Chapter 3
Trust in Face-to-Face and Electronic Negotiation in Buyer–Supplier Relationships: A Laboratory Study

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Abstract The purpose of this chapter is to study the role of pre-existing trust as a key factor for successful buyer–supplier relationships in electronic versus face-to-face negotiation mechanisms. It is known that e-sourcing can damage the buyer–supplier relationship, whereas face-to-face discussions can help elicit collaboration intentions and build trust. However, it is less recognized whether having established a prior trusting relationship can positively affect outcomes and strengthen the relationship even when electronic mechanisms are used. We explore such an issue by conducting a laboratory study which compares three negotiation mechanisms (i.e., face-to-face negotiation, e-mail negotiation, and e-reverse auction) across two pre-existing levels of buyer–supplier trust (i.e., high-trust and low-trust) in terms of their impact on perceived relational outcomes. Results confirm that higher pre-existing trust is linked to higher relational outcomes than low pre-existing trust; face-to-face negotiation is associated with higher supplier's perceived trust and satisfaction in dealing with the buyer compared to the e-mail negotiation and e-reverse auction. Furthermore, in the context of high pre-existing trust e-reverse auctions may not necessarily undermine existing relationships.

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1 Introduction

The adoption of different communication mechanisms for transacting business, such as face-to-face negotiation or e-sourcing via online negotiations and electronic reverse auctions, have been extensively researched. Empirical studies confirm that e-sourcing in particular can achieve cost reduction and procurement process improvements (Handfield and Straight 2003), although it has also been criticized for damaging the buyer–supplier relationship. The literature on inter-organizational relationships provides a key to understanding why, as trust between the parties is an antecedent for collaboration, higher satisfaction, and reduced transaction costs. Face-to-face discussions can help to build trust whereas electronically mediated interactions provide a less strong basis for trust. Yet, it can be argued that a high pre-existing level of trust between buyer and supplier can positively affect outcomes and strengthen the relationship even when electronic mechanisms are used.

In this chapter we study the role of trust as a prerequisite for successful buyer–supplier relationships, and whether it mitigates the potential negative impact of e-sourcing on such relationships when compared to traditional face-to-face negotiations. The purpose of the paper is to investigate the independent as well as joint effects of trust and negotiation mechanisms on negotiation results. Specifically, we compare three negotiation mechanisms (i.e., face-to-face negotiation, e-mail negotiation, and e-reverse auction) across two pre-existing levels of buyer–supplier trust (i.e., high-trust and low-trust) in terms of their impact on relational outcomes. A set of hypotheses is developed using insights from the literature review and previous empirical suggestions.

We tested these hypotheses using a laboratory experiment in which MBA students played the role of buyers and suppliers seeking to reach agreement on a transportation service contract with multiple attributes (e.g., price, reliability, delivery interval). As shown by studies in many disciplines, including economics, psychology, and more recently purchasing and supply management, using an experimental design offers many advantages in identifying causal relationships. For example, randomly assigning participants to conditions ensures that individual differences such as personality or experience levels cannot explain the pattern of findings. Moreover, using the same background conditions and contractual specifications across all participants and sourcing mechanisms eliminates the influence of contract terms, market characteristics, and the competition dynamics as alternative explanations.

Transportation services represent an ideal context in which to study buyer–supplier transactions. Transportation services are required by businesses in many industries, although their features are not specific and may involve multiple important attributes (e.g., delivery time and reliability in addition to price). Because of this, the terms of each contract are likely to require negotiation and careful consideration, thereby reducing any benefits of prior experience when negotiating new deals.

The paper is organized as follows. In Sect. 2 we review the relevant literature related to negotiations and auctions mechanisms and trust in buyer–supplier relationships. Section 3 summarizes the main empirical findings regarding how sourcing mechanisms affect relationships. We then present the conceptual model and develop hypotheses in Sect. 4, and describe the experimental design and methodology in Sect. 5. Section 6 reports our findings and Sect. 7 discusses the study findings, limitations, and practical implications.

2 Literature Review

2.1 Negotiations and Auctions

Negotiation and auction mechanisms have gained considerable attention in recent years. Research in purchasing and supply management increasingly focuses on the benefits companies get from the adoption of such mechanisms.

A broad multidisciplinary definition has been provided by Bichler (2000): negotiation is an iterative communication and decision-making process between two or more agents (parties or their representatives) who:

1. Cannot achieve their objectives through unilateral actions;
2. Exchange information comprising offers, counteroffers and arguments;
3. Deal with interdependent tasks; and
4. Search for a consensus that is a compromise decision.

Bichler et al. (2003) highlight several additional features of a negotiation: the outcome, which can be an agreement or a disagreement; the negotiation arena, which is the place where negotiators communicate and interact; the agenda, which is the negotiation framework and includes specification of the issues to be discussed; the decision-making rules used to determine, analyze, and select alternative and concessions; and the communication rules, which determine the way offers and messages are exchanged. The negotiation protocol includes all the rules that define the negotiation arena, agenda, and permissible decision-making and communication activities of the negotiators. Note that, according to this definition, negotiations can occur either face-to-face or via mediating technology (e.g., phone, e-mail). In supply chain management, the focus tends to be on a single buyer and seller, although theoretically, a buyer could conduct negotiations sequentially with several different suppliers.

Negotiations can be contrasted with auctions, in which an individual or organization simultaneously considers offers to buy or to sell from multiple parties (i.e., individuals or organizations). Selling auctions are known as *forward* (i.e., the price tends to increase as the auction progresses), whereas purchasing auctions are called *reverse* (as the price tends to decrease during the action). In both cases, one party "controls" the market because supply and demand set the price and enable simultaneous comparisons across offers.

An electronic reverse auction (or simply reverse auction) has formally been defined as "an on-line, real-time dynamic transaction between a buying organization and a group of pre-qualified suppliers who compete against each other to win the business of supply goods or services that have clearly defined specifications for design, quantity, quality, delivery, and relayed terms and conditions" (Beall et al. 2003). They are characterized by short duration and constrained environments (there is not any possibility to provide detailed clarifications during the auction), thus having items clearly and unambiguously specified is of heightened importance.

Beall et al. (2003) argue that reverse auctions have been used for sourcing three of the four purchase categories of the Kraljic's matrix: noncritical, leverage, and bottleneck direct and indirect materials, including services and capital goods. Only for strategic purchases, which often involve long-term strategic relationships with suppliers and high switching costs, reverse auctions seem less appropriate and are rarely used (Handfield and Straight 2003).

Auctions and negotiations may influence the "soft" elements of a sourcing relation. For example, one of the direct consequences of using electronic auctions is a decreased commitment in the relationships by the supplier (Tassabehji et al. 2006). Suppliers perceive that auctions destroy their relationships with buyers (Jap 2003, 2007), in contrast to traditional negotiations which allow suppliers to develop *rapport* with the buying company—which means that mutual interest, positive feelings, and coordination emerge during the negotiation process (Huang et al. 2008). Because auctions and negotiations affect these "soft" elements, it may be important to consider the pre-existing trust between buyers and suppliers in order to understand how these sourcing mechanisms affect their subsequent relationships.

2.2 Trust in Buyer–Supplier Relationships

In the literature, various classifications and models of buyer–supplier relationships have been suggested. Losch and Lambert (2007) observe that there are several recurrent issues invoked to characterize such relationships and to identify intrinsic as well as extrinsic characteristics (Table 1). Intrinsic features (e.g., information exchange, trust, long-term orientation) describe how the parties characterize the relationship, whereas extrinsic characteristics represent the outcomes or results of the relationship (e.g., satisfaction and success). In general, extrinsic characteristics can be correlated with intrinsic qualities or the overall relationship characteristics.

Scholars agree that three broad types of buyer–supplier relationships (i.e., combinations of intrinsic and extrinsic characteristics) can be identified (AMR 1998): transactional, information sharing, and collaborative relationships. *Transactional relationships* involve short-term transactions set up for spot sourcing and entail operational activities carried out to execute the purchase, e.g., order request and receipt and payment. *Information-sharing relationships* involve frequent

Table 1 Characteristics of buyer–supplier relationships (*source* Losch and Lambert 2007)

Characteristics of buyer–supplier relationships	
Intrinsic characteristics	Extrinsic characteristics
Trust	Successfulness
Commitment	Satisfaction
Transaction-specific investments	Conflict level
Information sharing	
Long-term orientation	
Status of the relationship (new vs. incumbent)	

communications and data exchange about strategic as well as operational information regarding buyer's demand and supplier's offer, but they do not necessarily involve long-term collaborations to share specific knowledge and competencies. Finally, in *collaborative relationships*, buyers and suppliers jointly work to understand buyer's requirements, and information is used to develop customized solutions. The goal of collaborative relationships is to generate synergistic solutions to joint problems. Collaborative relationships often evolve into strategic partnerships or alliances, which involve mutual trust and commitment over an extended time period and a sharing of information as well as the risks and rewards of the relation (Simchi-Levi et al. 2000).

Among the various intrinsic characteristics, trust has been highlighted as the key feature of buyer–supplier relationships (Selviaridis and Spring 2007). Zaheer et al. (1998) give one of the most comprehensive definitions: *trust* is the expectation that an actor: (1) can be relied on to fulfill obligations, (2) will behave in a predictable manner, and (3) will act and negotiate fairly when the possibility for opportunism is present. Researchers posit that when interorganizational trust is high, agreements will be reached more quickly and easily; in presence of trust, parties are more flexible in granting concessions due to expectations that the other party will reciprocate in the future (Zaheer et al. 1998). Trusting relationships are also characterized by high level of information sharing: when a supplier can trust a given buyer, for example, the supplier will be more willing to share confidential information, such as production costs or product design and innovation (Panayides and Venus Lun 2009). Conversely, a lack of trust between the parties may prompt suppliers to withhold information that could be potentially useful for problem solving.

In addition, a positive relation between trust and transaction performance, defined as the outcome obtained at the end of the negotiation, has been found. Trust is a key success factor in improving innovativeness and supply chain performances (Morris and Carter 2004; Panayides and Venus Lun 2009), including costs reduction, delivery reliability, quality improvement, lead time, and flexibility. These findings suggest that firms may derive competitive advantage from relationships based on high levels of mutual trust.

3 Impact of Sourcing Mechanisms on Buyer–Supplier Relationships: Empirical Evidence

The impact of sourcing mechanisms and trust levels on interorganizational relationships is an emerging research issue. Most of the studies addressing this topic empirically analyze the way in which specific sourcing tools influence buyer–supplier relationships.

Gattiker et al. (2007) focus on suppliers' trust in buyers as an important outcome of e-sourcing adoption. They analyze how suppliers' trust varied under different procurement conditions, which depend on the type of sourcing mechanism and the complexity of the procurement situation. Their experimental study reveals that in reverse auctions, suppliers' trust levels are lower than in both face-to-face and e-mail negotiations.

Jap (2003, 2007) and Carter and Stevens (2007) study how the buyer's auction design (e.g., the number of bidders and the price visibility) affects the buyer–supplier relationship. Jap's studies provide empirical evidence that open-bid auctions result in greater supplier perceptions of buyer opportunism than do traditional sealed-bid formats. Suppliers generally dislike electronic reverse auctions because they feel that the computer interface prevents them from informing buyers about nonprice attributes, causing their products to become commoditized (Jap 2003). A laboratory experiment conducted by Carter and Stevens (2007) demonstrates that suppliers' perception of the buyer opportunism is increased when the auction shows suppliers' relative ranks (rank-based visibility) rather than the current lowest bid (price-based visibility); in addition, greater perceptions of opportunism are associated with including a larger number of suppliers in the auction (i.e., six versus three bidders).

Some data suggest that companies' experiences with electronic auctions may depend in part on how these interact with their own strategic orientations. For example, Caniels and van Raaij (2009) found that companies that compete on prices are very positive about electronic auctions; in particular, they worry less about the detrimental effects of such tools on their relationships. On the contrary, suppliers that seek to differentiate their offerings on the basis of innovative capabilities and excellent customer service report bad experiences with electronic reverse auctions and are less inclined to participate in future auctions. This is consistent with case studies and exploratory interviews conducted by Tassabehji et al. (2006) in food-packaging suppliers participating in reverse auctions. They report that many suppliers felt that existing relationships with buyers were significantly damaged following sourcing changes to reverse auctions: in particular, they resented being treated as commodity suppliers despite having contributed to buyers' product design and business development for many years. Suppliers reported suspecting that buyers sometimes entered "phantom" bids themselves to force price reductions and interview comments illustrated suppliers concerns—for example that "when a relationship is based on getting the lowest prices, mutual respect and value declines; there is now less trust and no feeling there is a partnership".

Taken together, these empirical findings suggest that suppliers' experiences of electronic sourcing adoption may cause them to lose trust with their customers in ways that undermine long-term collaborative relationships. Yet, little is known about how pre-existing trust levels influence suppliers' responses to ongoing use of electronic sourcing mechanisms and, in particular, how this compares with face-to-face negotiations.

4 Conceptual Model and Hypotheses

The literature review above discussed has emphasized that trust plays a key role in buyer–supplier relationships, fostering greater collaboration (Johnston et al. 2004) and richer information exchange. In the context of electronic negotiations there is potential for relationships to deteriorate, thereby diminishing performance (Handfield and Straight 2003); in such situations, trust becomes an important asset to buyers and suppliers. For example, Gattiker et al. (2007) argue that when using e-mail negotiation or e-reverse auction, suppliers' perceptions of buyer honesty positively affects suppliers' desire to have future interaction with the buyer. Similarly, Jap (2003) claims that low levels of trusts between the parties might lead to opportunistic behaviors, in turn causing lower performance in terms of product quality and service level.

We explore such issues by analyzing the impact of trust in the context of three different types of sourcing mechanisms: face-to-face negotiations, e-mail negotiations, and electronic reverse auctions. We anticipate that the intrinsic and extrinsic outcomes are influenced by two factors: (1) the type of mechanism used to transact business; and (2) the level of trust characterizing the buyer–supplier relationship. Most studies have considered the effects of sourcing mechanism and trust separately, perhaps implicitly assuming that richer media always facilitate trusting relations. Yet, even suppliers conducting face-to-face negotiation may not trust a given buyer due to "bad" prior experiences. An important question is whether the benefits derived from the transparency of face-to-face mechanism elicit improved collaborative intentions and propensity to continue the relationship. Similarly, it is unknown whether having established a prior trusting relationship can offset the reduced transparency of e-mail negotiations or electronic auctions.

Performances concern *relational* elements (Stank et al. 1999) and are related to "the extent of activities and behaviors directed toward initiating, developing, and/or maintaining successful industrial relational exchange" (Morgan and Hunt 1994). The following outcomes are measured in the study:

- *Satisfaction with dealing*: this results from evaluation of all aspects of the relationship between the parties (Sanzo et al. 2003; Benton and Maloni 2005; Ghijseen et al. 2009). It is a perception that follows the conclusion of a negotiation and influences future behavioral intentions, i.e., the likelihood that the parties will negotiate in the future (Oliver at al. 1994);

- *Expectation of continuity*: this measures the suppliers' intentions and expectations regarding a long-term relationship (Jap 2007). When a firm expects that the relationship will continue into the future, it is more willing to engage in processes and cooperate toward mutual beneficial solutions;
- *Desire for future dealing*: this represents the desire to transact business with the other party again in the future (Oliver et al. 1994) that contributes to measure the relational performance as well.

In addition, the development of the following relational factors is measured, that is the difference between the post-transaction and the pre-transaction level:

- *Trust*: trust has been previously defined as the expectation that the other party will behave in a predictable and reliable manner (Zaheer et al. 1998). As theoretical models and empirical findings show, trust acts as antecedent in enhancing collaborations and improving performance and is an important outcome of the relationship as well. Hence, pre-existing levels are taken into account when measuring performances, which enables measurement of changes due to the sourcing mechanism.
- *Perception of opportunism*: empirical studies reveal that suppliers often view auctions as being opportunistically employed by buyers. Given the definition of opportunism as "self-interest with guile" (Williamson 1985), the suppliers' perceptions of opportunistic behavior by the buyer are measured before and after the transaction, in addition to the broader concept of trust.

4.1 The Effect of Sourcing Mechanism on Relational Outcomes

According to media richness theory, one would expect to find that the information richness associated with different communication channels will affect the trust levels between the parties. In the initial relationship development, both buyers and suppliers regard face-to-face communication (for example meetings) with their counterparts as a necessary step to establish good working relationships (Ambrose et al. 2008). Richer communication media are better at transmitting complex and tacit knowledge and in supporting routine problem solving. Electronic media can be "relatively rich" if used in existing relationships (Vickery et al. 2004). Purchasing research on various electronic technologies (Ambrose et al. 2008) finds that buyers utilize information technology-based communication (e.g., EDI and e-mail) for tactical matters whereas they select richer modes (e.g., phone and face-to-face) for communication on less routine issues. Communication via e-mail is often used both when there is a great deal of uncertainty (in order to control the relationship), and when there is little uncertainty and the relationship has a low social content (in order to take advantage of convenience, ease of use, and speed).

In a negotiation context, negotiators are more likely to be collaborative when they use richer communication media. Participants who negotiate face-to-face (in experimental studies) report more trust in their opponents before and after the negotiation is completed compared to those using electronic communication (Naquin and Paulson 2003). Negotiators using richer communication media also express greater desire for future interactions than negotiators using leaner media. Less rich media make it easier for negotiators to mask the use of distributive bargaining tactics, thus possibly encouraging competitive behaviors (Purdy et al. 2000).

The experimental study conducted by Gattiker et al. (2007) reveals that the sourcing mechanism itself affects supplier's trust in buyer after the negotiation. First, face-to-face negotiation generally is associated with the highest level of supplier trust in buyer, followed by e-mail negotiation and e-reverse auction. "When trust-building is a critical outcome, there is no substitute for face-to-face" (Gattiker et al. 2007, p. 196). If buyers wish to use electronic tools when trust is an important outcome, they need to find alternative ways to establish trust, particularly in new relationships. Afterward, the authors match the sourcing tool with the complexity of the procurement and find that when procurement complexity is high, face-to-face negotiation and e-mail negotiation do not differ.

The use of electronic auctions has been linked to a distributive form of negotiation (Kaufmann and Carter 2004) since it tends to result in "pie expansion" (Jap 2003). Consistently with transaction economics insights, Beall et al. (2003) find that many suppliers perceive that electronic auctions negatively affected their relationships with their customers and lead to lower level of trust. The latter perspective is confirmed by Jap (2003), who argues that auctions are ideally suited for transactional exchange contexts but may be less appropriate for relational exchanges. Auctions—in particular those based on price competition—may inhibit collaboration in relational contexts (Emiliani and Stec 2004) because such auctions do not allow the expression of non-price attributes, such as quality, service, and reliability. The buyer's choice to use a face-to-face or electronic-mediated mechanism may encourage the supplier's suspicion that the buyer is using the auction opportunistically against the supplier.

We sought to replicate Gattiker's findings concerning impact of sourcing mechanism richness on the relational development—measured by the potential increase of trust (and decrease of perception of opportunism) from pretransaction phase to post-transaction phase.

Hypothesis 1. Increasing "richness" of the sourcing mechanism (i.e., electronic reverse auction, e-mail negotiation, or face-to-face negotiation) will positively influence the relational outcomes (i.e., satisfaction with dealing, expectation of continuity, and desire for future dealing) as perceived by the supplier. In particular:
Hypothesis 1a. Face-to-face negotiation will result in higher relational outcomes for suppliers than will e-mail negotiation.
Hypothesis 1b. Face-to-face negotiation will result in higher relational outcomes for suppliers than will e-reverse auction.
Hypothesis 1c. E-mail negotiation will result in higher relational outcomes for suppliers than will e-reverse auction.

4.2 The Effect of Trust on Relational Outcomes

The ultimate outcomes of a given buyer–supplier transaction can also be affected by the pre-existing trust between the parties. Specifically, pre-existing trust levels reduce uncertainty about the other party's motives, lessening the likelihood of miscommunication and misunderstandings that may damage the relationship. Benton and Maloni (2005) empirically find that supplier satisfaction is not affected by the final performance of the buyer–supplier transaction but instead results from the nature of the ongoing relationship as measured by trust, cooperation, and commitment. Experimental studies confirm that trust positively influences satisfaction with the relationship (Andaleeb, 1996). An increased level of future dealing expectation has been revealed from negotiators who experienced trust and collaborative interactions (Purdy et al. 2000; Naquin and Paulson 2003). In contrast, lack of prior trust may have a negative impact on propensity to continue the relationship and desire for future dealings.

Therefore, the following hypothesis is defined:

Hypothesis 2. The level of pre-existing trust between the buyer and the supplier has a positive impact on the relational outcomes (i.e., satisfaction with dealing, expectation of continuity, and desire for future dealings). That is, a high level of pre-existing trust will result in higher satisfaction with dealing, higher expectation of continuity, and higher desire for future dealing than will low level of pre-existing trust.

4.3 Potential Interaction of Sourcing Mechanism and Trust on Relational Outcomes

The use of electronic mechanisms in situations characterized by low levels of pre-existing trust may cause further deterioration of relational outcomes relative to the use of face-to-face mechanism. That is, the negative effects of lean communication media linked to sourcing mechanisms might be especially damaging in the presence of pre-existing mistrust, whereas it might be offset by a high level of pre-existing trust. Conversely, an initial absence of pre-existing trust might be counterbalanced by the trust-enhancing effects of rich media in the face-to-face negotiation so that relational outcomes are repaired.

In e-reverse auctions, relational outcomes are expected to be lower than they are in face-to-face and e-mail negotiations at any level of pre-existing trust, since the characteristics of the mechanism (lack of interpersonal contact) provide few avenues for interaction and cannot be mediated by the pre-existing level of trust. Less rich media make it easier for negotiators to mask the use of distributive bargaining tactics, thus possibly encouraging competitive behaviors (Purdy et al. 2000). E-mail negotiation has been associated with lower level of pre-existing trust (and post-contact trust as well) than face-to-face negotiation (Naquin and Paulson 2003).

Hence, we predict a significant interaction between the pre-existing level of trust and the richness of the sourcing mechanism. We explore the effects of each mechanism separately for both high and low trust.

Hypothesis 3a. Face-to-face negotiation will result in higher relational outcomes among suppliers (satisfaction with dealing, expectation of continuity, and desire for future dealing) than will e-mail negotiation when the pre-existing level of trust is low; when the pre-existing level of trust is high face-to-face will result in lower relational outcomes than will e-mail negotiation.
Hypothesis 3b. Face-to-face negotiation will result in higher relational outcomes among suppliers (satisfaction with dealing, expectation of continuity, and desire for future dealing) than will e-reverse auction when the pre-existing level of trust is low; when the pre-existing level of trust is high face-to-face will result in lower relational outcomes than will e-mail negotiation.
Hypothesis 3c. E-mail negotiation will result in higher relational outcomes (satisfaction with dealing, expectation of continuity, and desire for future dealing) among suppliers than will e-reverse auction at both high and low levels of pre-existing trust.

We analyze the interaction effect across pre-existing trust levels for each sourcing mechanism separately. However, we posit that the level of pre-existing trust will have a positive influence on the relational outcomes for all three sourcing mechanisms:

Hypothesis 4a. The level of pre-existing trust has positive impact on the relational outcomes (satisfaction with dealing, expectation of continuity, and desire for future dealing) among suppliers when face-to-face negotiation is used as a sourcing mechanism. That is, the relational outcomes in high-trust condition are higher than the relational outcomes in low-trust condition when face-to-face negotiation is used.
Hypothesis 4b. The level of pre-existing trust has a positive impact on the relational outcomes (satisfaction with dealing, expectation of continuity, and desire for future dealing) among suppliers when e-mail negotiation is used. That is, the relational outcomes in high-trust condition are higher than the relational outcomes in low-trust condition when e-mail is used.
Hypothesis 4c. The level of pre-existing trust has a positive impact on the relational outcomes (satisfaction with dealing, expectation of continuity, and desire for future dealing) among suppliers when e-reverse auction is used. That is, the relational outcomes in high-trust condition are higher than the relational outcomes in low-trust condition when e-reverse auction is used.

4.4 Trust Development

A further interesting aspect is related to *trust development* during finalization of contract terms, namely the potential increase of trust and decrease in *perceptions of opportunism* from the pre-transaction to the post-transaction phase. With regard

to sourcing mechanisms, previous experimental findings (Huang et al. 2008) reveal that suppliers' trust in buyers (i.e., their perceived honesty and benevolence) grows significantly during face-to-face negotiations, whereas when e-mail is used an increase of honesty is observed only for complex procurement situations (i.e., those for which multiple and ambiguous attributes of the exchanged good or service are discussed in the procurement process). In electronic reverse auction the level of trust does not change during the sourcing event.

Based on these findings, we propose the following set of hypotheses:

Hypothesis 5. The "richness" of the sourcing mechanism has a positive impact on the development of suppliers' perceived trust in buyers following completion of the deal. In particular:
Hypothesis 5a. Face-to-face negotiation will result in increased perceived trust and decreased perceived opportunism from the pre-transaction to post-transaction phase.
Hypothesis 5b. E-mail negotiation will result in increased perceived trust and decreased perceived opportunism from the pre-transaction to post-transaction phase.
Hypothesis 5c. Electronic reverse auction will result in decreased perceived trust and perceived opportunism from the pre-transaction to post-transaction phase.

In addition, pre-existing trust may serve as foundation to foster the development of additional trust. Compared with low levels of pre-existing trust, high levels of pre-existing trust make it more likely trust will increase and suspicion of opportunistic behavior will decrease during the transaction. Alternatively, it has been argued that "high levels of existing trust may decrease the amount of future trust that can be formed because high levels of existing trust leave less room for new trust to grow (conceptually, as well as merely methodologically)" (Huang et al. 2008, p. 69).In other words, high pre-existing trust may create a "ceiling effect" that limits any further increases in trust. Given this divergence in reasoning, we considered two competing hypotheses regarding the effects of pre-existing trust on trust development:

Hypothesis 6. The level of pre-existing trust between buyer and supplier will affect the development of relational outcomes.
Hypothesis 6a. The level of pre-existing trust between the buyer and the supplier has a positive impact on the development of the relational outcomes. In particular, perceived trust will grow when the pre-existing level of trust is high and decrease when the pre-existing level of trust is low, and perceived opportunism will decrease when the pre-existing level of trust is high and grow when the pre-existing level of trust is low.
Hypothesis 6b. The level of pre-existing trust between the buyer and the supplier has a negative impact on the development of the relational outcomes. In particular, perceived trust will decrease when the pre-existing level of trust is high and grow when the pre-existing level of trust is low and perceived opportunism will grow when the pre-existing level of trust is high and decrease when the pre-existing level of trust is low.

The potential interaction between sourcing mechanism and trust condition and their effects on changes in perceived trust opportunism will be analyzed as post hoc research questions.

5 Methodology and Experimental Design

5.1 Behavioral Laboratory Experiments

The purpose of the traditional research on purchasing and supply management is the development of models and techniques that help decision makers to optimize their decisions. However, such models rely on specific assumptions that may not hold when implemented in real settings (Bendoloy et al. 2006), for example unbounded rationality and risk neutrality. Recent studies addressing this topic have proposed that new approaches are necessary to overcome the limitations of the traditional assumptions. *Behavioral operations management* (Gino and Pisano 2008) has the purpose of taking cognitive limitations, perceptions and personal attributes of individuals into consideration. Consistently, *behavioral experiments* are a suitable tool for the empirically study of behavioral operations issues (Bendoly et al. 2006; 2008). They are aimed at investigating relationships by manipulating treatments to determine the exact effect of controlled and independent variables on specific dependent variables (Wacker, 1998).

We undertook a laboratory (lab) experiment to test our hypothesized relationships. For the purposes of this research, a *laboratory experiment* is defined as a study involving participants that occurs in an environment that has been created for research objectives as a stylized version of a real setting (Colquitt 2008). The assumption underlying laboratory studies is that theory being tested applies in real-world situations and to actors outside the laboratory. Their primary advantage is a high degree of control over threats to internal validity, namely extraneous confounding factors that might affect the inference of causal relationships between the independent and dependent variables (Campbell and Stanley 1963). For example, in a field study, numerous differences among auctions (such as number of bidders, level of information visibility, and duration) could influence participants' confidence in the sourcing mechanism and thus mask the relationship between sourcing mechanism, trust and performances. By contrast, we standardized the contract characteristics and the cost structures among suppliers and buyers, thereby holding constant the purchase and market characteristics. Such tight control yields a high degree of confidence that observed differences in the outcome variables are actually due to differences in the independent variables.

One disadvantage of laboratory experiments is the lack of contextual realism, since they use students instead of real representatives of the population under study. However, as noted by Bendoly et al. (2006), "this can be a valid criticism if the phenomena under study heavily depend on the individual life experiences of

the subjects". As noted earlier, this consideration was not relevant here, since even experienced suppliers must attend closely to the terms of unique transportation contracts. Laboratory experiments thus provide a valuable complement to the existing field studies by providing highly controlled environments to test the causal effects of independent variables. Although some facets of external validity may be compromised, the tradeoff in increased control affords researchers a sound basis for inferring causal relationships.

5.2 Experimental Design and Setting

This research explores how different conditions in face-to-face and electronic-mediated sourcing mechanisms affect transaction performance in logistics services procurement. In particular, we compared three sourcing mechanisms (face-to-face negotiation versus e-mail negotiation versus electronic reverse auction) at two levels of pre-existing trust between the buyer and the supplier (*high trust* versus *low trust*), resulting in a 3 × 2 experimental design in which participants are randomly assigned to one of the six resulting conditions(or treatments). The experimental design is depicted in Fig. 1.

The dependent variables are the relational performances described in Sect. 4. We measure the suppliers' perception of the relationship at the end of the transaction (i.e., satisfaction with dealing, expectation of continuity, and desire for future dealing) as well as pre-to post transaction changes in the relationship (i.e., changes in perceived trust and opportunism).

Our sample consisted of 95 MBA (93 %) and business Ph.D. students (7 %) enrolled in graduate courses at a large mid-Atlantic university. Of these, 63 % were male, 73 were U.S. citizens, and the ethnic breakdown was as follows: 55 % Caucasian, 32 % Asian, 6 % African American, 4 % Latino, and 3 % other. Subjects reported an average age of 28.38 years (S.D. = 4.16; range 24–36). Participants took part in the study in exchange for either extra course credit or gift certificates.

It is worth noting that although the sample included graduate students rather than experienced suppliers, all respondents had prior professional work experience, which reduces concerns about sample representativeness. Some existing

Fig. 1 Experimental design

Independent Variables	
Trust	**Sourcing mechanism**
High	Face-to-face negotiation
	E-mail negotiation
	E-reverse auction
Low	Face-to-face negotiation
	E-mail negotiation
	E-reverse auction
Dependent variables	
Satisfaction with dealing. Expectation of continuity. Desire for future dealing. Trust. Perception of opportunism.	

research suggests that MBA students and executives show highly similar patterns in organizing information and making decisions (Croson and Donohue 2006). Thus, the use of graduate business students in this study should not lead to dramatically different results than would be observed with experienced suppliers. Moreover, as business majors, students in the sample are representative of the larger population from which buyers and sales representatives are typically drawn.

In order to test the experimental design depicted in Fig. 1, the two independent variables (sourcing mechanism and trust) were manipulated and six different treatment conditions were defined. For *sourcing mechanism,* the manipulation consisted of assigning participants to one of the three conditions in interacting with buyers: (1) face-to negotiation, (2) e-mail negotiation, and (3) electronic reverse auction. For *trust* between the buyer and supplier, two levels were manipulated: high trust and low trust, which was operationalized by creating two versions of the scenario indicating pre-existing trust between the buyer and the supplier. The trust manipulation was generated based on insights from the literature review on the construct definition and pilot tested in an online study involving separate sample. For example, it is known that trust develops between partners over time and is closely tied to past experiences (Young-Ybarra and Wiersema 1999; Tian et al. 2008). Therefore, this firm-specific information concerning prior relationships provides evidence about the trustworthiness of the exchange partner.

Within a given sourcing mechanism condition, all participants pairs were assigned to either the high or the low trust condition (i.e., there were no circumstances in which one party read a scenario indicating high pre-existing trust and was then assigned to interact with a party who had read a scenario indicating low pre-existing trust). Moreover, to ensure that participants' perception of trust level was consistent with the manipulation, several manipulation checks were included in the preliminary survey.

For the most part, the buyer and seller scenarios contained identical information, however, as with many simulated negotiations, buyers were provided with unique facts about their own preferences that were not provided to sellers, and vice versa.

5.3 Experimental Procedures

Standardized written procedures were developed for all treatments-related aspects of the study, such as creation of material packets, communication with subjects, participant recruitment, and organization of sessions (Cook and Campbell 1979). Potential participants were recruited in their graduate classes and offered information about the scope of the study, benefits and risks of participation, and incentives (i.e., extra course credit, gift certificates). Using the list of students who signed-up to participate on particular day and time, participants were randomly assigned to the six treatments previously described.

Subjects were randomly assigned to one sourcing mechanism once they arrived at the laboratory. In the face-to-face and e-mail negotiation conditions, subjects were

randomly assigned to be either the buyer or the supplier and then randomly paired with each other. Each dyad was randomly assigned to either the high or low trust condition. For the reverse auction sessions, suppliers were told that they would bid against other competing suppliers; however, they actually used an auction simulator and bid against the computer. Using a simulator eliminated the possibility of confounding factors, e.g., differences in competition dynamics from auction to auction. The simulator has the look and feel of a real online auction, and the computerized logic mimics the behavior of competing bidders. The simulator was programmed using Microsoft Visual Basic and developed on the price-based auction simulator used by Gattiker et al. (2007). Students who participated in the auction as suppliers were also randomly assigned to either the high or low trust condition.

After all participants arrived, they watched standardized powerpoint presentation that provided an overview of the study, described the procedure, and allowed time for them to review their role materials and complete the preliminary survey. The preliminary survey contained manipulation check items to test participants' perception of trust manipulation.

Dyads in the face-to-face condition were instructed to meet for a maximum of 60 min to conduct their negotiation. E-mail dyads were provided with appositely created e-mail addresses (i.e., participants' real names were not used) and instructed to negotiate using e-mail over the next 60 min, with the first e-mail to be sent within 5 min. All suppliers in face-to-face and e-mail conditions were instructed to make the first offer to the buyer. Suppliers in reverse auctions received written instructions and practice training in the use of the auction system. Then, they were instructed to log in the application and start bidding. An initial time length of 5 min was set for the auction, consistent with prior research showing that longer auction periods yield no differences in bids or bidding patterns (i.e., most bidding occurred during the first and last two minutes of the auctions, regardless of how long the actual auction period was; Carter and Stevens 2007). However, a soft-closing time was designed, namely the auctions extended for 90 s every time a bid was placed during the last 45 s; the purpose of extending the auction in this way was to possibly avoid sniping behaviors by bidders (i.e., placing bids in the last few seconds of the auction) (Chen-Ritzo et al. 2005).

At the conclusion of the transaction, participants were asked to complete a follow-up survey that recorded the settlements terms and individual perceptions on relational performance. Each experimental session concluded with a debriefing.

5.4 Contract Scenario

Participants received packets of written information that described their roles in the experiment. Two roles were assigned, depending on the sourcing mechanism condition: a buyer for the company desiring to purchase transportation services or a sales representative for the supplier company (note: only the supplier role was provided to participants assigned to the electronic auction condition). The same

hypothetical transportation service contract was designed for use in all experimental conditions. Due to the complex nature of the logistics service, a multi-attribute contract was used to provide a clear specification of contract terms. This choice was consistent with the critical issues in the procurement of services (Andersson and Norrman 2002).The buyer was described as an industrial manufacturer that needed to purchase transportation services for the movement of final products (computer and technical equipment) from production facilities to central warehouses and then to distributors and retailers. The supplier was depicted as a logistics services provider that offered global, value-added, customized logistics solutions.

After a brief introduction containing the names of the organizations and their representatives, the background information contained the trust manipulation, which described information about the prior relationship between the two parties. In the *high trust* scenario the relationship between the two companies was characterized by honesty, reliability, positive past experiences, and further features that induced the parties to conclude that the opposite party could be trusted. In the *low trust* scenario, all the inductions were reversed in a way that the relationship was characterized by dishonesty, unreliability, and bad past experiences.

Then, the role material provided a detailed description of the contract terms, confidential information about the company's preferences concerning the service attributes, and guidelines regarding how to conduct the transaction. The contract had three service-related attributes of interest: price p, delivery interval d, and reliability r. *Delivery interval* is the time interval between two deliveries; it is expressed in time units (e.g., a delivery interval of six days). Higher values of delivery interval mean lower frequency of deliveries. *Reliability* is the expected rate of on-time deliveries (e.g., 95 % of scheduled transports expected to be provided on time). *Price* is related to the total price of the contract that the buyer pays to the provider for purchasing the transportation service. To aid their decisions concerning offers and counteroffers, suppliers and buyers were given a table showing the costs and the utilities, respectively, associated with each level of delivery interval and reliability.

5.5 Measures

In order to measure the relational aspects concerning the relationships between the buyer and the supplier, questionnaires were administered in pre-test and post-test phases of the experiment. As suggested by Johnston et al. (2004), studies on inter-firm relationships typically use individuals' reports to assess the perception of the relationship at the interorganizational level. Although a few studies have looked at both interpersonal and interorganizational trust in buyer–supplier relationships (Zaheer et al. 1998), in this study the more conventional approach of using participants' assessments to represent their organizations perceptions and relational attitudes toward the other party is adopted.

Table 2 Reliability Cronbach's alpha for multi-item scales

Variable	Cronbach's alpha
1. Pre-test trust	0.974
2. Pre-test opportunism	0.961
3. Post-test trust	0.936
4. Post-test opportunism	0.883
5. Satisfaction with dealing	0.914
6. Expectation of continuity	0.953

Multiitem scales measured on a 7-point Likert scale (1 = "strongly disagree" and 7 = "strongly agree") were adapted from existing research: "strongly disagree" denoted poor performance and "strongly agree" strong performance.

Trust was measured using the scale developed and validated by Doney and Cannon (1997) that measures interorganizational trust between buyers and suppliers firms. The measure of *perception of opportunism* was derived from the experimental study of Carter and Stevens (2007), who adapted existing items (e.g., Morgan and Hunt 1994) to the context of their study based on the field research of Beall et al. (2003) and Jap (2003). *Satisfaction with dealing* was measured by using the items from Ghijsen et al. (2009); the items measuring *expectation of continuity* were derived from Jap (2007), whose work assesses suppliers' confidence in future relationships in the context of electronic auction usage. The scale for *desire for future dealings* included a single item used by Gattiker et al. (2007), who adapted the measure developed by Oliver (1994).The items used for the measures are listed in appendix.

For each variable the items were averaged to form a composite measure. To assess the degree to which the items are free from random error and measure the construct in a consistent manner, reliability analysis is suitable. Reliability is typically assessed using Cronbach's alpha coefficient. A scale is found to be reliable if the coefficient is 0.70 or higher. In this study, reliability analysis was performed with the collected data for the pre-test and post-test multiitems measures. An excellent level of inter-item agreement was achieved for all the measures, namely a Cronbach's alpha higher than 0.85 was achieved for all the scales (Table 2).

6 Analysis of Results

6.1 Sample

The study involved a 3 (face-to-face negotiation versus e-mail negotiation versus e-reverse auction) × 2 (high trust versus low trust) experimental design. Although data were collected from both buyers and suppliers, our analyses here reported focus on the suppliers' responses (recall that no buyer data could be collected in the e-reverse auction condition). Therefore, the considered sample size is 65 suppliers' responses. Of those, four responses were omitted from the analysis since

Between-subjects Independent Variables		Cell size (n)	Within-subjects Dependent Variable	
Trust (high versus low)	**Mechanism (face-to-face versus e-mail versus e-reverse auction)**		**Pre-test phase**	**Post test phase**
High	*Face-to-face negotiation*	8	DVs: Trust and Perceived Opportunism	DVs: Trust and Perceived Opportunism
	E-mail negotiation	9	DVs: Trust and Perceived Opportunism	DVs: Trust and Perceived Opportunism
	E-reverse auction	13	DVs: Trust and Perceived Opportunism	DVs: Trust and Perceived Opportunism
Low	*Face-to-face negotiation*	9	DVs: Trust and Perceived Opportunism	DVs: Trust and Perceived Opportunism
	E-mail negotiation	10	DVs: Trust and Perceived Opportunism	DVs: Trust and Perceived Opportunism
	Electronic reverse auction	12	DVs: Trust and Perceived Opportunism	DVs: Trust and Perceived Opportunism

Fig. 2 Cells size and mixed-design repeated measures MANOVA

they reported results that were beyond the reasonable range of final profit given the scenario provided in the background information. A problem in research using human subjects is that some participant may neglect to do their tasks conscientiously. This appears to have been the case with these few responses. Omitting the unusable data points leaves 61 observations for the hypothesis tests. Sample sizes in each cell vary from 8 to 12 (Fig. 2), which are adequate for a laboratory experiment design (Hair et al. 1998) as suggested by recent experimental research (Gattiker et al. 2007; Carter and Stevens 2007).

6.2 Models of Analysis

Trust and perception of opportunism were measured in the pre-test as well as in the post-test phases, therefore a mixed-design approach was adopted for testing the hypotheses concerning those variables. A mixed-design analysis of variance separately examines the effect of between-subjects factors (i.e., independent variables in which a different group of subjects is exposed to each treatment condition) and within-subjects factors (i.e., often referred to as "repeated-measures variables" since more than one measurement is taken from each subject). In this study, sourcing mechanism and trust are the between-subject variables and the *test time* (pre-test and post-test) is the within-subject factor. The repeated-measures MANOVA design is depicted in Fig. 2. Means, standard deviations, and intercorrelations for study variables are shown in Table 3.

Table 3 Means, standard deviations, and correlation of dependent variables

Variable	Mean	SD	1	2	3	4	5	6	7
1. Pre-test trust	3.80	2.13	1						
2. Pre-test opportunism	4.06	1.75	−0.913**	1					
3. Post-test trust	4.39	1.30	0.691**	−0.734**	1				
4. Post-test opportunism	3.40	1.48	−0.592**	0.574*	−0.820**	1			
5. Satisfaction with dealing	5.40	1.25	0.527**	−0.564**	0.808*	−0.658**	1		
6. Expectation of continuity	5.17	1.51	0.553**	−0.567**	0.828*	−0.691**	0.861**	1	
7. Desire for future dealing	5.55	1.24	0.420**	−0.506**	0.814**	−0.697**	0.806**	0.862**	1

*$p < 0.05$, two-tailed
**$p < 0.01$, two-tailed

6.3 Validation of Measures

To ensure that participants perceived the trust manipulations as intended, a *t*-test on items taken prior to the start of the contract negotiations or auctions showed significant differences in the predicted direction [$t(60) = 13.99$, $p < 0.0001$; low trust $M = 1.79$, high trust $M = 5.88$]. These results indicate that the trust manipulation was successful, namely the level of perceived pre-existing trust between the buyer and seller was significantly higher in the *high trust* condition than in the *low trust* condition.

6.4 Results for Relational Outcomes

Hypothesis 1 predicted that the richness of the sourcing mechanism would positively influence relational performance such that the three mechanisms would follow a pattern in which face-to-face negotiations would result in higher relational outcomes than would e-mail (H1a) or e-reverse auctions (H1b) and e-mail negotiations would result in better outcomes than e-reverse auctions (H1c).

Consistent with Hypothesis 1, an ANOVA test (Table 4) on satisfaction with dealing indicates a significant main effect of sourcing mechanism [$F(2, 55) = 15.538$, $p < 0.001$; $\eta^2 = 0.361$; power = 0.999]. The pairwise comparisons across the three mechanisms (Table 5) show the predicted pattern with regard to satisfaction with dealing: satisfaction in electronic reverse auctions ($M = 4.705$) is 1.026 points lower than in e-mail negotiation ($M = 5.731$) and 1.357 points lower than in face-to-face negotiation ($M = 6.063$); however, means in the face-to-face and e-mail negotiation do not significantly differ.

Similar results derive from the MANOVA on expectation of continuity and desire for future dealings. The multivariate tests (Table 6) indicate a significant main effect of sourcing mechanism on these dependent variables [Pillai's trace = 0.251, $p < 0.01$, $\eta^2 = 0.125$, power = 0.887]. The univariate tests (Table 7) confirm the significant effect for each variable: expectation of continuity [$F(2, 54) = 8.749$, $p < 0.01$; $\eta^2 = 0.245$; power = 0.962] and desire for future dealing [$F(2, 54) = 5.941$, $p < 0.01$; $\eta^2 = 0.180$; power = 0.860]. Examinations of the means and the pairwise comparisons in Table 8 indicate that expectation of continuity in electronic reverse auction ($M = 4.479$) was significantly lower (1.382 points) than in both the e-mail negotiation ($M = 5.467$) and the face-to-face

Table 4 ANOVA results (DV: satisfaction with dealing)

Source	Sum of squares	d.f.	Mean squares	*F*	*p*
Trust	26.315	1	26.315	37.913	0.000
Mechanism	21.569	2	10.784	15.538	0.000
Trust × Mechanism	4.764	2	2.382	3.432	0.039

Table 5 Bonferroni pairwise comparisons between mechanisms (DV: satisfaction with dealing)

Mech (I)	Mech (J)	Mean Difference (I−J)	Std. Err	*p*
F2F	E-mail	0.331	0.279	0.720
F2F	eRA	1.357	0.262	0.000
E-mail	eRA	1.026	0.254	0.000

Table 6 MANOVA multivariate tests results (DVs: expectation of continuity and desire for future dealing)

Source		Value	*F*	d.f.	*p*
Trust	Pillai's trace	0.409	18.313	2	0.000
Mechanism	Pillai's trace	0.251	3.874	4	0.006
Trust × Mechanism	Pillai's trace	0.067	0.936	4	0.446

Table 7 MANOVA univariate tests results (DVs: expectation of continuity and desire for future dealing)

Source	DV	Sum of squares	d.f.	Mean squares	*F*	*p*
Trust	Expectation of continuity	44.377	1	44.377	36.622	0.000
	Desire for future dealings					
Mechanism	Expectation of continuity	19.016	1	19.016	17.902	0.000
	Desire for future dealings					
Trust × Mechanism	Expectation of continuity	21.204	2	10.602	8.749	0.001
	Desire for future dealings					

Table 8 Bonferroni pairwise comparisons between mechanisms (DVs: expectation of continuity and desire for future dealing)

Measure	Mech (I)	Mech (J)	Mean difference (I−J)	Std. Error	*p*
Expectation of continuity	F2F	E-mail	0.394	0.368	0.866
	F2F	eRA	1.382*	0.349	0.001
	E-mail	eRA	0.988*	0.338	0.015
Desire for future dealing	F2F	E-mail	0.417	0.345	0.696
	F2F	eRA	1.097*	0.327	0.004
	E-mail	eRA	0.681	0.317	0.108

* Significant at the corresponding *p* value

negotiation (0.988 points lower; $M = 5.861$). A significant difference in desire for future dealing of 1.097 points was observed between electronic reverse auction ($M = 5.042$) and face-to-face negotiation ($M = 6.139$). Examination of the means

also showed differences in the predicted direction between face-to-face and e-mail negotiations; however, the effects were small and not statistically significant.

In summary, our data fully supported Hypothesis 1b and partially supported Hypothesis 1c (for satisfaction with dealing and expectation of continuity); however, data fail to confirm Hypothesis 1a.

Hypothesis 2 predicted that the level of pre-existing trust between the buyer and the supplier would have a positive impact on the relational outcomes, that is, higher pre-existing trust would be linked to higher satisfaction with dealing, higher expectation of continuity and higher desire for future dealing than would low levels of pre-existing trust. The analysis of the univariate test on satisfaction with dealing (Table 4) indicated a significant main effect of the trust manipulation ([$F(1, 55) = 37.913$, $p < 0.001$; $\eta^2 = 0.408$; power = 1.000], namely a significant difference in satisfaction with dealing existed between the high trust ($M = 6.166$) and low trust conditions ($M = 4.833$). Significant multivariate effects [Pillai's trace = 0.409, $p < 0.001$, $\eta^2 = 0.409$, power = 1.000] (Table 6) and univariate effects (Table 7) were observed for expectation of continuity ([$F(1, 54) = 36.622$, $p < 0.001$; $\eta^2 = 0.404$; power = 1.000]) and desire for future dealing ([$F(1, 54) = 17.902$, $p < 0.001$; $\eta^2 = 0.249$; power = .986]. Expectations of continuity were significantly higher in high trust ($M = 6.139$) than in the low trust condition ($M = 4.399$), as well as for desire for future dealing ($M = 6.204$ in high trust condition vs. $M = 5.065$ low trust condition). Therefore, Hypothesis 2 was fully supported.

Hypothesis 3a and 3b predicted that the face-to-face negotiation would result in higher relational outcomes than would the e-mail negotiation and electronic reverse auction, respectively, in the low trust condition, but not in the high trust condition. Conversely, Hypothesis 3c predicted that the differences in relational outcomes between e-mail negotiation and electronic reverse auction would be significant at both high and low levels of trust. Analysis of the between-subjects tests showed a significant two-way interaction effect between trust and sourcing mechanism on satisfaction with dealing [$F(2, 55) = 3.342$, $p < 0.05$; $\eta^2 = 0.111$; power = 0.621] (Table 4); conversely the trust × sourcing mechanism interaction effect on expectation of continuity and desire for future dealing was not significant [Pillai's trace = 0.067 ns]. In order to test which mechanisms differ on satisfaction with dealing at the two different levels of trust, two parallel ANOVA models were designed to analyze the effect of mechanism at each level of trust separately. Pairwise comparisons of the means indicate that sourcing mechanism had a much larger effect on satisfaction with dealing under low than high trust conditions (Table 9). Specifically, under conditions of low pre-existing trust, satisfaction was significantly lower after the electronic reverse auction than it was after either the e-mail or face-to-face negotiation. In contrast, there were no significant differences in satisfaction across sourcing mechanisms under conditions of high trust. These findings provide support for Hypothesis 3b, but not for Hypothesis 3a or Hypothesis 3c.

Hypotheses 4a, b , and c predicted a significant differences for high and low trust on satisfaction with dealing in face-to-face negotiation as well as in the e-mail

Table 9 Bonferroni pairwise comparisons between mechanisms in parallel models high trust versus low trust (DV: satisfaction with dealing)

Trust condition	Mech (I)	Mech (J)	Mean difference (I–J)	Std. Error	*p*
High trust	F2F	E-mail	0.162	0.400	1.000
	F2F	eRA	0.715	0.370	0.193
	E-mail	eRA	0.553	0.357	0.401
Low trust	F2F	E-mail	0.500	0.387	0.620
	F2F	eRA	2.000*	0.371	0.000
	E-mail	eRA	1.500*	0.360	0.001

Table 10 Bonferroni pairwise comparisons between trust levels in the three mechanism (DV: satisfaction with dealing)

Trust condition	Trust (I)	Trust (J)	Mean difference (I−J)	Std. Error	*p*
F2F	High	Low	0.792	0.277	0.012
E-mail	High	Low	1.130	0.323	0.003
eRA	High	Low	2.077	0.417	0.000

negotiation and electronic reverse auction conditions. These predictions find support in empirical data. In fact, we found significant differences in satisfaction with dealing between the high and low trust conditions for all three mechanisms (Table 10): electronic reverse auctions showed the largest difference at 2.077 points between high ($M = 5.744$) and low trust ($M = 3.667$). Smaller though significant differences were observed for e-mail negotiation and face-to-face negotiation.

6.5 Results for Trust and Perception of Opportunism

Hypotheses 5a, b, and c predicted that the richest sourcing mechanism (face-to-face negotiation) would increase perceived trust most from the pre-test to post-test phase, followed by e-mail negotiations and electronic reverse auctions. These hypotheses were tested with a multivariate mixed-design analysis of variance in which: the *test phase* (pre-test versus post-test) is the within-subject factor, and *sourcing mechanism* and *trust condition* are the between-subject factors.

As shown in Table 11, within-subjects multivariate tests indicate a significant main effect of time [Pillai's trace $= 0.362$, $p < 0.001$, $\eta^2 = 0.362$, power $= 0.999$] on perceived trust and opportunism. Univariate tests and means analyses indicate that the average level of perceived trust increased significantly from pre-test ($M = 3.843$) to post-test ($M = 4.474$), whereas the average level of perceived opportunism decreased significantly from pre-test ($M = 4.016$) to post-test ($M = 3.287$).

In addition, analyses showed a significant two-way interaction between time and sourcing mechanism [Pillai's trace $= 0.230$, $p < 0.01$, $\eta^2 = 0.115$, power $= 0.859$],

Table 11 Repeated measures MANOVA multivariate tests results (DV: trust and perception of opportunism)

Source		Value	*F*	d.f.	*p*
Within-subjects effects					
Time	Pillai's trace	0.362	15.319[a]	2.000	0.000
Time × Trust	Pillai's trace	0.598	40.221[a]	2.000	0.000
Time × Mechanism	Pillai's trace	0.230	3.581	4.000	0.009
Time × Trust × Mechanism	Pillai's trace	0.020	0.272	4.000	0.895
Between-subjects effects					
Trust	Pillai's trace	0.895	2.312	2.000	0.000
Mechanism	Pillai's trace	0.185	2.804	4.000	0.029
Trust × Mechanism	Pillai's trace	0.111	1.612	4.000	0.176

indicating that the change in perceived trust and opportunism from pre-test to post-test differed across the three mechanisms. Pairwise comparisons for the three mechanisms indicate a significant pre-test to post-test change in perceived trust and opportunism for the face-to-face and e-mail negotiations, but not for the electronic reverse auction. The means, which are presented graphically in Figs. 3 and 4, showed significant increases in perceived trust from pre-test ($M = 3.781$) to post-test ($M = 4.931$) and significant decreases in opportunism from pre-test ($M = 3.822$) to post test ($M = 2.671$) when face-to-face negotiation was used. The changes were smaller though significant when e-mail negotiations were used (trust increased by 0.597 points from pre-test to post-test and opportunism decreased by 0.989 points). In the electronic reverse auction condition, levels of trust and opportunism did not change significantly from pre-test to post-test. Therefore, Hypothesis 5a and Hypothesis 5b are supported, whereas Hypothesis 5c is not.

Hypothesis 6 predicted that the trust condition would significantly affect the development of perceived trust and opportunism, and Hypothesis 6a and 6b offered competing predictions concerning the direction of this effect. Analyses showed a significant two-way interaction between time and trust condition [Pillai's trace $= 0.598$, $p < 0.001$, $\eta^2 = 0.598$, power $= 1.000$], supporting Hypothesis 6.

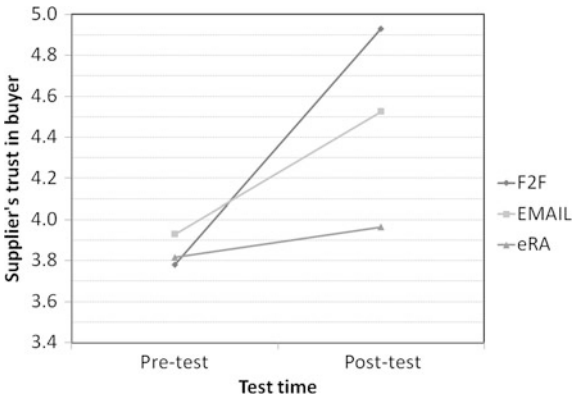

Fig. 3 Variation of trust across time and mechanism

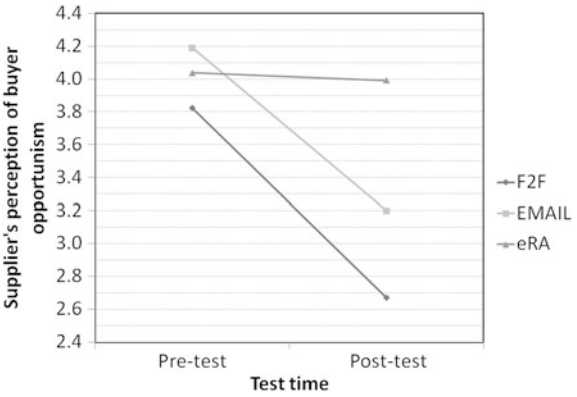

Fig. 4 Variation of perceived opportunism across time and mechanism

Results show a significant positive effect of time on perceived trust when the pre-existing trust condition was manipulated to be low: in fact, perceived trust increased by 1.768 points from pre-test ($M = 1.792$) to post-test ($M = 3.560$). Conversely, when the pre-existing trust condition was manipulated to be high, the results showed a small but significant decrease in subsequent levels of perceived trust (0.506 points) from pre-test ($M = 5.893$) to post-test ($M = 5.387$). With regard to perceived opportunism, a significant downward trend was observed when the pre-existing trust condition was low, namely a decrease of 1.500 points from pre-test ($M = 5.586$) to post-test ($M = 4.085$). When the pre-existing trust condition was high, perceived opportunism did not change significantly from pre-test to post-test. Thus, Hypothesis 6a was not supported, whereas Hypothesis 6b was partially supported (for trust but not for perceived opportunism).

Additional analyses related to the predictions discussed so far may provide additional insight into understanding how pre-existing trust levels and sourcing mechanisms influence relational outcomes. For example, between-subjects multivariate tests indicate a significant main effect of sourcing mechanism [Pillai's trace = 0.185, $p < 0.05$, $\eta^2 = 0.093$, power = 0.751]. Bonferroni pairwise comparisons across mechanisms indicate that the only significant difference in the development of perceived trust and opportunism is between electronic reverse auction and face-to-face negotiation. In fact, trust in electronic reverse auction ($M = 3.891$) is significantly lower (0.465 points) than in face-to-face negotiation ($M = 4.356$), and opportunism in electronic reverse auction ($M = 4.014$) is significantly higher (0.768 points) than in face-to-face negotiation ($M = 3.247$). As shown in Figs. 5 and 6, small differences exist between face-to-face negotiation and e-mail negotiation as well as between e-mail negotiation and electronic reverse auction, but the effects are not significant.

Furthermore, results from the between-subjects tests showed that the main effect of trust is significant [Pillai's trace = 0.895, $p < 0.001$, $\eta^2 = 0.895$, power = 0.999], having the average level of perceived trust in high trust condition ($M = 5.640$) 2.946 points higher than the average level in low trust condition ($M = 2.676$) and perceived opportunism in high trust condition ($M = 2.468$)

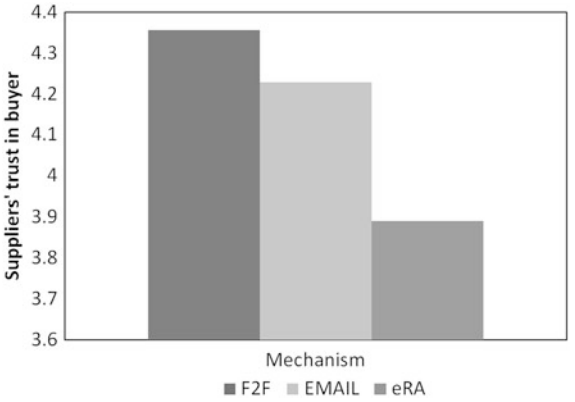

Fig. 5 Trust across mechanisms

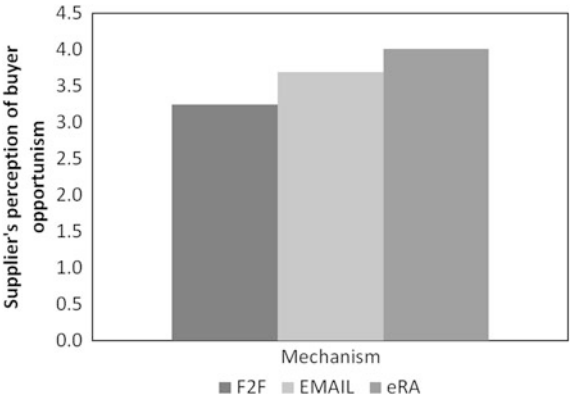

Fig. 6 Perceived opportunism across mechanisms

2.368 points lower than in low trust condition ($M = 4.836$). These results also confirm that the manipulation of the levels of trust (high versus. low) between buyer and supplier was effective. Besides, the effect of trust does not vary across mechanisms: the mean of perceived trust (opportunism) in high trust condition is

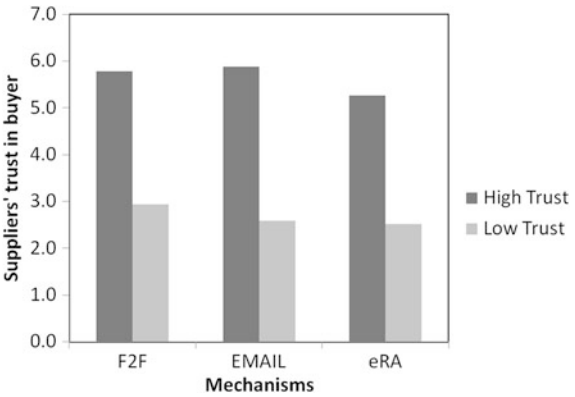

Fig. 7 Trust across trust levels and mechanisms

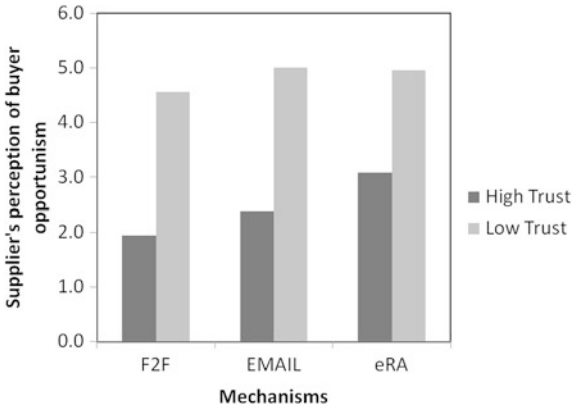

Fig. 8 Perceived opportunism across trust levels and mechanisms

higher (lower) than the mean in low trust condition in all three mechanisms, as shown in Figs. 7 and 8.

7 Discussion of Results and Conclusions

This study has addressed key issues in recent purchasing and supply management research, namely the role of pre-existing interorganizational trust as determinant of subsequent buyer–supplier relationships. We have focused on the influence of pre-existing trust on relationships, both alone and in conjunction with different e-sourcing mechanisms in contrast to the use of traditional face-to-face negotiations.

A 3 × 2 design of experiments was used to compare three sourcing mechanisms (face-to-face negotiation, e-mail negotiation, and electronic reverse auction) and two pre-existing levels of trust between the buyer and the supplier (high and low). Behavioral laboratory experiments were selected as methodology that would enable us to draw strong conclusions about the causal nature of our predicted relationships. Using a controlled laboratory setting, in which participants performed the role of either a buyer or a supplier of transportation service, we were able to isolate the impact of the independent variables from other extraneous factors (e.g., differences in the contract terms) that could affect results.

Multivariate and univariate analyses of variance, which were performed on data from the suppliers' sample, confirm that a considerable difference existed between face-to-face negotiation (the "richest" mechanism in the study) and electronic reverse auction (the "leanest" mechanism in the study) in terms of their relative impact on the relational outcomes. E-reverse auctions caused lower supplier satisfaction in dealing with the buyer, compared to face-to-face and e-mail negotiation; this result is particularly significant in the low trust scenario compared to the high trust scenario, thus suggesting that electronic reverse auctions may be ill-suited to repair trust when pre-existing relationships were poor. Interestingly,

we found that e-mail negotiations, which are often neglected for strategic transactions, achieved relational outcomes comparable to face-to-face negotiations.

The obtained results provide useful insights for selecting sourcing mechanisms which are appropriate for a desired or given type of business relationship. As this research links different mechanisms available for sourcing practices to their relational performance, results can help companies to trade-off transactional against relational outcomes, thereby selecting the mechanism best fitting the given trust scenario and the desired type of interorganizational relationship.

7.1 Limitations

Several limitations of our study should be recognized. One issue is that we manipulated the level of pre-existing trust using verbal instructions. Although the manipulation check indicated significant differences in perceived supplier trust consistent with the manipulation, it is possible that an actual history of strong or weak relationships might produce different outcomes in actual sourcing contexts. For example, it may be more difficult to overcome a long history of involving low trust through a single e-mail or face-to-face negotiation. It would be helpful for future researchers to explore this in field settings.

Second, the terms of the transaction were strictly limited in both the negotiation and the electronic reverse auction conditions. Although we designed the transaction to approximate a complex transaction including three attributes (price, delivery interval, and reliability), it may be that contracts involving more attributes or requiring a longer time-frame for negotiation than was permitted here would lead to somewhat different effects on relational outcomes. Future researchers might vary the number of attributes in future laboratory studies as one way to explore this possibility.

Finally, our predictions focused solely on relational outcomes and not on the actual terms of the transaction, which has been a central focus in many prior studies (e.g., Carter and Stevens 2007). We did not test whether pre-existing trust or sourcing mechanisms led to differences in the total value of the deal reached in this transaction, and it is possible that objective differences in terms may affect relational outcomes over time.

7.2 Practical Implications

Our study suggests several practical implications that may be of benefit to buyers and suppliers. One key finding is that in the context of high pre-existing trust, electronic reverse auctions may not necessarily damage existing relationships. Note that this contradicts some prior findings, such as that of Tassabehji et al. (2006) who reported the electronic reverse auctions increased skepticism among suppliers. Several factors may explain this discrepancy: for example our reverse

auction participants "competed" against two other suppliers. Participating in auctions that involve a larger number of suppliers has been linked to increased perceived opportunism (Carter and Stevens 2007), so it is possible that using e-reverse auctions with trusting supplier under less competitive conditions mitigates losses in trust.

A second implications is that both face-to-face and e-mail negotiations were linked with increases in perceived trust and reductions in perceived opportunism. This suggests that richer sourcing mechanisms may be used as trust-building or trust-repairing strategies. Buyers who have a history of poor relationships with suppliers thus may consider using these sourcing mechanisms to build trust, and postpone using electronic reverse auctions.

Appendix. Measures

Trust

1. This company keeps the promises it makes to my company.
2. This company is not always honest with my company (reverse coded item).
3. My company believes the information that this company provides us with.
4. When making important decisions, this company considers my company's welfare as well as its own.
5. My company finds it necessary to be cautious with this company (reverse coded item).
6. This company is genuinely concerned that our business succeeds.
7. My company trusts this company to keep our best interests in mind.
8. This company is trustworthy.

Perception of opportunism

1. In future interactions, I believe this company would be unwilling to accept responsibility for its mistakes.
2. In future interactions, I believe this company would provide us with false information.
3. In future interactions, I believe that this company would try to "nickel and dime" us.

Satisfaction with dealing

1. Dealing with this company benefits your company.
2. My company is satisfied with the dealings with this company.
3. This company is a good company to do business with.

Expectation of continuity

1. I expect to continue working with this company on a long-term basis.

2. The relationship with this company will last far into the future.

Desire for future dealings

1. Based on your experience in this negotiation, to what degree are you willing to have future dealings with this company?

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