The Use of Procedural Fairness in Electronic Reverse Auctions to Enhance Relationship Quality

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ABSTRACT

In this study, the use of procedural fairness by a buying organization in an electronic reverse auction (ERA) is examined. Drawing on the literature, a conceptual model is developed that relates procedural fairness to two key ERA outcomes: relationship quality and quality of the offering. The hypothesized relationships between procedural fairness and quality outcomes are empirically tested through a global field study with 179 procurement professionals in multinational companies, and explored through a supporting field study with 31 sales professionals from supplier firms. The results show that the use of procedural fairness by a buying organization is positively related to relationship quality and quality of the offering, without jeopardizing price savings. In addition, the positive association between procedural fairness and relationship quality is found to increase in the case of a repeat auction. This study contributes to the relationship marketing literature by examining how procedural fairness can mitigate relationship quality concerns in ERA use by buying organizations.

Over the past two decades, Electronic reverse auctions (ERAs) have seen their popularity increase in various industries including aerospace, automotive, aviation, chemicals, construction engineering, defense, electronics, machinery, packaged goods, petroleum, retail, and telecommunications (Beall et al., 2003; Radkevitch, Heck, & Koppius, 2009). An ERA is defined as “an online, real-time dynamic auction between a buying organization and a group of pre-qualified suppliers who compete against each other to win the business to supply goods or services that have clearly defined specifications for design, quantity, quality, delivery, and related terms and conditions. These suppliers compete by bidding against each other online over the Internet using specialized software by submitting successively lower priced bids during a scheduled time period” (Beall et al., 2003, p. 7).

The proportion of ERA sourcing, in relation to the total annual spend of a firm, ranges from less than 5% to up to 25%, with potential applicability as high as 50% (Beall et al., 2003; Jap, 2007). Private industry data reveal that firms mostly use ERAs in non-strategic spend pools such as raw materials, packaging, logistical services, temporary labor, and transportation, which amount to 20–40% of a firm’s total annual spend, of which 35% is sourced electronically. As an example of the absolute spend ERAs can account for, the METRO group, the fifth largest retailing group in the world, has run thousands of ERAs to purchase products worth more than 1 billion euro (Ganesan, George, Jap, Palmatier, & Weitz, 2009).

The popularity of ERAs stems from the tremendous price savings auctions can potentially yield, with average reported price savings of 15%, and a reported 5–40% price savings range (Ganesan et al., 2009). Additional benefits for the buying organization include a reduction in cycle time, enhanced productivity, an enlarged supply base, and accelerated inventory replenishment (Carter et al., 2004; Smeltzer & Carr, 2003). Incentives for the supplier organization to participate in ERAs include the opportunity to win new business, access new markets, obtain price information, and realize efficiency gains (Beall et al., 2003; Caniëls & van Raaij, 2009; Smeltzer & Carr, 2003).

While ERA use can benefit both buying organizations and suppliers, the one-sided focus on price savings as well as unethical behavior by both buyers and suppliers can prevent them from achieving such advantages (Beall et al., 2003). Examples of unethical behavior by buyers include the buying organization inviting unqualified suppliers to the ERA to exert price pressure on qualified suppliers, holding auctions for price discovery only (without the intent of awarding the business), providing incomplete or incorrect demand specifications, allowing certain suppliers to rebid after the closing date, frequently repeating the ERA to the point...
of supplier bankruptcy, threatening the supplier to end
the relationship in the absence of bids, and purpose-
fully cancelling the deal after the auction as buyer ex-
pectations are not met. Suppliers’ unethical behaviors
include illegal arrangements between suppliers to not
bid, selectively bid, or keep the price high, tenaciously
hurting competitors by making unrealistically low price
bids without the intention of being awarded the busi-
ness, and not honoring the deal by deliberately reducing
quality of the offering without informing the buyer or by
adding extra fees after the auction (Arnold, Kärner, &
Schnabel, 2005; Carter et al., 2004; Charki, Josserand,
& Charki, 2010; Guillett et al., 2010; Hohner et al., 2003;
Tassabehji, Taylor, Beach, & Wood, 2006).

As a result, the use of ERAs is widely recognized
as severely harming buyer–supplier relationships and
quality of the offerings (Beall et al., 2003; Caniels & van
Raaij, 2009; Carter & Stevens, 2007; Carter et al., 2004;
Charki & Josserand, 2008; Jap, 2007; Jap & Haruvy,
2008; Ray, Jenamani, & Mohapatra, 2011; Tassabehji
et al., 2006). In particular, when conducting an ERA,
a buying organization often terminates a long-term rela-
tionship with the incumbent supplier. According to a
supplier, in a study by Jap (2000): “[The buyer] talks
about the relationship being a partnership, and this
[the auction] really takes that away . . . What they do
is take your existing business that you have worked
very hard to achieve and maintain . . . and they send it
out across the board for a competitive bid. I just do not
think that is fair.”

While the use of ERAs by buying organizations
raises substantial concerns about the quality of the
relationship with suppliers and about the quality of
the offering, there is a paucity of research that focuses
on mechanisms for alleviating these adverse outcomes.
The objective of this study is to examine how the em-
ployment of procedural fairness by a buying organi-
ization in an ERA relates to relationship quality, and
quality of the offering, controlling for price savings and
other potentially confounding factors. In particular,
a buying organization can conduct an ERA in a procedu-
really fair manner by clearly explaining and communicat-
ing the auction rules and conditions to participant
suppliers, and by adopting objective procedures that do
not discriminate between the suppliers participating
in the auction (Carter et al., 2004; Kumar, Scheer, &
Steenkamp, 1995).

The contribution of this study is twofold. First, it
adds to the relationship marketing literature by exam-
ining the role of procedural fairness in enhancing rela-
tionship quality and quality of the offering in ERAs for a
buying organization. This study illustrates that a “rela-
tional auction is not an oxymoron” (Daly & Nath, 2005a,
p. 173) and points to the importance of procedural fair-
ness in relationship marketing for influencing quality
outcomes. Second, it offers empirical support through
a global field study involving 179 buying profession-
als, as well as exploratory insight through a supporting
field study with 31 sales professionals at supplier orga-
nizations, showing that the use of procedural fairness
by a buying organization is positively associated with
quality outcomes in ERA use, without jeopardizing
price savings. It also shows that the positive association
between procedural fairness and relationship quality
increases in case of a repeat auction.

This paper is organized as follows: In the next
section, procedural fairness and quality outcomes in
ERAs are reviewed, a conceptual model is presented,
and hypotheses are developed. Then, the research
method is described, and in a following section, the re-
search results are presented. Finally, findings, impli-
cations, and limitations are discussed and the paper is
concluded.

THEORETICAL FOUNDATION

In this section, prior literature on procedural fairness
and the impact of ERA use on relationship quality and
quality of the offering in buyer–supplier relationships
is reviewed, and hypotheses are developed.

Procedural Fairness

The principle of fairness is probably as old as human
interaction itself. Records of fairness go back as far as
2500 years. Fairness or justice (the concepts have been
used interchangeably) concerns equal treatment and
the justification of departures from equality, and has
been studied extensively in the organizational justice,
social psychology, and economic literatures (Fehr &
Schmidt, 1999; Folger & Cropanzano, 1998; Kahneman,
Knetsch, & Thaler, 1986; Maxwell, Nye, & Maxwell,

Research on fairness distinguishes between dis-
btributive and procedural fairness (Hartman, Yrlé,
& Galle, 1999; Huffman & Cain, 2001; Ndubisi,
Natarajan, & Lai, 2014). While distributive fairness
pertains to the fairness of the division of benefits
and burdens, related to decision outcomes (Frazier,
Spekman, & O’neal, 1988), procedural fairness refers
to the fairness of the procedures through which deci-
sions are made or rules applied (Tyler & Lind, 1992).

Another form of fairness that has been identified in
the literature is interactional fairness, which is defined
as the interpersonal treatment people receive as pro-
cedures are carried out (Bies & Moag, 1986; Colquitt,
2001; Skarlicki & Folger, 1997). Luo (2008), Moorman
(1991), and Niehoff and Moorman (1993) consider inter-
actional fairness to be a subset of procedural fairness.

In this study, the focus is on procedural fairness.
This is in keeping with Tyler and Lind (1992), who offer
two arguments for the manifestation of procedural fair-
ness as the key category of fairness. First, distributive
outcomes are considered one-time responses to partic-
ular situations, unlike procedures that have a more en-
during quality. Second, before one can assess distribu-
tive fairness, one has to have a good understanding of
the other parties’ relative efforts and rewards, which is
Relationship quality is central to the role of procedural fairness in their study of marketing channel relationships, stating that a distributive outcome is at least partly determined by external factors, whereas procedures are directly attributable to one's actions and therefore indicative of one's fairness.

In a review of the procedural justice literature, Konovsky (2000) refers to both objective and subjective procedural fairness, and assumes that objective procedural fairness leads to subjective justice perceptions, which Konovsky (2000, p. 492) defines as "perceptions of objective procedures or to the capacity of an objective procedure to enhance fairness judgments." In the organizational justice literature, procedural fairness is viewed as a means to generate favorable outcomes (Brockner, 2002; Konovsky, 2000). More specifically, procedural fairness is concerned with the fair process effect (Folger, Rosenfield, Grove, & Corkran, 1979), which is as follows: "the more someone considers a process to be fair, the more tolerant that person is about the consequences of the process, such as adversely unfair outcomes that a decision-making process creates when it governs the distribution of outcomes" (Folger & Cropanzano, 1998, p. 32).

In the setting of an ERA, procedural fairness can be defined as the fairness of the procedures through which the buying organization makes decisions or applies rules when interacting with the suppliers participating in the ERA (Amelinckx, Muylle, & Lievens, 2008; Kumar et al., 1995). The study of procedural fairness in ERAs is promising, as procedural fairness has been studied in other interfirm relationship settings before. Kumar et al. (1995) found that procedural fairness enhances relationship quality between relatively smaller, vulnerable resellers and larger, powerful suppliers. Likewise, Vinhas, Heide, and Jap (2012) found supplier fairness and consistency in economic payoffs to positively influence relationship outcomes with resellers. De Clercq and Rangarajan (2008) found procedural justice to be positively related to relationship outcomes in entrepreneur–customer dyads. Ndubisi et al. (2014) found fairness to be positively related to relationship quality and commitment, as perceived by customers of legal service providers. Luo (2008) found that procedural fairness improves both operational and financial cooperation outcomes in alliances. Finally, Chiu, Huang, and Yen (2010) found that fairness in online auctions positively influences trust of bidders.

In addition, prior exploratory research has proposed procedural fairness as an influencing factor in ERAs (Daly & Nath, 2005a; Tunca, Wu, & Zhong, 2013). Charki et al. (2010) highlight the importance of considering fairness in addressing ethical concerns in ERA use for balanced buyer–supplier relationship outcomes, as ERAs are considered zero-sum outcome mechanisms that contradict the generally accepted moral principle of fairness in traditional negotiation. Likewise, Amelinckx et al. (2008) and Carbone (2008) recommend buying organizations to be transparent and ethical for effective ERA use.

Hypotheses Development

The conceptual model, shown in Figure 1, illustrates the hypothesized relationships between procedural fairness and quality outcomes in an ERA. In this model, procedural fairness is hypothesized to be positively associated with relationship quality and quality of the offering. In addition, these associations are hypothesized to be positively moderated by the repeat nature of the ERA. The hypotheses below allow us to explore these predicted relationships.

**Relationship Quality.** Relationship quality is concerned with the level of trust and commitment in a buyer–supplier relationship, and is defined as "the overall depth and climate of the interfirm relationship" (Bejou, 1997; Dwyer, Schurr, & Oh, 1987; Johnson, 1999, p. 6; Morgan & Hunt, 1994; Ndubisi, 2014). Relationship quality captures important relational attributes including trust, commitment, coordination, conflict, and information sharing (Anderson & Narus, 1990; Ellram & Hendrick, 1995; Jap, Manolis, & Weitz, 1999; Ndubisi, 2013; Sriram & Stump, 2004; Stump & Sriram, 1997; Wilson, 1995). However, the use of ERAs often prevents realizing the various benefits associated with long-term buyer–supplier relationships, such as superior financial performance, increased levels of customer satisfaction, organizational learning, partners' propensity to stay, acquiescence by partners, and decreases in uncertainty (Hunt, Arnett, & Madhavaram, 2006; Morgan & Hunt, 1994).

Prior research focusing on preserving relationship quality in ERA use has been sparse. Daly and Nath (2005) propose several principles that can be used to render ERAs more relationship friendly. However, these principles involve price concessions, which are generally deemed unacceptable for buying organizations that conduct ERAs as a means to save money (Emiliani & Stec, 2005). In addition, Smart and Harrison (2003) concluded that when ERAs are used primarily as a process improvement tool (instead of as a price weapon), the effect on the relationship is not necessarily harmful. Also, Ray et al. (2011) propose a relationship-preserving mechanism in ERA use for a limited supplier base, consisting of intermittently awarding business as well as a penalty scheme for untruthful behavior.

Furthermore, Jap (2003, 2007) and Jap and Haruvy (2008) propose specific auction attributes that render auctions more relationship friendly, and provide empirical evidence regarding the impact of these auction attributes on the interorganizational relationship as perceived by the supplier. In a quasi-experiment, involving six ERAs conducted by a single buying organization, Jap (2003) finds that open bid (full price visibility) auctions adversely affect buyer–supplier
relationships. Furthermore, Jap (2007) states that a buyer–supplier relationship is affected by two attributes of the ERA: auction design and price/event dynamics. Through a quasi-experimental research study, using 25 ERAs conducted by four buying organizations in a variety of industries, Jap (2007) shows that a large number of bidders (with a maximum of 12), a large number of lots, a substantial size of the purchase contract, partial (rather than full) price visibility, and moderate price drops benefit the buyer–supplier relationship. Furthermore, Jap and Haruvy (2008) find aggressive bidding behavior to be detrimental for successive relationship building, and longer auction events to be gentler on the relationship.

While these studies offer valuable insight regarding the impact of specific mechanisms and auction design attributes on the buyer–supplier relationship, there is a paucity of research that examines the role of procedural fairness in the interaction between the buying organization and the supply base in ERA use. In keeping with the literature, establishing and implementing fair procedures can enact the fair process effect and benefit the buyer–supplier relationship.

Hence, the following hypothesis is formulated:

H1a: Higher procedural fairness is associated with higher relationship quality.

Quality of the Offering. While prior research has mainly focused on relationship quality, quality of the offering has also been identified in the literature as a key ERA outcome (Charki & Josserand, 2008; Jap, 2002). Quality of the offering is defined as “a perceived fundamental characteristic of products and services which meet or exceed the buying organization’s expectations regarding features and performance as described in the demand specifications” (Calantone & Knight, 2000, p. 495). The buying organization’s objective of producing substantial price savings is at odds with the goal of suppliers to maintain or increase prices. In response to the one-sided focus on price competition, the supplier may harm the quality of the offering, shirk on commitments, remove value-added services or key intangibles (e.g., delivery reliability, product support, responsiveness), and damage its relationship with the buyer once the contract has been awarded (Carter et al., 2004; Jap, 2002, 2003, 2007). Furthermore, Elmaghraby (2007) states that, in response to ambiguous specifications, suppliers may bid too aggressively, lowering the quality of the offering they are willing to supply. Also, Jap (2007) notes that if the price drops below a level that is credible in relation to industry norms, the buyer may have included unqualified suppliers in the ERA project. Finally, Caniels and van Raaij (2009) argue that suppliers that aim to compete on quality (instead of price) refrain from taking part in ERAs.

However, the buying organization can benefit from employing procedural fairness and thereby evoke the fair process effect (Folger & Cropanzano, 1998), leading the supplier to act in the interest of the buying organization. Through the implementation of fair procedures and processes, a buying organization can influence the supplier to become more tolerant about the consequences of the auction and motivate the supplier to provide adequate quality offerings, hence enabling the buying organization to achieve desired outcomes. Considering the above, the following hypothesis is formulated:

H1b: Higher procedural fairness is associated with higher quality of the offering.

Repeat Auction. A buying organization typically sets up a repeat auction after a period of time for an identical or similar offering, especially for products with regularly changing markets (Beall et al., 2003). Jap and Haruvy (2008) refer to the use of auctions in industrial relationships as more than one-shot deals, and argue that such procurement auctions are ongoing structures that can affect behavior over the course of the relationship. While H1a and H1b explore the relationships of procedural fairness to quality outcomes in an ERA, these relationships might be different because of the repeated nature of the event. For example, in a game theory experiment involving a principal–agent relationship, Anderhub, Gächter, and Königstein (2002) found...
that in a repeated game the importance of fairness increased. Likewise, according to the buyer–supplier relationships literature (e.g., Dwyer et al., 1987), procedural fairness becomes increasingly important as the relationship progresses. For instance, Kumar et al. (1995, p. 57), in a study of supplier–reseller relationships, state that: “actions and policies must be perceived as fair for the relationship to deepen into a longer term commitment.” Therefore, the following hypotheses are formulated:

H2a: In a repeat ERA, higher procedural fairness is more strongly associated with higher relationship quality, as compared to a first-time auction.

H2b: In a repeat ERA, higher procedural fairness is more strongly associated with higher quality of the offering, as compared to a first-time auction.

Control Variables. From prior research, confounding factors were identified, which have been related to quality outcomes in ERA use. These factors, as shown in Figure 1 and described below, were controlled for in this study.

The rationale to control for price savings, which is defined as the percentage change in contract price compared to the historical price (or, if not available, the estimated market price) (Beall et al., 2003; Jap, 2007; Smart & Harrison, 2003), is in keeping with the belief that the buying organization attributes a disproportionate amount of attention to the pricing aspect in an ERA (Jap, 2007). If the price drops below a level that is credible in relation to industry norms, the quality of the offering may become unacceptable. In addition, (incumbent) suppliers may infer that the buyer is using the ERA opportunistically to acquire additional price concessions, negatively impacting relationship quality (Jap, 2007). Controlling for price visibility, which is defined as the degree to which suppliers can see the bids of other suppliers during the auction (Jap, 2003), is consistent with the observation that the less visible the price in an auction, the more positive is the impact on various ERA outcomes, including price savings and the buyer–supplier relationship (Jap, 2003, 2007).

The higher the economic stakes (size of the purchase contract) and the higher the number of lots, the higher is the motivation for suppliers to participate in an ERA (Grewal, Comer, & Mehta, 2001; Jap, 2007). According to Grewal et al. (2001), higher contract value motivates the supplier to be responsive to and supportive of the buyer, favorably impacting the buyer–supplier relationship. In keeping with Grewal et al. (2001), the posited relationship between number of lots and size of the purchase contract, and relationship quality, was accounted for, as well as their potential impact on quality of the offering.

Also, the number of bidders in the ERA was controlled for, as an increase in the number of bidders provides a credible signal to suppliers that the buying organization is aware of realistic alternatives and is doing its due diligence to keep purchasing prices in check (Jap, 2007). However, if too many bidders participate, this becomes unrealistic and potentially increases price competition, which may lead to lower quality of the offering and suspicions of buyer opportunism (Jap, 2007).

Finally, the rationale to control for the extent to which the buyer is able to clearly define the specifications of the offering, also referred to as “specifiability” in the ERA literature (Beall et al., 2003; Kaufmann & Carter, 2004; Wagner & Schwab, 2004), is in keeping with the observation that ERAs are less successful for offerings that have ambiguous specifications (Beall et al., 2003; Jap, 2002). As a response to ambiguous specifications, suppliers may either bid overly cautiously, resulting in lower price savings, or too aggressively, lowering the quality of the offering they are willing to supply (Elmaghraby, 2007). Furthermore, Beall et al. (2003) argue that ERAs can improve relationship quality by removing some of the ambiguity about market prices and forcing both buyers and suppliers to be very clear about the specifications of the offering.

RESEARCH METHOD

To empirically test the conceptual model, a main study was conducted with procurement professionals at buying organizations. To account for potential bias in their perception of fairness, a supporting, exploratory field study was conducted involving sales professionals at supplier organizations.

Main Study

The population of interest to the main study consisted of procurement professionals in multinational companies, who were (co)responsible for a completed electronic sourcing project that involved an ERA. Four electronic sourcing consultants and service providers active in Europe and the United States, and two procurement associations in Europe provided contact data of procurement professionals at customer firms. To ensure that only knowledgeable informants participated in the study, the respondents had to meet specific qualifications (Kumar, Stern, & Anderson, 1993; Phillips, 1981). As a result, only procurement professionals that had engaged in multiple ERAs before and that were (co)responsible for a recent ERA project, participated in the study. By instructing the respondent to refer to a recently completed electronic sourcing project involving an ERA, recall decay bias was controlled for. The key informant (Campbell, 1955) provided factual information with respect to the price savings and the repeated nature of the auction (as obtained from the auction record) and was asked to evaluate the other constructs in this study by means of an online survey. To reduce the
influence of socially desirable responses, respondents were allowed to answer anonymously, and the order of the questions in the online survey was changed (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

In total, 851 personally addressed e-mail messages with personal salutations were sent (Barron & Yechiam, 2002; Joinson & Reips, 2007), with an invitation to participate in the online survey. As an incentive, all respondents were offered a summary of the research study results. The respondents were also assured that their identity and their responses would remain confidential and only reported in the aggregate. To further increase the response rate, follow-up e-mails were sent (Fan & Yan, 2010). Nonresponse bias was controlled for by comparing the responses of early respondents with late respondents (Armstrong & Overton, 1977). No statistically significant differences were found on any of the constructs considered in this study; therefore nonresponse bias did not appear to be a problem.

Usable responses were provided by 179 procurement professionals. As data concerning ERAs are regarded as “unique and enormously difficult to obtain” (Jap, 2007, p. 147), the sample size of this study can be considered exceptional in the field. Furthermore, this sample size represents an effective response rate of 21.03%, which is generally considered satisfactory for an industrial survey (Erdogan & Baker, 2002; Frohlich, 2002). On average, respondents had 9.33 years of purchasing experience. The most frequently occurring job titles were purchasing manager, global sourcing manager, supply chain manager/director, and purchasing analyst. The ERA projects involved a wide range of industries, from automotive, chemicals and consumer goods, to pharmaceuticals, services, and telecommunications. The market offerings that were auctioned included IT hardware, palm oil, cokes, pallets, packaging material, office cleaning, temporary labor, transportation, car leasing, consultancy, facility management, and logistical services. The respondent companies were distributed around the globe, with 77% of the companies being headquartered in Europe, 15% in the United States, and the remaining 8% in other regions of the world.

Supporting Study

As the buying organization’s perception about their use of procedural fairness in the ERA is potentially biased (the buying organization is likely to believe that it is procedurally fair), a supporting study with sales professionals at supplier organizations was conducted. The electronic sourcing consultants and service providers that provided the contact data of buying professionals for the main study were bound by confidentiality agreements, precluding them from sharing contact data of the sales professionals at supplier organizations that participate in ERAs. Hence, no supplier contact data from these sources could be made available for the supporting study, and a dyadic buyer–supplier research study design was impossible. To explore the hypothesized relationships from a supplier perspective, a convenience sample (Ferber, 1977) of 31 sales professionals at supplier organizations that recently bid in an ERA, and that were awarded (part of) the business, was drawn from a variety of sources. In keeping with the approach of the main study, the respondents of the supporting study were qualified and asked to complete an online survey, taking similar measures to reduce recall decay bias and social desirable response bias.

On average, the respondents in the supporting study had 14.75 years of sales experience. The most frequently occurring job titles were sales manager, sales director, and account manager. The ERAs in the supporting study involved a wide range of industries, from consumer goods, electronics, IT, and manufacturing, to packaging, services, and telecommunications. The market offerings that were auctioned included IT hardware and consultancy services, office supplies, routers and switches, transportation and maintenance services, packaging material, electricity, and gas.

Measures

The measures, used in both the main and the supporting study, were obtained from the literature. The wording of the measurement items was modified for use in an ERA setting, and adjusted to either the buyer or supplier perspective. The measures were pretested qualitatively with four academics and three domain experts from industry, as well as quantitatively with 24 respondents at buying organizations, after which minor modifications and refinements were made. Appendix A provides the measures, the Cronbach alpha values, and the factor loadings for the main study. Appendix B provides the measures for the supporting study.

The focus of this research is on subjective procedural fairness: procedural fairness as perceived by the respondent. This is in keeping with Carter et al. (2004) who note that ethical concerns, whether actual or simply perceived, can damage the buyer–supplier relationship. Procedural fairness was measured using a three-item scale, adapted from prior research (Kumar et al., 1995; Tyler & Lind, 1992). The four items measuring quality of the offering were adapted from Stanley and Wisner (2001), and those for relationship quality were adapted from Stump and Sriram (Sriram & Stump, 2004; Stump & Sriram, 1997). Each of the multiitem scales was measured on a 7-point Likert scale. The control variables were measured through numerical, binary, or single-item scales, obtained from the ERA literature (Beall et al., 2003; Carter et al., 2004).

Confirmatory Factor Analysis

To further validate the measures, the psychometric properties of the key constructs in the main study (procedural fairness, relationship quality, and quality of the...
The use of a confirmatory factor analysis, SPSS Amos 19.0 (Arbuckle, 2010) was used to specify the relations of the observed measures to their posited underlying constructs (Anderson & Gerbing, 1988). The overall fit indices of the measurement model compared favorably against common cutoff criteria (Hu & Bentler, 1999): \( \chi^2(89) = 157.79 \) (\( p < 0.01 \)); CFI = 0.95; TLI = 0.91; NFI = 0.89; RMSEA = 0.07. Standardized item factor loadings exceeded the 0.7 threshold (Hulland, 1999), except for two items (the factor loadings are listed in parentheses after the corresponding items in Appendix A). These two items were retained as their respective item factor loadings were still above 0.6, in keeping with Hulland (1999) who suggests an absolute minimum value of 0.4. Furthermore, the \( t \)-values of all item factor loadings were significant at the 0.01 level. In addition to statistical considerations, Baumgartner and Homburg (1996) suggest to retain items that add substantial meaning to their respective construct in order to increase the probability of tapping all facets of the construct of interest. All constructs have a Cronbach alpha value above the 0.7 threshold (Nunnally & Bernstein, 1991). Convergent validity was assessed using composite reliability (CR) (Werts, Linn, & Joreskog, 1974) and average variance extracted (AVE) (Fornell & Larcker, 1981). All CRs exceeded the 0.7 criterion, ranging from 0.86 to 0.91, and all AVEs were above the 0.5 recommended level, ranging from 0.62 to 0.73. Discriminant validity for all the constructs in the model was confirmed. The AVE values exceeded the shared variance (squared interconstruct correlations; see Table 1), indicating that all constructs shared more variance with their measures than with other constructs (Fornell & Larcker, 1981). Table 1 furthermore reports the means, SDs, and squared correlations for the multi-item variables of the main study.

The likelihood of common method bias in the main study was assessed by using the procedure suggested by Podsakoff et al. (2003). A confirmatory factor analysis indicated that a single (method) factor did not fit the data, providing evidence that interitem correlations were not purely driven by method bias (\( \chi^2 = 704.92 \) [df = 119; \( p < 0.001 \)]; CFI = 0.54; TLI = 0.41; NFI = 0.51; RMSEA = 0.17). Furthermore, a test of the measurement model, including common method bias as a construct, did not offer a better fit of the data than the measurement model (\( p = 0.11 \)). Finally, it is important to note that the constructs under study were measured through a larger survey on electronic sourcing (Standaert, Muylle, & Amelinckx, 2015). It is therefore unlikely that the respondents would hold a “theory” about the hypothesized relationships.

### Table 1. Squared Correlation between Constructs (Shared Variance) and AVE Values (Shaded Cells).

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<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>1. Procedural fairness</td>
<td>6.36</td>
<td>4</td>
<td>7</td>
<td>0.67</td>
<td><strong>0.72</strong></td>
<td></td>
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<tr>
<td>2. Relationship quality</td>
<td>5.13</td>
<td>2.67</td>
<td>7</td>
<td>0.90</td>
<td><strong>0.62</strong></td>
<td></td>
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<tr>
<td>3. Quality of the offering</td>
<td>5.38</td>
<td>3.33</td>
<td>7</td>
<td>0.81</td>
<td><strong>0.73</strong></td>
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### RESULTS

In this section, the results of the data analyses are reported. In section “Main study,” the results for the main study are described. In section “Supporting study,” the exploratory results for the supporting study are presented.

### Main Study

To test H1a and H1b, a structural model was specified in which procedural fairness is related to relationship quality and quality of the offering. Furthermore, the control variables were included in the analysis. Imposing these paths and allowing the variables to correlate freely, resulted in a structural model with the exact same fit indices as the measurement model specified above.

Table 2 displays the estimated standardized regression weights. The association between procedural fairness and relationship quality was significant and positive, providing strong support for H1a. Strong support was also found for H1b. The \( R^2 \)-values indicated the model explained a considerable portion of the variance in both outcome variables. The estimated standardized regression weights for the control variables are not significant, except for the relationships between size of the purchase contract and relationship quality, and between size of the purchase contract and quality of the offering.

To test the moderation effects (H2a and H2b), a multiple group analysis was conducted in Amos 19.0.
(Arbuckle, 2010). The data were split into two groups according to the repeated nature of the ERA: first-time ($N_1 = 121$) or repeat event ($N_2 = 58$). The unconstrained model, which allows for different measurement and structural parameters across both groups, indicated a good fit: $\chi^2 (180) = 333.447 \ (p < 0.01);$ CFI $= 0.89; \ TLI = 0.81; \ NFI = 0.80; \ RMSEA = 0.07$. Measurement invariance, which consists of metric and scalar invariance, was tested across both groups by means of a chi-square difference test (Jöreskog, 1971). Measurement invariance was supported as the metric invariant model did not differ significantly from the unconstrained model ($\chi^2 = 12.02; \ df = 8; \ p = 0.15$), and the scalar invariant model did not differ significantly from the metric invariant model ($\chi^2 = 6.66; \ df = 11; \ p = 0.83$).

For reasons of parsimony and power, the structural weights of the relationships between the control variables and the outcome variable were set equal across groups in the measurement invariant model, serving as a reference model to test the moderation effects ($\chi^2 (211) = 366.85 \ (p < 0.01);$ CFI $= 0.89; \ TLI = 0.84; \ NFI = 0.78; \ RMSEA = 0.07$). This model did not differ significantly from the measurement invariant model ($\chi^2 = 14.72; \ df = 12; \ p = 0.26$). Table 3 reports the estimated standardized regression weights for the hypothesized relationships and provides the primary basis of comparison for the tests of moderation that follow. In addition, Table 3 details the $R^2$ values, showing that the amount of variance explained by the explanatory variables increased for relationship quality and quality of the offering, for both first-time and repeat auctions. Given the small sample sizes in these groups, the reported correlations are Kendall's tau-b values.

The nonparametric correlation between procedural fairness and relationship quality was significant and positive for both a first-time and repeat auction. The potential moderating effects were tested by constraining the regression weight of the relationship between procedural fairness and the respective outcome variables to be invariant across both groups. To test the validity of each of the two constraints, a chi-square difference test (Jöreskog, 1971) was conducted comparing the fit of the constrained model to the fit of the reference model. The results of the two corresponding chi-square difference tests are shown in Table 4.

As the deterioration in fit, compared to the reference model, was significant for the first model ($p = 0.03$), evidence was found for a moderation effect. The direction of the moderation effect was found to be positive, as can be seen in Table 3, providing support for H2a. The deterioration in fit for the second model, compared to the model in which it was nested, was not significant ($p = 0.17$). Hence, no support was found for H2b.

### Table 3. Parameter Estimates in Both Groups (H2a,b).

<table>
<thead>
<tr>
<th></th>
<th>Relationship Quality</th>
<th>Quality of the Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First-Time</td>
<td>Repeat</td>
</tr>
<tr>
<td>Procedural fairness</td>
<td>0.29**</td>
<td>0.61**</td>
</tr>
<tr>
<td>$N^2$</td>
<td>121</td>
<td>58</td>
</tr>
<tr>
<td>$R^2$</td>
<td>17.3%</td>
<td>38.4%</td>
</tr>
</tbody>
</table>

*p < 0.01; **p < 0.001.

### Supporting Study

To explore whether the hypothesized relationships between procedural fairness and both relationship quality and quality of the offering hold in the minds of supplier organizations, the data collected from sales professionals were analyzed. Table 5 reports the mean scores and SDs of the main constructs in the supporting study, and the interconstruct Pearson correlations.

The results of the correlation analysis showed that the use of procedural fairness in an ERA by the buying organization as perceived by the sales professionals was positively correlated with relationship quality ($r = 0.62; \ p < 0.001$), but not with quality of the offering ($r = -0.12; \ p > 0.05$). While these findings provide further support for H1a, they show no support for H1b.

Furthermore, the data included responses related to both first-time ($N_1 = 14$) and repeat ($N_2 = 17$) auctions, allowing for further exploration of the moderation effect of the repeat nature of the event. Table 6 presents the correlations between procedural fairness and both relationship quality and quality of the offering, for both first-time and repeat auctions. Given the small sample sizes in these groups, the reported correlations are Kendall's tau-b values.

The nonparametric correlation between procedural fairness and relationship quality was significant and positive for both a first-time and repeat auction. The

### Table 4. Moderation Effect on Hypothesized Paths (H2a,b).

<table>
<thead>
<tr>
<th></th>
<th>Invariant path across both groups</th>
<th>Model Chi²</th>
<th>Chi² Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Procedural fairness—relationship quality</td>
<td>371.83</td>
<td>4.98*</td>
<td></td>
</tr>
<tr>
<td>2. Procedural fairness—quality of the offering</td>
<td>368.73</td>
<td>1.88</td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.05.

### Table 5. Mean Scores of Constructs and Interconstruct Correlations.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Procedural fairness</td>
<td>4.96</td>
<td>2.67</td>
<td>7</td>
<td>1.14</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Relationship quality</td>
<td>3.63</td>
<td>1.25</td>
<td>6</td>
<td>1.22</td>
<td>0.62*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3. Quality of the offering</td>
<td>4.83</td>
<td>2.50</td>
<td>7</td>
<td>1.07</td>
<td>-0.12</td>
<td>0.11</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < 0.001.

### Table 6. Correlations (Kendall’s tau-b) in a First-Time and Repeat Event.

<table>
<thead>
<tr>
<th></th>
<th>Relationship Quality</th>
<th>Quality of the Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First-Time</td>
<td>Repeat</td>
</tr>
<tr>
<td>Procedural fairness</td>
<td>0.48*</td>
<td>0.44**</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01.
correlation between procedural fairness and quality of the offering was not found to be statistically significant for both a first-time and repeat auction.

DISCUSSION

The empirical results of the main study provide support for the hypothesized relationships between the use of procedural fairness by a buying organization in an ERA and quality outcomes. In addition, partial support was found for the moderating role of the repeat nature of the ERA. The analysis points to four key insights.

First, procedural fairness is found to be positively associated with relationship quality. This suggests that buying organizations can alleviate concerns about relationship quality by treating the suppliers in a procedurally fair manner. A verbal account from a buyer, as reported in the exploratory case study research of Amelinckx et al. (2008, p. 130), illustrates the point: “Online bidding was viewed as a fair and efficient way of negotiating total price and supplier relationships were still considered important. Further, communication to suppliers was key and was managed through a well-prepared, consistent, and ethical approach: ‘The key message that we communicate is that e-sourcing is not a game. We don’t play with suppliers. You have to stick to some ethical rules.’” Furthermore, the exploratory insights from the supporting study with sales professionals offer preliminary evidence that the positive association between the use of procedural fairness by the buying organization and relationship quality also seems to hold for supplier organizations.

Second, the hypothesized relationship between procedural fairness and quality of the offering is found to be positive. This suggests that buying organizations can evoke the fair process effect, which may lead the supplier to be more tolerant about the consequences of the ERA and not to compromise on the quality of the offering. However, in the supporting study, no significant correlation between procedural fairness and quality of the offering was observed, suggesting that suppliers may not consider the use of procedural fairness by the buying organization in responding to their requirements for quality of the offering.

Third, the positive association of procedural fairness with relationship quality is found to increase in a repeat auction, which suggests a progressive positive influence of procedural fairness as the buying organization continues to employ ERAs and benefit from the fair process effect in its relationships with suppliers. As to the supplier data, while procedural fairness seems to be positively associated with relationship quality for both a first-time and a repeat auction, a moderation effect cannot be inferred from this small data set.

Finally, the positive association of procedural fairness with quality of the offering is found to increase in a repeat auction, albeit not in a statistically significant manner. Although no significant moderation effect was observed for the hypothesized relationship between procedural fairness and quality of the offering, the increase in the regression weight of that relationship in the main study suggests that there may be a progressive positive association for the buying organization. As to the supplier study, no significant nonparametric correlations between procedural fairness and quality of the offering were observed for both first-time and repeat auctions.

In summary, this study provides theoretical and empirical support for the positive association between procedural fairness and relationship quality, and for an increase of the positive association of procedural fairness with relationship quality in a repeat auction. The findings collectively support the notion that procedural fairness is a key consideration for buying organizations when using ERAs.

Theoretical Implications

The study adds to emerging research on relationship marketing in ERAs, by revealing a positive association between procedural fairness and key ERA quality outcomes, both for first-time and repeat auctions. While prior research widely supports the proposition that ERAs are detrimental to both quality of the offering and relationship quality, as ERAs are primarily focused on price savings (Jap, 2002, 2003), the findings from this study suggest that a buying organization can potentially obtain price savings while maintaining quality of the offering and relationship quality by organizing the ERA in a procedurally fair manner. These findings also support the notion that a relational auction does not necessarily have to be an oxymoron (Daly & Nath, 2005b).

In addition, the study provides further evidence of the robustness of the fair process effect across areas of investigation (van den Bos, Lind, Vermunt, & Wilke, 1997). While the fair process effect originated in social psychology, in which it has been frequently replicated, this work demonstrates the role of the fair process effect in a buyer–supplier relationship, in which ERAs are used.

Managerial Implications

In the context of an ERA, managers of buying organizations can employ procedural fairness to preserve quality relationships and offerings, without jeopardizing price savings. Organizing an ERA in a procedurally fair manner involves treating all suppliers similarly, applying consistent policies and decision-making procedures across all suppliers, and treating the suppliers with respect (Kumar et al., 1995; Tyler & Lind, 1992). Moreover, in the case of repeat auctions, managers can further enhance relationship quality by continuing to be fair in their procedures and policies.
The results relating to the influence of the control variables on the ERA outcomes under study are also of importance to practitioners. As shown in Table 2, the size of the purchase contract is the only control variable having a significant impact on the ERA quality outcomes. This finding confirms Jap’s point that “stakes matter” (2007, p. 156) and that managers should strive for auction events with large contract values. As contract value increases, suppliers are increasingly motivated to be responsive to and supportive of the buying organization, which favorably impacts the buyer–supplier relationship (Grewal et al., 2001).

Limitations and Directions for Future Research

This study has certain limitations. The cross-sectional research design limited the ability to determine causality between procedural fairness and quality outcomes in ERAs. Reciprocal relationships are possible, for example, between procedural fairness and relationship quality. A repeated measures longitudinal design to explore the relationships posited in the conceptual model and the possible reciprocal relationships could shed additional light on the relationships over the course of repeat auctions.

In addition, while this study explored the supplier perspective on procedural fairness and ERA quality outcomes to evaluate the potential bias that could be introduced by asking representatives of buying organizations about their use of procedural fairness in the ERA, a dyadic buyer–supplier research design could offer more insight into the potential difference in the perceptions of the buying and the corresponding supplier organizations. However, given that field data for a single ERA are enormously difficult to obtain (Jap, 2007), collecting longitudinal, dyadic buyer–supplier data would be an exceptionally daunting task.

Also, respondents were asked to choose a recently completed ERA in which they participated and to base their answers on their experience with and perceptions of this ERA. Since it is human nature to recall memorable events, it may be that the chosen ERAs are those that ran particularly positive or negative (Arnold et al., 2005), excluding random selection of ERAs.

Furthermore, a single respondent evaluated all the constructs, as a representative of the ERA project team. This raises the issue of common method bias, the influence of which was estimated to be unlikely in the main empirical study. In addition, by considering the perspectives of supplier organizations, the possibility for common method bias is further alleviated. That being said, having multiple members of a team respond would not only further alleviate common method bias, it would also offer additional insight into ERA project team dynamics. This constitutes an interesting avenue for future research.

CONCLUSION

The key research question that motivates this study is how the use of procedural fairness in an ERA by a buying organization is associated with relationship quality and quality of the offering. This paper draws from organizational justice literature to answer this question and identifies procedural fairness as a key factor in addressing quality outcome concerns. In particular, a buying organization can employ procedural fairness and obtain desired quality outcomes by virtue of the fair process effect. Based on an empirical field study, involving 179 procurement professionals at buying organizations around the world, as well as an exploratory field study, involving 31 sales professionals at supplier organizations, higher procedural fairness was found to be associated with higher relationship quality and higher quality of the offering, while controlling for price savings. In addition, the study found the repeated nature of an ERA to positively moderate the association between procedural fairness and relationship quality. It is our sincere hope that this study serves as a foundation for further investigations seeking to examine the use of procedural fairness in ERAs.

REFERENCES


The authors acknowledge Deva Rangarajan for his assistance in collecting data from suppliers for the supporting field study.

*Both authors contributed equally to this paper.

Correspondence regarding this article should be sent to: Willem Standaert, Vlerick Business School, Belgium (willem.standaert@vlerick.com).
APPENDIX A: MEASURES USED IN THE MAIN STUDY

Procedural Fairness (Adapted from Kumar et al., 1995; Tyler & Lind, 1992; $\alpha = 0.88$)

During the electronic sourcing project, our company (1 = strongly disagree and 7 = strongly agree)

- did not discriminate but rather treated all suppliers similarly; (0.85)
- applied consistent policies and decision-making procedures across all suppliers; (0.88)
- treated the suppliers with respect. (0.82)

Relationship Quality (Adapted from Sriram & Stump 2004; Stump & Sriram, 1997; $\alpha = 0.85$)

The relationship with the current, active supplier(s) that won the business through this electronic sourcing project was characterized by

(1 = to a very little extent and 7 = to a very large extent)

- mutual trust; (0.88)
- information sharing; (0.91)
- overall co-ordination; (0.63)
- relationship commitment. (0.65)

Quality of the Offering (Adapted from Stanley & Wisner, 2001; $\alpha = 0.91$)

How do you rate

(1 = very low and 7 = very high)

- the overall product/service quality? (0.81)
- the quality of the delivered product/service? (0.86)
- the quality of the product/service compared to your specifications? (0.86)
- the quality of the product/service compared to your expectations. (0.89)

Repeat Auction (Adapted from Arnold et al., 2005)

For this product/service, the electronic sourcing project was a:

- first-time or one-time event;
- repeat event.

Control Variables

Price Savings (Adapted from Beall et al., 2003; Jap, 2007; Smart & Harrison, 2003). What was the percentage change ($\pm$) in contract price compared to the historical price or, if no historical price was available, to the estimated market price that resulted from the electronic sourcing project?

Price Visibility (Jap, 2003). Was there (partial) price visibility during the ERA? (Yes–No)

Number of Lots (Jap, 2007). What was the number of lots in the ERA? (1 = 1 to 10; 2 = more than 10)

Size of the Purchase Contract (Jap, 2007). From a supplier's perspective, the size of the purchase contract that was awarded through this project was large.

(1 = strongly disagree and 7 = strongly agree)

Specifications of the Offering (Adapted from Beall et al., 2003). The product/service category was clearly specified in terms of quality.

(1 = to a very little extent and 7 = to a very large extent)

Number of Bidders (Jap, 2007). How many suppliers were invited to the ERA?

APPENDIX B: MEASURES USED IN THE SUPPORTING STUDY

Procedural Fairness (Adapted from Kumar et al., 1995; Tyler & Lind, 1992)

During the electronic sourcing project, the buying company

(1 = strongly disagree and 7 = strongly agree)

- did not discriminate but rather treated all suppliers similarly;
- applied consistent policies and decision-making procedures across all suppliers;
- treated the suppliers with respect.

Relationship Quality (Adapted from Sriram & Stump 2004; Stump & Sriram, 1997)

The relationship with the buyer that awarded the business through this electronic sourcing project was characterized by

(1 = to a very little extent and 7 = to a very large extent)

- mutual trust;
- information sharing;
- overall co-ordination;
- relationship commitment.

Quality of the Offering (Adapted from Stanley & Wisner, 2001)

How do you rate

1 Standardized factor loadings from the measurement model are listed in parentheses after the relevant item.
(1 = very low and 7 = very high)
• the overall product/service quality?
• the quality of the delivered product/service?
• the quality of the product/service compared to the buying organization’s specifications?
• the quality of the product/service compared to the buying organization’s expectations.

Repeat Auction (Adapted from Arnold et al., 2005)
Did you participate in an electronic reverse auction project organized by the same buying organization, for the same or a similar product/service, before?
• No
• Yes