How information and controls impact the formation of trust in inter-firm settings

Alexandra Van den Abbeele[1]
Katholieke Universiteit Leuven, Naamsestraat 69, 3000 Leuven - Belgium
E-mail: alexandra.vandenabbeele@econ.kuleuven.ac.be

Filip Roodhooft
Katholieke Universiteit Leuven, Naamsestraat 69, 3000 Leuven - Belgium
E-mail: filip.roodhooft@econ.kuleuven.ac.be
&
Vlerick Leuven Gent Management School, Vlamingenstraat 83, 3000 Leuven - Belgium

Luk Warlop
Katholieke Universiteit Leuven, Naamsestraat 69, 3000 Leuven - Belgium
E-mail: luk.warlop@econ.kuleuven.ac.be

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Abstract

This study explores the way trust is built at the level of the inter-firm relationship and the role that controls and information play in this process. We use a 3 (no, weak or strong control system) X 2 (traditional versus more refined Total Cost of Ownership information) experimental design to investigate the influence of cost information and its interaction with inter-firm control systems on buyer-supplier negotiations and on resulting outcomes. Based on Tomkins (2001) and Dekker (2004) we expect some non-linear relations between information, controls and trust. In an early phase of the relationship, we expect and find evidence of a positive relation between formal controls and trust as well as a positive association between information and trust on negotiation outcomes. Furthermore, we find that information and controls form substitutes in the formation of trust. We explain these results by explicitly investigating the negotiation process. At a later stage in the relation, information has no longer a positive impact on joint profits, while, depending on the information available, trust may replace the need for information exchange. We conclude that the negotiation process, characterized by information exchange, plays a crucial role in explaining inter-firm negotiation outcomes.

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1. Introduction

Inter-firm relationships are characterized by a number of specific risks such as the exchange of sensitive information, the fair division of cost and benefits and the appropriation of investments to be made in specific assets (Dekker, 2003). These concerns require cooperating firms to have confidence that opportunistic behavior will not occur. Confidence may be derived from the presence of trust or it may be gained from formal controls or refined information. It is important for managers to cultivate an optimal mix of these governance mechanisms because they interact with each other (Lui & Ngo, 2004) and they are not costless to develop (Parkhe, 1993).

Prior studies showed contradictory results on the relation between trust and controls, i.e. whether trust is a *substitute* or a *complement* for formal control mechanisms. Some prior studies provide evidence of the complementary roles of trust and control in cooperative relationships (Luo, 2002; Poppo & Zenger, 2002). Other researchers argue that the more trust one has, the less control one needs over a partner (Madhok 1995; Nooteboom 1996). Malhotra and Murnighan (2002) even found that the presence of control systems inhibits the development of trust.

Recent research indicates that the relationship between trust and control is more complex: trust and control may be complements or substitutes depending on the situation. Woolthuis et al. (2005) conducted four longitudinal case studies to reveal that trust and controls can be complements as well as substitutes, depending on the purpose and the content of the formal agreement. Lui & Ngo (2004) showed that the relationship between contractual safeguards and cooperative outcomes depends on both the level and the type of trust (goodwill trust and competence trust). Fryxell et al. (2002) examined the moderating effects of age and partner trust on the relationship between control mechanisms and perceptions of performance in international joint ventures (IJVs) and found a positive relation in younger IJVs, but a negative relation in more mature IJVs.

One prior study, although in an intra-organizational context, hints at a more dynamic perspective according to which the interpersonal interaction involved in the execution of control systems may actually contribute to the development of trust. If the nature of the control system is such that it initially provides economic incentives for cooperation, a more trusting relationship may develop out of this cooperation, and control systems may eventually facilitate the development of trust (Coletti et al., 2005).

Coletti et al. (2005) have hinted at the mediating role of control-induced cooperation, but their study lacks the context of typical interpersonal actions. Like in other prior work they used prisoners' dilemma games to simulate trusting interactions. However, these studies do not provide insights into real negotiation behavior, such as the use of distributive tactics and the exchange of information that characterize a real negotiation setting, and that influences negotiation outcomes.

We argue that prior studies have neither fully explored the way in which trust is built in the relationship (the *how* of the trust building process), nor the role that information plays in this process. While several authors have raised questions about the relationship between trust, information and control (e.g. Langfield-Smith & Smith, 2003; Dekker, 2004; Tomkins, 2001), there is hardly any study on how information and formal controls relate to the *process* of trust building (Vosselman & van der Meer-Kooistra, 2004).

Our contribution is threefold. First, we conduct the first empirical investigation of the role of information in the relation between inter-firm controls and trust. We demonstrate empirically the existence of non-linear relations between information, trust and controls (cf. Dekker, 2004; Tomkins, 2001). At an early stage of the relation, we find evidence of a positive relation between formal controls and trust as well as a positive association between information and trust on negotiation outcomes. Later in the relationship, information has no longer a positive impact on joint profits, while, depending on the information available, trust may replace the need for information exchange. Our second contribution is the investigation of the interpersonal processes by which trust is built at the level of the relationship. We not only explain negotiation outcomes, but also take into account the negotiation process that leads to these outcomes. This process, characterized by information exchange and distributive behavior has largely been ignored in the accounting literature. Our study demonstrates that the negotiation process, characterized by information exchange, plays a crucial role in explaining negotiation outcomes. Third, this study operationalizes more refined cost information as Total Cost of Ownership (TCO) information and provides evidence on how TCO may help building a higher level of buyer-supplier trust. A recurring theme in the accounting literature on TCO information is that it represents an important and useful tool for negotiation between buyers and suppliers (Ellram, 1995a & 1995b; Monczka et al., 2002; Roodhooft et al., 2003 & 2005). This study is one of the first to provide empirical evidence for these claims.

Furthermore, we study the effects of control strength. The everyday use of formal controls leads to questions about the ultimate strength of the bonds that they have created. Investigating the effects of contract strength has therefore been identified as a clear avenue for new research (Malhotra & Murnighan, 2002). For example, a weaker control system may fail to provide strong enough incentives for cooperation. In such a case, the feedback may reveal shirking and, as a result, lead to heightened levels of *distrust* among collaborative partners.

The remainder of the paper is organized as follows: in section two, the relevant literature is reviewed and hypotheses are formulated. Section three covers the research method, whereas results are reported in section four. Finally, in section five, results are discussed and possibilities for further research are formulated.

2. Literature review and hypotheses

Dekker (2004) and Tomkins (2001) provided interesting insights into the relation between trust and control, and between trust and information, respectively. Dekker (2004) argues that the relationship between trust and controls may be nonlinear. *Until a certain threshold* (determined by the relation's transaction hazards) the use of formal controls may be complementary and enhancing to trust. However, since trust is the low-cost solution, it will substitute formal controls whenever a sufficient level of control is realized for safeguarding the transaction. Partners will not unnecessarily use expensive formal control mechanisms and in addition risk damaging the quality of their relationship (Dekker, 2004). This implies that, in an early phase of the relation, where trust still needs to be built, one would expect a positive relation between formal controls and trust. However, at a later stage in the relation, trust may replace formal controls.

While Dekker (2004) provides us with insights into the relation between trust and formal control systems, Tomkins (2001) gives us a better understanding of how information and trust are related. While prior literature (e.g. Wicks et al., 1999) conclude that there is an inverse relationship between the willingness to trust and the need for information, Tomkins (2001) describes the relationship between trust and information during different stages of the relationship life cycle as an inverted U-shape: in the early stages of the relationship trust and information are additively related, while later on they become substitutes. Tomkins (2001) reasons that it is probably true to say that, at any specific point of time, there is a reasonably strict inverse association between information and the level of trust (i.e. trust intensity), but this assumes that the level of trust intensity is somehow given, quite independent of any other activity. It ignores the fact that trust derives from learned, usually interactive, experiences and that this process itself depends upon information as well as appropriate information depending upon the state of trust.

Although the exchange of information and its relation to inter-firm controls and trust has been less well investigated, Seal et al. (1999) offer some suggestions on how management accounting may contribute to the development of dyadic business relationships. Although their fieldwork revealed that a partnership may be organized by the enactment of inter-dependence and through the establishment of shared meanings, these common behaviors and understandings can be built up more readily if participants can draw on a commonly understood management accounting methodology. Indeed, their research shows that the specification and sharing of cost data can play a central role in inter-organizational negotiations as both sides in a manufacturing partnership learn about and respect each other's financial and commercial constraints and objectives. Therefore they submit that, both in inter- and intra-organizational environments, accounting may play a constitutional role in the establishment and management of trusting and collaborative business relationships (Seal et al., 1999). Thus accounting proves to be able to serve an important function in relational signaling and thus in building trust. It generates information in order to (jointly) solve problems, to share information for allocation purposes, to be cooperative and supporting in a need-situation or to account for a mishap (Vosselman & Van der Meer-Kooistra, 2004). Ness & Haugland (2005) came to similar

conclusions in their case study on the cooperation between the Norwegian Road Authorities (NRA) and a private contractor. The initial information-sharing and problem-solving behavior, followed by successful implementation, gave the parties positive experiences. These initial positive experiences from exploiting the integrative potential led to a reinforcement of trust as a governance mechanism and problem solving as a negotiation strategy. Such explicit and implicit information sharing made it possible to understand the partner's concerns and interests, and the parties learned to identify the integrative potential in different situations. Trust and relational norms were reinforced over time, and became important structural conditions that fostered a more cooperative climate where both parties yielded on issues to the other's advantage. It also restrained the use of contending tactics (Ness & Haugland, 2005).

So, once one takes a dynamic view of a relationship, one sees that there is likely to be a positive association between information and trust at earlier stages of relationship development simply because trust itself cannot be increased without further information. However, as trust intensity becomes established at higher levels in later stages of the relationship, it is likely that less information will be needed to sustain that relationship (Tomkins, 2001).

We can conclude that controls and information serve a similar role in the trust building process and can thus be regarded as substitutes. In an early stage, information or controls are required to build up trust; however, once a certain level of trust has been established, it is expected that controls and information are less needed to sustain the relation. This can be explained through the negotiation process: trust gives rise to expectations that the other party will continue to behave cooperatively and non-opportunistically during the remainder of the relationship (Vosselman & Van der Meer-Kooistra, 2004). Indeed, exchange theory prescribes that norms develop through interactions, as do trust and other key variables (Roloff, 1981). As Ring & Van de Ven (1992) point out, relational norms evolve over time, as exchange partners establish behavioral rules for processes such as conflict resolution, monitoring, joint problem solving, and the like.

So far, the discussion has been in general terms about the role of information in inter-firm relations. Many different forms of inter-firm relations exist, however, each with specific information needs (for a detailed listing see Tomkins, 2001). In this study, we focus on buyer-supplier relations and the use of Total Cost of Ownership (TCO) information.

Total Cost of Ownership (TCO) accounting systems account for costs that are caused by buying at a certain supplier, such as costs of ordering, delivery, quality and administration (Carr & Ittner, 1992). The TCO concept attempts thus to quantify all of the costs related to the purchase of a given quantity of products or services from a given supplier (Ellram, 1995a). Many TCO systems nowadays are ABC supported (Wouters et al., 2005) and the cost (and cost driver) information resulting from the analysis can be used to optimize and better coordinate the performance of activities across the supply chain. TCO information can be used when negotiating with suppliers to identify areas requiring performance improvement: suppliers can be made

aware of the extra costs they generate and the ways to improve their competitive position by reducing these costs at the buyer side (Ellram, 1995a & 1995b; Monczka et al., 2002; Roodhooft et al., 2003 & 2005).

We focus on TCO information for two specific reasons. First, it allows us to test recurring claims in the literature on the usefulness of TCO information for negotiation between buyers and suppliers (Ellram, 1995a & 1995b; Monczka et al., 2002; Roodhooft et al., 2003 & 2005). Although is has often been claimed that TCO information can be used in negotiations with suppliers to identify areas requiring contractual performance improvement, empirical evidence is still lacking. Second, by focusing on TCO we can test the above expectations on the non-linear relation between trust and information in a concrete context. Although it is clear that different inter-firm relations have different information needs, all of them exhibit a staged development of the balance between trust and information as the relationship develops (Tomkins, 2001). We expect therefore that the relation between TCO information and trust will also be non-linear.

Based on the above observations, we formulate the following hypotheses:

At an early stage of the relationship

H1: TCO information has, through its positive impact on a dyad's problem solving behavior, a positive impact on (a) the dyad's trust and (b) joint profit.

H2: Formal controls have, through their positive impact on problem solving behavior and their negative impact on a dyad's bargaining behavior, a positive impact on (a) the dyad's trust and (b) joint profit.

H3: As both formal controls and TCO information help building trust at an initial stage, we expect controls and information to form substitutes in their relation to (a) a dyad's trust and (b) joint profit.

At a later stage of the relationship

H4: TCO information has, through its positive impact on a dyad's problem solving behavior, a positive impact on joint profit.

H5: Trust has, through its positive impact on problem solving behavior and its negative impact on a dyad's distributive bargaining behavior, a positive impact on a dyad's joint profit.

H6: Trust and TCO information form substitutes in their relation to a dyad's joint profit.

3. Research method

3.1 Experimental design

An experiment has been used as research method. The experiment consists of three consecutive negotiation games between buyers and sellers[2] and uses a 3 (control system: no, weak or strong) x 2 (information: traditional cost information vs. more refined TCO information) design. Manipulation of control and information was as follows.

3.1.1 Control system

The participants under the "strong control system" (SCS) condition were informed that an auditor had been hired to supervise the negotiations and that both firms had agreed on this control system (cf. Coletti et al., 2005). If the auditor observed that a player had shared false or faulty information in order to mislead his/her partner, the player would be penalized[3]. For the participant this meant that he would earn no bonus for that negotiation round. Participants under the "weak control system" (WCS) condition were informed that there was a 10% chance that an auditor would observe the negotiations and that both firms had agreed on this control system. If the auditor observed that a player had shared false or faulty information in order to mislead his/her partner, the player would be penalized in the same way (= no bonus). Participants under the "no control system" (NCS) condition did not face the possibility of auditor controls. Once participants had completed the two first negotiation rounds, the computer program informed them that no auditor would supervise in the final game. Thus, in the last round, the "strong control system", the "weak control system" and the "no control system" conditions are identical in structure. This identical control structure in the last game allows us to isolate the effect of trust[4]. As a result we can measure and compare the development of trust over the different control conditions. This is further explained in the section on the measurement of the dependent variables.

3.1.2 Information

Information was manipulated by providing the buyer with traditional cost information or Total Cost of Ownership (TCO) information, the latter being our operationalization of more refined cost information. A recurring theme in the accounting literature on TCO information is that it represents an important and useful tool for negotiation between buyers and suppliers (Ellram, 1995a & 1995b; Monczka et al., 2002; Roodhooft et al., 2003 & 2005). TCO information can be used when negotiating with suppliers to identify areas requiring performance improvement: suppliers can be made aware of the extra costs they generate and the

[2] Inter-firm relations come in a variety of forms and structures – such as joint ventures, minority equity alliances, joint R&D, joint production, long-term supply agreements, and so on. The type of the relation has significant implications for the roles of trust, control and information (Birnberg, 1998; Tomkins, 2001). As our experiment involves the negotiation between buyers and suppliers, our results may not be generalizable to other types of inter-firm relations.

[3] The control literature distinguishes between two main modes of formal control: behavioral and outcome control (Ouchi & Maguire, 1975). The operationalization of the control system in this experiment focuses on behavioral control as the control system is indented to reduce opportunistic behavior (i.e. sharing false information in order to mislead the partner) and not on outcome control. This may restrict the validity of our results to behavioral control situations.

[4] In order to avoid end-of-game effects, players ware not aware of the fact that the third round was the last one. This is discussed in more detail in the procedure section (3.2).

ways to improve their competitive position by reducing these costs at the buyer side (Ellram, 1995a & 1995b; Monczka et al., 2002; Roodhooft et al., 2003 & 2005). The cost (and cost driver) information resulting from the analysis can be used, as suggested by Porter (1985), to optimize and better coordinate the performance of activities across the supply chain. The possession of relevant information for the interactions places the buyer in a strong position to work with the seller in identifying and assessing alternative courses of action and, thus, increases the likelihood that problem-solving efforts will be effective (Barlow & Eisen, 1983). Buyers with TCO information had a payoff table with detailed cost information showing all costs expressed in monetary figures, whereas buyers with traditional information only had an indication of the costs and the relative importance of each of the issues to be negotiated. This corresponds to traditional management accounting practices that only track the purchase price associated with a particular product or supplier and that bury other costs of purchasing in overhead accounts or general expenses (Carr & Ittner, 1992). Sellers received the same information in each of the experimental cells: they always had full cost and income information. This manipulation results in six experimental cells as indicated in Appendix A.

3.2 Subjects and procedures

Participants were recruited from a graduate management accounting course of a Masters program in business administration at a large West-European university. The course had covered traditional accounting methods, ABC, TCO and supplier selection problems before the experiment took place. The experiment was run in a computer laboratory. Participation required attendance at a specific place and time, and was restricted to one session of maximum two hours. The opportunity to earn cash, depending on their performance, was the only incentive offered. In total there were 294 subjects. Participants were randomly assigned to one of the six experimental conditions. Procedures were identical for all conditions. Participants were either buyer or supplier. Buyers and suppliers sat in different class rooms so that participants were unable to identify their counterpart; hence personality effects and collusion are precluded. Participants read the instructions, describing their role position and the nature of the bargaining task, and played the game on their own pace. The seller started the game by making a first offer. Every participant played three[5] different, but similar, games against the same partner. The games are simplified Kelley (1966) games. During the first two games, one third of the dyads were under the no controls situation, one third was under the weak controls situation and the last third was under the strong controls situation. After playing two games, the control systems disappeared. This meant that all experimental cells were similar with respect to the control system (no controls) in the third, last game. However, manipulation of the information remained the same during the three games: buyers had during the three games either traditional information or TCO information. Participants could send messages along with their offers and counteroffers if they desired. Each game ended when (i) an agreement was reached, (ii) a player opted to end the game, receiving nothing, or (iii) after 10 bidding rounds. In the last case, participants were informed by the computer program that time was running up. This happened only in 2 out of 147 cases. Participants earned 3 Euro for participating, plus a bonus of

[5] All participants played three negotiation games. In order to avoid end-of-game effects, all players were informed that they would play anything between 2 and 5 rounds against the same counter-partner. In reality, however, all participants played three rounds.

0.1% of their company's profit (on average participants earned 9.26 Euro; min = 4.53 Euro; max = 13.28 Euro).

3.3 The bargaining tasks

The bargaining tasks are based on a negotiation game developed by Kelley (1966) and have been applied by many other researchers over the last decades[6]. The game was adapted to suit a TCO setting. This means that the "payoff tables" of Kelley's game were replaced by cost tables for the buyers and cost and income table for the seller (cf. appendix B). Participants were not shown their counter-partner's payoff table; they were only able to gain insights into their counter-partner's profit and costs schedule through the process of offers and counteroffers and through the messages they sent throughout the negotiations.

In the first negotiation game, buyers and sellers had to negotiate a lease-contract for a set of machines. The buyer could earn a fixed income by selling end-products to an end customer. The instructions explained that maintenance and spare parts were needed to keep the machines running and to produce an end-product for the end customer. The game thus involved the simultaneous negotiation of three issues: a price contract, a maintenance contract and a spare part contract. For each of these issues five different contracts were possible. Price was an income for the seller, but a cost for the buyer. Consequently, the price issue was distributive in nature. This issue was worth the same for each negotiator, with preferences on the issue going in opposite directions. Consequently, one's gain was equal to the other's loss. The task provided, however, an opportunity for the parties to integrate their interests and thus for win-win situations. The buyer had a comparative advantage in taking care of the spare parts while the seller had a comparative advantage in maintaining the machines. Since the issue that was *most valuable* to one party automatically was *less valuable* to the other party, it was possible for participants to trade off issues. Such "logrolling", giving up on less valuable issues to maximize outcomes on the most valuable one, would yield a fully integrative solution or Pareto optimal solution. The Pareto optimal solution is the solution whereby no dyad member can improve without the opposite party being worse off; no other combination of contracts offers as much or more profit to both parties. The Pareto optimal solution was reached when buyer and seller agreed on contract 3AV. In this agreement, the distributive issue (i.e. price) is set at the middle and the two integrative issues (maintenance and spare parts) are fully traded off. This situation is highlighted in bold in appendix B. As cost tables were private, participants had to find out the Pareto optimal solution through the process of offers and counteroffers and by exchanging information about their interests. The second and the third negotiation games were very similar. The second game involved the simultaneous negotiation of three issues concerning a set of spare parts: a price contract, the delivery time and the payment terms. Buyers were instructed that they preferred a short delivery time for the spare parts, but a long payment term as this costs less to them. For each issue seven different contracts were available. Again a Pareto optimal solution (4GR) could be reached by setting the distributive issue (i.e. price) at the middle contract and by trading off the two integrative issues

[6] e.g. De Dreu & Van Kleef, 2004; Neu et al., 1988; Pruitt & Lewis, 1975; Schurr & Ozanne, 1985

(delivery time and payment terms). The third game involved the negotiation for a lease contract of a new set of machines and was almost identical to the first game, except that the costs were somewhat different. The cost tables for game 2 and 3 are also provided in appendix B.

3.4 Dependent variables

3.4.1 Negotiation outcomes

Trust is the central outcome variable of interest. H2 predicts that participants in the "control system" conditions will be judged as more trustworthy than those in the "no control system" condition. This prediction depends on the ability of the control system to provide feedback, so that both buyer and seller can observe control-induced cooperation. Therefore we allow for two periods of play before assessing the perceived trustworthiness of each participant's partner. Before playing the last game, participants judged the likelihood that their counter-partners would honestly share information (= behave cooperatively). Specifically, they answered, "How likely is it that your partner will cooperate?" on a 7-point Likert scale (cf. Coletti et al., 2005). Trust may be conceptualized as the perceived likelihood that another person will cooperate, absent any economic incentives to do so (Coletti et al., 2005). Because this question was asked after game 2, after the prospect of an auditor's visit had been removed, this question operationalizes our definition of trust[7]. A dyad's trust was obtained by averaging the responses of the buyer and the seller per dyad[8]. A second important outcome variable is the joint profit of the dyad. The joint profit of dyad is the total of the buyer's profit and the seller's profit at the end of a game. Joint profit is measured after game 1, game 2 and game 3.

3.4.2 Negotiation behavior

Interaction analysis (Putman & Fairhurst, 2001) was used for coding verbal behavior to examine categories and meanings embedded in structural pattern of talk. The classification scheme is based on negotiation communication coding schemes used in prior studies (e.g. Alexander et al., 1994; Boles et al., 2000; De Dreu et al., 1998; Giebels et al., 1998, 2000 & 2003; Neu et al., 1988; Schurr & Ozanne, 1985). The classification scheme is included in appendix C. Three judges, who were blind to conditions or hypotheses, coded each negotiation independently. Inter-rater agreements, expressed in Cohen's Kappa, varied between 0.68 and 0.89, all satisfactory values (Landis & Koch, 1977). After completing the coding, the coders compared their coding and reconciled disagreements by together reviewing the negotiation messages and producing a single set of codes for each subject. Negotiation behavior was determined from analyses of these codes.

[7] Our operationalization of trust is not concerned with a partner's *ability* to perform in accordance with agreements (competence trust), but with his *intentions* to do so (goodwill trust) (cf. Sako, 1992). The generalizability of our results may therefore be restricted to situations of goodwill trust. Furthermore, it is also important to note that our definition of trust differs from a game-theoretic perspective (e.g. Williamson, 1993), which assumes that trust occurs when the economic incentives favor cooperative behavior (Coletti et al, 2005).

[8] Results are reported for the dyad's trust, joint profits and behavior. Analyses for buyers and sellers separately indicate that trust, joint profits and behavior results for buyers and seller are very similar for dyads in which the buyer has TCO information. For dyads in which the buyer has traditional information, however, buyers earn less and have less trust than their counter-parts.

Messages sent by participants were coded for (a) problem solving behavior, operationalized as information exchange about numerical values and priorities (b) distributive behavior such as sending threats and issuing warnings. The three independent judges established the participant's *information exchange* about priorities and numerical values reflecting integrative problem solving behavior. Information exchange was coded 0 for participants not revealing any information about their cost structure; 1 for participants revealing the relative importance of each of the three issues to be negotiated. *Distributive behavior* is based on five behavior types: lies, threats, warnings, commitment and punishments. Each of these five types of distributive behavior was coded 1 if the behavior was present in the messages sent by a participant and 0 if not (cf. Neu et al., 1988). A participant's distributive behavior is measured as the average of these five types of behaviors. As with the outcome variables, a dyad's problem solving behavior and distributive behavior were obtained by averaging the result for the buyer and the seller.

Appendix D lists the descriptive statistics for each variable in the study, including reliability measures (Cronbach's alpha), which ranged from 0.75 to 0.84. These all exceed the minimum value of 0.70, which is usually considered acceptable (Nunnally, 1978). Thus, the items within each variable are highly correlated with one another and therefore reliable predictors of that latent variable (Hair et al., 1998). The high reliability measures also provide confidence that the items in each variable were measuring a single construct. Factor analyses (not reported) indicate that the different distributive behavior tactics load on one factor in each negotiation round. Appendix E contains a correlation matrix, which reveals that none of the variables are too highly correlated with each other.

4. Statistical analysis and results [9]

The analyses proceed in two stages. First, the effects of controls and information on the trust building process and on joint profit are analyzed. Then, in a second stage, we analyze the effects of the built-up trust and information on subsequent performance.

4.1 Early stage of the relation

We analyzed the data using 2 x 3 analysis of variance (ANOVA) designs. Table 1 presents descriptive statistics and ANOVA results for the behavioral variables (problem solving and distributive behavior) and for the outcome variables (trust and joint profit). As experimental conditions and results in game 1 and 2 are

[9] Some experimental checks were performed before statistical analyses were undertaken. On completion of the task, participants filled out a post-bargaining questionnaire with seven-point scales checking for motivation, task understanding and their usage of cost reports. Checks on procedures, including the subject involvement in the task (motivation, fun), their understanding of the instructions and the payoff tables, and whether they had enough time to complete the exercise, appropriately showed no differences between conditions ($p > 0.10$). Means indicated that they were highly involved (Mean = 5.88; st.d. = 1.08), that they assessed the exercise as "fun" (Mean = 5.70; st.d. = 1.13) and that they understood the instructions (Mean = 6.39; st.d. = 1.03). Buyers with TCO information judged the cost information they had more relevant than the buyers with traditional cost information ($F(1,146) = 27.53$, $p < 0.001$). Analyses revealed neither main nor interaction effects for gender of participants on negotiation process and outcomes. Because this variable did not influence other measures and did not interact with the experimental manipulations, gender was excluded from further analyses.

very similar, and in order to make the reporting of the results not unnecessary complex, the results for game 1 and 2 were averaged. As the experimental conditions changed after the second game, the results on the third game are reported separately in the next section.

The first set of ANOVA tests contains the main effects of the type of information (information = 0 for traditional cost data and 1 for TCO information) and inter-firm control system (no control system (NCS) = 0, weak control system (WCS) = 1, and strong control system (SCS) =2) on dyads' behavior, on joint profits in the first two games and on the dyads' trust[10]. It also induces their interaction. H1 and H2 predict that controls, respectively information, will have a positive impact on a dyad's trust and on a dyad's joint profit and that these results can be explained by the mediating effect of behavior. Furthermore, H3 predicts that controls and information form substitutes in their relation to trust and joint profit. In order to test these hypotheses, an ANOVA was performed on the trust variable and on the joint profit variable. We find a main effect for information ($F(1,141) = 5.92$, $p < 0.05$): participants in dyads with TCO information trust each other more. This result provides support for hypothesis H1a. As predicted in H2a, we also find a main effect for controls ($F(1,141) = 5.39$, $p < 0.01$). Thus, after all control system had been removed, participants judged their opponent as more trustworthy in the conditions where a control system was in place during the first two negotiation rounds than in the condition where control systems were never in place. A Tukey HSD post hoc test for homogenous subsets (not reported) reveals that the WCS and the SCS form a homogenous subset, whereas the NCS condition forms a separate subset, indicating that the weak control system is equally effective in building trust as the strong control system. The significant interaction effect of cost information and control system on the trust variable ($F(1,141) = 2.78$, $p < 0.10$) indicates that controls and information are, to a certain extent, substitutes in their relation to trust. More specific, we find that in the presence of a control system participants judge others to be equally trustworthy, irrespective of the cost information available (TCO information or not), but that in the *absence* of a control system, participants will judge others to be more trustworthy when there is TCO information available than when there is no TCO information available. These results support hypothesis H3a. An ANOVA on joint profit reveals a main effect for controls ($F(1,141) = 2.51$, $p < 0.10$), indicating that dyads reached higher joint profits in the control conditions than in the no control condition (as predicted in H2b). We also find a highly significant main effect for information (supporting H1b): participants in dyads with more refined information obtain higher joint profits ($F(1,141) = 9.65$, $p < 0.01$). Contrary to H3b, no interaction effect of information and control system on joint profit was found ($F(1,141) = 0.77$, $p > 0.10$). These results imply that more refined information as well as control systems have a positive effect on a dyad's trust and on a dyad's joint profit. However, control systems and refined information only form substitutes in their relation to a dyad's trust and not in relation to joint profits.

[10] Analyses were performed for all subjects in the study. However, analyses of the data without including the subjects not reaching agreement yielded the same results. Very few dyads did not reach an agreement: in game 1 all dyads reached agreement, in game 2 only two dyads out of 147 did not reach agreement, while in game 3 three out of 147 dyads did not reach agreement.

Table 1: Descriptive statistics (mean and standard deviation) and AN(C)OVA results (F-statistic and significance) averaged over the first two games

	Mean (standard deviation)					
Variable	**No tco; NCS**	**No tco; WCS**	**No tco; SCS**	**Tco; NCS**	**Tco; WCS**	**Tco; SCS**
Trust (a)	2.83	3.77	4.02	3.86	4.04	4.04
	(0.94)	(1.13)	(1.43)	(0.91)	(0.86)	(1.22)
Joint profit_12 (b)	7.55	7.85	7.94	8.02	8.09	8.14
	(1.07)	(0.39)	(0.50)	(0.43)	(0.37)	(0.48)
Problem solving_12 (c)	0.14	0.46	0.49	0.58	0.51	0.55
	(0.22)	(0.37)	(0.34)	(0.35)	(0.37)	(0.38)
Distributive behavior_12 (d)	0.22	0.07	0.07	0.22	0.06	0.08
	(0.22)	(0.09)	(0.09)	(0.24)	(0.07)	(0.09)

ANOVA			
Variable	Information	control system	Information * control system
Trust	5.92 **	5.39 ***	2.78 *
Joint profit_12	9.65 ***	2.51 *	0.77
Problem solving_12	10.67 ***	3.04 **	5.23 ***
Distributive behavior_12	0.01	16.30 ***	0.05

ANCOVA					
Variable	information	control system	Information * control system	Problem solving	distributive behavior
Trust	2.78 *	0.94	1.40	8.20 ***	8.13 ***
Joint profit_12	4.53 **	0.26	0.05	14.21 ***	3.40 *

F-statistics are reported. ***, **, * indicates a p-value of = 0.01, 0.05, 0.10 in a two-tailed test.

(a) Participants' assessment of their partners' trustworthiness on a 7-point Likert scale. Specifically, participants answered "How likely is it that your partner will cooperate?" after being told that no control system would be in place in the future. Results wee averaged per dyad.
(b) Joint profit of dyad is the total of the buyer's profit and the seller's profit.
(c) Problem solving is coded 1 if participant shares private cost information, zero otherwise.
(d) Based on 5 distributive behaviors (lies, threats, positional commitment, punishments, and warnings).

To test for the mediating effect of behavior, we first performed ANOVA's to test the effect of controls and information on behavior, then in a second stage, ANCOVA's, with behavior as covariates, are used to test the overall effect of controls, information and behavior on trust and joint profits. The ANOVA on problem solving behavior reveals that participants in the control conditions display more problem solving behavior ($F(1, 141) = 3.04$, $p = 0.05$) than participants in the no control condition and that participants in the TCO condition use more problem solving techniques (i.e. share more often private cost information) than participants in the no TCO condition ($F(1, 141) = 10.67$, $p < 0.01$). Looking at the means and standard deviations for problem solving behavior in game 1 and 2, we see that players in the no TCO and NCS condition use significantly less problem solving behavior (i.e. they share less often private cost information). An ANOVA on distributive behavior for game 1 and 2 revealed a main effect for control system ($F(1, 141) = 16.30$, $p < 0.01$): participants under the control conditions used less distributive bargaining techniques than participants in the no control condition. No effect of information on distributive behavior was found ($F(1,141) = 0.01$, $p > 0.10$), nor an interaction effect ($F(1,141) = 0.05$, $p > 0.10$). A Tukey HSD post hoc test for homogenous subsets (not reported) reveals that, at a 95% confidence interval, the WCS and the SCS form a homogenous subset, whereas the NCS condition forms a separate subset, indicating that participants in the no control condition use significantly more distributive tactics than participants in the control conditions.

This result indicates that the WCS and the SCS are, compared to the NCS, equally effective in reducing distributive bargaining tactics.

The ANCOVA results indicate that negotiation behavior (problem solving and distributive behavior) mediates the effects of information and controls on trust. Once problem solving and distributive behavior are added, the main effects of controls on trust and on joint profit drop to a non-significant level, ($F(1,139) = 0.94$, $p > 0.10$) and ($F(1,139) = 0.26$, $p > 0.10$) respectively. Also the interaction effect of controls and information on trust drops to a non-significant level (from ($F(1,141) = 2.78$, $p < 0.10$) to ($F(1,139) = 1.40$, $p > 0.10$)). Only the main effects of information on trust and joint profits remain significant, although the significance level drops substantially in both cases. These results clearly indicate that it is not so much the direct effects of the control system, nor of the more refined information that induce higher trust and higher joint profits, but that their indirect effect on the negotiation process, characterized by problem solving and distributive behavior, explains the negotiation outcomes.

4.2 Later stage of the relation

After analyzing the trust building process[11] in game 1 and 2, we concentrate, in a second stage, on the effect of trust and information on negotiation behavior and joint profits after controls had been removed. Based on Tomkins (2001), we expect that in later stages of the relationship, it is likely that less information will be needed to sustain a relationship as trust intensity becomes established at higher levels. After controls are removed, we expect therefore that information and trust have a positive impact on a dyad's joint profit (H4 and H5) and that trust and refined information form substitutes in their relation to a dyad's joint profit (H6). To test these hypotheses we ran a set of regressions[12] (cf. Table 2).

First, we regressed joint profits on information, trust and their interaction term as independent variables Contrary to our predictions, we find no significant effects (coefficient for trust = 0.07, $p > 0.10$ and coefficient for information = 0.20, $p > 0.10$), nor an interaction effect of trust and information on joint profits (coefficient = 0.05, $p > 0.10$). These results indicate that in the third game (when formal controls have been removed and a certain level of trust has been built up) the joint profit of the dyad is not significantly higher for dyads in which the buyer possesses refined TCO information than when the buyer has traditional information. Nor does the possession of this information interact with trust to explain joint profits.

[11] It has been suggested that the passing of time may reflect learning in the task as well as "trust". However, some further analyses on the data rule out major learning effects. First, the number of pairs reaching the Pareto optimal solution in the three different negotiation games is respectively 20, 10 and 33 (out of 147 dyads). Thus even in the third game the number of dyads reaching the Pareto optimal solution is rather low (around 22%). Second, if important learning effects would exist, the dispersion between the mean joint profit and the Pareto optimal solution would diminish over time. However, this dispersion remains stable over the three games (respectively 10%, 9%, and 11%).

[12] As trust is not a categorical variable regression analyses are used in the second part instead of ANOVA's.

Table 2: Descriptive statistics (mean and standard deviation) and regression result for the third game

Mean (standard deviation)		
Variable	**No tco (n=74)**	**Tco (n =73)**
Joint profit_3 (a)	4.40	4.81
	(1.05)	(0.50)
Problem solving_3 (b)	0.27	0.41
	(0.41)	(0.42)
Distributive behavior_3 (c)	0.11	0.08
	(0.15)	(0.17)

Mean (standard deviation)		
Variable	**Low trust (trust <3.76) (n=74)**	**High trust (trust >3.76) (n =73)**
Joint profit_3	4.49	4.72
	(0.92)	(0.76)
Problem solving_3	0.21	0.47
	(0.36)	(0.43)
Distributive behavior_3	0.12	0.07
	(0.18)	(0.14)

Regression (relation information and trust)

Variable	**Constant**	**Information**	**Trust**	**Information * trust**
Joint profit_3	4.15 ***	0.20 (0.51)	0.07 (0.28)	0.05 (0.52)
Problem solving_3	-0.08	-0.06 (0.71)	0.10 (0.00)***	0.04 (0.27)
Distributive behavior _3	0.20 ***	(0.03) (0.64)	-0.03 (0.05)**	-0.01 (0.49)

	Constant	**Information**	**Trust**	**Information * trust**	**Problem solving_3**	**Distributive behavior_3**
Joint profit_3	4.14 ***	0.23	0.02	0.03	0.63 ***	0.29

Regression (relation problem solving and trust)

Variable	**Constant**	**Problem solving_3**	**Trust**	**Problem solving_3 * trust**
Joint profit_3 (full sample)	3.99 ***	1.32 **	0.11	-0.17
Joint profit_3 (sample with TCO)	4.15 ***	1.45 ***	0.13	-0.26 **
Joint profit_3 (sample with traditional cost information)	4.10 ***	0.95	0.02	-0.02

Regression (relation controls and trust)

Variable	**Constant**	**Control system**	**Trust**	**Control system*trust**
Joint profit_3	4.02 ***	0.07	0.18 *	-0.05

Regression coefficients are reported.. ***, **, * indicates a p-value of = 0.01, 0.05, 0.10 in a two-tailed test.

(a) Joint profit of dyad is the average of the buyer's profit and the seller's profit.
(b) Problem solving is coded 1 if participant shares private cost information, zero otherwise.
(c) Based on 5 distributive behaviors (lies, threats, positional commitment, punishments, and warnings).

Results become more interesting, however, if we consider the negotiation process. We performed similar regressions on problem solving and distributive behavior: we find that information has no longer a significant impact on negotiation behavior in game 3, while trust is highly significant in explaining both problem solving behavior as well as distributive behavior. It is therefore interesting to look at the combined effect of trust, information and behavior. While trust and information have no main effects, nor an interaction effect on joint profit, we notice that the problem solving behavior of the participants has a highly significant and positive effect on joint profits in the third game (coefficient = 0.63, $p < 0.00$). Recall that trust has a positive and highly significant effect on problem solving behavior (coefficient = 0.10, $p < 0.00$). These results indicate that, although trust has no significant direct effect on joint profits (coefficient 0.07, $p = 0.28$); trust has indirect effect on joint profits through its significant impact on problem solving behavior.

In order to more fully understand the role of problem solving behavior, we performed some detailed analyses on the relation between information, the exchange of this information (i.e. the problem solving behavior) and trust. We regressed therefore the exchange of information in the third game, represented by the problem solving behavior variable, the trust variable and their interaction on joint profits. We ran this regression three times: once for the full sample, once for the dyads in which the buyer possess TCO information and once for the dyads in which the buyer possess traditional information. For the full sample, we see that, problem solving behavior becomes highly significant in explaining joint profits (coefficient = 1.32, $p < 0.05$). However, in contradiction to what we expected, we find, for the full sample, no interaction effect of problem solving behavior and trust on joint profits. Running the same regression for two sub samples separately, namely for the dyads with TCO information and the dyads with traditional information, yields however different and interesting results. For the sub sample with traditional information, we find no main effects, nor an interaction effect on joint profits. For the sub sample with TCO information, however, we see in Table 2 that problem solving behavior (coefficient = 1.45, $p < 0.01$) and trust (coefficient = 0.13, $p = 0.11$), although the latter to a somewhat lesser extent, are important factors in explaining joint profits in the third game. Both variables have a positive effect on joint profits. However, we also notice a significant negative interaction effect of problem solving and trust (coefficient = -0.26, $p < 0.05$). This result provides support for our prediction on the substitution effects of trust and information in later stages of the relation.[13]. We conclude that H6, namely that trust and the exchange of refined information form substitutes in their relation to joint profit for dyads for which a certain level of trust has been built up, holds as long as the buyer possesses refined TCO information. However, no substitutive effects are found when the buyer possess traditional information.

Finally, we also analyze the relation between controls and trust at a later stage of the relation. We ran a regression to check whether control systems remain to have an impact on the negotiation outcomes after they have been removed and a certain level of trust has been built. Although we find no significant effect of controls on joint profit ($p > 0.10$), we do find a significant effect of trust on joint profits (coefficient = 0.18, $p > 0.10$). This result indicates that trust may replace the need for controls at a later stage of the relation. However, if we control for information (not reported), we find that nor the control system nor trust, but the available information explains the joint profits in the third game.

[13] Finally, some sensitivity analyses were performed to test the robustness of the results against different ways of measuring negotiation behavior. After game 3, participants rated their own and their counter-partner's bargaining strategies with respect to information exchange. Information exchange was measured as the average of the participant's assessment of their own and their partner's bargaining strategy. Similar results are obtained and conclusions remain the same in case the exchange of information is assessed by the participants themselves.

5. Conclusion and further research

This study explores the way in which trust is built at the level of the relationship and the role that controls and information play in this process. Prior studies on this topic focused on trust and control and their effect on *negotiation outcomes*, without paying attention to the *negotiation process* leading to these outcomes. By setting up an experiment in which we use a set of negotiation games with potential for integrative solutions, we provide more insight into the role of *information* in strengthening the links between control, trust, and cooperation in the *negotiation process*.

Based on Tomkins (2001) and Dekker (2004) we expected nonlinear relations between trust and controls and between trust and information. More specific, based on Dekker (2004), we hypothesized that, in an early stage of the relation, where trust still needs to be built, a positive relation between formal controls and trust. However, in a later stage in the relation trust may replace these formal controls. Based on Tomkins (2001), we reasoned that as the relationship matures from the initial state of low level of trust, there will be a positive association between trust and information, but as trust intensity becomes established at higher levels in later stages of the relationship, it is likely that less information will be needed to sustain that relationship.

We provide evidence that controls and refined TCO information have a positive impact on a dyad's trust and on a dyad's joint profit in an early stage of a relationship. These results are explained through the mediating effect of controls and TCO information on a dyad's bargaining behavior. Furthermore, we also find that, as expected, both controls and TCO information can help building trust in an initial stage of the relationship. This implies that, in an early stage of the relationship, controls and TCO information form, to a certain extent, substitutes in the trust building process.

In a second stage, we tested the relation between trust and information on the negotiation process and outcomes after controls have been removed. We expected that trust would, through its mediating effect on a dyad's bargaining behavior, have a positive impact on a dyad's joint profit and that trust and information would form substitutes in their relation to a dyad's joint profit. Partial support was found for these expectations: the relation holds when the buyer possesses more refined TCO information.

This study thus provides empirical support for what earlier studies (Ness & Haugland, 2005; Seal et al., 1999; Vosselman & Van der Meer-Kooistra, 2004) have suggested on how management accounting may contribute to the development of dyadic business relationships. Accounting information proves to be able to serve an important function in relational signaling and thus in building trust. Information sharing made it possible to understand the partner's interests and to identify the integrative potential in different situations. Trust and relational norms were reinforced over time, and became conditions that fostered a more cooperative climate and restrained the use of distributive behavior.

This study shows that the specification and sharing of cost data play a central role in inter-organizational negotiations. We conclude that the negotiation process, characterized by information exchange and distributive behavior, plays a crucial role in explaining negotiation outcomes and we argue that prior studies on this topic have failed to fully explore the negotiation and the trust building process. The results of this study indicate that future research should pay more attention to behavior of people involved to explain outcomes in accounting setting.

Finally, we also studied the effects of formal control strength. Although not the core objective of this study, we were interested to see whether a weaker control system would provide similar results as a strong control system or on the other hand, whether this weak control system may fail to provide strong enough incentives for cooperation. Our results indicate that the weak (and in theory, less expensive) control system is equally effective as the strong (and more expensive) control system in reducing distributive tactics and in building trust. However, our manipulations of weak and strong controls were exemplars in some sense. Other contract types provide open ground for future research. Further research can give for instance more insights into the boundary conditions within which a control system will or will not positively affect cooperation and trust. The logical next step is to identify the boundary conditions within which a control system will positively affect cooperation and trust.

With this study we provide some important contributions to the discussion on the relations between trust, information and controls. Of course, many other possible extensions are conceivable which can make a contribution to the understanding of when, why and how benefits of more accurate information are obtained in inter-firm negotiation settings.

While the experimental context induced by a simple negotiation game (Kelley, 1966) allows maintaining control over exogenous variables, the scope for generalizing the conclusions is somewhat limited. Other factors, such as the incentive system, future negotiations probabilities, etc. have been shown to impact negotiated outcomes but were not manipulated here. Further research is necessary to determine the sensitivity of the results to several experimental parameters included in the current study.

Further research may manipulate different types of control mechanisms. In this study, the control system was introduced to manipulate the fair exchange of sensitive information. Control mechanisms implemented to counter some other important risks in inter-firm relationships, such as the fair division of cost and benefits, and the appropriation of investments to be made in specific assets, can be a fruitful direction for further study.

Furthermore, our manipulation of TCO information obviously remained a simplification of reality. In our study, we provided perfect TCO information. In a real business environment, TCO information is not perfect, but characterized by mistakes and simplifications. Further research can examine the effects of imperfect or

uncertainty in the TCO information on the negotiation process. Future research may also consider aspects such as how buyers gather TCO data (e.g. from the seller, benchmarking, past experience), the type of TCO systems (formal vs. informal, standardized vs. unique models) installed and how these design aspects impact buyer-supplier relations and negotiations.

We focused on TCO data to test the expectations on the non-linear relation between trust and information in a concrete context. Although it is clear that different inter-firm relations have different information needs, Tomkins (2001) predicts that all of them exhibit a staged development of the balance between trust and information as the relationship develops. Tomkins (2001) makes a conceptual distinction between different types of information for inter-firm relations. It would be interesting to extend the scope of this research from TCO data to other types of information for inter-firm relations (e.g. Type 1 and Type 2 information as distinguished by Tomkins (2001)) and to investigate whether the relation between these types of information and trust are also non-linear.

Because of the way we measured trust, the validity of our results may be restricted to situations of goodwill trust. The operationalization of trust in this study was not concerned with a partner's *ability* to perform according to agreements (competence trust), but with his *intentions* to do so (goodwill trust) (cf. Sako, 1992). It would be interesting to see whether the results also stand in situations of competence trust. Similarly, the operationalization of the control system focuses on behavioral control as the control system is indented to reduce opportunistic behavior (i.e. sharing false information in order to mislead the partner) and not on outcome control. It would be interesting to study in future research whether outcome controls (e.g. a maximum level of allowable joint costs and thus a required minimum level of joint profits) would yield similar results.

Not only the type of information, the type of trust and the type of control system, but also the type of the relation may have significant implications on the results. Further research should therefore investigate whether the results found in this study also hold beyond buyer-supplier relationships. Other types of inter-firm relationships could be joint ventures, joint R&D, joint production, and so on. For instance, Das & Teng (2001) suggest that goodwill trust has a more significant role in joint ventures than in non-equity alliances and thus that individual and team-level trust building may be more promising in joint ventures. This contingent approach is important because a mismatch could be costly to an alliance (Das & Teng, 2001).

Lastly, insights from this study need to be examined by using alternative methods involving different settings, subjects and operationalizations to further investigate the proposed hypotheses and the obtained results.

APPENDICES

Appendix A.

Experimental cells.

	Control system		
	No controls in game 1 & 2; no controls in game 3 (NC, NC, NC)	Weak controls in game 1 & 2; no controls in game 3 (WC, WC, NC)	Strong controls in game 1 & 2; no controls in game 3 (SC, SC, NC)
Cost information			
TCO information	Cell 1 (n= 24 dyads)	Cell 2 (n= 26 dyads)	Cell 3 (n= 24 dyads)
Traditional cost information	Cell 4 (n= 25 dyads)	Cell 5 (n= 24 dyads)	Cell 6 (n= 24 dyads)

Appendix B. Payoff tables of the three negotiation games.

GAME 1: buying machines

Payoff table of the seller (all cells)

Price		Maintenance		Spare parts	
Contract	Income (€)	Contract	Cost (€)	Contract	Cost (€)
1	2000	**A**	**1350**	R	2250
2	3000	B	1050	S	1750
3	**4000**	C	750	T	1250
4	5000	D	450	U	750
5	6000	E	150	**V**	**250**

Payoff table buyer with TCO (cell 1, 2 and 3)

Income = 8000

Price		Maintenance		Spare parts	
Contract	Cost (€)	Contract	Cost (€)	Contract	Cost (€)
1	2000	**A**	**250**	R	150
2	3000	B	750	S	450
3	**4000**	C	1250	T	750
4	5000	D	1750	U	1050
5	6000	E	2250	**V**	**1350**

Payoff table buyer with traditional information (cell4, 5 & 6)

Income = 8000

Price		Maintenance		Spare parts	
Contract	Cost (€)	Contract	# maintenance sessions	Contract	# spare parts
1	2000	**A**	**1**	R	2
2	3000	B	3	S	6
3	**4000**	C	5	T	10
4	5000	D	7	U	14
5	6000	E	9	**V**	**18**

GAME 2: buying spare parts

Payoff table seller (all cells)

Price		Delivery time		Payment terms	
Contract	Income (€)	Contract	Cost (€)	Contract	Cost (€)
1	2300	A	1900	**R**	**1250**
2	2650	B	1600	S	1050
3	3000	C	1300	T	850
4	**3350**	D	1000	U	650
5	3700	E	700	V	450
6	4050	F	400	W	250
7	4400	**G**	**100**	X	50

Payoff table buyer with TCO (cell 1, 2 and 3)

Income = 6700

Price		Delivery time		Payment terms	
Contract	Cost (€)	Contract	Cost (€)	Contract	Cost (€)
1	2300	A	50	**R**	**100**
2	2650	B	250	S	400
3	3000	C	450	T	700
4	**3350**	D	650	U	1000
5	3700	E	850	V	1300
6	4050	F	1050	W	1600
7	4400	**G**	**1250**	X	1900

Payoff table of buyer with traditional information (cell 4, 5 & 6)

Income = 6700

Price		Delivery time		Payment terms	
Contract	Cost (€)	Contract	# weeks for delivery	Contract	# weeks for payment
1	2300	A	1	**R**	**19**
2	2650	B	5	S	16
3	3000	C	9	T	13
4	**3350**	D	13	U	10
5	3700	E	17	V	7
6	4050	F	21	W	4
7	4400	**G**	**25**	X	1

GAME 3: buying new machines

Payoff table of the seller (all cells)

Price		Maintenance		Spare parts	
Contract	Income (€)	Contract	Cost (€)	Contract	Cost (€)
1	2100	**A**	**2100**	R	550
2	2675	B	1600	S	425
3	**3250**	C	1100	T	300
4	3825	D	600	U	175
5	4400	E	100	**V**	50

Payoff table buyer with TCO (cell 1, 2 and 3)

Income = 6500

Price		Maintenance		Spare parts	
Contract	Cost (€)	Contract	Cost (€)	Contract	Cost (€)
1	2100	**A**	**50**	R	100
2	2675	B	175	S	600
3	**3250**	C	300	T	1100
4	3825	D	425	U	1600
5	4400	E	550	**V**	**2100**

Payoff table buyer with traditional information (cell 4, 5 & 6)

Income = 6500

Price		Maintenance		Spare parts	
Contract	Cost (€)	Contract	# maintenance sessions	Contract	# spare parts
1	2100	**A**	**2**	R	2
2	2675	B	7	S	12
3	**3250**	C	12	T	22
4	3825	D	17	U	32
5	4400	E	22	**V**	**40**

Appendix C.
Behavioral coding categories.

Variables	Coding categories	Examples
Problem solving	**Information exchange**	- Price is for me the most expensive issue, then spare part. Maintenance is less important to me.
Distributive behavior	**Lies**	- I have an outside option off 1500 Euro.
	General threats	- Make a concession or you will be in trouble. - Respond with a concession or I will call another supplier.
	Punishment	- This negotiation is going nowhere.
	Warnings	- My company has a policy against uncooperative supplier.
	Positional commitment	- I refuse to concede any further. - I refuse to drop below my present level.

Appendix D.
Descriptive statistics

Game	Variable	Theoretical range	Actual Range	Mean	Standard deviation	Cronbach's alpha
Game 1	Problem solving (a)	0 – 1	0 – 1	0.46	0.45	n/a
	Distributive behavior (b)	0 – 1	0 – 1	0.13	0.18	0.76
	Joint gain (c)	0 – 4.80	3.20 – 4.80	4.31	0.31	n/a
Game 2	Problem solving (a)	0 – 1	0 – 1	0.46	0.45	n/a
	Distributive behavior (b)	0 – 1	0 – 1	0.12	0.20	0.84
	Joint Gain (c)	0 – 4.00	0.00 – 4.00	3.62	0.49	n/a
After game 2, before game 3	Trust (d)	1 – 7	1.00 – 6.50	3.76	1.16	n/a
Game 3	Problem solving (a)	0 – 1	0 – 1	0.34	0.42	n/a
	Distributive behavior (b)	0 – 1	0 – 0.70	0.10	0.16	0.75
	Joint Gain (c)	0 – 5.20	0 – 5.20	4.60	0.85	n/a

Descriptive statistics for variables (across different experimental cells)

(a) Problem solving is coded 1 if participant shares private cost information, zero otherwise.

(b) Based on 5 distributive behaviors (lies, threats, positional commitment, punishments, warnings). Each of these distributive behavior tactics was coded 1 if present and 0 otherwise. Distributive behavior is the average of these five variables.

(c) Joint gain of dyad is the total of the buyer's profit and the seller's profit of the final agreement.

(d) Participants' assessment of their partners' trustworthiness on a 7-point Likert scale. Specifically, participants answered "How likely is it that your partner will cooperate?" after being told that no control system would be in place in the future. The average per dyad is taken.

Appendix E.
Correlation matrix

	Tco	Cs	Problem solving1	Problem solving2	Problem solving3	Distri-butive1	Distri-butive2	Distri-butive3	Joint profit1	Joint profit2	Joint profit3	Trust
Information	1											
Control system	0.00	1										
Problem solving1	0.21 (*)	0.20 (*)	1									
Problem solving2	0.21 (*)	0.10	0.37 (**)	1								
Problem solving3	0.17 (*)	0.18 (*)	0.36 (**)	0.54 (**)	1							
Distriutive1	-0.01	-0.32 (**)	0.04	0.06	0.02	1						
Distributive2	0.01	-0.29 (**)	-0.08	-0.06	-0.10	0.41 (**)	1					
Distributive3	-0.07	-0.20 (*)	-0.02	-0.05	-0.14	0.36 (**)	0.40 (**)	1				
Joint profit1	0.30 (**)	0.12	0.36 (**)	0.15	0.17 (*)	0.03	0.00	-0.07	1			
Joint profit2	0.12	0.14	0.22 (**)	0.23 (**)	0.15	-0.06	-0.32 (**)	-0.02	0.13	1		
Joint profit3	0.25 (**)	-0.05	0.14	0.33 (**)	0.35 (**)	0.05	-0.07	-0.01	0.10	0.16	1	
Trust	0.19 (*)	0.24 (**)	0.23 (**)	0.31 (**)	0.33 (**)	-0.24 (**)	-0.24 (**)	-0.21 (*)	0.16	0.23 (**)	0.16	1

Correlation coefficients (n=147)

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

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