that complex contracts create a predictable collaborative environment that mitigates exchange hazards and facilitates coordinated action.

In contrast, the relational perspective promotes a more relational governance strategy in which partners rely on trust to address issues of safeguarding and coordination. A broad variety of trust definitions exist, yet there is a converging understanding that trust refers to positive expectations regarding the other party in a risky situation (Lewicki et al.,

[1] The complete transaction cost framework also includes transaction frequency. However, this construct has received limited attention in empirical governance research (Geyskens, Steenkamp, & Kumar, 2006).

TABLE 1
Structural and Relational Perspectives on Alliance Governance

Characteristic	Structural Perspective	Relational Perspective
Focus of analysis	Single transaction	Interfirm relationship
Theoretical basis	Transaction cost theory	Social exchange theory
Main assumptions	Partners tend to act opportunistically	Partners tend to act in a trustworthy fashion
	Alliance performance is driven by the quality of the initial structural design	Alliance performance is driven by the quality of the ongoing relational processes
Proposed governance mechanism	Complex contracts	Trust
Criticism	Undersocialized view of human action	Oversocialized view of human action
Reference publications	Pisano, Russo, & Teece (1988) Pisano (1990) Williamson (1991) Hennart (1991, 2006) Parkhe (1993a) Oxley (1997) Sampson (2004)	Larson (1992) Ring & Van de Ven (1992) Zaheer & Venkatraman (1995) Gulati (1995) Uzzi (1997) Dyer & Singh (1998) Salk (2005)

2006; Rousseau et al., 1998). In addition, scholars (e.g., Das & Teng, 2001; Nooteboom, 1996) have increasingly argued that trust is a multidimensional concept, encompassing positive expectations about a partner's ability to perform according to an agreement (*competence trust*) as well as the party's intentions to do so (*goodwill trust*). According to the relational perspective, trust can be used as an alternative governance mechanism for two reasons. First, trust provides alliance partners with the assurance that knowledge and information will be used for the greater good (Jones & George, 1998). In this way, the perception of opportunistic hazards is likely to be limited, reducing the need for costly and inflexible formal safeguarding mechanisms such as complex contracts (Dyer & Singh, 1998; Larson, 1992). Second, under conditions of trust, members of different partner organizations are likely to engage in extensive communication and information sharing on an informal basis (Ring & Van de Ven, 1994; Uzzi, 1997). Coordination between partners can be consequently achieved not by referring to contractual systems and procedures, but by processes of mutual adjustment (Mintzberg, 1979).

Both the structural and relational perspectives on alliance governance have been criticized, for different reasons. The structural perspective is faulted for being acontextual and ahistorical (Granovetter, 1985; Zajac & Olsen, 1993), neglecting the social context within which alliance transactions are embedded.[2] At the same time, those who promote a more relational perspective are often criticized for having too rosy a view of human nature. In particular, they are said to overemphasize issues like relational embeddedness, ignoring transaction-situated issues like opportunism and contractual hazards (Jeffries & Reed, 2000).

Connecting Structural and Relational Perspectives

Although structural and relational alliance governance perspectives tend to focus exclusively on either the structure of a transaction *or* the relational processes within an interfirm relationship, one notable study, Doz (1996), has indicated that these two aspects are related to each other in governing alliances. In his theoretical framework of alliance evolution, Doz (1996) suggested that relational processes in alliances mediate between initial structural conditions and alliance outcomes. Drawing on this framework, numerous scholars (e.g., Bell, den Ouden, & Ziggers, 2006; Contractor, 2005;

[2] Some scholars (e.g., Reuer & Ariño, 2007; Reuer, Ariño, & Mellewigt, 2006) have conducted first attempts to include social context into their analyses of the design of structural elements such as contracts. However, these studies only measure the social context by counting the number of prior alliance transactions, without providing insights into the nature and dynamics of the underlying relational processes (Contractor, 2005).

Madhok & Tallman, 1998; Osborn & Hagedoorn, 1997; Vlaar, Van den Bosch, & Volberda, 2007) have called for empirical research that explores the connections between the structural and relational governance perspectives. Some scholars have responded to this call, examining the relationship between the two governance mechanisms these two perspectives stress: complex contracts and trust. However, the results of these studies are rather ambiguous. Some studies (Luo, 2002; Poppo & Zenger, 2002) have provided evidence that complex contracts facilitate trust building, whereas other studies (Lyons & Mehta, 1997; Malhorta & Murnighan, 2002) have concluded that complex contracts negatively influence the level of trust between partners.

We argue that these inconsistent findings might be due to three important issues. First, existing research (e.g., Deeds & Hill, 1998; Mellewigt et al., 2007; Parkhe, 1993a; Reuer & Ariño, 2007) has exclusively focused on the *degree* of contractual formalization, or the number of clauses that are defined in a contract. For each observed alliance contract, these studies assess the absence/presence of a predefined set of clauses, yielding a score that reflects degree of formalization. However, such an approach ignores the *nature* of formalization, or the actual content of the contractual clauses (Klein-Woolthuis, Hillebrand, & Nooteboom, 2005). This aspect is important, as Hagedoorn and Hesen (2007) showed. From in-depth content analysis of six interfirm contracts, they concluded that similar types of juridical clauses, such as dispute resolution clauses, intellectual property clauses, and warranties, are given a different content depending on the partnership form of a given alliance. For instance, in equity joint ventures and nonequity partnership contracts, dispute settlement clauses favor internal and private dispute resolution, whereas in licensing contracts, dispute settlement clauses emphasize the use of court enforcement. Whereas Hagedoorn and Hesen's (2007) study clearly shows that the content of alliance contracts can significantly vary, it did not examine how such variation in the nature of contractual formalization influences relational processes such as trust dynamics.

Second, these previous studies have tended to focus attention on the initial design of contracts, while ignoring how such structural elements are *applied* during the alliances (Bell et al., 2006). However, previous case study research on the evolution of alliances (e.g., Ariño & de la Torre, 1998; Doz, 1996; Madhok, 1995a) provides anecdotal evidence indicating that alliance contracts can be applied in different ways, ranging from strict enforcement to much more flexible approaches. In addition, some studies on collaborative dynamics within firms (Ghoshal & Moran, 1996; Sitkin & Stickel, 1996) have suggested that contract application and trust are likely to coevolve over time. In particular, they have identified the occurrence of negative reinforcing cycles in which managers' increased reliance on formal mechanisms triggers negative trust dynamics at the employee level, which in turn motivates managers to further increase the use of such formal mechanisms. In-depth process research into how the application of structural elements such as contracts and relational processes such as trust dynamics cocreate rich collaborative dynamics in alliances has, however, remained absent.

A third issue is the studies' exclusive focus on relational processes at the managerial level. As alliance governance scholars have mainly relied on managers as core informants (Currall & Inkpen, 2000), they have tended to treat the operational level as a black box. However, as the roles of actors significantly vary at the operational and managerial levels, the nature of relational processes such as trust dynamics might also vary (Zaheer, Lofstrom, & Varghese, 2002). Moreover, in a recent conceptual study, Janowicz, Krishnan, and Noorderhaven (2005) suggested that relational processes at the operational level might substantially influence relational processes at the managerial level. We therefore argue that, in order to get a fine-grained understanding of the connections between structural and relational aspects, it is necessary to explore the evolution of relational processes such as trust dynamics at both the managerial *and* operational levels.

In sum, previous attempts to link structural elements (i.e., contracts) to relational processes (i.e., trust dynamics) have provided inconsistent results. In this study, we aim to create a richer understanding of the connections between these structural and relational aspects by exploring the following research questions:

Research Question 1. How does the content of contracts influence trust dynamics at both operational and managerial levels in alliances?

Research Question 2. How does the application of contracts coevolve with trust dynamics at both operational and managerial levels in alliances?

METHODOLOGY

Research Design and Setting

The purpose of this study was to inductively build a more integrative perspective on alliance

governance that explains how the design and application of structural elements is connected to relational processes at two different levels: the operational and the managerial. Although case studies have remained rather rare within the alliance governance literature,[3] such a design was appropriate for theory building because it allowed us to (1) answer "how" questions about a contemporary set of events over which we, as investigators, had little or no control (Yin, 1984), (2) mobilize multiple observations on complex relational processes (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Parkhe, 1993b), and (3) draw in the significance of various interconnected levels of analysis (Hall, 2006; Pettigrew, 1990).

We conducted an in-depth case study of two sequential exploratory R&D alliances, labeled the "side shooter head (SSH) alliance" and the "end shooter head (ESH) alliance," between the same two firms: "Graph," one of the world's leading imaging companies, employing over 20,000 people in 40 different countries, and "Jet," a stock-quoted inkjet technology company employing 185 people. Both alliances were exploratory, meaning that the purpose of each alliance was to evaluate new technological opportunities through upstream activities such as fundamental research, experimenting, and testing[4] (Faems, Janssens, Bouwen, & Van Looy, 2006; Koza & Lewin, 1998). Table 2 presents the main characteristics of the two alliances. For each alliance, both Graph and Jet created engineering teams that were responsible for the execution of the project. In each company, these teams consisted of approximately five engineers[5] who internally reported to two senior managers.

[3] The studies of Ariño and de la Torre (1998), Larson (1992), Doz (1996), Yan and Gray (1994), and de Rond and Bouchikhi (2004) are notable exceptions in this respect.

[4] In contrast, the purpose of *exploitative* R&D alliances is to leverage partners' existing technological capabilities through engaging in upstream activities such as standardization, refinement, and upscaling.

[5] In each team, the exact number of members fluctuated over time. For instance, additional engineers were sometimes brought into the teams temporarily to help address particular technological problems. The engineers of the different teams also got support from technicians who carried out basic tasks such as handling the machines and constructing the prototype printheads. In this study, we did not interview these technicians as they were not involved in collaborative interactions between Graph and Jet.

Data Collection and Analysis

Data on the two exploratory R&D alliances were collected in a retrospective way. Retrospective data collection allowed for a more focused process because it reduced the danger of data overload and collecting much unusable data (Leonard-Barton, 1990; Poole, Van de Ven, Dooley, & Holmes, 2000). However, documenting cases in a retrospective way also has its disadvantages. For instance, respondents have the tendency to filter out events that do not fit or that render their story less coherent (Poole et al., 2000). To improve the validity of these retrospective reports and prevent accepting respondent bias, we applied a number of strategies. First, we triangulated our data, applying two data sources: interviews and documents (Eisenhardt, 1989; Yin, 1984). Second, we asked informants to reflect on concrete events rather than abstract concepts to reduce the risk of cognitive biases and impression management (Miller, Cardinal, & Glick, 1997). Finally, we attempted to verify individual reports by asking similar questions to multiple informants (Cardinal, Sitkin, & Long, 2004).

Following Pettigrew's (1990) and Pentland's (1999) suggestions, we distinguished three different stages in our theory-building efforts, going from surface level to deeper levels of data collection and analysis. In the first stage, we conducted unstructured interviews with two managers of Graph to obtain some initial information about the history and characteristics of the two exploratory R&D alliances. For each alliance, we also studied relevant documents. In addition to tapping publicly available information (i.e., annual reports, press releases), we obtained access to 126 private documents (i.e., contracts, reports of technical meetings, reports of steering meetings) representing a total of 1,747 pages (see Table 2). Using this information, we constructed a graphical representation of the chronology of the major events within each alliance.

In the second stage, we conducted semistructured interviews (Kvale, 1996) with informants of both organizations. As we wanted to analyze relational processes at both managerial and operational levels, we made an effort to interview not only managers but also engineers (see Table 2).[6] Each interview was conducted individually, face-to-face, and in the native language of the interviewee to maximize his or her ability to express thoughts, feelings, and opinions. The interviews were structured according to the chronology of the major al-

[6] One Jet and four Graph informants were involved in both alliances, while others only participated in one alliance.

TABLE 2
Main Characteristics of the SSH and ESH Alliances

Characteristic	SSH Alliance: March 1999–April 2001	ESH Alliance: July 2000–March 2002
Ownership structure	Nonequity	Nonequity
Purpose of alliance	Exploration of the feasibility of side shooter head (SSH) technology for printing applications	Exploration of the feasibility of end shooter head (ESH) technology for printing applications
Partners' main responsibilities	Jet: Development of prototype SSH printheads Graph: Development of prototype SSH printing system	Jet: Development of prototype ESH printheads Graph: Development of prototype ESH printing system
Degree of success	Objectives not achieved Premature termination	Successful achievement of objectives Partners negotiate new alliance transaction to jointly exploit the ESH printhead
Number of interviews	Graph managers: 2 Graph engineers: 4 Jet managers: 1 Jet engineers: 2	Graph managers: 2 Graph engineers: 5 Jet managers: 2 Jet engineers: 2
Number of documents	Contract: 1 Reports of technological meetings between Jet and Graph: 14 Reports of internal technological meetings: 33 Reports of steering meetings between Jet and Graph: 6 Other documents (Graph evaluation document, memos): 3	Contract: 1 Reports of technological meetings between Jet and Graph: 29 Reports of internal technological meetings: 29 Reports of steering meetings between Jet and Graph: 5 Other documents (memos and mail correspondence): 5

liance events. As interviewees described these events, we asked additional "why" and "how" questions to get a better view of the role of structural and relational aspects in explaining the described collaborative dynamics. The average length of the interviews was between one and two hours. All the interviews were taped, transcribed, and sent back to the interviewees for feedback. At this stage, we also reexamined available documents (i.e., reports of steering and technological meetings) to verify whether the content of the interviews was consistent with the content of the documents. When discrepancies occurred among data sources, we contacted respondents for additional questions. Subsequently, we wrote a case study report, reconstructing the history of the two exploratory R&D alliances. In this report, we made extensive use of citations from both the interviews and documents in order to stay very close to the original data, achieving a high level of accuracy (Langley, 1999). These reports were sent to two managers in each company, and their comments were collected via electronic mail or face-to-face conversations.

In the third and last stage, we analyzed the data through an inductive approach, moving from first-order to second-order analysis. The first-order analysis was framed around the information as expressed by the informants (Gioia & Chittipeddi, 1991; Gioia, Thomas, Clark, & Chittipeddi, 1994; Van Maanen, 1979). Each author individually conducted a content analysis of the SSH and ESH contracts to identify differences in the nature of contractual formalization. Using statements from documents and interviews, each author also developed for each alliance a visual map (Langley, 1999; Plowman et al., 2007) of the interactions among contractual elements (i.e., contract design and application) and relational processes such as trust dynamics[7] at both operational and managerial levels. Comparing our interpretations, we had at times

[7] Previous alliance governance research has tended to measure trust in a static way (Lewicki et al., 2006). However, scholars (e.g., Carson, Madhok, Varman, & John, 2003; Rousseau et al., 1998) increasingly argue that, as a partner receives firsthand information on the competencies and/or intentions of the other partner, the level of trust is likely to change during an alliance. We therefore applied a more dynamic approach. Statements that referred to a positive evolution of a partner's expectations about the intentions and competencies of the other partner were categorized as positive goodwill–competence trust dynamics. Statements that referred to a negative evolution of a partner's expectations about the intentions/competencies of the other partner were categorized as negative goodwill–competence trust dynamics.

identified the same differences in the nature of contractual formalization but had used different labels to express them. Negotiation led to agreement on representative labels. Regarding the visual maps, we initially oberved some discrepancies among us.[8] These inconsistencies were addressed by going back to the data, contacting informants, and discussing intensively.[9] The next section describes the final result of this first-order analysis.

During the second-order analysis, we moved to a more theoretical level, examining the data and first-order findings to arrive at an explanatory framework that allowed addressing the original research questions (Gioia & Chittipeddi, 1991; Gioia et al., 1994; Van Maanen, 1979). First each author individually developed such a second-order framework. We focused on identifying connections between our initial core concepts (i.e., contract design, trust dynamics, contract application), yet we also allowed for additional concepts to enter the analysis. For instance, as the second-order analysis proceeded, it became clear that we needed to add the concept of operational joint "sensemaking" (i.e., joint problem definition and joint problem solving [Allen, 1977]) as an additional relational process to our explanatory framework to explain the connection between contract design and managerial trust dynamics. Next, we came together to discuss, compare, and integrate our individual efforts. This multistage process of independent, comparative, and collaborative analyses resulted in a multilevel process model, separating out governance, operational, and managerial levels and identifying connections among them. During the latter meetings, we also started contrasting and comparing our empirical findings with the two competing theoretical perspectives on alliance governance, the structural and relational perspectives. This "three-cornered fight" (Hall, 2006: 27) finally resulted in new theoretical insights regarding the connections between structural elements and relational processes, both within and between alliance transactions.

When a first draft of this article had been completed, we conducted feedback interviews with the two Graph managers who were interviewed at the first stage to discuss our interpretations and explanatory framework. These feedback interviews proved to be very helpful not only in fine-tuning our insights but also in testing the internal validity of our findings.

THE SIDE SHOOTER HEAD AND END SHOOTER HEAD ALLIANCES

In this section, we describe the two exploratory R&D alliances studied here. For each, we describe its initiation, followed by the negotiation of the alliance contract and the dynamics of collaboration in the alliance. Figures 1 and 2 summarize the dynamics of collaboration in the SSH and ESH alliances, respectively.

The Side Shooter Head Alliance

At the end of the 1990s, Jet planned to initiate a new technological endeavor regarding inkjet technologies. Having recently invented side shooter head technology, the company wanted to develop a generic inkjet printhead[10] that could be integrated into the printing systems of different original equipment manufacturing (OEM) partners. Within Jet, this effort was seen as a "'revolutionary innovation project" (Jet manager). Given Jet's limited financial resources, the company sought partners to financially and technologically support the exploration of the SSH printhead. Jet recognized Graph as a promising partner because Graph possessed substantial financial resources as well as technological expertise in digital printing systems. Graph was interested in Jet's proposal because it had recently recognized inkjet technology as an important emerging technology for printing applications.

Negotiation of the SSH contract. At the end of 1998, negotiations began between Graph and Jet. In the interviews, both Graph and Jet managers stressed that, during these negotiations, Jet acted as the dominant partner, presenting the collaborative project as a take-it-or-leave-it proposition to Graph:

> Jet had orchestrated the whole scenario. This became apparent during the negotiations. This came across as quite arrogant. . . . Their attitude communicated that, if it would not be possible to come to an agreement with Graph, they would do it with somebody else. (Graph manager)

[8] For instance, although some of us concluded that, because of intensive interaction, delays in the ESH project had been minimal, another author concluded that, *despite* intensive interaction, substantial delays had emerged in that project.

[9] By reanalyzing some technological documents and contacting one Graph engineer, we found that interaction on mechanical aspects had been intensive from the start of the ESH alliance, resulting in little delay on these technological aspects. At the same time, it became clear that interaction on problems that were directly related to the core of Jet's technology was lacking, resulting in substantial delay regarding *electronic* aspects.

[10] Inkjet printers release ink from an aperture located on a cartridge, or printhead, that is inserted into a printer.

> Our CEO applied a fairly bullish negotiating style. He found that projecting an air of high confidence in the technology was a winning strategy. (Jet manager)

As Graph was eager to start working with this new technology, they accepted most conditions dictated by Jet. On March 25, 1999, the SSH agreement was signed. In this contract, Graph agreed to fund Jet's technological efforts to design and develop SSH prototype printheads. The third page of the contract stipulated that Graph would pay a "nonrefundable contribution toward Jet's development costs" and that, in exchange for its financial contribution to the exploration of the SSH technology, "Graph would become one of at most three preferential partners to which Jet would sell the generic SSH printhead" (page 4 of the agreement). It was also stated in the contract that Graph would design and develop a prototype printing system that would allow testing the prototype printheads.

The SSH agreement contained a number of juridical clauses that dealt with concerns about the partners' behavior outside of the alliance itself. First, it was stipulated that, in case of conflicts that could not be solved amicably, legal action by the partners was permitted. Second, the confidential nature of exchanged technological and commercial information was stressed, forbidding partners to pass on exchanged information to outside parties. Third, the contract stressed that the initiation of the alliance did not imply an agency relationship between the partners. Fourth, the contract contained a rule for allocating intellectual property between the partners if new inventions should emerge during their collaboration.

The agreement also contained contractual clauses that referred more directly to the actual execution of the collaborative agreement. We found contractual statements linking Graph's payments to milestones that specified deliveries of prototype printheads from Jet to Graph. Target dates and performance standards for these deliveries were also codified in the contract. Interviewees referred to these milestones, target dates, and performance standards as "mechanisms that allowed monitoring the performance of the other partner" (Graph manager). However, contractual clauses specifying how partners had to achieve these milestones were absent. The SSH contract also stipulated that Jet's engineering team was solely responsible for designing and developing prototype printheads, while Graph was solely responsible for designing and developing one prototype printing system into which the prototype printheads could be integrated. No contractual statements were present that obliged partners to exchange technological information during the project.

Graph interviewees stressed that it was Jet's management who had proposed to contractually define a strict task division that anticipated no information exchange, but only monitoring of the partner's' outputs:

> Jet's CEO came to us and said "We propose this kind of collaboration and this is the contractual framework in which this collaboration should fit. You only need to sign it." (Graph manager)

To explain Jet's preference for this particular mode of collaboration, Jet interviewees referred to their fear of unintended knowledge spillovers. Although an explicit rule was present for the allocation of intellectual property rights, they still feared that Graph would be able to access sensitive knowledge and abuse this knowledge for its own benefit. By avoiding profound technological involvement of Graph in designing and developing the prototype printheads, Jet wanted to minimize the risk of unintended knowledge spillovers:

> Jet had only one body of intellectual property. So the fear was that if we engaged Graph at a detailed technical level, our intellectual property would rapidly flow out of this building toward Graph. (Jet engineer)

In addition, Jet interviewees mentioned that, if Graph were to become actively involved in the design and development of printheads, they would be able to influence the original design specifications in order to improve the applicability of the printhead for the particular printing systems that Graph envisioned. Such changes, however, would hamper the generic applicability of the printhead, making it much more difficult for Jet to sell it to other OEM partners. As a consequence, Jet wanted to keep Graph at a distance:

> The attitude at Jet then was: "Graph is not going to be an exclusive printhead licensee. We therefore will keep them away from the core technology; we are going to keep them at a distance." (Jet manager)

In sum, Jet managers feared that intensive technological involvement of Graph in designing and developing printheads could trigger self-interested actions by Graph. To mitigate these risks, Jet's management preferred to contractually define a strict task division with limited information exchange and limited monitoring opportunities.

Emergence of SSH "UTPs" at Jet. After the SSH agreement was signed, operational activities within the SSH alliance took off. As Jet started to experiment with the SSH technology, a number of unan-

ticipated technological problems (UTPs) quickly emerged. Jet engineers faced huge operating problems regarding printing nozzles and experienced enormous difficulties in coating the prototype printheads.[11] Graph engineers were not involved in addressing these technological issues. Rather, they were "watching from the sidelines" (Graph project manager). Both Graph and Jet engineers explicitly referred to the strict task division to explain this limited involvement of Graph engineers in solving the unexpected problems:

> [It] was concurrent engineering, each partner on its own domain of expertise. . . . Jet did not ask for support. (Graph engineer)

> I would guess that the structure of the first agreement between Jet and Graph was limiting the involvement that Graph [engineers] could have. (Jet engineer)

Graph interviewees also stressed that, because Jet perceived Graph as an investor instead of a technology development partner, Jet's willingness to provide additional information on the technological problems was low:

> They [Jet] were very reserved in telling details to us. . . . They saw us as an investor who should be informed about the product that they were developing, but who should not know the details of the technology. (Graph engineer)

At the same time, one Graph interviewee explicitly mentioned that "we could not really force them to provide more information," indicating that the absence of contractual obligations to exchange information limited the ability of Graph engineers to become actively involved in addressing the emerging technological problems.

Because of the strict task division between the partners and the low degree of interaction about technology, Graph engineers had only limited understanding of Jet's emerging technological problems. In addition, Graph engineers started to become frustrated over their inability to influence the progress of the project:

> That was an annoying situation. We saw that things went wrong and, at the same time, we were forced to stay on the sidelines. (Graph engineer)

The frustrations of Graph engineers also had their impact on how Graph's management assessed the intentions of Jet's management. As Graph's engineering team was not fully informed about the content of the emerging technological problems, Graph's management started questioning the good intentions of Jet's management. In particular, they got the impression that "Jet's management was much more preoccupied with defending its own financial interests than [with] the technological project itself" (Graph manager). At the same time, Jet's concerns about potential opportunistic action by Graph increased further. One Jet interviewee, for instance, mentioned that "Graph's demands for more information on our technology were perceived as a confirmation of our theory [that established firms are after stealing knowledge]."

Emergence of serious delays. At the beginning of 2000, the UTPs at Jet resulted in considerable delays. Graph's management, having serious doubts about the intentions of Jet's management, opted for emphasizing the contractual milestones, perceiving this as the only option available to them for addressing the difficulties:

> We started to feel as if we were playing a game of poker with them [Jet's management]. . . . The only way that we could react was by emphasizing the contractual issues. We told them that if they could not perform according to the milestones, we would not pay them. (Graph manager)

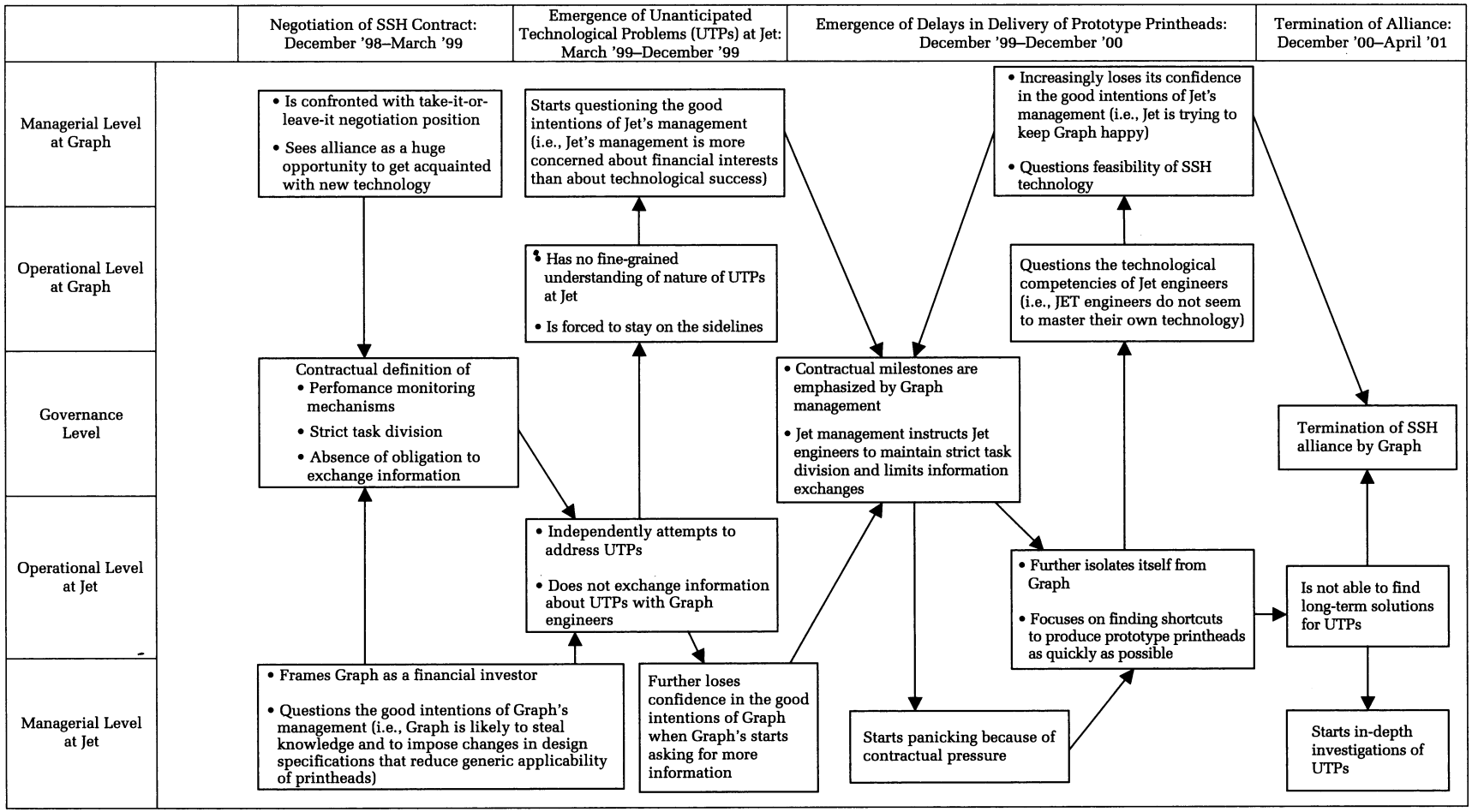
The exertion of contractual pressure by Graph's management made Jet's management very nervous. They feared the financial consequences of not delivering prototype printheads in a timely manner. Consequently, Jet engineers were instructed to develop and deliver prototype printheads to Graph as quickly as possible. Instead of focusing on sustainable solutions for the pending technological problems, Jet engineers started to look for technological shortcuts, allowing for the delivery of prototype heads to Graph.

At the same time, Jet's management was unwilling to deviate from the contractually agreed-upon mode of collaboration in the project. Although Graph engineers wanted to know more about the unanticipated technological problems and wanted to help Jet engineers to address some particular issues, Jet engineers had been instructed by their own management to continue limiting the exchange of information to Graph:

> A lot of electronic communication was initiated. A lot of that could be characterized as the Graph guys trying to get more information. . . . From my personal point of view, I would have liked to involve them more. But my instructions were not to. . . . I was under instructions not to be entirely truthful. I always had to conceal part of the story. (Jet engineer)

[11] A printing nozzle is a mechanical device designed to control the flow of ink within a printhead; coating involves the application of a thin film of functional material to a substrate, such as a printhead.

FIGURE 1
Overview of the Dynamics of Collaboration in the SSH Alliance



Jet interviewees again referred to the fear of Jet's management about unintended knowledge spillovers and losing command over the project to explain this explicit order not to share information on technological problems with Graph:

> Our management was both commercially and technically defensive. They were saying, "We do not want to lose technical and commercial control." (Jet engineer)

As information exchange on the technological problems remained absent, Graph engineers started getting the feeling that "Jet engineers were further isolating themselves" (Graph engineer).

A few months after Graph's management had started to increase contractual pressure, the first prototype printheads were delivered to Graph. However, Graph engineers quickly noticed that the quality of these printheads was not in accordance with the performance standards agreed on in advance. Graph engineers consequently started to question the technological capabilities of Jet's engineering team:

> In these circumstances, you get the feeling that they did not master their technology, that they do not understand the subtlety of their own inventions. (Graph engineer)

As a result, Graph's management started to have serious doubts about the technological feasibility of the SSH project. At Graph, the feeling also emerged that Jet was trying to "keep Graph happy" (Graph manager) by complying with contractual commitments (i.e., milestones), even if this meant delivering printheads of poor quality. Consequently, Graph's suspicions about the intentions of Jet's management further increased. Because of these lowered expectations and heightened suspicions, Graph's management started to push even harder for the milestones that were negotiated in the contract. As one Jet interviewee mentioned, this additional pressure resulted in a negative spiral:

> When you get put under financial pressure on such a project, you start looking for shortcuts. . . . The main questions that are raised at that moment are, "What is the quickest and what is the lowest-cost option?" and not "What is the option most likely to succeed?" . . . I do not disagree with financial and time scale pressures. But when you run up against difficulties, they actually create a feedback that makes it worse and worse. This very much happened in this project. (Jet manager)

As Graph's management continued to emphasize the contractual milestones, Jet engineers continued to focus on finding short-term solutions to delivering prototype printheads as quickly as possible instead of solving the fundamental technological issues at hand.

Termination of the SSH alliance. In December 2000, a new CEO was appointed at Jet to turn around the decreasing stock quotation of the company. This new CEO started an in-depth investigation of the UTPs in the SSH project. At Graph, these changes were seen as a positive development. However, Graph's confidence in the technological feasibility of the SSH technology remained low. At the beginning of 2001, after "benchmarking" the potential business scenarios for the SSH technology, Graph officially decided to terminate the SSH alliance.

The End Shooter Head Alliance

In May 2000, Graph proposed to Jet that the companies jointly initiate a second project in which they would work together to explore the feasibility of Jet's proprietary ESH technology for a number of printing systems that Graph had in mind. As mentioned before, the SSH alliance between Graph and Jet was facing serious difficulties at that moment. In addition, Graph's management had become very suspicious of the intentions of Jet's management. It therefore might seem odd that Graph wanted to initiate another alliance with Jet at this time. Graph interviewees provided two explanations. First, they stressed that Graph was highly dependent on Jet for access to inkjet technology, which was becoming very important for Graph from a strategic point of view:

> Researchers at Graph were convinced that inkjet technology would be the future for our graphics division. In addition, it was very difficult to get access to other head developers. Jet turned out to be our only option. (Graph manager)

Second, it was mentioned that "the engineering team that was responsible for the ESH technology was completely different from the engineering team that was responsible for the SSH-related activities" (Graph engineer). Moreover, Graph interviewees stressed that "this ESH engineering team already had successfully commercialized inkjet printheads in the past for other applications and customers." Graph consequently was quite confident in the capabilities of this ESH engineering team to turn the second alliance into a success. As Jet was in desperate need of additional sources of revenue, Jet also had its interests in initiating this ESH alliance.

Negotiation of the ESH contract. The Jet and Graph managers who had been involved in negotiating and monitoring the SSH alliance were also responsible for negotiating the ESH alliance. How-

ever, unlike the earlier negotiations, the new negotiations were dominated by Graph's management:

> At that moment, Jet faced substantial financial problems. . . . Psychologically, this was the optimal moment for us to negotiate these conditions. (Graph manager)

> Jet was finding it very difficult to sell licenses. . . . We were struggling to get income at all. Our stock was declining rapidly. . . . These facts changed the attitude of our managing director [during the negotiations] enormously. (Jet manager)

Because of Jet's precarious financial situation at that time, Jet accepted the conditions advanced by Graph.

On June 30, 2000, the ESH agreement was signed, signaling the start of the second exploratory R&D alliance between Graph and Jet. In the contract, it was stipulated that Graph would fund Jet's exploratory efforts to design and develop ESH prototype printheads. In exchange for its financial contribution, Jet granted Graph a "royalty-free, world-wide, non-transferable license to use the ESH printhead manufactured by Jet in any Graph application" (page 4 of the agreement). This license would make it possible for Graph to use the ESH printheads in their printing systems.

The degree of formalization of the ESH contract was similar to that of the SSH contract. In particular, both contracts had a score of 0.66 on Parkhe's (1993a) measure of degree of formalization.[12] However, we also compared the content of both contracts. In this way, we observed that, in the ESH contract, the content of the contractual clauses that referred to partners' behavior outside the alliance (i.e., right to legal action, proprietary nature of exchanged information, no agency relationship, allocation of intellectual property rights) was identical to that in the SSH contract. At the same time though, we noticed that the content of the clauses that addressed how the alliance activities should be executed substantially differed from those for the SSH alliance contract. Apart from program milestones, target dates, and performance standards formalizing Jet's expected outputs (i.e., the delivery of printheads), the ESH contract contained contractual statements regulating the activities that Jet was supposed to conduct in order to meet these milestones. For instance, it was stipulated that, during the first six months of the ESH alliance, Jet had to execute the following activities:

> Allocate resources to the program and establish working practices. . . . Define the detailed printhead specification required by Graph. . . . At the end of this stage the [Jet] development team will produce a recommendation for the printhead design, and plans and detailed financial estimates for the remainder of the development program through to full production. (ESH agreement annex 1: Project description ESH)

In this way, Graph could not only monitor the outputs of Jet's activities, but also follow up on the activities that Jet had to conduct to arrive at these outputs.

In addition, both task division and information exchange were contractually defined in new ways. In comparison with the SSH contract, the tasks overlapped much more in the ESH contract. For instance, the latter stipulated that the engineering teams of both partners would work together to establish the initial design specifications for the ESH prototype printhead. In addition, it was agreed that, during the collaborative project, Jet and Graph would conduct similar technological tests to evaluate the design of the prototype printheads. In the ESH contract, clauses were also present that obliged partners to exchange information on specific technological activities, including joint reviews regarding results of specific technological experiments:

> Jet will consider possibilities for . . . printhead designs and construction methods to meet the Graph requirements. Jet will review this with Graph. (ESH agreement, annex 1: Project description ESH)

Interviewees indicated that Graph had proposed these contractual changes, in view of the previous collaborative experience with the SSH alliance:

> From the SSH project we had learned that the ESH project should be defined in an alternative way. Therefore, the ESH project was initiated from another perspective. Now, Graph wanted to know more details and wanted to understand why some processes had a low yield. (Graph manager)

At Jet, enthusiasm about shifting toward this alternative mode of collaboration was quite limited as concern about potential opportunistic actions by Graph was still high:

> It was a completely different structure from that of the SSH alliance and it was a structure that was

[12] Numerous empirical studies (e.g., Deeds & Hill, 1998; Mellewigt et al., 2007; Reuer & Ariño, 2007) have applied Parkhe's (1993a) measure of degree of formalization. Parkhe (1993a) selected eight provisions through a computer-assisted search of the legal literature. In addition, he arranged these different types of contractual safeguards in increasing order of severity, so one weights the stringency of contractual provisions to arrive at the global measure of degree of formalization, which ranges from 0 to 1.

> largely dictated by Graph. . . . People here were still concerned about the potential of Graph abusing Jet as a result of the ESH alliance. (Jet manager)

However, as one Graph manager expressed, "they [Jet] had no other option than to accept the conditions put forward by Graph as they were standing with their back against the wall."

Emergence of ESH UTPs at Jet. In July 2000, the engineering teams of Graph and Jet started their ESH-related activities. After a few months of experimenting, Jet engineers came to the conclusion that developing a prototype head that met the predefined target specifications would be much more difficult than expected in advance. For instance, Jet's engineers "faced serious problems in creating ESH prototype printheads that were able to shoot very small drop sizes" (Jet engineer).

However, Graph engineers were now much better informed about UTPs than they had been with the earlier alliance. Interviewees referred to the contractual structure of the ESH alliance to explain this intensive information sharing. First, it was stressed that, in the ESH alliance, Jet engineers were contractually obliged to provide information about ongoing technological activities. One Jet interviewee, for instance, mentioned that "now we had to tell them what was going on." Second, Graph engineers emphasized that Jet's ongoing efforts were now closely monitored by checking the status of Jet's contractually defined activities. As unexpected difficulties triggered delays in the execution of these activities, additional technical meetings were organized, during which Graph engineers asked for explanations:

> We kept them on a tight leash. . . . When we thought that a specific problem was present, we organized a technical meeting to get additional information. (Graph engineer)

Graph engineers not only received information about Jet's technical problems but also were actively involved in defining their specific nature. The presence of an overlapping task division, allowing Graph engineers to conduct tests similar to those the Jet engineers were doing, was identified as a condition that facilitated the emergence of such joint problem definition processes:

> There definitely has been overlap in this project. . . . They were testing the heads and we were trying to carry out similar tests to compare the results. . . . The results of these tests were put on the table. Based on these results, decisions were made about how to move on. (Graph engineer)

As technological problems were identified, "joint brainstorming sessions were initiated to jointly search for solutions regarding issues within the scope of the contract" (Graph engineer). These joint efforts quickly started to pay off. Adopting suggestions that had emerged during joint brainstorming sessions, Jet engineers were able to successfully address a number of technological issues.

Because of the intensive information exchange, joint problem definition, and joint problem solving, Graph's engineering team acquired a fine-grained understanding of the UTPs at Jet and felt actively involved in addressing these issues. One exception was observed, however. In conducting tests, Graph had come to the conclusion that the electronic design applied by Jet was unsatisfactory. Discussing this specific technological issue was not straightforward. This problem turned out to be directly related to the core of Jet's ESH technology, but the ESH contract did not say that Jet needed to exchange information on the core aspects of its technology. Jet engineers were less willing to involve Graph in solving these issues:

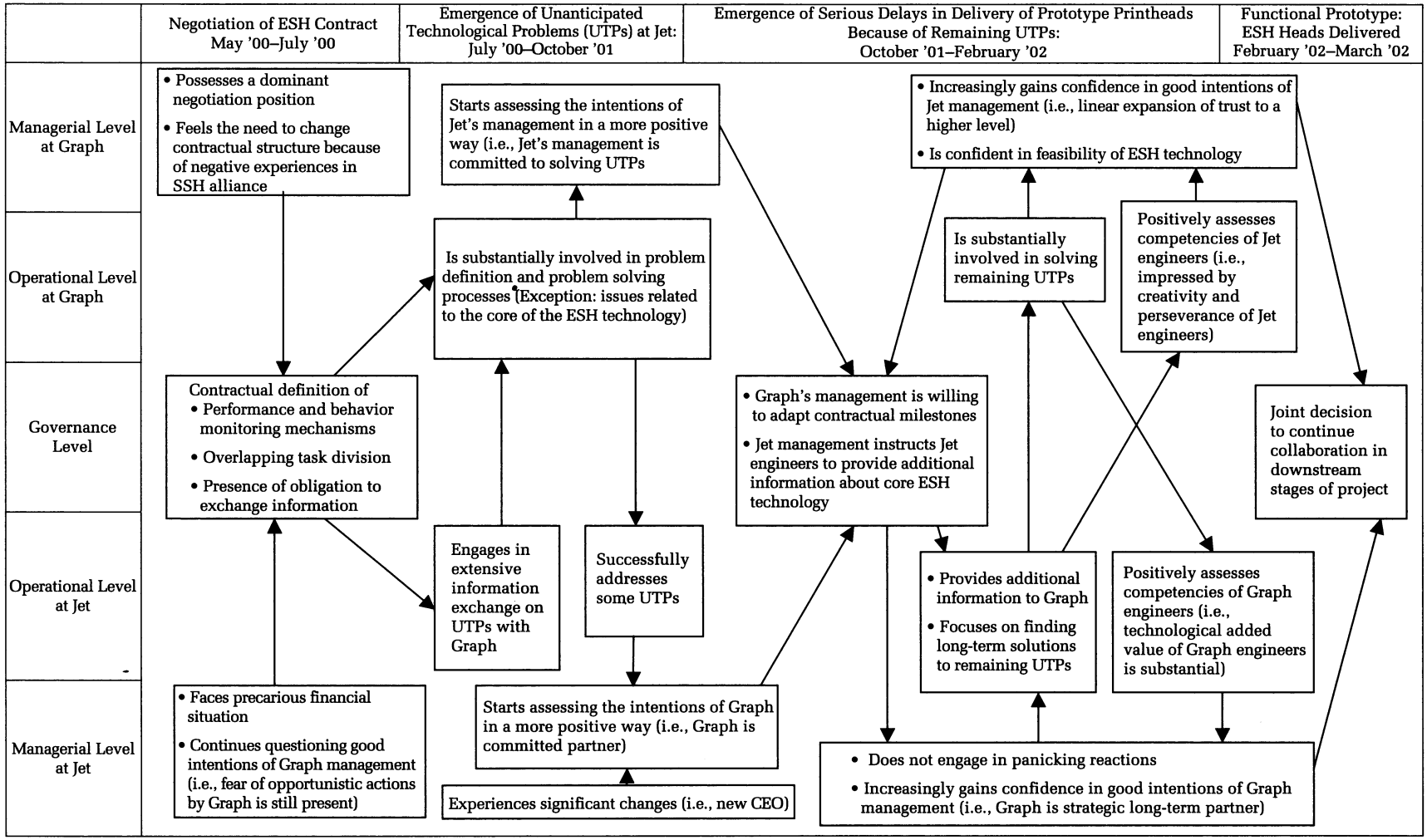
> We had a number of questions regarding the waveform development of the printhead. Jet however said: "This is our know-how and we do not want to give much insight into it." (Graph engineer)

Both Jet and Graph interviewees also indicated that, as the ESH alliance became operational, the quality of the relationship between the managers of both partners started to change. Though Jet's management had previously suspected Graph of having opportunistic intentions, they now started assessing the intentions of Graph's management in a more positive way. One Jet manager, for instance, mentioned that "we started seeing Graph as an important partner that was committed to turning the relationship into a success." In a similar vein, Graph's management became more convinced of the good intentions of Jet's management. One Graph manager, for instance, stressed that "there was a different approach by the Jet management. . . . Now, the focus was on the technology [instead of financial interests]." In the interviews, two reasons were provided to explain this positive relational evolution at the managerial level in the ESH alliance. First, it was stressed that the intensive and fruitful collaboration at the operational level triggered a relational turnaround at the managerial level:

> Clearly Graph had a significant amount of involvement in this project [ESH]. This drastically changed the relationship and the way that it was perceived here [at Jet]. (Jet manager)

> [At the operational level], meetings were regularly organized in which information was exchanged in an honest, open, and verifiable manner. In this way, you start building trust. (Graph manager)

FIGURE 2
Overview of the Dynamics of Collaboration in the ESH Alliance



Second, the appointment of a new CEO at Jet in December 2000 was identified as a major event that further accelerated these positive relational dynamics at the managerial level. During 2001, this new CEO hired some new managers and engineers from other companies that were experienced in developing and industrializing products. He also consistently stressed the strategic importance of the collaboration with Graph in his internal and external correspondence. As a result of these efforts, Graph's expectations about the positive intentions of Jet's management further increased:

> The arrival of this new CEO caused an additional jump in the relationship. . . . He was a huge supporter of the collaboration with Graph. (Graph manager)

Emergence of delays. In October 2001, the first ESH prototype heads were built by Jet. However, Graph engineers quickly found out that fundamental problems with the electronics of these prototype printheads had remained unsolved:

> An initially fully functional chevron-based printhead was delivered. . . . During the days after the meeting, tests revealed severe problems with the printhead electronics which were not experienced during the first hours we [Graph] used these printheads. Further delivery of ESH was blocked. (Internal Graph document: "Work meeting ESH Graph/Jet," November 9, 2001)

Jet had not been able to internally address the printhead electronics problems. Because of the persistence of this technological issue, the ESH alliance began to face serious delays. However, unlike in the SSH alliance, Graph's management refrained from increasing contractual pressure on Jet:

> We no longer threatened that, if they would not meet the deadlines, we would end the relationship or no longer reimburse their costs. Instead, we sat together and said to them: "We need to find a solution; tell us about your problems." (Graph manager)

In the ESH alliance, the original time schedule for completing the prototype printheads was adapted. As a result, Jet engineers could continue the search for high-quality solutions to the pending technological issues. At the same time, information exchange from Jet to Graph further increased.

> Jet became much more open in providing details. I remember meetings where Jet's project leader projected a table that provided detailed data about the yield of their core processes, what the main problems were, and how they were trying to address them. (Graph manager)

Although they were not contractually obliged to do so, Jet's management instructed its own engineers to start providing detailed information on the core of Jet's ESH technology.

In sum, when delays emerged in the ESH alliance, the contract was applied in a different way. In contrast to the SSH alliance, contractual milestones were adjusted and additional information exchange was initiated. Interviewees referred to the positive relational dynamics at the managerial level as an important explanation in this respect:

> From a relational point of view, a different kind of connection had grown between us and Jet's new management. This allowed for a different management approach. (Graph manager)

> The relationship between our new management and Graph's management was much more open and honest. . . . Now, we were told [by Jet's management] to deliver all the information they could use. (Jet engineer)

The additional information flows allowed Graph engineers to achieve a better understanding of the remaining technological problems and to make valuable contributions to the solution of the printhead electronics problems:

> After we had got access to the designs of the electronics, we started digging deeper. In this way, we noticed that some fundamental errors were present. However, these errors were easy to solve when you knew how to solve them. (Graph engineer)

The successful solution of additional problems further improved the quality of the relationship at both operational and managerial levels. At the operational level, Jet engineers admitted that "Graph delivered substantial added value from a technological point of view," and Graph engineers said that they "were impressed by the creativity and perseverance of the [Jet] engineering team." At the managerial level, each partner's confidence in the intentions of the other partner further increased. One Graph manager, for instance, referred to the "linear progression of trust between Graph and Jet's management" in the ESH project. At the same time, the technological successes at the operational level increased the confidence of both Graph and Jet managers in the technological feasibility of the project. According to one Graph interviewee, these relational dynamics made it possible to continue adapting milestones as well as focusing on the technological problems at hand:

> A feeling of mutual respect emerged. We started seeing them as competent suppliers of technology with whom we could work in a structural manner. . . . The milestones have been adapted a lot of times. However, it was always clear why they were

adapted. . . . We tried to settle this matter with them. We did not want to say to them, "This is what has been agreed in the contract; find a solution for it." (Graph manager)

Delivery of functional prototypes. In March 2002, fully functional ESH prototype printheads were delivered by Jet, allowing partners to jointly move to the downstream stages of this technological innovation trajectory.

MULTILEVEL PROCESS MODELS

Drawing on the findings above, we developed for each observed alliance transaction a multilevel process model, separating out governance, operational, and managerial levels. Figure 3 presents these two models. In this section, we systematically discuss the models and link them to our research questions.

Contract Content and its Impact on Trust Dynamics

To answer our first research question, on the impact of the content of a contract on trust dynamics, we first outline two different kinds of *contractual interface structures*, which are defined as collections of contractual statements that formalize monitoring, task division, and information flows within an alliance transaction. We then discuss how these differences in the nature of contractual formalization have an impact on the quality of joint sensemaking at the operational level, which in turn influences the dynamics of goodwill trust (positive expectations about a partner's intentions to perform according to an agreement) at the managerial level.

Narrow versus broad contractual interface structures. Although the degree of formalization was similar in both the SSH and ESH contracts, their nature of contractual formalization showed

FIGURE 3
Multilevel Process Models of Dynamics of Collaboration in the SSH and ESH Alliances

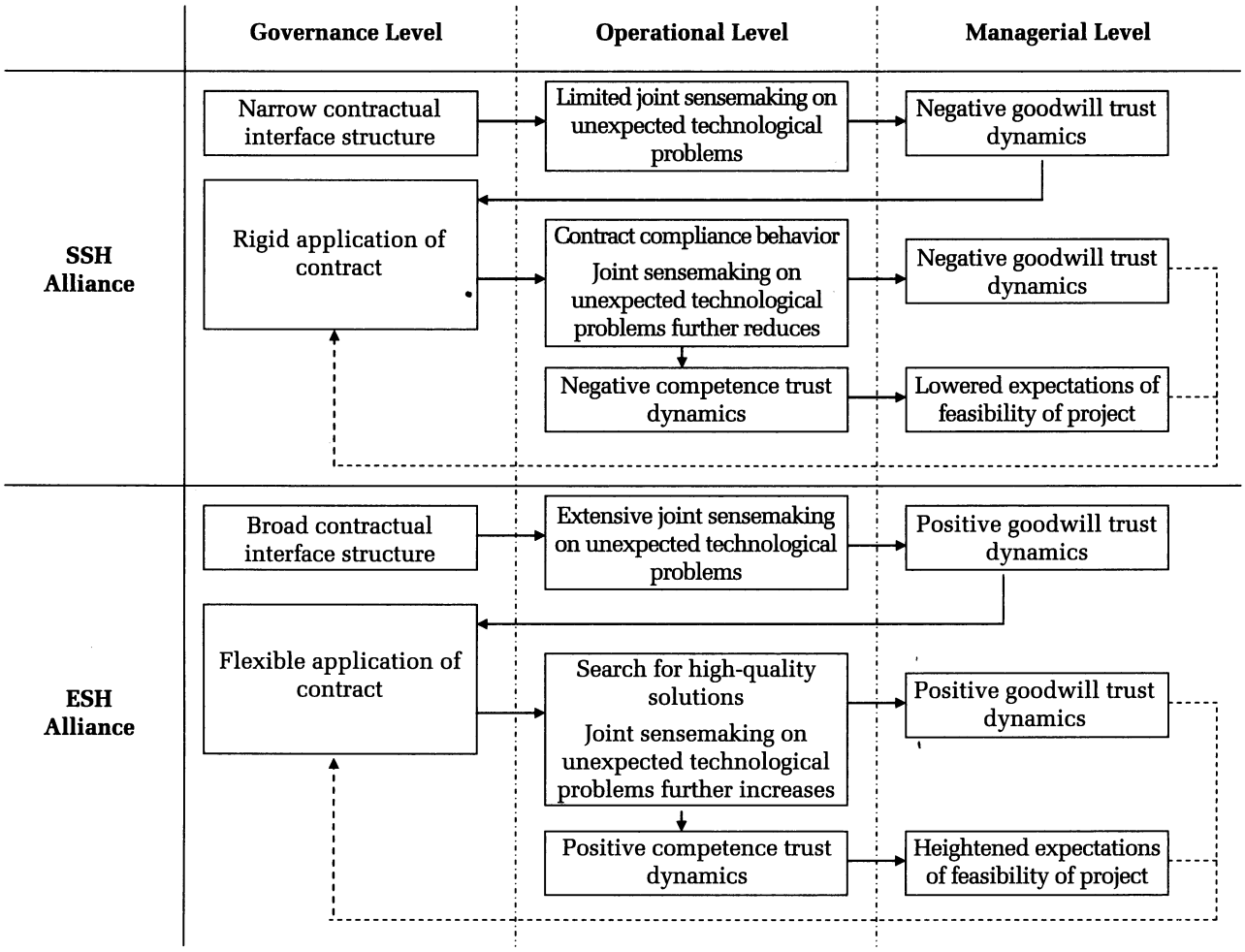


TABLE 3
Content of Alliance Contracts: Differences between the SSH and ESH Contracts[a]

Content Aspect and Source in Literature	Narrow Contractual Interface Structure: SSH Alliance	Broad Contractual Interface Structure: ESH Alliance
Formalization of monitoring (Barney & Hesterly, 1996)	Presence of performance monitoring mechanisms: *Presence of program milestones, target dates, and performance standards for delivery of SSH printheads.*	Presence of performance monitoring mechanisms: *Presence of program milestones, target dates, and performance standards for delivery of ESH printheads.*
	Absence of behavior-monitoring mechanisms	Presence of behavior-monitoring mechanisms: *Specification of technological activities that are supposed to be conducted by Jet.*
Formalization of task division (Landau, 1969)	Mutually exclusive task division: *Jet solely designs and develops the SSH prototype printheads, while Graph solely designs and develops the prototype printing system.*	Overlapping task division: *Jet and Graph jointly establish the initial design specifications of the ESH prototype printhead. Jet and Graph are supposed to conduct similar technological tests.*
Formalization of information flows (Van de Ven & Fry, 1980)	Absence of contractual obligation for information flows	Presence of contractual obligation for information flows: *Planning of joint review meetings in which results of technological experiments need to be exchanged.*

[a] Additional descriptions of the constructs are in italics.

some remarkable differences. In particular, we observed substantial differences in how issues of monitoring, task division, and information exchange were contractually defined. Relying on concepts of organization theorists (e.g., Barney & Hesterly, 1996; Landau, 1969; Van de Ven & Fry, 1980), we summarize the observed differences in Table 3.

Relying on Barney and Hesterly's (1996) distinction between performance and behavior monitoring mechanisms, we noticed a first difference regarding the content of both contracts. In the SSH contract, formalization of monitoring was limited to the definition of milestones, target dates, and performance standards. In contrast, in the ESH contract, not only performance-monitoring mechanisms, but also behavior-monitoring mechanisms, were contractually defined. Contractual statements that specified the technological activities that Jet was supposed to execute were illustrations of this type of monitoring. Besides monitoring, the SSH and ESH contracts differed regarding the formalization of task division and information flows. In the SSH contract, collaborating partners were solely responsible for different technological activities. Landau (1969) labeled such task division "mutually exclusive." Contractual obligations for information flows, or "work-related messages sent among members of collaborating partners through different modes of communication" (Van de Ven & Fry, 1980: xx) also remained absent from this contract. In contrast, in the ESH contract, task division between partners was formalized in a much more "overlapping" (Landau, 1969) manner: collaborating partners shared responsibilities regarding specific technological activities and conducted similar kinds of technological activities in parallel. In addition, the ESH contract contained statements that explicitly obliged partners to exchange information on the results of technological experiments.

Given these observations, we suggest a conceptual distinction between two kinds of contractual interface structures: *narrow* and *broad*. A narrow contractual interface structure is characterized by a mutually exclusive task division, an absence of obligations to exchange information, and monitoring mechanisms that are mainly performance-oriented. In contrast, a broad contractual interface structure is characterized by an overlapping task division, the presence of obligations to exchange information, and mechanisms that provide opportunities for not only performance but also behavior monitoring.

This conceptual distinction between narrow and broad contractual interface structures provides a much more comprehensive view of the options that managers have in designing the actual *content* of contracts in interfirm settings. It clearly shows that they can not only vary the contractual definition of juridical clauses that focus on partners' behavior outside an alliance (Hagedoorn & Hesen, 2007), but also make different choices in the content of contractual clauses that refer to the actual execution of the alliance agreement. Moreover, though Hage-

doorn and Hesen (2007) stressed that the content of contracts is likely to vary across different partnership forms, we provide evidence that, *within* one particular partnership form (i.e., contractual alliance), the content of particular contractual clauses can also substantially vary.

Impact of contractual interface structures on operational joint sensemaking. As predicted by new-product development scholars (e.g., Burgelman & Sayles, 1986; McGrath, 2001), the exploratory nature of technological activities quickly led to unanticipated technical problems in both alliances under study. Our data suggest that the nature of contractual formalization substantially influences the quality of joint sensemaking (i.e., joint problem definition and joint problem solving) on these UTPs at the operational level. In the SSH alliance, the presence of a narrow contractual interface structure severely limited information exchange on unanticipated technological problems between the engineers of the different partners, which resulted in what Allen (1977) called an "impoverished problem definition and solution space." In contrast, in the ESH alliance, the contractual obligation to exchange information and the presence of behavior-monitoring systems stimulated discussions about emerging technological problems. In addition, the presence of overlapping task division enhanced opportunities for joint problem definition and joint problem solving. In other words, the broad contractual interface structure of the ESH alliance positively influenced the quality and amount of joint sensemaking on unanticipated technological problems between engineers. This latter finding is in line with Landau's (1969) argument that, in organizational settings, overlap contributes to both problem definition and problem solving.

Whereas our study indicates that the outcome of the contractual negotiation process (i.e., the negotiated contractual interface structure) substantially influences the intensity and quality of joint sensemaking on the operational level, Vlaar, Van den Bosch, and Volberda (2006) have argued that the contracting process itself functions as a sensemaking device on the managerial level. In both the SSH and ESH alliances, however, we found no instances of intensive joint sensemaking between managers during contractual negotiation. Instead, we observed that, on the basis of their dominant bargaining position, the managers of one partner imposed a contract on the other partner with little room for focusing partners' attention, provoking articulation, and instigating interactions.

Impact of operational joint sensemaking on managerial trust dynamics. Our data also indicate that the quality of joint sensemaking at the operational level influences goodwill trust dynamics at the managerial level. As joint sensemaking on unanticipated technological problems remained absent in the SSH alliance, Graph's management started questioning Jet's good intentions. In contrast, in the ESH alliance, the presence of joint problem definition and joint problem solving at the operational level contributed to a relational turnaround in which managers from both partners started assessing the intentions of the other partner in much more positive terms. In other words, extensive joint sensemaking at the operational level contributed to positive goodwill trust dynamics at the managerial level. These findings are in line with the conceptual argument of Janowicz, Krishnan, and Noorderhaven (2005) that relational processes (i.e., joint sensemaking) at the operational level substantially influence relational processes (i.e., goodwill trust dynamics) at the managerial level.

To sum up, we identified particular connections between the nature of contractual formalization, the quality of joint sensemaking at the operational level, and goodwill trust dynamics at the managerial level. In particular, we propose:

> *Proposition 1. In an exploratory R&D alliance, a broad (narrow) contractual interface structure facilitates (hampers) joint sensemaking on unanticipated technological problems at the operational level, which in turn positively (negatively) influences goodwill trust dynamics at the managerial level.*

We need to remark that the extensive joint sensemaking at the operational level was not the only factor that influenced goodwill trust dynamics in the ESH alliance. We observed that the appointment of a new CEO at Jet also contributed to the emergence of positive goodwill trust dynamics. This latter finding sheds a new light on the impact of mobility among key persons in interfirm relationships. Although previous research (de Rond & Bouchikhi, 2004; Doz, 1988; Ring & Van de Ven, 1994) has mainly focused on the negative consequences (i.e., destruction of informal commitments; disappearance of important tacit knowledge) of replacing key individuals, we observed that the introduction of new people at the managerial level can also have a positive impact, contributing to a positive turnaround in trust dynamics.

Coevolution of Contract Application and Trust Dynamics

To address our second research question, we describe how trust dynamics and contract application coevolve over time. We first discuss how managerial

goodwill trust dynamics influence the mode of contract application and then argue that different modes of contract application trigger different trust dynamics at both operational and managerial levels, resulting in negative or positive reinforcing cycles.

Impact of trust dynamics on mode of contract application. In line with previous research (e.g., Ariño & de la Torre, 1998; Doz, 1996; Madhok, 1995a), our findings showed that contracts can be applied in different ways during alliances. In the SSH alliance, a rigid mode of contract application was observed. When unanticipated technological problems emerged in the SSH alliance, Graph's management was not willing to adjust the milestones and target dates. Rather, contractual pressure was increased by emphasizing the existing contractual milestones. At the same time, Jet's management turned out to be unwilling to adjust the contractually agreed upon task division and to allow for information flows. In contrast, in the ESH alliance, a much more flexible contract application approach was applied when unanticipated technological problems emerged. In this case, Graph's management was willing to adjust the existing milestones and target dates, while Jet's management was willing to further increase information flows and overlap in task activities.

Previous research remains silent on *why* contracts are applied in different ways; we, however, identified one particular condition that seems to influence the mode of contract application: the nature of goodwill trust dynamics at the managerial level. In the SSH alliance, Graph's management started questioning the good intentions of Jet's management. At the same time, the concerns of Jet's management about potential opportunistic behavior by Graph's management further increased. Interviewees explicitly referred to these negative goodwill trust dynamics at the managerial level to explain the rigid mode of contract application. In the ESH alliance, much more positive goodwill trust dynamics were observed at the managerial level. According to the interviewees, these positive goodwill trust dynamics triggered a much more *flexible* mode of contract application when unanticipated technological problems emerged. We therefore propose:

Proposition 2. In an exploratory R&D alliance, positive (negative) goodwill trust dynamics at the managerial level increase the probability of flexible (rigid) contract application.

At the same time, however, we did not find that the emergence of positive goodwill trust dynamics reduced the importance of contracts as governance mechanisms. Although previous studies (e.g., Das & Teng, 1998; Dyer & Singh, 1998; Larson, 1992) have suggested that, as positive trust dynamics emerge in alliances, formal contracts are pushed to the background and norms of fairness, honesty, and reciprocity take on a powerful role in governing the alliances, our data showed that the contract remained an important safeguarding and coordination device, even after positive trust dynamics emerged in the ESH alliance. For instance, one Graph manager explicitly stressed that "even when it starts becoming very pleasant, you need to oblige yourself to continue cross-checking whether the partner's activities are in line with the contractual arrangements." At the same time, this manager admitted that "we were now much more flexible in how these contractual targets were met." In other words, our data suggest that positive goodwill trust dynamics do not reduce the importance of contracts in governing alliances, but rather, allow for a shift from a rigid to a more flexible mode of contract application.

Negative or positive reinforcing cycles. Previous studies (Ghoshal & Moran, 1996; Sitkin & Stickel, 1996) have pointed to the risk of negative reinforcing cycles between contract application and trust dynamics. Our data on the SSH alliance seem to confirm this reasoning. In this case, the rigid application of the contract triggered "contract compliance behavior" (Macaulay, 1963) at Jet (i.e., searching for technological shortcuts) and further reduced the opportunities for joint sensemaking at the operational level, which in turn increased the suspicions of Graph's management about the intentions of the other partner. In addition, as Jet engineers started to deliver printheads of inferior quality, Graph engineers started to question the technological competencies of the Jet engineers. These negative competence trust dynamics at the operational level lowered the expectations of Graph's management about the feasibility of the project. The further decrease of goodwill trust and the lowered expectations about the feasibility of the project motivated Graph's management to further increase contractual pressure.

However, our data on the ESH alliance suggest that interactions between contract application and relational dynamics can also result in positive reinforcing cycles. In this case, the flexible application of the contractual interface structure allowed Jet engineers to focus on the search for high-quality solutions to pending technological problems and resulted in an increased sharing of sensitive technological information with Graph engineers. As a consequence, goodwill trust dynamics at the managerial level continued to be positive. In addition, the positive collaborative experiences at the opera-

tional level triggered positive competence trust dynamics at this particular level, leading to heightened expectations of the project's feasibility at the managerial level. The further increase in goodwill trust and the heightened expectations stimulated managers to continue applying the contractual interface structure in a flexible way.

In sum, although previous studies have emphasized the likely occurrence of negative reinforcing cycles between contract application and trust dynamics, our study suggests that application of contracts can trigger both negative and positive reinforcing cycles, depending on *how* contracts are applied. In particular, we argue:

Proposition 3. In an exploratory R&D alliance, a rigid (flexible) application of the contract is likely to trigger negative (positive) trust dynamics at both operational and managerial levels, which in turn leads to increasing rigidity (flexibility) regarding contract application.

TOWARD AN INTEGRATIVE PERSPECTIVE ON ALLIANCE GOVERNANCE

In this section, we discuss the main theoretical implications of our findings. Whereas previous alliance governance research has tended to focus on the structural design of single transactions *or* on relational dynamics within interfirm relationships, we present a more integrative perspective on alliance governance. In particular, we provide in-depth theoretical insights into how the design and application of structural elements are connected to relational processes, both *within* and *between* transactions.

Connections between Structural Design and Relational Dynamics within Transactions

The multilevel process models that we developed above suggest that, within an alliance transaction, the initial contract design substantially influences relational dynamics at operational and managerial levels, which in turn determine how the contract is applied. The theoretical implications of these findings are twofold. First, we provide a process-oriented view of the contract-trust relationship. Second, we propose an alternative perspective on the role of goodwill trust in governing alliance transactions.

Our study adds a different and richer voice to the current debate on the relationship between contracts and trust and the mixed evidence to date (e.g., Luo, 2002; Lyons & Mehta, 1997; Malhorta & Murnighan, 2002; Poppo & Zenger, 2002) by providing a more process-oriented view. We observed that contracts with a similar degree of formalization but a different nature of formalization triggered different kinds of joint sensemaking dynamics at the operational level, which in turn generated different kinds of goodwill trust dynamics at the managerial level. In the SSH alliance, the narrow contractual governance structure hampered joint sensemaking on unanticipated technological problems, which are an inherent aspect of exploration. This misalignment between the nature of contractual formalization and the specific nature of exploratory activities triggered negative trust dynamics at the managerial level. In contrast, the implementation of a broad contractual governance structure in the ESH alliance seemed to fit much better with the need for intensive joint sensemaking on unexpected technological problems in an exploratory innovation setting. This positive alignment between the nature of contractual formalization and the nature of alliance activities contributed to the emergence of much more positive goodwill trust dynamics at the managerial level in this case. We therefore argue that contracts with a similar *degree* of contractual formalization can trigger both positive and negative trust dynamics, depending on the extent to which the *nature* of contractual formalization reflects the nature of the alliance activities. In addition, although previous alliance governance studies have tended to treat the operational level as a black box (Currall & Inkpen, 2000), we point to relational processes at the operational level (i.e., joint sensemaking) as important intermediary processes between contract design at the governance level and goodwill trust dynamics at the managerial level.

Adherents of the relational perspective (e.g., Dyer & Singh, 1998; Gulati, 1995; Larson, 1992; Parkhe, 1993a; Uzzi, 1997) typically argue that, when high levels of goodwill trust are present, contracts are deemphasized, and partners switch from contractual governance to relational governance. In this line of reasoning, goodwill trust is envisioned as an alternative governance mechanism for complex contracts. Our data provide a different perspective on the role of goodwill trust in governing alliance transactions. First, we did not find evidence that positive goodwill trust dynamics substantially reduced the importance of contracts. Further, we found strong indications that positive goodwill trust dynamics allowed for a flexible approach to contract application. And finally, our data suggest that, in the case of negative goodwill trust dynamics, a rigid mode of contract application is likely to emerge. In view of these findings, we do not refer to goodwill trust as an alternative

governance mechanism for contracts, but rather conceptualize goodwill trust as a condition that determines how contracts are applied as governance mechanisms. Such a conceptualization of trust is in accordance with an argument of Rousseau and colleagues: "Trust is not a behavior or a choice, but an underlying psychological condition that can cause or result from such [governance] actions" (1998: 395).

Connections between Relational Dynamics and Structural Design between Transactions

Our findings also generate additional theoretical insights into how the relational history in previous alliance transactions influences the structural design in subsequent transactions between the same pair of firms. Examining two separate alliance transactions that were sequentially embedded within the same interfirm relationship, we suggest two relational processes explaining partners' need and ability to change the contractual interface structures for the governance of subsequent alliances as well as question the role of goodwill trust as a necessary condition for subsequent transactions.

In line with Mayer and Argyres (2004), we found evidence that learning experiences in previous transactions trigger a *need* to change contract content in subsequent transactions. The negative experience with the narrow contractual interface structure in the SSH alliance was for Graph a motivation to negotiate a broader contractual interface structure in the second explorative R&D alliance. However, although Mayer and Argyres (2004) provided an example in which both alliance partners experienced the need to change the content of their contract, our data indicated that partners' learning experiences may differ. Graph managers perceived a high need to shift to another contractual interface structure, yet Jet managers were not eager to do so. Further, we observed that Graph was able to effect the shift in contractual interface structure because, during the previous transaction, it gradually had gained the necessary bargaining power to do so. This latter observation is consistent with the argument of bargaining power theorists (e.g., Makhija & Ganesh, 1997; Yan & Gray, 1994) that the partner with a greater distribution of power is able to affect structural design more than the partner with less power.

In sum, we agree with Mayer and Argyres (2004) that, because of learning experiences in previous transactions, a collaborating partner may feel the *need* to change the nature of the contractual interface structures in subsequent transactions. However, we argue that, in the case of asymmetric learning experiences (i.e., only one partner perceives a *need* to change the content of a contract), a partner will primarily be *able* to effect such a shift if it has the necessary relative bargaining power to do so.

Focusing on transactional attributes to explain structural design changes, adherents to the structural alliance governance perspective might suggest an alternative theoretical explanation for the observed shift from narrow to broad contractual interface structures. As interviewees referred to the SSH technology as revolutionary and to the ESH technology as an extension of Jet's existing commercial printhead technologies, the level of technological uncertainty in the ESH alliance can considered to be lower than it was in the SSH alliance. Such lower levels of technological uncertainty would, according to the structural perspective, decrease the risk and/or consequences of opportunistic action, which in turn would reduce the need for contractual protection in interfirm relationships (e.g., Blumberg, 2001; Poppo & Zenger, 2002). Following this reasoning, one could argue that it was the presence of less technological uncertainty in the ESH alliance that reduced the perceived risk of opportunism at its start, which in turn increased the parties' willingness to negotiate a broader contractual interface structure. However, our interview data do not confirm this alternative explanation. As already mentioned, Jet interviewees stressed that, at the start of the ESH alliance, concerns about the potential for Graph to abuse Jet as a result of their collaboration were still substantial. In other words, we did not find indications of reduced opportunism concerns at the start of the ESH alliance, despite the decreased technological uncertainty.

Finally, our findings call into question the role of goodwill trust as a necessary condition for continuing interfirm relationships over different alliance transactions. The authors of some conceptual studies (e.g., Madhok, 1995b; Ring, 1997) have proposed that goodwill trust functions as the necessary social glue that keeps partners together. They have argued that the emergence of positive goodwill trust dynamics in previous transactions induces partners to continue and even expand their relationship through negotiating new transactions. Implicitly, these scholars seem to assume that negative goodwill trust dynamics limit the incidence of future ties. Previous case study research that provides instances of unsuccessful alliances (e.g., Ariño & de la Torre, 1998; Doz, 1996) seems to affirm this argument. These studies describe how negative goodwill trust dynamics in an alliance contributed to the dissolution of the relationship. However, our case study provides an example in which, despite the negative goodwill trust dynam-

ics in a previous transaction, the managers of both partners negotiated a new contractual transaction. Both Jet and Graph interviewees explained this decision by referring to their respective financial and technological dependence on each other. Whereas Jet desperately needed Graph's financial support, Graph needed Jet to gain access to inkjet technologies. A second condition explaining their willingness to negotiate a new alliance was the presence of positive expectations about the competencies of the new Jet engineering team. The track record of Jet's ESH team convinced Graph that, in contrast to Jet's SSH team, this team was competent to turn this project into a success. These findings lead us to suggest that mutual interdependence—the core concept of resource dependence theory (e.g., Pfeffer & Salancik, 1978)—and competence trust might be more important conditions for the continuation of interfirm relationships over multiple transactions than goodwill trust.

Conclusion

Our study contributes to an integrative perspective on alliance governance by examining the complex and dynamic connections between structural and relational aspects in governing alliances. We clearly show that structural and relational aspects are inherently linked and mutually influence each other, both within *and* between transactions. On the basis of our findings, we (1) provide a process-oriented view of the relationship between contracts and trust, (2) conceptualize goodwill trust as a condition that determines how contracts are applied, (3) define the contracting process as an incremental learning process that is sensitive to changes in relative bargaining power, and (4) point to mutual interdependence and competence trust as crucial conditions for subsequent transactions.

Several avenues for future research can be identified. First, we stress the need for additional research on how alliance contracts are negotiated. We found strong indications that, when managers are able to achieve a good fit between contract content and alliance activities, a contract is likely to catalyze positive relational processes on operational and managerial levels. These findings point to the negotiation of the contract as a vital process in an alliance. However, although researchers have paid a lot of attention to the antecedents and outcomes of contracts, the actual process of negotiating them has received limited attention (Argyres & Mayer, 2007; Ring, 1997). Second, the relationship between variations in contract design and relational processes may be extended to variations in juridical clauses. In our study, the contract designs for the two studied alliances differed in the way monitoring, task division, and information flows were contractually defined but were similar regarding the juridical clauses regulating the behavior of partners outside the alliances. As these clauses can also differ (Hagedoorn & Hesen, 2007), future research examining how changes in the content of juridical clauses influence relational processes might be very fruitful. Third, breaking with the focus of previous work on trust on the individual or the organizational level, our focus on the operational and managerial levels allowed analyzing the evolution of trust at a meso level (i.e., a group level). In this way, we found first indications that competence and goodwill trust dynamics may operate at different levels but, at the same time, influence each other. These observations point to the need for additional research on the complex links between competence and goodwill trust across different levels. Fourth, we point to the need for further research on the revitalization of interfirm relationships. Previous alliance research (e.g., Ariño & de la Torre, 1998; Das & Teng, 2000) has tended to conceptualize interfirm relationships as rather unstable phenomena, especially when negative trust dynamics are present. Our findings, however, indicate that, after negative trust dynamics have emerged, partners may still decide to continue their relationship and may even manage to achieve a significant turnaround in trust dynamics. Moreover, although previous research (de Rond & Bouchikhi, 2004; Doz, 1988; Ring & Van de Ven, 1994) has emphasized the negative consequences of the mobility of key persons during collaborative projects, we found first indications that replacing key individuals and/or teams can revitalize a relationship. For instance, we observed how the creation of discontinuity at the operational level (i.e., switching between engineering teams at Jet) allowed for continuity at the interfirm relationship level. In addition, we found strong indications that the management changes at Jet hugely contributed to the positive trust dynamics in the ESH alliance. At the same time, we acknowledge that additional research is needed in this respect. For instance, rather than collecting retrospective data, as we did, it might be interesting to conduct real-time case study research to attain finer-grained insights into how the mobility of key individuals at operational and managerial levels influences the collaborative dynamics in alliances.

As a final reflection, we point to the main limitation of this study. Our findings are based on an in-depth examination of two sequential exploratory R&D alliances between the same pair of partners. Although this research design allowed us to com-

pare these two alliances with a minimum of extraneous variation, the findings are contextualized. For instance, our data suggest that a broad contractual interface structure is more effective than a narrow contractual interface structure in exploratory R&D alliances. However, this does not imply that narrow interface structures cannot be useful in other collaborative settings. For instance, Gerwin and Ferris (2004) have already provided indications that, in exploitative settings, where partners focus on standardization and fine-tuning and face higher time-to-market pressures, a narrow interface structure might be more cost- and time-efficient than a broad interface structure.

In sum, this study provided a more integrative perspective on alliance governance. We hope that our insights may help managers improve the success rate of their alliances. At the same time, we encourage scholars to further explore the interactions between structural and relational aspects within and between alliance transactions in a variety of organizational settings.

REFERENCES

Allen T. J. 1977. ***Managing the flow of technology.*** Cambridge, MA: MIT Press.

Anand, B., & Khanna, T. 2000. Do firms learn to create value? The case of alliances. ***Strategic Management Journal,*** 21: 295–315.

Argyres, N., & Mayer, K. J. 2007. Contract design as a firm capability: An integration of learning and transaction cost perspectives. ***Academy of Management Review,*** 32: 1060–1077.

Ariño, A., & de la Torre, J. 1998. Learning from failure: Towards an evolutionary model of collaborative ventures. ***Organization Science,*** 9: 306–325.

Ariño, A., & Reuer, J. J. 2005. Alliance contractual design. In O. Shenkar & J. J. Reuer (Eds.), ***Handbook of strategic alliances:*** 149–167. Thousand Oaks, CA: Sage.

Barney, J. B., & Hesterly, W. 1996. Organizational economics: Understanding the relationship between organizations and economic analysis. In S. Clegg, C. Hardy, & W. R. Nord (Eds.), ***Handbook of organization studies:*** 115–147. London & Thousand Oaks, CA: Sage.

Bell, J., den Ouden, B., & Ziggers, G. W. 2006. Dynamics of cooperation: At the brink of irrelevance. ***Journal of Management Studies,*** 43: 1607–1619.

Blau, P. 1964. ***Exchange and power in social life.*** New York: Wiley.

Bleeke, J., & Ernst, D. 1991. The way to win in cross-border alliances. ***Harvard Business Review,*** 69(6): 127–135.

Blumberg, B. 2001. Cooperation contracts between embedded firms. ***Organization Studies,*** 22: 825–852.

Burgelman, R. A., & Sayles, L. R. 1986. ***Inside corporate innovation.*** New York: Free Press.

Cardinal, L. B., Sitkin, S. B., & Long, C. P. 2004. Balancing and rebalancing in the creation and evolution of organizational control. ***Organization Science,*** 15: 411–431.

Carson, S. J., Madhok, A., Varman, R., & John, G. 2003. Information processing moderators of the effectiveness of trust-based governance in interfirm R&D collaborations. ***Organization Science,*** 14: 45–56.

Contractor, F. J. 2005. Alliance structure and process: Will the two research steams ever meet in alliance research? ***European Management Review,*** 2(2): 123–129.

Currall, S. C., & Inkpen, A. C. 2000. Joint venture trust: interpersonal, inter-group, and inter-firm levels. In D. O. Faulkner & M. De Rond (Eds.), ***Cooperative strategy: Economic, business, and organizational issues:*** 324–340. Oxford, U.K.: Oxford University Press.

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. 2000. Instabilities of strategic alliances: An internal tensions perspective. ***Organization Science,*** 11: 77–101.

Das, T. K., & Teng, B.-S. 2001. Trust, control, and risk in strategic alliances: An integrated framework. ***Organization Studies,*** 22: 251–283.

de Rond, M., & Bouchikhi, H. 2004. On the dialectics of strategic alliances. ***Organization Science,*** 15: 56–69.

Deeds, D. L., & Hill, C. W. 1998. An examination of opportunistic action within research alliances: Evidence from the biotechnology industry. ***Journal of Business Venturing,*** 14: 141–163.

Doz, Y. L. 1988. Technology partnerships between larger and smaller firms: Some critical issues. In F. J. Contractor & P. Lorange (Eds.), ***Cooperative strategies in international business:*** 317–338. New York: Lexington Books.

Doz, Y. L. 1996. The evolution of cooperation in strategic alliances: Initial conditions or learning processes? ***Strategic Management Journal,*** 17: 55–83.

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. 1989. Building theories from case

study research. ***Academy of Management Review,*** 14: 532–550.

Eisenhardt, K. M., & Graebner, M. E. 2007. Theory building from cases: Opportunities and challenges. ***Academy of Management Journal,*** 50: 25–32.

Faems, D., Janssens, M., Bouwen, R., & Van Looy, B. 2006. Governing explorative R&D alliances: Searching for effective strategies. ***Management Revue,*** 17(1): 9–29.

Faems, D., Van Looy, B., & Debackere, K. 2005. Interorganizational collaboration and innovation: toward a portfolio approach. ***Journal of Product Innovation Management,*** 22(2): 238–250.

Gerwin, D., & Ferris, J. S. 2004. Organizing new product development projects in strategic alliances. ***Organization Science,*** 15: 22–37.

Geyskens, I., Steenkamp, J.-B. E. M., & Kumar, N. 2006. Make, buy, or ally: A transaction cost theory meta-analysis. ***Academy of Management Journal,*** 49: 519–543.

Ghoshal, S., & Moran, P. 1996. Bad for practice: A critique of the transaction cost theory. ***Academy of Management Review,*** 21: 13–47.

Gioia, D. A., & Chittipeddi, K. 1991. Sensemaking and sensegiving in strategic change initiation. ***Strategic Management Journal,*** 12: 433–448.

Gioia, D. A., Thomas, J. B., Clark, S. M., & Chittipeddi, K. 1994. Symblism and strategic change in academia: The dynamics of sensemaking and influence. ***Organization Science,*** 5: 363–383.

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

Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. ***American Journal of Sociology,*** 91: 481–510.

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.

Hall, P. A. 2006. Systematic process analysis: When and how to use it. ***European Management Review,*** 3(1): 24–31.

Hennart, J.-F. 1991. The transaction costs theory of joint ventures. ***Management Science,*** 37: 483–497.

Hennart, J.-F. 2006. Alliance research: Less is more. ***Journal of Management Studies,*** 43: 1621–1628.

Janowicz, M., Krishnan, R., & Noorderhaven, N. G. 2005. ***Trust repair: Taking it to the next level.*** Paper presented at the 21st European Group for Organization Studies (EGOS) colloquium, Berlin.

Jeffries, F. L., & Reed, R. 2000. Trust and adaptation in relational contracting. ***Academy of Management Review,*** 25: 873–882.

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.

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.

Kvale, S. 1996. ***InterViews: An introduction to qualitative research interviewing.*** London: Sage.

Landau, M. 1969. Redundancy, rationality, and the problem of duplication and overlap. ***Public Administration Review,*** 29: 346–358.

Langley, A. 1999. Strategies for theorizing from process data. ***Academy of Management Review,*** 24: 691–710.

Larson, A. 1992. Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. ***Administrative Science Quarterly,*** 37: 76–104.

Leonard-Barton, D. 1990. A dual methodology for case studies: Synergistic use of a longitudinal single site with replicated multiple studies. ***Organization Science,*** 1: 248–266.

Lewicki, R. J., Tomlinson, E. C., & Gillespie, N. 2006. Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions. ***Journal of Management,*** 32: 991–1022.

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.

Macaulay, S. 1963. Non-contractual relations in business: a preliminary study. ***American Sociological Review,*** 28: 55–67.

Madhok, A. 1995a. Opportunism and trust in joint venture relationships: An exploratory study and a model. ***Scandinavian Journal of Management,*** 11: 55–74.

Madhok, A. 1995b. Revisiting multinational firms' tolerance for joint ventures: A trust-based approach. ***Journal of International Business Studies,*** 26: 117–137.

Madhok, A., & Tallman, S. B. 1998. Resources, transactions and rents: Managing value through interfirm collaborative relationships. ***Organization Science,*** 9: 326–339.

Makhija, M. V., & Ganesh, U. 1997. The relationship between control and partner learning in learning-related joint ventures. ***Organization Science,*** 8: 508–527.

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.

McGrath, R. G. 2001. Exploratory learning, innovative capacity, and managerial oversight. ***Academy of Management Journal,*** 44: 18–131.

Mellewigt, T., Madhok, A., & Weibel, A. 2007. Trust and formal contracts in interorganizational relationships—Substitutes and complements. ***Managerial and Decision Economics,*** 28: 833–847.

Miller, C. C., Cardinal, L. B., & Glick, W. H. 1997. Retrospective reports in organizational research: A reexamination of recent evidence. ***Academy of Management Journal,*** 40: 189–204.

Mintzberg, H. 1979. ***The structuring of organizations: A synthesis of the research.*** Englewood Cliffs, NJ: Prentice-Hall.

Nooteboom, B. 1996. Trust, opportunism and governance: A process and control model. ***Organization Studies,*** 17: 985–1010.

Osborn, R. N., & Hagedoorn, J. 1997. The institutionalization and evolutionary dynamics of interorganizational alliances and networks. ***Academy of Management Journal,*** 40: 261–278.

Oxley, J. E. 1997. Appropriability hazards and governance in strategic alliances: A transaction cost approach. ***Journal of Law, Economics, and Organization,*** 13: 387–409.

Parkhe, A. 1993a. Strategic alliances structuring: A game theoretic and transaction cost examination of interfirm cooperation. ***Academy of Management Journal,*** 36: 794–829.

Parkhe, A. 1993b. "Messy" research, methodological predispositions, and theory development in international joint ventures. ***Academy of Management Review,*** 18: 227–268.

Pentland, B. T. 1999. Building process theory with narrative: From description to explanation. ***Academy of Management Review,*** 24: 711–724.

Pettigrew, A. M. 1990. Longitudinal field research on change: theory and practice. ***Organization Science,*** 1: 267–292.

Pfeffer, J., & Salancik, G. R. 1978. ***The external control of organizations.*** New York: Harper & Row.

Pisano, G. P. 1990. The R&D boundaries of the firm: An empirical analysis. ***Administrative Science Quarterly,*** 35: 153–176.

Pisano, G. P., Russo, M. V., & Teece, D. 1988. Joint ventures and collaborative agreements in the telecommunications equipment industry. In D. Mowery (Ed.), ***International collaborative ventures in U.S. manufacturing:*** 23–70. Cambridge, MA: Ballinger.

Plowman, D. A., Baker, L. T., Beck, T. E., Kulkarni, M., Solansky, S. T., & Travis, D. V. 2007. Radical change accidentally: The emergence and amplification of small change. ***Academy of Management Journal,*** 50: 515–543.

Poole, M. S., Van de Ven, A. H., Dooley, K., & Holmes, M. E. 2000. ***Organizational change and innovation processes: Theory and methods for research.*** Oxford, U.K.: Oxford University Press.

Poppo, L., & Zenger, T. 2002. Do formal contracts and relational governance function as substitutes or complements? ***Strategic Management Journal,*** 23: 707–725.

Powell, W. W. 1998. Learning from collaboration: Knowledge and networks in the biotechnology and pharmaceutical industries. ***California Management Review,*** 40(3): 228–240.

Reuer, J. J., & Ariño, A. 2007. Strategic alliance contracts: Dimensions and determinants of contractual complexity. ***Strategic Management Journal,*** 28: 313–330.

Reuer, J. J., Ariño, 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:*** 113–145. Oxford, U.K.: Oxford University Press.

Ring, P. S., & Van de Ven, A. H. 1992. Structuring cooperative relationships between organizations. ***Strategic Management Journal,*** 13: 483–498.

Ring, P. S., & Van de Ven, A. H. 1994. Developmental processes of cooperative interorganizational relationships. ***Academy of Management Review,*** 19: 90–118.

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.

Salk, J. E. 2005. Often called for but rarely chosen: Aliance research that directly studies process. ***European Management Review,*** 2(2): 117–122.

Sampson, R. C. 2004. Organizational choice in R&D alliances: Knowledge-based and transaction cost perspectives. ***Managerial and Decision Economics,*** 25: 421–436.

Sitkin, S. B., & Stickel, D. 1996. The road to hell: The dynamics of distrust in an era of quliaty. In R. M. Kramer & T. R. Tyler (Eds.), ***Trust in organizations: Frontiers of theory and research:*** 196–215. Thousand Oaks, CA: Sage.

Uzzi, B. 1997. Social structure and competition in inter-

firm networks: the paradox of embeddedness. ***Administrative Science Quarterly,*** 42: 35–67.

Van de Ven, A. H., & Fry, D. L. 1980. ***Measuring and assessing organizations.*** New York: Wiley.

Van Maanen, J. 1979. The fact of fiction in organizational ethnography. ***Administrative Science Quarterly,*** 24: 539–550.

Vlaar, P. W. L., Van den Bosch, F. A. J., & Volberda, H. W. 2006. Coping with problems of understanding in interorganizational relationships: Using formalization as a means to make sense. ***Organization Studies,*** 27: 1617–1638.

Vlaar, P. W. L., Van den Bosch, F. A. J., & Volberda, H. W. 2007. On the evolution of trust, distrust, and formal coordination and control in interorganizational relationships: Toward an integrative framework. ***Group & Organization Management,*** 32: 407–428.

Williamson, O. E. 1985. ***The economic institutions of capitalism.*** New York: Free Press.

Williamson, O. E. 1991. Comparative economic organization: The analysis of discrete structural alternatives. ***Administrative Science Quarterly,*** 36: 269–296.

Yan, A., & Gray, B. 1994. Bargaining power, management control, and performance in United States–China joint ventures: A comparative study. ***Academy of Management Journal,*** 37: 1478–1517.

Yin, R. K. 1984. ***Case study research: Designs and methods.*** London: Sage.

Zaheer, A., Lofstrom, S., & George, V. P. 2002. Interpersonal and interorganizational trust in alliances. In F. J. Contractor & P. Lorange (Eds.), ***Cooperative strategies and alliances:*** 347–380. Amsterdam: Pergamon.

Zaheer, A., & Venkatraman, N. 1995. Relational governance as an interorganizational strategy: An empirical test of the role of trust in economic exchange. ***Strategic Management Journal,*** 16: 373–392.

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.

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