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Building Effective Online Marketplaces with Institution-Based Trust

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Institution-based trust is a buyer's perception that effective third-party institutional mechanisms are in place to facilitate transaction success. This paper integrates sociological and economic theories about institution-based trust to propose that the perceived effectiveness of three IT-enabled institutional mechanisms—specifically feedback mechanisms, third-party escrow services, and credit card guarantees—engender buyer trust in the community of online auction sellers. Trust in the marketplace intermediary that provides the overarching institutional context also builds buyer's trust in the community of sellers. In addition, buyers' trust in the community of sellers (as a group) facilitates online transactions by reducing perceived risk.

Data collected from 274 buyers in Amazon's online auction marketplace provide support for the proposed structural model. Longitudinal data collected a year later show that transaction intentions are correlated with actual and self-reported buyer behavior. The study shows that the perceived effectiveness of institutional mechanisms encompasses both "weak" (market-driven) and "strong" (legally binding) mechanisms. These mechanisms engender trust, not only in a few reputable sellers, but also in the entire community of sellers, which contributes to an effective online marketplace. The results thus help explain why, despite the inherent uncertainty that arises when buyers and sellers are separated in time and in space, online marketplaces are proliferating. Implications for theory are discussed, and suggestions for future research on improving IT-enabled trust-building mechanisms are suggested.

Key words: institution-based trust; online auction marketplaces; institutional structures; feedback mechanisms; escrows; third-party guarantees; reputation systems
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1. Introduction

The popularity and success of online auction marketplaces is growing at an unusual rate (*IFCC* 2003), a growth matched by increased academic interest (Ba and Pavlou 2002, Dellarocas 2003, Lee et al. 2000, Pavlou 2002). In these marketplaces buyers routinely engage with sellers with whom they have little or no prior interaction. This exposes buyers to an even greater risk of opportunistic seller behavior than do online storefronts. Indeed, the number of Internet complaints by buyers has increased threefold in 2002; most of these complaints (46.1%) arise from online auctions (*IFCC* 2003). Given that buyers face realistic concerns, we seek in this paper to explain the apparent popularity and success of online auction marketplaces and to create a framework for building effective online marketplaces. This study aims to understand what steps can be taken to increase buyers' trust and reduce their risk perceptions so as to encourage legitimate transactions in online auction marketplaces.

Both economists and sociologists agree that trust is a crucial enabling factor in relations where there is uncertainty, interdependence, and fear of opportunism (Gefen 2002, Gefen et al. 2003, Hoffman et al. 1999, Mayer et al. 1995, McKnight and Chervany 2002, Williamson 1985), as is the case in online markets (Kollock 1999, Luo 2002, Palmer et al. 2000). Indeed, trust is crucial even in less risky e-commerce relationships, such as buying from known online vendors (Gefen 2000, 2002; Jarvenpaa et al. 2000; Reichheld and Schefter 2000). However, in online marketplaces,

the dyadic trust-engendering effects of familiarity (Gefen 2000), reputation (Jarvenpaa et al. 2000), similarity to self (Kollock 1999), and previous satisfactory interaction may not apply. The objective of this study is to present a unique type of online trust building, namely trust built based on *third-party structures*, otherwise known as *institution-based trust* (Shapiro 1987, Zucker 1986). Institution-based trust is especially suited for online marketplaces where buyers predominantly transact with new and unknown sellers under the aegis of third parties who provide an *institutional context*. In fact, many online auction marketplaces, such as Amazon's Auctions and eBay, have established such institution-based mechanisms as a means to mitigate transaction risks, build a trustworthy marketplace, and encourage online transactions.[1] Accordingly, a basic premise of this study is that institutional mechanisms should be as important in online marketplaces as they have been in traditional business environments (Zucker 1986), albeit with some notable differences given the unique nature of online marketplaces.

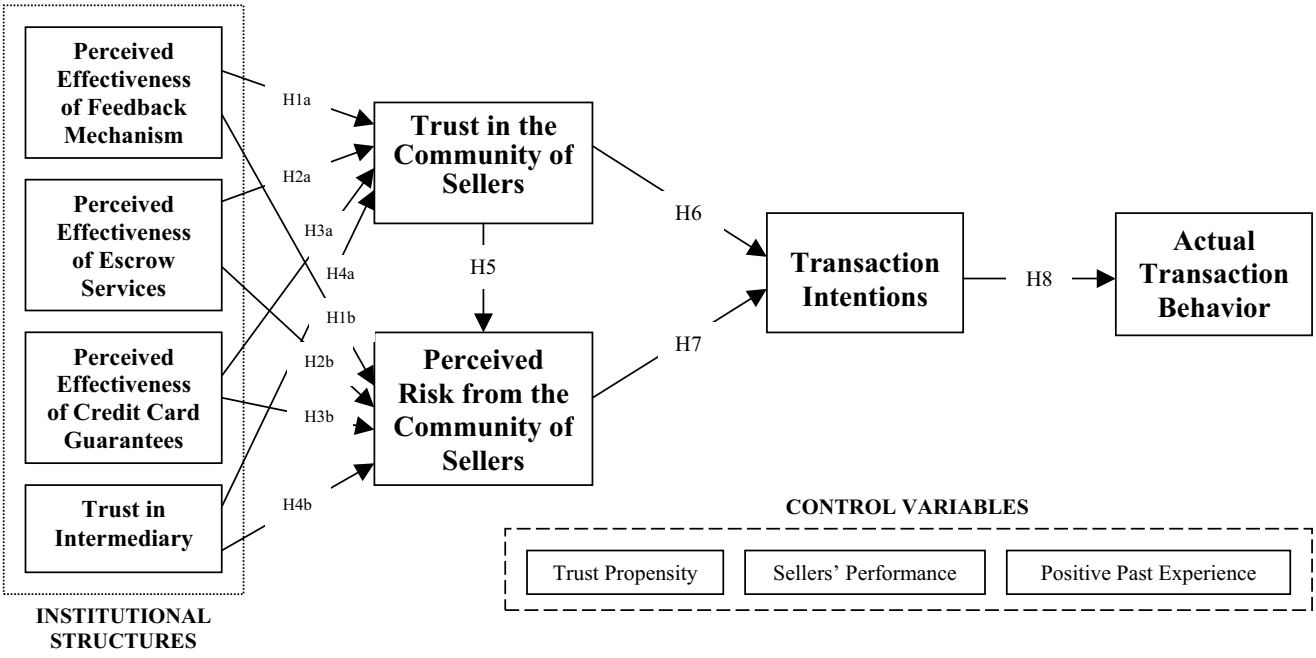
Institutional mechanisms are mechanisms, such as feedback features, escrow services, and credit card guarantees, that are implemented or created by third parties to create conditions that will facilitate transaction success. Because of the unclear and underdeveloped legal environment of e-commerce, some institutional mechanisms used in online marketplaces do not enjoy the same legal protection and enforcement provided by governmental agencies in traditional markets. For example, some institutional mechanisms in traditional environments that have been clearly shown to be effective (Zucker 1986), such as state-managed certifications or escrows, do not yet exist in online environments. In addition, some theoretically "strong" mechanisms (i.e., legally binding mechanisms) may be perceived by online users as ineffective because of the lack of clarity about legal standing of online rules and legal jurisdiction over the Internet. In contrast, "weak" mechanisms (i.e., market-driven institutional mechanisms) are increasingly perceived as viable complements or substitutes for legal mechanisms in online markets (e.g., Bakos and Dellarocas 2002). Therefore, we propose the construct "perceived effectiveness of institutional mechanisms" to capture the psychological and cognitive response of subjects who rely on both legally binding and market-driven, third-party institutional mechanisms as a basis of trust building and risk reduction. This "perceived effectiveness" captures the degree to which a buyer believes that institutional mechanisms provide recourse, are enforceable, are convenient, are available, and are cost effective, among other factors. Irrespective of whether institutional mechanisms are legal or market driven in nature, this "perceived effectiveness" assesses how a buyer evaluates their overall value.

The study draws on sociological (Zucker 1986, Shapiro 1987) and economic (Shapiro 1983) theories to investigate the *perceived effectiveness* of four institution-based structures commonly present in online auction marketplaces: (a) feedback mechanism (buyers posting feedback about individual sellers), (b) escrow services (authorizing payments only after the buyer is satisfied), (c) credit card guarantees (recourse provided by financial institutions in case of fraudulent seller behavior), and (d) trust in the marketplace's intermediary. The first three are concrete factors for which we draw on the means of institution-based trust (certification and escrows) described by Zucker (1986). For the fourth, trust in the intermediary, we draw on work by Stewart (2003) on building trust in online contexts through transference.[2] Escrow services and credit card guarantees are legally binding mechanisms, whereas the feedback mechanism and trust in the intermediary are market driven. Thus, we study the perceived effectiveness of both types of institutional mechanisms. The proposed theoretical model is shown in Figure 1.

[1] While many third-party intermediaries may be present in buyer-seller transactions (e.g., escrow, accreditation, authentication, and insurance services), this study primarily focuses on the formal authority or intermediary that manages the exchange network (e.g., Amazon Auctions or eBay) as the overarching institutional context.

[2] Examples where unknown parties need to be trusted through their relationship with a more trusted organization include auction marketplaces (e.g., eBay, Yahoo! Auctions, Amazon Auctions), individual web storefronts with no brand name (e.g., Amazon's zShops, Yahoo! Shopping), business-to-business marketplaces (e.g., Covisint.com), dispatchers of inspection services (e.g., eppraisals.com), and consulting services (e.g., Guru.com, Elance.com).

Figure 1 The Proposed Conceptual Model and Research Hypotheses



The study shows that the perceived effectiveness of the four institutional mechanisms influences actual online transaction activity. More specifically, the results show that trust in the intermediary, perceived effectiveness of feedback mechanisms, and perceived effectiveness of escrow services build trust in the community of sellers. However, these same factors reduce perceived risk only indirectly, through the mediating role of trust. In turn, trust in the community of sellers and buyers' perceived risk from the community of sellers affect transaction intentions, which influences actual transaction behavior, as measured a year later.

This paper makes three key contributions. First, it extends the notion of institution-based trust mechanisms to include not only theoretically effective, legally binding mechanisms (e.g., Zucker 1986), but also some market-driven institutional mechanisms commonly present in online marketplaces. Specifically we focus on the conceptualization and empirical examination of their perceived effectiveness. The "perceived effectiveness" perspective has both descriptive implications for the practical use and success of institutional mechanisms in online marketplaces and prescriptive implications for (a) improving the trust-building and risk-reducing potential of existing mechanisms and (b) instituting new effective mechanisms. Second, while previous research has predominantly focused on trust in dyadic (one-to-one) relationships, this paper examines the case of trust in a large number of trustees, specifically trust in a community of sellers *as a group*. In online marketplaces, where buyers transact with a group of unknown sellers, often with a low probability of encountering the same seller twice, the entire population of the specific marketplace is the target of a buyer's trust (one-to-many). We show that trust in the community of sellers as a whole is a crucial factor in whether the buyer will consider purchasing products from any particular seller. The study proposes and validates the derivative role of institutional mechanisms in building effective marketplaces by creating trust and reducing risk as it applies to the entire community of sellers. Third, from a descriptive viewpoint, this study shows that the effects of institutional structures on transaction behavior are mediated by trust and perceived risk. In sum, by explicating this unique trust-building environment and the proposed institution-based trust antecedents, this paper aims to contribute to the continued development and success of online marketplaces and e-commerce in general.

2. Literature Review

2.1. Online Marketplaces

Online marketplaces are communities of buyers and sellers who exchange product information, coordinate, and transact using Internet technologies. Online marketplaces can be separated into two categories: business-to-business marketplaces, such as Covisint (www.covisint.com), that facilitate exchange relationships among organizations and consumer-to-business or consumer-to-consumer marketplaces that facilitate transactions involving consumers. This study exclusively focuses on the latter category, aiming to understand the specific institutional structures of online (auction) marketplaces that engender consumer's trust in their seller communities. Prominent examples of such online marketplaces include eBay and Amazon auctions. These online marketplaces, as endorsing institutions or intermediaries ("cybermediaries" or "info-mediaries"), are the equivalent of traditional middlemen (Song and Zahedi 2002). They collect, process, and provide information using the Internet infrastructure to facilitate online transactions (Bailey and Bakos 1997, Crusciel and Zahedi 1999, Grover and Teng 2001, Sarkar et al. 1995). Another critical service that online marketplaces provide, and the focus of this study, is the creation of trust in the marketplace and reduction of perceived risk from it.

Although in general economic transactions that span time and space require an element of trust because of the ever-present fear of opportunistic behavior (Mayer et al. 1995, Williamson 1985), the lean nature of the online medium imposes additional unique risks (Lee 1998). This is because neither product characteristics nor seller identity can be fully assessed during the transaction, making cheating easier (Ba and Pavlou 2002).[3] In fact, Bailey and Bakos (1997) found trust to be more important in online markets than in physical ones. In addition, the lean nature of the online environment eliminates many otherwise prominent social cues (e.g., body language) that might otherwise be used to analyze whether a business partner can be trusted (Gefen 2000, 2002; Reichheld and Schefter 2000). Under these circumstances, institution-based trust could be a prominent factor in influencing buyer's transaction behavior in online marketplaces. It is important to note that these online marketplaces lack the legal power of traditional marketplaces to single-handedly safeguard transactions.

[3] In online auctions buyers inspect the product on delivery, after the seller has received their payment. This delay increases risk compared to transactions where the focal product is present during the exchange.

2.2. Dyadic Trust Compared to Trust in a Community of Sellers

According to Keen (1999), trust is the foundation of e-commerce. Trust in the traditional dyadic (one-to-one) sense has been defined as a belief that the seller will behave in accordance with the consumer's confident expectations by showing ability, integrity, and benevolence (Doney and Cannon 1997, Gefen 2002, Luhmann 1979, Mayer et al. 1995). While there is a consensus that dyadic trust facilitates e-commerce, trust in the entire community of sellers (one-to-many) in an online marketplace (where a buyer often interacts with unknown sellers under the auspices of an online marketplace) has been studied only infrequently (Pavlou 2002). In this paper we focus on trust in the collectivity of a well-defined network group, as opposed to a single vendor. This view is consistent with "trust in generalized others" where the target of trust could be either an individual or a group (Dasgupta 1988, Rotter 1967), and the way such trust in a community affects people's assessments, beliefs, and behavior (Fukuyama 1995). In contrast to Mayer et al.'s (1995) focus on a person's general propensity to trust others we focus on trust in the *identifiable* population of a specific marketplace. While not discounting the importance of dyadic trust in online transactions, we believe that the nature of online marketplaces makes "one-to-many" trust deserving of special attention. A generalized trust belief in the community of sellers is arguably the first determinant of whether a buyer will visit a particular marketplace to look for products; only after making this decision, when a buyer starts considering individual sellers, does dyadic trust enter the picture. This is consistent with Durkheim (1964), who argues that institutional trust underwrites interpersonal trust. Trust in a community of sellers is defined as the buyer's subjective belief that online transactions with sellers in a specific marketplace will occur in a manner consistent with his/her expectations of trustworthy behavior.

2.3. Institution-Based Trust in a Community of Sellers

Institution-based trust is trust that is based on guarantees and recommendations from third parties (Shapiro 1987, Zucker 1986). Lane and Bachmann (1996) argue that trust-based buyer-seller relations rarely evolve spontaneously at the individual level, but are highly dependent on the existence of stable institutions. Zucker suggests that institutional trust is the most important mode of trust creation in business environments where there is no previous interaction and where the buyers and sellers may come from different social and cultural backgrounds. Institution-based trust exists when trust is tied to the existence of third-party *structures* that are independent of dyadic actions. In markets where experience is not readily available, trust can be built through institution-based mechanisms such as certification and escrows. Certification deals with licenses and accreditation, which testify to the ability and expected behavior of the trusted party. Digital certification has been shown to build trust (Luo 2002). Escrows guarantee the financial side of the transaction by making sure that funds are released by the third party only when both parties agree that the terms of the deal have been met.

We argue here that these mechanisms can also create trust in a community, not just specific individuals. Trust transference (the generalization of impressions about one entity to related entities, Hamilton and Sherman 1996) has been shown to occur in online contexts (Stewart 2003). It appears that buyers form opinions about whether multiple individual sellers in a particular marketplace can be trusted, and thus form an overall opinion about sellers in that marketplace. In other words, information about many individual sellers serves as a proxy for the overall reputation of the seller community (Tirole 1996). This generalized perception of the seller community affects buyer behavior by determining in general terms what buyers expect from a member of that community (Fukuyama 1995). Moreover, from information about specific sellers, buyers can form an opinion as to whether the accepted transaction norms in a particular marketplace correspond to what they perceive to be trustworthy behavior. Creating a general opinion about a community through limited information, or encounters with a small number of its members, is quite common in other business scenarios (Niehoff and Paul 2001, Pate and Malone 2000, Rousseau 1989). Accordingly, following McKnight and Chervany (2002), institution-based trust in a community of sellers is defined here as a buyer's perception that appropriate conditions are in place to facilitate transaction success with the marketplace's sellers.

2.4. Perceived Risk in a Community of Sellers

Most buyer-supplier relationships are characterized by risks due to information asymmetry to the sellers' advantage (Mishra et al. 1998). Because it is difficult to measure actual risk as an objective reality and because it is the perception of risk rather than objective risk that affects behavior, research has focused mainly on perceived risk (e.g., Jarvenpaa et al. 2000). Perceived risk is the subjective belief that there is some probability of suffering a loss in pursuit of a desired outcome. Following the transference logic described above, we define buyers' perceived risk from the community of sellers as buyers' perception that there is some probability of suffering a loss when pursuing transactions among members of the community of sellers in the specific marketplace. Following Mayer et al. (1995) and Gefen (2002), this study views perceived risk as buyers' fears that stem from sellers' potential for opportunistic behavior (e.g., not delivering the right product at the right time as promised, outright fraud). We distinguish this risk from risk concerns related to the nature of the online context or the behavior of entities other than the seller (e.g., product loss during shipping, manufacturer defects).

3. Hypothesis Development

3.1. Perceived Effectiveness of Institutional Mechanisms

At an abstract level, third-party institutional structures facilitate transactions in online marketplaces by providing a rational basis for interaction among marketplace participants (Shapiro 1983, 1987; Zucker 1986). This study examines the perceived effectiveness of three common institutional mechanisms—feedback mechanisms, escrow services, and credit card guarantees—together with trust in the intermediary (i.e., in the third party who sets the rules and

creates the institutional framework on which the marketplace operates). Although not an exhaustive list of all institutional structures, the proposed factors represent both popular market-driven factors (feedback mechanisms and trust in the intermediary), and common legally binding factors (the escrow services and credit card guarantees).

In general, the perceived effectiveness of the proposed institutional mechanisms facilitates transaction behavior by building trust and reducing risk. The basic rationale for the relationships among institutional structures and trust in the community of sellers is trust building through transference (Doney and Cannon 1997, Stewart 2003), guaranties (Zucker 1986), and signals (Akerlof 1970). The basic rationale for risk reduction is through economic (calculative) reasoning about incentives (Jensen and Meckling 1976, Shapiro 1983, Williamson 1985).[4] Because trust and risk perceptions are closely intertwined, it is expected that similar cognitive processes cause institutional structures to influence buyer perceptions, especially given the collective target of the trust and risk. A detailed description of the means by which each proposed institutional structure builds trust and reduces risk follows.

3.1.1. Perceived Effectiveness of the Feedback Mechanism. A common aspect of many online transactions is feedback. Feedback mechanisms are essentially market-driven reputation systems where buyers can describe their past experiences with specific sellers. Imitating word-of-mouth communication using online means (Dellarocas 2003), these systems accumulate and disseminate information about sellers' past trading behavior. Feedback mechanisms have been widely adopted in practice, such as eBay's and Amazon's Feedback Forums. Feedback mechanisms in online marketplaces are primarily informal, self-regulated institutional mechanisms. Such mechanisms are likely to be effective only if the participants perceive that the feedback provided is an accurate and credible depiction of the marketplace and other buyers' experiences. Accordingly, the *perceived effectiveness of the feedback mechanism* is defined as the extent to which a buyer believes that the feedback mechanism in an online marketplace is able to provide accurate and reliable information about the past transaction behavior of the marketplace's sellers.

Effective feedback mechanisms discriminate among sellers and create price premiums (Shapiro 1983). More importantly, for this paper, they also provide buyers with an overview of the marketplace and its sellers' past behavior, allowing buyers to assess the *entire* community of sellers in a marketplace and whether its transaction norms correspond to their own notion of trustworthiness. Based on the marketplace's overall reputation, buyers should be able to form beliefs about the nature of the community of sellers. An effective feedback mechanism should therefore act as an informal buyer-driven certification system for sellers.

Moreover the trust-building transference process allows buyers to trust sellers based on information they receive from other buyers (Doney and Cannon 1997). To a given buyer, other buyers are essentially trusted third parties because they have nothing to gain by providing inaccurate feedback on sellers. Therefore, provided that other buyers generally trust the community of sellers (as this is portrayed in the aggregate feedback from many buyers for multiple sellers), this trust can be transferred (Stewart 2003).[5] Accordingly, effectively instituting a feedback mechanism should itself create trust in the community, as it does in other contexts (Fukuyama 1995).

Hypothesis 1a (H1a). *The perceived effectiveness of the feedback mechanism increases buyer trust in the community of sellers.*

In addition to engendering trust in the seller community, an effective feedback mechanism can also help reduce the perception of risks arising from the seller community. By capturing the overall reputation

[4] It is important to clarify that institution-based trust is not the same as calculative-based trust (Gefen et al. 2003). Calculative-based trust is not only related to third-party institutions, but to any rational assessment. Calculative trust is based on an economic rationale and a calculated analysis that assesses whether it is in the trustees' best interest to cheat (Williamson 1985). By shaping incentives, effective institutional structures cause cheating to not be in the trustees' best interest (Shapiro et al. 1992).

[5] It is possible that the feedback mechanism draws a negative picture about the community of sellers. However, in effective marketplaces, the overall reputation of sellers is positive. For example, 99.1% of the feedback on the community of sellers in eBay's marketplace is positive (Resnick and Zeckhauser 2002).

of the seller community, the feedback mechanism provides incentives to the members of the seller community not to engage in opportunistic behavior (Ba and Pavlou 2002). More specifically, an effective feedback mechanism acts as a sanctioning mechanism that penalizes sellers for opportunistic behavior and promotes cooperative behavior. This should reduce buyers' actual risk and, presumably, risk perceptions. In traditional marketplaces, equivalent social mechanisms, even informal ones, reduce the perceived inherent risk of doing business by establishing economic rules of conduct and punishing those who do not adhere to them (Fukuyama 1995). In other words, an effective feedback mechanism indicates that the marketplace has instituted a set of incentives for ensuring appropriate seller conduct (Shapiro 1983, Williamson 1985).

Hypothesis 1b (H1b). *The perceived effectiveness of the feedback mechanism reduces buyers' perceived risk of transacting with the community of sellers.*

3.1.2. Perceived Effectiveness of Escrow Services. Escrow services, such as PayPal (www.paypal.com) and Escrow (www.escrow.com), are third-party services in which a third party authorizes payment only after the buyer receives and approves the goods (Wolverton 2002). Many escrow services also offer mediating services in cases of disputes between buyers and sellers. Theoretically, escrows (if managed correctly) could solve many uncertainty issues for buyers and be a compelling trust-building mechanism in a marketplace. However, whether or not escrows have this effect depends on the buyer's assessment of how effective these services are, plus the cost and bother involved in using them. Hence, *perceived effectiveness of escrow services* is defined as the extent to which buyers believe that escrows are able to guarantee that their transactions with sellers in a marketplace will be fulfilled in accordance with their expectations.

By providing escrow services for sellers in a specific marketplace, a third party provides a transaction guarantee to the buyer. This should build trust and reduce risk in the community of sellers. With respect to trust, the buyer relies on the escrow provider's need to protect its own reputation by fulfilling its escrow obligations. This trust, when transferred (Stewart 2003), should create trust in the seller's marketplace. In addition, the fact that some sellers offer an escrow option and also that an escrow company is willing to guarantee some transactions create a signal of the marketplace's trustworthiness. Moreover, escrow services reduce social uncertainty by providing a framework within which the transaction occurs, making it possible to force even unwilling sellers to behave in a socially acceptable manner (Gefen 2000, Gefen et al. 2003, Luhmann 1979). As Zucker (1986) explains, escrows build trust by adding a level of control to the transaction.

With respect to risk, effective escrow services reduce actual risk by absorbing some of the uncertainty regarding payments, product quality, and delivery. Accordingly, the presence of an effective escrow service should also reduce perceived risk. Moreover, transaction control creates incentives for sellers to refrain from opportunistic behavior because such behavior cannot pay off (Williamson 1985). By inducing sellers to behave appropriately, presumably escrow reduces buyer perceptions of the risk of doing business with the community of sellers.

Hypothesis 2a (H2a). *The perceived effectiveness of escrow services increases buyer trust in the community of sellers.*

Hypothesis 2b (H2b). *The perceived effectiveness of escrow services reduces buyer perceived risk of transacting with the community of sellers.*

3.1.3. Perceived Effectiveness of Credit Card Guarantees. Credit card guarantees, such as those provided by Visa or MasterCard, are another legally supported, third-party institutional mechanism that safeguards transactions by providing some protection to the buyer (Wolverton 2002). Credit cards are the most common means for settling online transactions, especially now that most credit card institutions offer buyers zero liability for fraud when they are used in online transactions. Essentially, credit card guarantees provide recourse by reducing the buyer's monetary liability in case of illegal seller behavior. This service however does involve paperwork and hassle for the buyer and does not protect against all types of opportunistic seller behaviors. The effectiveness of credit card guarantees depends on buyer assessment of how effective the recourse is and how much hassle is involved in pursuing it. The *perceived effectiveness*

of credit card guarantees is defined as the extent to which buyers believe that the available protection from credit card institutions will protect them from opportunistic sellers.

Escrow services and credit card guarantees are hypothesized to create trust and reduce perceived risk, following a similar theoretical reasoning as above. Through transference (Stewart 2003), a buyer builds trust in the community of sellers because a trusted third party, in this case the credit card company, has accepted the seller as a business partner. By offering a credit card option, sellers send a signal of the confidence that a credit card institution has placed in them. Additionally, as in the case of escrow services, the transaction framework created and enforced by credit card companies reduces social uncertainty as to how sellers might behave and creates a social structure within which the transaction will occur. In doing so, it creates trust in the community of sellers (Luhmann 1979).

In case of a problematic transaction, credit card institutions usually discipline the seller (Angwin 2000), either by withholding the payment or even terminating the relationship. This creates strong incentives for sellers to act cooperatively, reducing real risk to buyers and presumably, if buyers realize this, also buyers' perceived risk. Moreover, assuming buyers perceive the recourse provided by a credit card institution to be effective, their fears of monetary liabilities because of fraud should be reduced (Chellappa and Pavlou 2002).

Hypothesis 3a (H3a). *The perceived effectiveness of credit card guarantees increases buyer trust in the community of sellers.*

Hypothesis 3b (H3b). *The perceived effectiveness of credit card guarantees reduces buyer perception of risk of transacting with the community of sellers.*

3.1.4. Trust in the Intermediary. An online intermediary is a third-party institution that uses the Internet infrastructure to facilitate transactions among buyers and sellers in its online marketplace by collecting, processing, and disseminating information (Bailey and Bakos 1997, Crusciel and Zahedi 1999, Grover and Teng 2001, Sarkar et al. 1995). While intermediaries can facilitate transactions in many ways, one of the intermediary's main roles, and the focus of this study, is building buyers' trust and reducing risk (Palmer et al. 2000). Intermediaries reduce transaction uncertainty by instituting regulations that restrict the ability of a seller to engage in opportunistic behavior, and provide guidelines of what constitutes acceptable transaction behavior. To reduce uncertainty, intermediaries, among other things, (a) provide a reliable and secure environment, (b) institute fair and open rules and procedures, (c) accredit, evaluate, or weed out problematic sellers, and (d) encourage benevolent transaction norms.[6] Such measures generally build trust by conveying fair treatment and fair outcomes (Kumar 1996).

The effectiveness of these practices is reflected in the buyers' trust in the intermediary (Tan and Thoen 2001). *Trust in the intermediary* is defined as the subjective belief with which a buyer believes that the intermediary will institute and enforce fair rules, procedures, and outcomes in its marketplace competently, reliably, and with integrity, and, if necessary, will provide recourse for buyers to deal with seller opportunistic behavior. Like trust in any target, a buyer's trust in an intermediary can arise from *familiarity* with the marketplace (the buyer's expectations are continuously met), *reputation* of other marketplaces,[7] and *benevolent* behavior.[8]

Following a trust-transference logic (Doney and Cannon 1997, Stewart 2003), we argue that trust in the intermediary could build buyer trust in sellers. Buyers who trust the intermediary should also trust the sellers because of their perceived association with the intermediary. In contrast, trust will be lost as trust in the intermediary erodes (Durkheim 1964). In addition, by participating in a trusted third party's marketplace, the community of sellers sends a positive signal about its own trustworthiness (Shapiro 1983).

A trusted intermediary can also be expected to take steps to reduce buyer risk. First, intermediaries can

[6] A detailed set of best practices for intermediaries to support their online marketplaces is provided by Selis et al. (2002).

[7] One respondent indicated: "As a new user to these auctions, I haven't had any problems, but I'm still concerned about the system. As the time goes on, I think that as Amazon is a good shop, so their auctions should be as well."

[8] A representative quote from a survey respondent: "Amazon always e-mails you back with a caring response."

reduce transaction uncertainties and prevent seller opportunistic behavior (Bakos 1998, Sarkar et al. 1995). Enforcement steps may include identifying and removing problematic sellers or taking legal action against fraudulent sellers on behalf of the buyers. Such steps should create incentives for sellers to behave cooperatively (Williamson 1985). Realizing that these incentives are in place, buyers may perceive a lesser degree of risk of transacting in such a marketplace. Second, many intermediaries provide some limited financial liability to protect buyers from fraudulent sellers. For example, both eBay and Amazon guarantee their auction transactions, providing coverage up to a limit of $250. This absorption of risk by the intermediary helps reduce buyers' actual risk, and presumably by doing so also reduces buyers' perceived risk from transacting with its community of sellers. Such absorption of risk by the intermediary should also testify to the degree the intermediary itself believes in its ability to create a trustworthy marketplace. After all, if the marketplace were too risky, no intermediary could sustain such a promise for long.

Hypothesis 4a (H4a). *Trust in the intermediary increases buyer trust in the community of sellers.*

Hypothesis 4b (H4b). *Trust in the intermediary reduces buyer perceived risk of transacting with the community of sellers.*

3.2. Trust and Perceived Risk

Trust and perceived risk are both subjective concepts embedded in social relations (Chiles and McMackin 1996). Research has established that trust reduces expectations of opportunistic behavior (Sako and Helper 1998) and diminishes risk perceptions (Anderson and Weitz 1989, Ganesan 1994, Gefen 2000, Koller 1998).[9] The effect of trust on risk has been empirically supported in research on e-commerce and virtual communities (Gefen 2002, Jarvenpaa et al. 2000, Luo 2002, Pavlou 2003).

Hypothesis 5 (H5). *Trust in the community of sellers reduces the perceived risk of transacting with sellers in online marketplaces.*

[9] A detailed discussion of the causal relationship between trust and perceived risk is provided in Gefen (2002).

3.3. Transaction Intentions

As in previous research in e-commerce (e.g., Gefen et al. 2003), *intention to transact* is defined in this study as the buyer's intention to engage in online exchange relationships with the community of sellers. The proposed impact of trust and perceived risk on transaction intentions with sellers is based on the *theory of reasoned action* (TRA) (Ajzen and Fishbein 1980), which postulates that salient beliefs (expectations about the outcome of a given behavior) influence intentions to undertake a behavior. Viewing the auction transaction with sellers as the focal behavior, both trust and perceived risk can be seen as beliefs leading to behavioral intentions.

3.3.1. Trust and Transaction Intentions. Taking part in online transactions where there is uncertainty and information asymmetry requires trust in the other party (Gefen 2000, McKnight and Chervany 2002). By extrapolating from TRA, trust can be viewed as an antecedent belief (a confident expectation) that creates a positive attitude toward the transaction behavior (Jarvenpaa et al. 2000), which in turn leads to transaction intentions. Using the same logic, Gefen (2000, 2002), McKnight and Chervany (2002), and Pavlou (2003) show that trusting beliefs in specific online vendors are correlated with transaction intentions with those same vendors. Online buyers are faced with overwhelming social uncertainty, not knowing what the other party will do. Trust is one of the major social uncertainty reduction mechanisms. It allows buyers to subjectively rule out many undesirable possible behaviors on the part of the party they trust and so reduce the myriad of possible outcomes to a more manageable level (Gefen 2000). Once this is accomplished, rational assessments can begin (Gefen et al. 2003).

We hypothesize that the same logic can be extended to online communities of sellers. Here too buyers are faced with overwhelming social uncertainty, not knowing what the community is like and hence what to expect of it. Here too, trust in a community should help overcome this obstacle. Indeed, in traditional marketplaces trust in the community as a whole is a major determinant of individual's intentions to interact with the community's members (Fukuyama 1995).

Hypothesis 6 (H6). *Trust in the community of sellers increases buyer intentions to transact with sellers in the specific online marketplace.*

3.3.2. Perceived Risk and Transaction Intentions. Analysis of risk perceptions has long been viewed as an important factor in economic decisions (Chiles and McMackin 1996). The relationship between perceived risk and transaction intentions is also explained by the TRA. Perceived risk increases negative expectations, leading to an unfavorable attitude that should result in a negative influence on transaction intentions. Empirical evidence supports an expectation of a negative relationship between perceived risk and online intentions to transact with individual sellers (Gefen 2002, Jarvenpaa et al. 2000, Pavlou 2003).

Hypothesis 7 (H7). *Perceived risk in the community of sellers decreases intentions to transact with sellers in an online marketplace.*

3.4. Transaction Intentions and Actual Transaction Behavior

Drawing on the TRA, behavioral intention is the primary antecedent of voluntary behavior (Ajzen and Fishbein 1980). Following a deductive logic, transaction intention is likely to influence future transaction activity.

Hypothesis 8 (H8). *Buyer intentions to transact with sellers in an online marketplace are positively related to transaction behavior.*

3.5. Control Variables[10]

To examine the research model, additional control variables known to affect trust, risk, and online behavior were controlled for, as described below:

3.5.1. Positive Past Experience with Sellers in a Marketplace. Positive past experience reflects the quality of a buyer's *own* encounters with particular sellers in a specific marketplace. Through past experience with a limited number of individual sellers, buyers can form a general opinion about the seller community (Tirole 1996). Satisfaction with the service quality delivered by sellers in the past is an important component of buyer perceptions, and has been shown to positively influence future intentions (Ganesan 1994). Therefore, we expect positive experience with a marketplace to positively affect intention to transact in that marketplace. On the other hand, bad experience should sensitize the buyer to the possibility of risk. Past positive experience with a marketplace should reduce the perceived risk of transacting in that marketplace.

3.5.2. Sellers' Performance. Whereas past experience draws on a buyer's own prior encounters with sellers, buyers also have a general knowledge about the average performance of sellers in a specific marketplace. For example, one may have never purchased anything from eBay (no past experience), but still knows from friends and other sources that sellers in this marketplace perform well in general. Buyers usually have a broad awareness with the quality of the products sold in a marketplace, their pricing, and their delivery terms. Sellers' performance is easily communicated among buyers and serves as a proxy for the overall reputation of sellers in a marketplace. Outstanding vendor performance in general contributes to customer loyalty to a marketplace and willingness to transact with its sellers (Reichheld and Schefter 2000). Thus, the impression of the performance of sellers in a particular marketplace is added as a control variable; it is proposed to influence trust, perceived risk, and intentions.

3.5.3. Trust Propensity. Trust in the community of sellers is also the product of general trust propensity. Trust propensity is formed through socialization and life experience and is invariant across situations (Gefen 2000, Whitener et al. 1998). Because propensity to trust has been shown to increase trust in online contexts (Gefen 2000), we control for its effect on trust in the community of sellers.

4. Research Methodology

The research model was tested with data from 274 of Amazon's online auction marketplace buyers. Amazon was chosen because its website is, together with eBay, among the most widely used Internet sites (*The Economist* 2000). Like eBay, Amazon is large and reputable, both of which increase trust online (Jarvenpaa et al. 2000). Amazon also actively invests in building customer trust by explaining its

[10] Consistent with the paper's conceptualization, the target of the control variables is also the *community of sellers*.

policies and keeping customers updated on what is happening; such measures generally build trust by conveying fair treatment and fair outcomes (Kumar 1996). The structure and institutional mechanisms in Amazon, eBay, and most other auction marketplaces are for all practical purposes similar (e.g., they offer the same credit card guarantees (Visa, MC, Amex), make available the same escrow companies (PayPal, Escrow), offer similar feedback mechanism, etc.).

4.1. Measurement Development

Measurement items were adapted from the literature wherever possible. New measures were developed following standard psychometric scale development procedures (Bagozzi and Phillips 1982, Boudreau et al. 2001). The domain of the relevant construct was initially specified, and the items were subsequently developed based on the conceptual definition. The preliminary instrument was pilot tested and reviewed by faculty and doctoral students for clarity. The items were modified following a pretest of the survey instrument with a sample of 70 auction buyers, using the same website-based data collection method that would be applied in the actual data collection, following procedures recommended by Churchill (1979). All items were seven-point, Likert-type scales anchored at "strongly disagree" (1), "strongly agree" (7), and "neither agree nor disagree" (4).

Measures of trust in the community of sellers were based on measures used in Ohanian (1991), adapted to refer to the population of sellers participating in the marketplace (Pavlou 2002). As in past dyadic studies, much trust in the community of sellers was measured as beliefs about honesty, dependability, reliability, and trustworthiness of the community. These items resemble those applied by Doney and Cannon (1997), Jarvenpaa et al. (2000), and Gefen et al. (2003). The perceived effectiveness of the feedback mechanism was measured with four items, following Pavlou (2002). The perceived effectiveness of escrow services was assessed with three new items. The perceived effectiveness of credit card guarantees was measured with three items based on Chellappa and Pavlou (2002). Trust in the intermediary was assessed with four items adapted to reflect the intermediary (Amazon) as the target of trust, following Pavlou (2002). Based on its conceptual definition, the measure focused on the intermediary's competence, reliability, and integrity. Perceived risk was assessed with three items following Jarvenpaa et al. (2000). These items measured the buyer's perception of there being risk in taking part in an auction in Amazon's online marketplace. Through personal interviews with five buyers, we verified that this wording tapped into beliefs about the risk regarding the community of auction sellers. Propensity to trust was assessed with three items adapted from Gefen (2000). Sellers' past performance was measured with three items based on Zaheer et al. (1998), modified to reflect general perceptions about the seller community. In contrast, positive past experience asked about buyer's personal perception of the quality of prior actual transactions in the marketplace. Past experience and transaction intentions were new scales. All measurement items are shown in Appendix 1a.

Actual transaction behavior was assessed a year after the initial data collection to allow sufficient time lag to infer causality. Actual transaction behavior was observed both objectively from the website (how many purchases the buyers made over the last year), and through a follow-up survey where we asked the buyers to report how many auctions they won during the previous year. The follow-up study also asked the buyers to indicate why they did *not* use feedback mechanisms, escrow services, or credit card guarantees. These follow-up study items are shown in Appendix 1b.

4.2. Survey Administration

E-mail addresses of 1,600 buyers were randomly selected from 16,000 buyer addresses collected from Amazon's auction website using an e-mail extractor spider program.[11] Invitation e-mails were sent to the selected buyers explaining the purpose of the study and requesting their participation. The respondents were asked to click on the URL link provided in the e-mail message, which linked to the web-based survey instrument. The respondents were offered incentives in the form of (a) a monetary award of $250 to be raffled among the participants and (b) a report that summarized the results of the survey (65% of the respondents requested this report

[11] The Random procedure in Matlab® was used to select 10% of the 16,000 e-mail addresses that the spider extracted.

Table 1 Demographic Information of Consumer Sample

Variable	Previous Bids	Age	Gender	Education	Annual Income	Experience (Years)
Mean (STD)	22 (29)	41 (15)	55% males	Some college	$25,000–$50,000	3.2 (1.2)

and 88% agreed to participate in follow-up studies). The invitees were assured that the results would be reported only in aggregate and that their anonymity would be assured. Respondents came from 22 countries, but most resided in the United States (85%). Specific demographic information is shown in Table 1.

4.3. Response Rate and Nonresponse Bias

Out of the original 1,600 invitees, 69 e-mails were not delivered, and 274 responses were obtained (18% response rate). Following Armstrong and Overton (1977), nonresponse bias was assessed by verifying that (a) respondent demographics were not distinct from current Internet consumers (http://www.infoplease.com/ipa/A0901651.html) and (b) early and late respondents[12] were not significantly different. Both tests compared samples on the basis of age, gender, education, income, and Internet experience. All possible t-test comparisons between the means of each of the two groups in both tests showed no differences ($p < 0.1$ level).

In the follow-up study, all 244 of the original respondents that agreed to be contacted were sent a request for follow-up data by e-mail; 45 e-mails were undeliverable; 38 responses were obtained (19%); and 33 responses were matched to the first study. Similar nonresponse bias tests by Armstrong and Overton (1977) showed no statistical differences between the respondents and nonrespondents. Equivalent objective transaction data from Amazon's site were also collected for 182 respondents (66%). The average number of completed transactions was seven (STD = 19), which closely matched the self-reported transaction data ($r = 0.92$, $p < 0.001$).

4.4. Questionnaire Data Analysis

The data collected from the original group of 274 buyers were first analyzed with a principal components factor analysis to examine the factorial validity of the scales. Appendix 2 shows the result of this analysis; the covariance matrix is shown in Appendix 3. There were 10 factors, extracting 89% of the variance. All the items of each construct loaded highly on a single common factor and loaded with low coefficients on all other factors, showing a good loading pattern (Hair et al. 1998). The extent of common method bias was assessed using Harman's one-factor test (Podsakoff and Organ 1986). The 10 principal constructs explain about 9.5% of the variance each (first factor 13%, tenth factor 7%), indicating that our data do not suffer from high common method variance. The factor loading was then examined in a LISREL *confirmatory factor analysis* (CFA). After dropping two items that shared high residual variance with other items the CFA showed acceptable fit indexes (Hair et al. 1998) with the $\chi^2_{389} = 598.88$, GFI = 0.88, AGFI = 0.85, NFI = 0.94, CFI = 0.98, RMR = 0.032. All items loaded significantly on their assigned latent constructs.

Discriminant analysis was assessed by comparing the CFA of the original model with its 10 latent constructs with all possible alternative CFAs in which pairs of latent constructs were joined, as done by Gefen et al. (2003). The analyses show that the difference in χ^2 between any of the alternative CFA models with 9, rather than 10 latent constructs, is significantly larger than that of the original CFA, establishing their discriminant validity (Segars 1997). It was further verified that the AVE of all constructs was above 0.50, meaning that the latent construct captures more construct-related variance than error variance.[13] Descriptive statistics of the principal constructs are shown in Table 2, and the correlation matrix is shown in Table 3.

Using the two-step approach (Anderson and Gerbing 1988), we analyzed the research model using LISREL on the covariance matrix of the data. LISREL examines all covariance values in the data when estimating coefficients, thus examining not only the path

[12] Early respondents were identified as those that responded during the first phase in December 2001 (54%), late respondents were those responding in February 2002 (46%).

[13] AVE is average variance extracted. It is calculated as $(\sum \lambda_i^2)/((\sum \lambda_i^2) + (\sum(1 - \lambda_i^2)))$.

Table 2 Descriptive Statistics

Construct	Mean (STD)[1]	Reliability (Cronbach's α)	LISREL AVE	LISREL Construct Reliability
Transaction intentions	5.96 (1.20)	0.94	0.86	0.95
Perceived risk from sellers	2.98 (1.49)	0.92	0.84	0.92
Trust in community of sellers	5.59 (1.35)	0.97	0.91	0.96
Feedback mechanism	5.39 (1.35)	0.95	0.84	0.96
Sellers' performance	5.36 (1.12)	0.82	0.60	0.82
Positive past experience	5.95 (1.30)	0.97	0.91	0.97
Trust propensity	5.07 (1.28)	0.95	0.88	0.96
Escrow services	5.04 (1.33)	0.93	0.82	0.93
Trust in intermediary	5.58 (1.37)	0.96	0.86	0.95
Credit card guarantees	5.05 (1.52)	0.95	0.87	0.95

Note. [1]Mean, standard deviation, and Cronbach's α were all calculated on the entire dataset. The LISREL statistics were calculated on the scales after the two items were dropped.

specified by the researchers, but also alternative paths that may have been overlooked, providing indications not only as to whether the correlations that were specified are significant, but also whether the model may be incomplete or made more parsimonious (Gerbing and Anderson 1988). Parsimonious models are generally more precise (Chou and Bentler 1990, Bollen 1989). The control variables were mapped as additional exogenous variables. The relationships among trust in the intermediary and the perceived effectiveness of the three institutional mechanisms were mapped in accordance with LISREL defaults as correlations among exogenous variables.

The *left-hand side* of Figure 2 (everything before and including *transaction intentions*) shows the parsimonious research model with standardized coefficients as built with the two-step approach (Anderson and Gerbing 1988).[14] All loadings were significant. Fit indexes were all within the accepted threshold except for GFI, which was slightly below its threshold (Gefen et al. 2000): $\chi^2_{402} = 630.75$ with a ratio of less than 1:3 of df to χ^2, GFI is 0.87, AGFI is 0.84, NFI = 0.94, CFI = 0.98, and RMR = 0.042, RMSEA = 0.046. It is common that not all fit indexes are perfect in LISREL (Boudreau et al. 2001, Gefen et al. 2003). All hypothesized paths were significant, except for H3a,[15] and the hypothesized effects of the institutional structures on *perceived risk* (H1b, H2b, H2b, and H4b).[16] The explained degrees of variance, the SMC statistics, were *transaction intentions* 59%, *perceived risk* 21%, and *trust in the community of sellers* 65%. As expected, *positive past experience* ($b = 0.42^{**}$) and *sellers' performance* ($b = 0.22^{**}$) are empirically the strongest predictors of transaction intentions. The results show that even when controlling for experience, trust is still necessary and the institutional structures still build this trust. LISREL converged in 12 iterations.

4.5. Analysis of Follow-Up Transaction Data

A key question that remained open with the first dataset was whether transaction intentions really predict actual future behavior (H8). This is a crucial question because some research (e.g., Straub et al. 1995) questions whether behavioral intentions are a reasonable proxy for actual behavior. Using ordinary least squares regression,[17] the results from the follow-up study show significant relationships between initial intentions and the actual number of online transactions in Amazon's marketplace (as objectively reported in Amazon's marketplace ($r = 0.31$, $p < 0.01$), and as self-reported by the respondents ($r = 0.25$, $p < 0.05$). Objective evidence is almost identical ($r = 0.92$, $p < 0.001$) to the respondents' self-reports. Transaction intentions remained relatively constant during the year ($r = 0.42$, $p < 0.01$), confirming that the buyers' perceptions did not change considerably during the time their behavior was observed (Ajzen and Fishbein 1980). The results of this analysis are shown on the *right-hand side* of Figure 2. It is

[14] The right-hand side of Figure 2 (*intentions* and the two measures of behavior) was analyzed with linear regression on the smaller datasets collected a year later.

[15] Chellappa and Pavlou (2002) also show a weak effect of credit card protection on trust; the authors argue that the absorption of financial risk by third parties may not be sufficient to engender trust.

[16] As a post-hoc analysis, the traditional regression tests for mediation (Baron and Kenny 1986) confirmed these results for all direct antecedents of trust.

[17] The follow-up data could not be analyzed together with the original 274 responses because the sample size was inadequate for LISREL.

Table 3 Correlations Among Principal Constructs

	TR	RK	ST	FB	PR	EX	TP	ES	HT	CR
Transaction intentions (TR)	1.00									
Perceived risk from sellers (RK)	−0.50	1.00								
Trust in community of sellers (ST)	0.45	−0.34	1.00							
Feedback mechanism (FB)	0.42	−0.29	0.71	1.00						
Sellers' performance (PR)	0.64	−0.40	0.40	0.41	1.00					
Positive past experience (EX)	0.71	−0.41	0.46	0.47	0.71	1.00				
Trust propensity (TP)	0.37	−0.25	0.56	0.47	0.37	0.43	1.00			
Escrow services (ES)	0.42	−0.29	0.63	0.62	0.48	0.46	0.44	1.00		
Trust in intermediary (HT)	0.46	−0.32	0.76	0.79	0.43	0.54	0.55	0.67	1.00	
Credit card guarantees (CR)	0.33	−0.22	0.44	0.41	0.37	0.38	0.48	0.52	0.49	1.00

important to note that behavior measures completed purchases (won auctions), while transaction intentions reflect bidding intentions. This partly explains the low *R*-squared for transaction behavior because auction bids do not necessarily result in purchases.

As shown in Table 4, which summarizes the follow-up responses from 38 buyers, 57% of the respondents indicated lack of recourse as a reason for not using the feedback mechanism, and 41% ranked this factor as the primary reason. Escrow services were not used for several reasons: lack of awareness (72%), inconvenience (54%), cost (36%), and lack of availability (31%). Credit cards were not used mostly because they were not available (83%) and because they were perceived as not providing adequate recourse (21%).

5. Discussion

5.1. Summary of Results

This study helps outline the complex process in which institutional mechanisms influence actual transactions in online marketplaces. The present study shows that the perceived effectiveness of feedback mechanisms and escrow services combined with buyers' trust in the intermediary increased buyers' trust in the community of sellers in an online marketplace, even when controlling for trust propensity. Buyers' trust, in turn, reduced perceived risk and increased their intentions to transact, even when past experience and sellers' performance were included in the model. Perceptions of the two market-driven institutional structures—trust in the

Figure 2 Standardized Data Analysis Results (revised model with only significant paths)

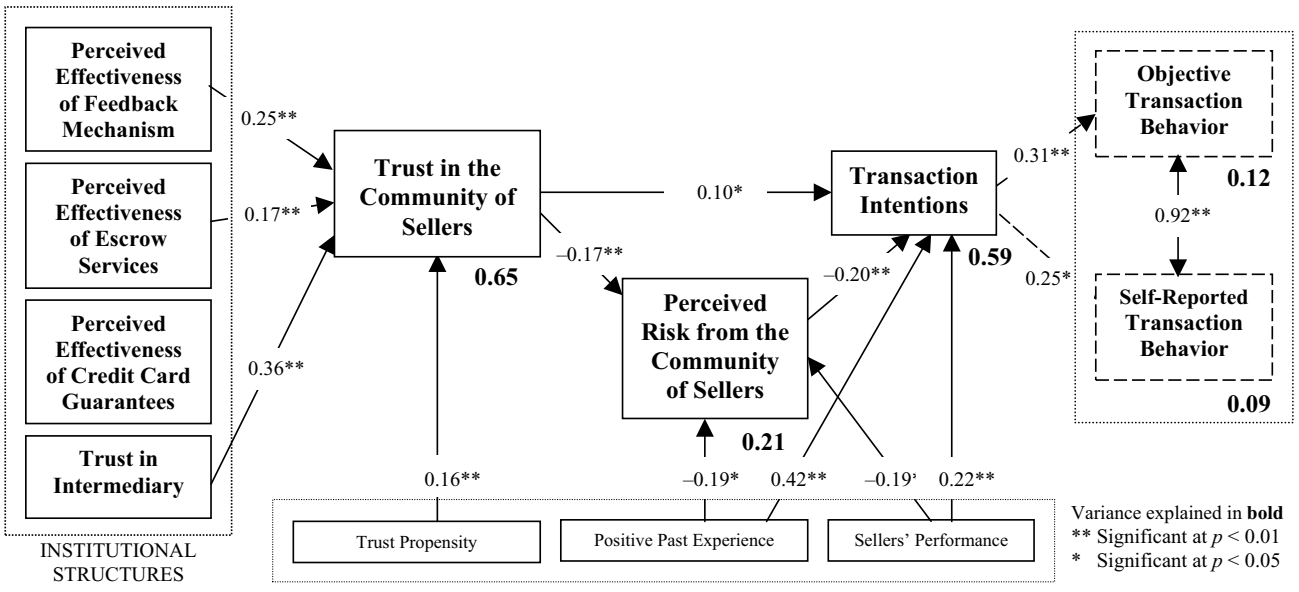


Table 4 Factors Determining the Perceived Effectiveness of Institutional Mechanisms

	Lack of Awareness		Inconvenience		Unavailability		High Cost		Lack of Recourse	
Institutional Mechanism	Checked (%)	Primary (%)	Checked (%)	Primary (%)	Checked (%)	Primary (%)	Checked (%)	Primary (%)	Checked (%)	Primary (%)
Feedback mechanism	21	18	22	16	0	0	0	0	74	66
Escrow services	72	42	54	28	31	12	36	14	14	4
Credit card guarantees	0	0	0	0	83	80	3	3	21	17

Note. Checked represents the percentage of respondents checking the factor as one of the reasons for not using the institutional mechanism.
Primary represents the number of people ranking the factor as the *primary* reason for not using the institutional mechanism.

intermediary and the perceived effectiveness of the feedback mechanism—were the strongest predictors of buyers' trust in the community of sellers. The legally binding structures—the perceived effectiveness of escrow services and credit card guaranties—played a weaker role. Contrary to our expectations, the proposed institutional structures did not have a direct impact on perceived risk, influencing it only indirectly, through trust. Finally, transaction intentions positively related to transaction behavior a year later (assessed both with self-reported and objective measures).

5.2. Limitations

Although the data generally support the proposed model, we need to mention some characteristics of our study that may limit our ability to generalize from these results. First, the results may have been impacted by self-selection bias. Our sample comprised only active buyers. Lurkers and disgruntled buyers who had already ceased to participate in Amazon auctions might have different perceptions about the effectiveness of the institutional mechanisms, and so may have been differently affected by the proposed institutional structures. This limitation (a truncated population sample) may have inflated the degrees of explained variance and the power of the paths in the model compared to a generalized (nontruncated) population.[18] Therefore, the results should be interpreted as only explaining the behavior of current marketplace buyers. Whether these results can be generalized to nonparticipants or to disaffected participants will require additional research.

[18] The variation in transaction intentions (21% coefficient of variability) suggests that the sample still includes less-enthusiastic buyers.

Second, the data were collected from a single-auction marketplace, and one which also has a reputation as an established bookseller. However, Amazon is not unique in this respect. Other well-known online auction marketplaces are also multipurpose sites. Yahoo! (www.yahoo.com), for example, is known primarily as a portal, and eBay is also expanding as an online store through Half.com (www.half.com). More importantly, most auction marketplaces work on the same principles and use very similar institutional mechanisms. Nonetheless, the generality of the model to other marketplaces will require additional research.

Third, like eBay's and Yahoo!'s, Amazon's auction marketplace is considered a reputable and well-run marketplace. Therefore, the results may not generalize to unknown or shady sites whose institutional mechanisms may be problematic. However, studying ill-reputed auction marketplaces was not the objective of this study, and arguably such marketplaces will not last long. Finally, although common method bias was assessed based on Harman's one-factor test (Podsakoff and Organ 1986) and showed that common method variance was not a major concern, statistically, common method bias cannot be absolutely ruled out.

5.3. Key Insights and Contribution

The study draws on sociological and economic theories to identify, conceptually propose, operationalize, and empirically examine the perceived effectiveness of institution-based mechanisms on buyers' transaction behavior. A primary contribution of this study is the attention paid to the perceived effectiveness of institutional mechanisms, including both legally binding and market-driven mechanisms. Previous research on institutional guarantors predominantly examined mechanisms with legal authority, assuming that such authority would plainly translate into perceived effectiveness. This study, on the other hand,

shows that *perceptions* of institutional mechanisms with binding legal power, such as the credit card guarantees and escrow services, may be less effective than market-driven mechanisms. Theoretical and practical implications are discussed below.

This study examines a novel view of online trust. Previous e-commerce research viewed trust as a dyadic (one-to-one) relationship between a buyer and a specific seller. This study presents a new (one-to-many) view of buyer trust in a marketplace's community of sellers as a whole. This emphasis on trust in a community, as opposed to trust in a specific vendor, is a new and expanded perspective of trust and presents new avenues of research on the topic. In this context, the study also explains how institutional mechanisms, whose primary role is to differentiate among sellers, also help build effective marketplaces as a whole by building trust and reducing risk in the entire community of sellers.

Third, from a descriptive standpoint, this study helps explain the process by which institutional structures facilitate actual transaction behavior. These structures operate through trust in the community, perceived risk, and transaction intentions. The analysis shows that the perceived effectiveness of institutional mechanisms increases trust in the community but only indirectly affects perceived risk. The reason for this, in hindsight, may be because buyers do not perceive the incentives given to sellers as powerful enough to guarantee cooperative behavior. Additionally, the actual absorption of financial liability by these mechanisms may not be high enough; for example, the auction intermediaries' maximum of $250 for fraud reimbursement may not be sufficient in many cases to alter risk perception. It may also be that the hassle imposed on the buyers to prove their case to receive reimbursement is perceived as excessive to make the recourse worthwhile.

The mediating role of trust and perceived risk is explained by the role of trust and perceived risk as expectations about the behavior of others (transacting with sellers). Following TRA, trust and perceived risk, being external beliefs specific to the target of the behavior (the community of sellers), should mediate the effect of the perceived effectiveness of institutional mechanisms, because the latter do not deal directly with the target of the behavior. Finally, the study provides empirical evidence that transaction intentions translate over time into actual behavior, as assumed but seldom shown in e-commerce research.

The institutional mechanisms studied here are IT-enabled systems that substitute for lengthy dyadic familiarity processes (Miles and Snow 1986) by allowing buyers to benefit from the experience of others, such as third parties (e.g., escrow and credit card institutions), intermediaries, and other buyers. This adds a new twist to previous research on online trust creation where previously identified antecedents of online trust in e-commerce dealt with familiarity (Gefen 2000) and service quality (Reichheld and Schefter 2000). In this regard, the study highlights the role of IT-enabled institutional mechanisms by stressing the fundamental role of IT in facilitating success in online marketplaces and e-commerce in general.

5.4. Implications for Theory

Institutional mechanisms have been assumed to have a straightforward effect on markets when administered by an authority with legal power, such as state regulators (Zucker 1986). This study suggests that market-driven mechanisms may be even more powerful in contexts with unclear or under-developed legal environments. This implies that the effectiveness of institutional mechanisms may also be psychological, sociological, or cognitive, as shown in this study of subjective perceptions. This finding has important implications for online marketplaces and e-commerce in general where the legal environment is not yet as sound (Luo 2002), and hence existing or new market-driven mechanisms may prove as effective as legal ones. This finding, if supported by additional research, may have significant ramifications because legal mechanisms are usually more expensive to institute (Bakos and Dellarocas 2002).

This study demonstrates the value of enhancing the subjective perceptions of institutional mechanisms. The *perceptual* challenges of awareness, availability, convenience, and cost of institutional mechanisms should be considered when these mechanisms are created. Even notionally feasible mechanisms may not always engender trust directly because of these perceptual challenges. Second, there is a *reality* issue of theoretical effectiveness of each mechanism based on the actual recourse or tangible guarantee it provides.

Based on the limited follow-up data we collected, one could argue that market-driven mechanisms might be perceived as more effective if they were backed by a specific guarantee, while legally binding mechanisms could be improved by being more convenient and less costly.

Past research on online auctions focused on the primary role of institutional mechanisms, which is to differentiate among sellers and create differential outcomes, such as price premiums (Ba and Pavlou 2002, Lee et al. 2000). However, the fact that online marketplaces are proliferating is not solely because of few reputable sellers that absorb price premiums, but presumably because many sellers are encouraged to act cooperatively and create a large supply of goods. This study focuses on the *derivative* role of institutional mechanisms, which is to build a trustworthy trading environment as a whole. For example, certification of medical doctors does not only build trust in specific a doctor (Zucker 1986), but it builds trust in the medical profession as a whole. That is, by differentiating among sellers and thus encouraging them to behave cooperatively, institutional mechanisms provide incentives for all sellers to transact responsibly, and in doing so help build effective online marketplaces. This interesting by-product of institutional mechanisms has been largely ignored by both the literatures on institution-based trust and online auction marketplaces. Earlier we asked what steps can be taken to increase buyers' trust and reduce perceived risk to encourage legitimate transactions in online marketplaces. This study suggests that institutional mechanisms, providing they are perceived as effective, are one such method for doing so.

There has been a growing debate regarding the need for mediators ("info-mediaries" or "cyber-mediaries") in e-commerce (Chircu and Kauffman 1999, Song and Zahedi 2002). This study extends the theoretical rationale for the continuing role of mediating players (Palmer et al. 2000, Sarkar et al. 1995) by showing that the uncertain nature of the online environment promotes the growth of a new generation of intermediaries and mediating third parties that specifically focus on facilitating a trustworthy trading environment. As this study argues, the success of these intermediaries and third parties hinges to a large extent on the buyers' perception of trustworthiness of the intermediary and effectiveness of the third-party mechanism.

Finally, the study makes another contribution to research on trust. While past research has examined trust in a specific entity, such as a specific person or specific sellers, this study shows a new trust target—an entire community of sellers. This finding has implications for expanding the examination of targets of trust to less-structured entities. This extension of the target of trust to a whole community is especially of interest in the case of online marketplaces where buyers seldom encounter the same seller, and they are likely to consider the community of sellers.

5.5. Suggestions for Future Research

Because trust in the intermediary was the strongest trust-building factor, future research could examine the antecedents of "trust in the intermediary." Shapiro (1987) raised a crucial question in the context of institutional trust: "Who guards the guardians?" In the banking context, a governmental organization, the House Committee on Financial Services, does it. On the Internet, such elaborate mechanisms are yet evolving (see FCC report on steps being taken in *IFCC* 2003). Understanding how third parties can increase their own trustworthiness, a critical component of the perceived effectiveness of their institutional mechanisms, requires additional research. Such research could build on the work of Song and Zahedi (2002) who have proposed a theoretical framework describing several antecedents of trust in intermediaries. The results of our follow-up study also suggest some avenues for improving the perceptual effectiveness of institutional mechanisms. Future research could further explore these and additional antecedents, and how, through them, guardians (intermediaries and third parties) could increase their own trustworthiness, especially on their competence-trust dimension (e.g., server reliability, download speed, website design). Existing theories on trust building (e.g., Doney and Cannon 1997, Jarvenpaa et al. 2000, Stewart 2003) could be used to study marketplace trustworthiness.

Online marketplaces offer both mechanisms for differentiating among sellers (e.g., through each seller's unique feedback profile), and also nondifferentiating mechanisms that increase the sense of trustworthiness of all of its participants (e.g., through accreditation, escrows, credit card guarantees). Failure to provide such differentiation will cause high-quality sellers to flee the marketplace because their quality could not be

signaled to earn them price premiums (Ba and Pavlou 2002). In other words, undiscriminating trust-building mechanisms run the risk of creating a "market of lemon sellers" where only low-quality sellers linger, and the market will eventually collapse. Therefore, both types of trust-building mechanisms are necessary to achieve an effective online marketplace. Future research could explore an optimum mix between differentiating and nondifferentiating institutional mechanisms. Because online marketplaces rely on high trade volume, improvements in the design of their institutional mechanisms may be important to their success. Research could also examine whether institutional mechanisms and trust in the community of sellers work differently with different types of buyers. In e-commerce trust does work differently; presumably the same should apply to electronic markets too. Additional research could examine such differences.

It is important to integrate the institution-based perspective by which organizations build trust with experience-based trust formation (Gefen 2000, Luhmann 1979). In fact, the less existence of familiarity and similarity among buyers and sellers in a marketplace, the higher the need for institutional structures (Luhmann 1979). This study argues that past experience has a complementary role to institutional mechanisms. Longitudinal research on the integration of these trust-building mechanisms (familiarity, similarity, institutions) in online marketplaces over time is needed. Zucker (1986) theorizes that institution-based trust is likely to be an important determinant of trust in early stages, until familiarity grows. Borys and Jemison (1989) also argue that the development of trust initially relies on contractual assurances, and it then moves to widely accepted norms and rules of conduct. The work of McKnight et al. (1998) on initial trust formation could guide the study of the role of trust-building mechanisms over time.

Problematic and fraudulent transactions not only harm buyers, legitimate sellers, online marketplaces, and the proliferation of e-commerce, but they also have legal and public policy implications. Indeed federal officials have become "dead serious" about online fraud and have started chasing and prosecuting fraudulent parties (*FTC* 2000, *IFCC* 2003, O'Donnell and Swartz 2003). Other than ex-post-facto punitive measures, public policy officials could increase the perceived effectiveness of institutional mechanisms through public education on how institutional mechanisms work.[19] According to Christine Gregoire, Washington state's attorney general, "Our single biggest piece of advice is three things: Use your credit card, use your credit card, use your credit card" (Gross 2003). Educating buyers about the benefits of using credit cards for online transactions may be an advisable public policy. The same applies for third-party protection, such as escrows. Future research should examine how public education can increase the effectiveness of institutional mechanisms and prevent problematic transactions.

6. Conclusion

The institutionalization of trust can be a primary means of building effective online marketplaces, especially in the absence of familiarity, similarity, and well-established legal recourse. Having shown the impact of the proposed market-driven and legally binding institution-based factors on trust building, risk reduction, and actual transaction behavior, we hope to entice future researchers to focus on (a) further examination of the relative effectiveness of existing legally binding and market-driven institutional mechanisms, (b) improving the effectiveness of existing institutional mechanisms, (c) identifying or designing new effective institutional mechanisms, (d) better understanding the bases and dynamics of trust in a community of trustees, and (e) understanding and promoting the nature and role of IT-enabled institutional mechanisms in facilitating the success of online transaction relationships in online marketplaces and in e-commerce in general.

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[19] As one of our respondents admitted: "This research opened my eyes to the fact that I should be more careful about the legal aspects of online transactions and the need to investigate . . . the guarantees and protection to the bidder in case of failure or misunderstandings with the seller. I trusted the brand Amazon and didn't ask for more. Now I'll be more careful."

Appendix 1a. Measurement Items for Primary Study

Item	Caption	Standardized Loading
Trust in the community of sellers		
ST1	Sellers in Amazon's auctions are in general *dependable.*	Dropped
ST2	Sellers in Amazon's auctions are in general *reliable.*	0.90
ST3	Sellers in Amazon's auctions are in general *honest.*	0.96
ST4	Sellers in Amazon's auctions are in general *trustworthy.*	0.97
Perceived effectiveness of feedback mechanism		
FB1	I feel confident that Amazon's Ratings & Feedback mechanism gives *accurate information* about the auction *sellers' reputation.*	0.90
FB2	A considerable amount of *useful feedback information* about the transaction history of auction sellers is available through Amazon's Ratings & Feedback mechanism.	0.88
FB3	I believe that the Ratings & Feedback mechanism in Amazon's auctions is *effective.*	0.94
FB4	I believe that the Ratings & Feedback mechanism in Amazon's auctions is *reliable and dependable.*	0.95
Perceived effectiveness of escrow services		
	The escrow method in Amazon's auction marketplace:	
ES1	*guarantees that I will get what I pay for.*	0.91
ES2	*protects me from an inappropriate behavior of sellers.*	0.93
ES3	*guarantees that sellers cannot cheat easily.*	0.87
Perceived effectiveness of credit card guarantees		
CR1	I believe my credit card company will *protect me in case of problematic transactions* with sellers in Amazon's auction marketplace.	0.95
CR2	I am confident that my credit card *payments are safe in case of disputed purchases* from sellers in Amazon's auction marketplace.	0.92
CR3	My credit card company will *stand by me if problems occur* during transactions with sellers in Amazon's auction marketplace.	0.93
Trust in intermediary		
HT1	As an auction host/intermediary, *Amazon can be trusted at all times.*	0.90
HT2	As an auction host/intermediary, *Amazon can be counted on to do what is right.*	Dropped
HT3	As an auction host/intermediary, *Amazon has high integrity.*	0.96
HT4	Amazon is a *competent and knowledgeable* auction host/intermediary.	0.92
Perceived risk in sellers		
RK1	There is a *considerable risk* involved in participating in Amazon auctions.	0.87
RK2	There is a *high potential for loss* involved in participating in Amazon auctions.	0.96
RK3	My decision to participate in Amazon auctions *is risky.*	0.84
Sellers' performance		
	Please rate the performance of Amazon's auction sellers *on average* on fulfilling these goals:	
PR1	*Competitive pricing.*	0.72
PR2	*Timeliness of delivery.*	0.82
PR3	*High-quality products.*	0.79
Positive past experience		
EX1	My *past experience* in Amazon's auction marketplace was positive.	0.93
EX2	I *received excellent service* from sellers in Amazon's auction marketplace in the past.	0.97
EX3	Sellers in Amazon's auction marketplace *did a good job in the past.*	0.96
Individual propensity to trust		
P1	Most Internet retailers and auction sellers are *reliable.*	0.94
P2	Most Internet retailers and auction sellers *keep promises and commitments.*	0.96
P3	Most Internet retailers and auction sellers are *honest.*	0.91
Transaction intentions		
TR1	Given the chance, *I predict that I would consider bidding for products* from sellers in Amazon's auctions in the future.	0.91
TR2	It is likely that *I will actually bid for products* from sellers in Amazon's auctions in the near future.	0.96
TR3	Given the opportunity, *I intend to place a bid* in Amazon's auctions.	0.91

Appendix 1b. Measurement Items for Follow-Up Study

Caption
Actual transaction behavior
How many times have you won an auction (purchased a product) in Amazon's auctions *during the last year*? —— times
Reasons for NOT using institutional mechanisms
Please check if the following factors are reasons for ***NOT*** using escrow services/credit cards/feedback mechanism for auction purchases: (Check boxes for (a) lack of awareness, (b) inconvenience (time, effort), (c) unavailability, (d) high cost, (e) lack of adequate recourse.)
Please **rank** the reasons for ***NOT*** using escrow services/credit cards/the feedback mechanism for auction purchases: (Rank boxes for (a) lack of awareness, (b) inconvenience (time, effort), (c) unavailability, (d) high cost, (e) lack of adequate recourse.)

Appendix 2. Principal Components Factor Analysis with Varimax Rotation

	Feedback Mechanism	Trust in Sellers	Trust Propensity	Credit Card Guarantees	Perceived Risk	Transaction Intentions	Escrow Services	Past Experience	Sellers' Performance	Trust in Intermediary	Communality
FB3	**0.85**	0.22	0.14	0.11	0.09	0.09	0.18	0.11	0.09	0.19	**0.92**
FB4	**0.84**	0.23	0.15	0.12	0.07	0.11	0.23	0.11	0.09	0.19	**0.92**
FB2	**0.81**	0.25	0.15	0.13	0.07	0.01	0.15	0.11	0.13	0.15	**0.84**
FB1	**0.78**	0.29	0.11	0.17	0.04	0.06	0.21	0.18	0.07	0.21	**0.86**
ST2	0.32	**0.80**	0.17	0.14	0.10	0.15	0.18	0.16	0.11	0.22	**0.93**
ST1	0.32	**0.79**	0.17	0.11	0.09	0.18	0.16	0.17	0.10	0.22	**0.93**
ST3	0.31	**0.78**	0.25	0.14	0.13	0.14	0.19	0.14	0.14	0.14	**0.92**
ST4	0.35	**0.77**	0.23	0.13	0.12	0.14	0.21	0.16	0.14	0.14	**0.93**
P2	0.15	0.21	**0.89**	0.13	0.06	0.07	0.10	0.11	0.11	0.15	**0.94**
P1	0.14	0.18	**0.88**	0.21	0.03	0.09	0.12	0.11	0.06	0.12	**0.92**
P3	0.20	0.15	**0.85**	0.20	0.12	0.11	0.11	0.13	0.10	0.08	**0.89**
CR3	0.14	0.10	0.16	**0.90**	0.09	0.11	0.14	0.08	0.05	0.08	**0.92**
CR1	0.12	0.12	0.17	**0.89**	0.08	0.10	0.19	0.07	0.10	0.07	**0.93**
CR2	0.18	0.13	0.18	**0.85**	0.07	0.12	0.19	0.06	0.10	0.17	**0.90**
RK2	−0.10	−0.06	−0.09	−0.03	−**0.91**	−0.19	−0.09	−0.08	−0.08	−0.10	**0.92**
RK1	−0.03	−0.11	−0.06	−0.04	−**0.89**	−0.11	−0.13	−0.10	−0.10	0.00	**0.86**
RK3	−0.09	−0.08	−0.03	−0.16	−**0.83**	−0.14	−0.05	−0.19	−0.18	−0.10	**0.84**
TR3	0.08	0.14	0.10	0.13	0.21	**0.82**	0.11	0.19	0.25	0.17	**0.90**
TR2	0.09	0.19	0.10	0.13	0.22	**0.80**	0.05	0.29	0.23	0.13	**0.93**
TR1	0.10	0.16	0.10	0.14	0.19	**0.79**	0.11	0.34	0.21	0.07	**0.90**
ES2	0.26	0.18	0.13	0.21	0.13	0.07	**0.82**	0.11	0.16	0.16	**0.91**
ES1	0.25	0.19	0.13	0.20	0.08	0.06	**0.80**	0.11	0.17	0.19	**0.89**
ES3	0.27	0.20	0.11	0.21	0.16	0.14	**0.78**	0.07	0.06	0.16	**0.86**
EX3	0.19	0.17	0.14	0.10	0.16	0.28	0.10	**0.82**	0.23	0.11	**0.95**
EX2	0.20	0.16	0.16	0.11	0.19	0.28	0.09	**0.80**	0.27	0.13	**0.95**
EX1	0.16	0.23	0.14	0.06	0.19	0.30	0.13	**0.78**	0.25	0.10	**0.93**
PR2	0.04	0.12	0.08	0.09	0.12	0.13	0.12	0.29	**0.80**	0.06	**0.80**
PR3	0.10	0.13	0.07	0.09	0.19	0.14	0.11	0.22	**0.77**	0.06	**0.76**
PR1	0.18	0.07	0.13	0.07	0.07	0.37	0.10	0.05	**0.72**	−0.01	**0.74**
HT2	0.42	0.25	0.20	0.16	0.15	0.16	0.31	0.11	0.07	**0.68**	**0.93**
HT3	0.46	0.31	0.18	0.17	0.08	0.18	0.23	0.13	0.07	**0.68**	**0.94**
HT1	0.41	0.28	0.23	0.19	0.13	0.16	0.26	0.16	0.08	**0.63**	**0.88**
HT4	0.46	0.31	0.17	0.17	0.09	0.15	0.22	0.19	0.04	**0.63**	**0.89**
Eigenvalue	4.45	3.54	2.97	2.95	2.80	2.74	2.71	2.70	2.37	2.28	
Variance	13.48	10.72	9.00	8.93	8.49	8.30	8.23	8.19	7.19	6.92	Total = **89.5%**

Appendix 3. Covariance Matrix

	Mean	Std.																																		
ST1	5.67	1.39	1.00																																	
ST2	5.67	1.40	0.94	1.00																																
ST3	5.53	1.43	0.85	0.86	1.00																															
ST4	5.52	1.44	0.86	0.87	0.93	1.00																														
FB1	5.46	1.43	0.68	0.68	0.64	0.65	1.00																													
FB2	5.38	1.45	0.58	0.56	0.59	0.63	0.77	1.00																												
FB3	5.32	1.49	0.62	0.63	0.60	0.63	0.84	0.84	1.00																											
FB4	5.34	1.44	0.64	0.65	0.63	0.66	0.86	0.83	0.90	1.00																										
HT1	5.44	1.52	0.68	0.70	0.65	0.66	0.67	0.60	0.67	0.70	1.00																									
HT2	5.49	1.49	0.66	0.67	0.64	0.65	0.68	0.62	0.67	0.69	0.88	1.00																								
HT3	5.62	1.46	0.71	0.71	0.67	0.69	0.69	0.67	0.69	0.70	0.87	0.90	1.00																							
HT4	5.63	1.39	0.69	0.69	0.67	0.68	0.70	0.68	0.68	0.68	0.81	0.85	0.89	1.00																						
ES1	4.95	1.38	0.52	0.55	0.54	0.55	0.54	0.47	0.51	0.54	0.57	0.61	0.59	0.56	1.00																					
ES2	5.02	1.41	0.51	0.53	0.55	0.56	0.53	0.50	0.50	0.54	0.58	0.63	0.57	0.55	0.86	1.00																				
ES3	4.93	1.49	0.52	0.54	0.55	0.56	0.52	0.50	0.51	0.55	0.61	0.61	0.57	0.57	0.78	0.81	1.00																			
CR1	5.02	1.64	0.35	0.38	0.39	0.38	0.38	0.33	0.32	0.34	0.43	0.39	0.42	0.41	0.45	0.46	0.44	1.00																		
CR2	5.11	1.55	0.40	0.42	0.42	0.42	0.44	0.40	0.39	0.42	0.52	0.50	0.49	0.47	0.46	0.47	0.49	0.87	1.00																	
CR3	4.96	1.63	0.33	0.35	0.38	0.37	0.36	0.34	0.30	0.32	0.41	0.39	0.40	0.39	0.41	0.41	0.40	0.89	0.85	1.00																
P1	5.09	1.34	0.45	0.45	0.50	0.49	0.42	0.36	0.41	0.41	0.51	0.47	0.49	0.47	0.39	0.37	0.37	0.45	0.47	0.43	1.00															
P2	5.14	1.30	0.48	0.48	0.52	0.50	0.41	0.41	0.41	0.43	0.53	0.51	0.51	0.48	0.38	0.39	0.36	0.40	0.43	0.37	0.91	1.00														
P3	5.02	1.33	0.43	0.45	0.53	0.52	0.40	0.39	0.41	0.43	0.49	0.47	0.45	0.43	0.38	0.39	0.37	0.46	0.46	0.44	0.85	0.87	1.00													
RK1	3.12	1.67	-0.27	-0.28	-0.31	-0.31	-0.18	-0.18	-0.21	-0.22	-0.29	-0.31	-0.22	-0.23	-0.25	-0.32	-0.33	-0.20	-0.22	-0.19	-0.14	-0.18	-0.21	1.00												
RK2	2.97	1.56	-0.30	-0.30	-0.33	-0.32	-0.20	-0.23	-0.26	-0.25	-0.33	-0.34	-0.30	-0.30	-0.27	-0.29	-0.34	-0.21	-0.22	-0.20	-0.19	-0.20	-0.26	0.84	1.00											
RK3	2.83	1.60	-0.32	-0.34	-0.36	-0.34	-0.25	-0.22	-0.28	-0.24	-0.35	-0.34	-0.31	-0.29	-0.29	-0.30	-0.34	-0.33	-0.30	-0.30	-0.18	-0.20	-0.24	0.72	0.81	1.00										
PR1	5.14	1.36	0.31	0.32	0.38	0.38	0.28	0.31	0.29	0.32	0.33	0.28	0.31	0.29	0.30	0.31	0.30	0.28	0.24	0.23	0.26	0.29	0.35	-0.20	-0.28	-0.34	1.00									
PR2	5.40	1.40	0.34	0.34	0.36	0.37	0.28	0.28	0.29	0.28	0.33	0.30	0.29	0.28	0.36	0.36	0.29	0.27	0.30	0.23	0.23	0.27	0.28	-0.28	-0.27	-0.33	0.60	1.00								
PR3	5.53	1.18	0.37	0.37	0.39	0.40	0.31	0.31	0.32	0.33	0.34	0.34	0.32	0.30	0.37	0.37	0.30	0.27	0.29	0.24	0.24	0.29	0.29	-0.31	-0.31	-0.41	0.54	0.66	1.00							
TR1	6.12	1.19	0.47	0.46	0.44	0.45	0.35	0.24	0.33	0.35	0.46	0.43	0.42	0.42	0.33	0.35	0.38	0.35	0.38	0.33	0.33	0.33	0.38	-0.39	-0.44	-0.45	0.50	0.47	0.47	1.00						
TR2	5.95	1.24	0.49	0.47	0.47	0.47	0.33	0.28	0.34	0.36	0.48	0.47	0.46	0.45	0.32	0.34	0.36	0.34	0.37	0.34	0.32	0.33	0.37	-0.39	-0.45	-0.47	0.50	0.48	0.49	0.88	1.00					
TR3	5.83	1.33	0.46	0.45	0.44	0.44	0.31	0.28	0.33	0.34	0.48	0.47	0.48	0.45	0.35	0.37	0.39	0.34	0.37	0.34	0.32	0.33	0.36	-0.36	-0.45	-0.44	0.52	0.47	0.47	0.82	0.88	1.00				
EX1	6.03	1.33	0.53	0.53	0.53	0.54	0.44	0.37	0.39	0.41	0.49	0.45	0.46	0.48	0.42	0.41	0.41	0.33	0.32	0.29	0.37	0.38	0.38	-0.36	-0.38	-0.45	0.50	0.56	0.53	0.70	0.65	0.60	1.00			
EX2	5.90	1.35	0.50	0.50	0.49	0.51	0.45	0.39	0.43	0.44	0.52	0.47	0.48	0.49	0.39	0.41	0.40	0.36	0.38	0.33	0.39	0.40	0.41	-0.36	-0.38	-0.44	0.49	0.59	0.54	0.68	0.65	0.60	0.90	1.00		
EX3	5.93	1.33	0.50	0.49	0.49	0.50	0.45	0.38	0.42	0.42	0.50	0.46	0.45	0.48	0.39	0.40	0.39	0.33	0.35	0.32	0.37	0.37	0.39	-0.33	-0.33	-0.41	0.46	0.54	0.52	0.67	0.64	0.57	0.90	0.93	1.00	

Note. All covariances are significant at least at the 0.005 level.

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