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TRANSPARENCY IN REPUTATION SYSTEMS

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Abstract

Reputation systems are extensively used in e-commerce, particularly online auction markets, to foster cooperation and accountability between buyers and sellers, resulting in price premiums and improved trust between buyers and sellers. The diffusion of reputation systems through online auction markets is pervasive, as trust engendered through reputation is necessary for cooperative action. Information transparency influences cooperative and competitive behavior in online auction markets, and through information transparency this study explores the information effects within online auctions on seller reputation and buyer trusting beliefs and intentions. In addition, a seller's reputation is dependent on the salience of their market identity, and cannot be relegated to simple feedback scores. Therefore, we propose that perceived reputation of sellers' depends on seller identifiability through pseudonyms and levels of identity knowledge. Finally, a distinction is drawn between institutionalized reputation, e.g. feedback scores, and perceived reputation, e.g. the impression of potential buyers. In this research in progress, we present a theoretically grounded research model to study the effects of identity and information transparency in reputation systems and online auction markets. We outline the proposed experimental design using a proxy website to manipulate key information components to induce treatment effects, and conclude with a discussion of the implications of adopting different identity and transparency design for reputation systems in online auction markets.

Introduction

Trust-building mechanisms are used extensively in e-commerce and online markets to reduce and resolve on-line disputes while promoting honest and cooperative business between buyers and sellers (Dellacros 2005; Resnick 2000, 2002). Reputation systems institutionalize, digitize and aggregate feedback information of buyers and sellers through feedback scores (Dellacros 2003), while making available information about the quality of previous transactions through feedback comments. The reputation systems are operationalized differently by different markets. Some consumer-to-consumer (C2C) online markets such as Amazon (http://www.amazon.com) have little or no information available about the prior transactions of other buyers and sellers apart from feedback

ratings. E-Bay (http://www.ebay.com), on the other hand, provides significant information about prior transactions, including what was purchased, sold, winning bid, winning bidder, feedback comments, etc. The availability of such information concerning prior transaction may legitimize and subsequently increase a buyer or seller's reputation. Research in reputation systems have focused on the relationship between feedback scores and a variety of outcome variables, particularly price premiums (Ba and Pavlou 2002; Lee et al. 2000) and trust (Brown and Morgan 2006); however, these studies often ignore the nature of the reputation system mechanisms and the quality and availability of information about the product and auction. Therefore, this study explores information effects of several factors (information transparency and identifiability) of the online auction and the reputation mechanism itself.

Information asymmetry and information transparency as "the degree of visibility and accessibility of information" (Zhu 2002) influence the behavior of buyers and sellers incentives to cooperate in online markets (Zhu 2004). Information asymmetries and transparency in online markets differentiate sellers by supporting other mechanisms in the market, specifically trust and reputation mechanisms (Gregg and Scott 2006). However, no research has addressed the impact of the nature and amount of information available to buyers and sellers in online markets on reputation, trust, and buyer's intention to transact.

Reputation systems require some level of identity to function efficiently. Anonymous users have little or no incentive to behave ethically in the market (Friedman and Resnick 2001), while identified users have no privacy. Therefore, reputation systems must balance the amount of available information with the privacy of the user. Pseudonyms are used to promote accountability and cooperation between buyers and sellers, while maintaining the privacy of users. While the areas of anonymity and identity have been explored in the context of reputation systems in on-line markets in the past (Friedman and Resnick 2001) none have directly explored the effects of varying degrees of identifiability on reputation.

The study seeks to expand on previous research that investigates the effects reputation systems have on consumer reputation and trust in on-line, C2C markets. Researchers have investigated many constructs in markets with an active reputation system, including trust (Brown and Morgan 2006), price premiums (Ba and Pavlou 2002, Lee et al. 2000), satisfaction, and feedback ratings (Standifird 2001). However, although commonly

associated with reputation literature, anonymity, identifiability (Friedman and Resnick 2001) and information transparency (Dellarocas 2003, 2005) are overlooked in reputation systems of online markets. Therefore, the study seeks to answer the following question: *What effect does identifiability, information transparency, and reputation of buyers and sellers on the formation of trust beliefs and their intentions to transact?*

Literature Review

Online markets through e-commerce technologies enable people to engage in on-line transactions with others in geographically separate areas. On-line markets create several incentives over traditional markets, including lowering the product price, sales tax, and search costs; however, with higher risk and distribution costs (Strader and Shaw 1999). Consumers find additional incentives to participate in C2C markets, such as the reduced or eliminated cost of dealing with an intermediary (Strader and Ramaswami 2002). Many examples of on-line C2C markets exist. eBay (http://www.ebay.com), for example, is commonly used in on-line C2C market research as it represents the most successful and ubiquitous case of an online C2C market (Dellarocas 2003; MacInnes, Li, and Yurick 2005; Strader and Ramaswami 2002). Other examples of C2C markets include Yahoo Auction (http://auctions.yahoo.com) and new and used items sold on Amazon (http://www.amazon.com) (Resnick 2000).

Many online markets employ reputation systems to build trust and hold participants accountable for their actions, fostering cooperation between buyers and sellers and improving customer confidence. Reputation systems, or trust building mechanisms, help buyers and sellers discover information about the satisfaction of past transactions, without requiring direct word-of-mouth between previous and potential buyers (McDonald and Slawson 2002). As such, reputation systems provide asynchronous feedback in a structured and organized manner. Information systems have been used extensively to establish trust and reputation of on-line users trading consumer goods (Dellarocas 2003; Kollock 1999). By building mechanisms to track the quality of the transaction, such as buyer and seller satisfaction or feedback, reputation systems are able to foster trustworthiness between market participants. Reputation is created from repeated interactions between one or more individuals where the intention of other individuals is uncertain (Wilson 1985). Rein (2005) further conceptualizes reputation as a public perception of a person, thing, or action and may be either positive or negative (favorable or unfavorable, etc.). Reputation is a socially constructed phenomenon, in that people's interactions with the person, thing, or action

and interactions among themselves create and reinforce a particular perception of the person, thing, or action (Dellarocas 2003; Rein 2005; Resnick 2000).

Recent literature has found that reputation systems have positive effects on online markets. MacInnes et al. (2005) found that reputation and experience with on-line transactions on eBay led to a significant decrease in the number of disputes between buyer and seller. In addition, Gregg and Scott (2006) demonstrated reputation systems improve the ability of buyers and sellers to detect fraud in eBay auctions through negative feedback ratings. In addition, reputation systems may exist outside of the marketplace, supporting consumer's decisions to purchase from vendors and retailers in the case of Bizrate (http://www.bizrate.com) and particular products regardless of retailer, such as Epinions (http://www.epinions.com) (Resnick 2000).

This study will differentiate between the two aforementioned notions of reputation. The public, socially constructed perception of buyers and sellers is termed *perceived reputation* (e.g. Einwiller 2003; Jarvenpaa et al. 2000; Pennington et al 2004), while the representation of reputation through feedback scores (e.g. Ba and Pavlou 2002) is termed *institutional reputation*. Literature in reputation systems has focused primarily on how a buyer or sellers reputation (through feedback scores) affects a variety of outcome variables; however, these studies do not investigate the relationship between the institutional representation of reputation and how that reputation is perceived by other buyers and sellers. Institutional reputation is the reputation of the buyer or seller defined by the institution, in this case, the reputation system of the online market, and is not to be confused with institution-level constructs, such as institution-based trust, which . In other words, the former is reputation *by* the institution, while the latter is trust *of* or reputation *of* the institution. Perceived reputation, on the other hand, is the aggregate, observed interpretation of buyer and seller characteristics, past experiences with the buyer and seller, and of the institutionalized reputation as codified through feedback scores.

Anonymity and Identifiability

The identity of individuals in traditional markets carries significant weight in terms of reputation when individual interact often (Klein 1997), and as such, the ability to identify market actors accurately has significant bearing in the formation of trust from the actor's reputation. Anonymity and identification create two extremities of a dichotomous relationship, representing the degree of identity knowledge available to other people (Marx

1999). Anonymity occurs when a person cannot be appropriately identified by another along several dimension of identity knowledge. Identification, on the other hand, uses similar dimensions of identity knowledge, although no ideal state of identification exists. Instead, identification is the degree a person is identifiable along each of the dimensions of identity knowledge. The seven dimensions of identity knowledge, in order of the ease to identify a person, are as follows: (1) legal name, (2) location, (3) identifiable pseudonyms, (4) anonymous pseudonyms, (5) behavioral patterns, (6) social categorization, and (7) symbolic.

Anonymity is an important aspect of online markets, as it protects the identity and other personal information of buyers and sellers. Anonymity may also be viewed as a mechanism to promote privacy online. However, anonymity is problematic as participants who enjoy near absolute anonymity have little or no incentive to cooperate, as buyers and sellers cannot be held personally accountable for their actions. However, while identifying individuals may greatly improve cooperative market behavior and reduce the occurrence of fraud, as personal accountability and responsibility can be enforced (Gregg and Scott 2006); privacy concerns may drive away users, as personal information becomes widely available on the market. Therefore, under both extreme circumstances, anonymous and identified, severe problems arise in online markets, and the only solution is to establish some degree of each by using pseudonyms.

Another alternative, online pseudonym, require users to create a temporary, local identity to participate in the market (Cvrcek 2004; Friedman and Resnick 2001). Pseudonyms preserve the privacy of users, but create a form of unique identification in the market. On-line C2C markets typically support the creation of pseudonyms, which carry their own independent reputation apart for the identity of the owner of the pseudonym. Pseudonymous identities, however, may easily be created and destroyed, providing little benefit for individuals seeking to be cooperative and fair in the market, but nevertheless provides strong incentives for previous "cheaters" to become more cooperative with their newfound, pseudonym identity (Friedman and Resnick 2001). Online markets using systems reputation systems will also decreases the ease of entry and exit since both significant investments required to develop the reputation, and incentives exist against cheating (Yamamoto et al. 2003).

Information Transparency

Information transparency is the degree of visibility and accessibility of information (Zhu 2002, 2004). Information transparency may manifest itself through information asymmetry, the unequal distribution of information between multiple parties; and may alleviate information asymmetry by increasing the visibility and accessibility of information for those who have no direct control. Information transparency may also play a role as an antecedent of reputation and trust in on-line, C2C markets. Zhu (2002, 2004) found in business-to-business (B2B) on-line markets, the benefits of information transparency to promote cooperation had its limits.

Gregg and Scott (2006) identify two types of information asymmetry in online auctions: product and seller. Two similar dimensions can be found in information transparency, since information asymmetry is a product of a deficiency in transparency. In addition, we identify a third dimension related to the auction itself, such as the terms and conditions of the auction. Therefore, information transparency, within a C2C, auction-based market context, may be viewed in three dimensions: product, auction, and seller. Information transparency as the visibility and accessibility of information varies from auction to auction on each of the aforementioned dimensions. The *product* dimension of information transparency concerns the presence and availability of information regarding the nature and condition of the product being sold, including technical specifications, product description, images, condition, etc. The *auction* dimension of information transparency concerns the presence and availability of information regarding the terms of the auction itself, such as purchase or bidding price, auction terms, warranties and guarantees, etc. The *seller* dimension refers to the transparency of information concerning the nature of the seller, including such information as the seller's past transactions, feedback on those transactions, and their overall reputation. An interaction effect is plausible between identity and seller information transparency, where additional information found through the identification of the buyer or seller contributes to the overall visibility and availability of seller information.

Trust

Trustworthiness is a critical factor in C2C on-line transactions (Dellarocas 2003). The importance of trust is particularly emphasized in the seller's reputation and quality of past transactions. Buyers who perceive a seller with higher trustworthiness or reputation will be more willing to pay a premium for the product or service, which

may give buyers and sellers the incentive to be trustworthy in order to maintain their reputation (Strader and Ramaswami 2002; Strader and Shaw 1999).

The study utilizes McKnight et al. (1998) and McKnight and Chervany (2002) construction of the initial formations of trust to bridge the link between identifiability, information transparency, and reputation, with the behavioral outcomes, such as buyer satisfaction and feedback. A comprehensive definition of trust, based upon the theoretical underpinnings of psychological, sociological, and economic thought, is proposed. McKnight defines trust as follows: "to willingly become vulnerable to the trustee, whether another person, an institution, or people generally, having taken into consideration the characteristics of the trustee." (McKnight and Chervany 2002).

McKnight et al. (2002) investigates the framework for the initial formation of trust in an e-commerce, business-to-consumer (B2C) setting, validating an instrument designed to capture each of the constructs and sub-constructs in the originally theorized model. A person's *disposition to trust* is the "general propensity to trust others", an internal factor influencing the trust of an individual. *Institutional-based trust* is the willingness to be vulnerable given structural and environmental factors; therefore, in an on-line auction context, would refer to security measures, fraud protection, or even perceived reputation.

Research Model

The salient constructs in the study, including a brief definition of the construct and the relevant sources are outlined in Table 1.The research model (Figure 1) represents the relationships between each of the constructs listed in Table 1. Our research model incorporates *institution-based reputation*, representing the feedback scores of buyers and sellers, and differentiates the effects of institutional reputation on perceived reputation and other variables.
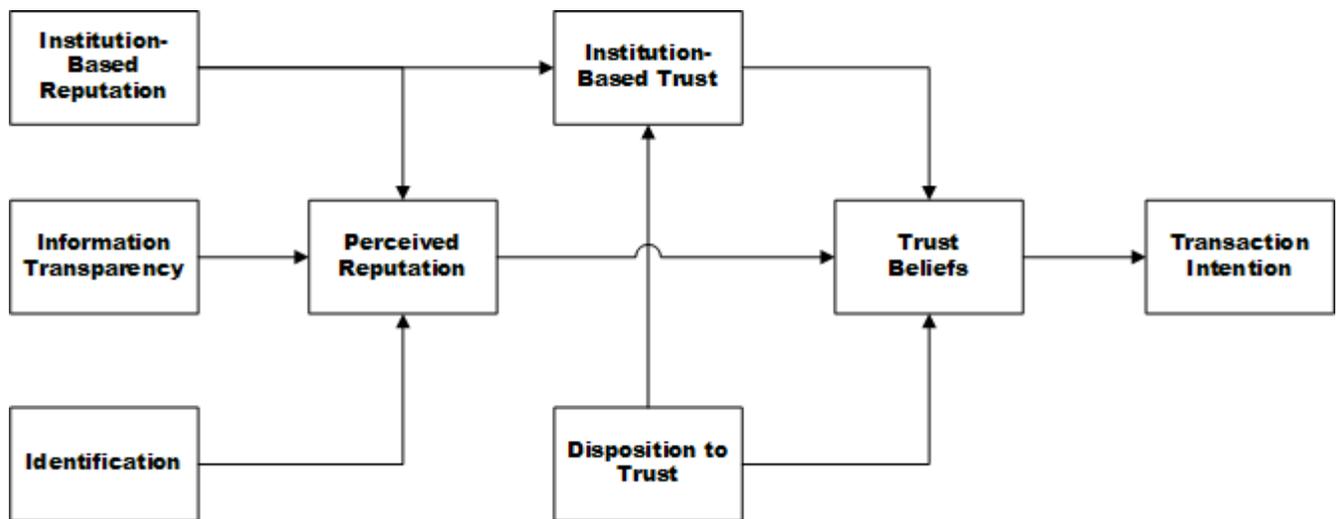
Figure 1: Research Model

Institution-based reputation is also expected to have a positive impact on institution-based trust, as McKnight et al. (2002) suggested that reputation through feedback scores would constitute an institution-based trust mechanism. *Information transparency* and *identification* are both expected to positively influence perceived reputation. *Perceived reputation* is, in turn, expected to have a direct, positive impact on the trust beliefs of buyers. From here, the relationships between disposition to trust, institution-based trust, and trust beliefs are strongly supported in recent studies (McKnight et al. 1998, 2000); however, the original context involved trust beliefs and intentions with websites, not online auctions or other buyers or sellers. A buyer's individual *disposition to trust* is expected to positively influence both their institution-based trust and trust beliefs. *Institution-based trust*, or the willingness to be vulnerable given structural and environmental factors, is expected to positively affect trust beliefs in the buyer, and ultimately their intention to transact. Transaction intention represents the trust-related behaviors described in McKnight et al. (2000).

Experimental Design

We plan to use experimental design to test our model. A proxy online auction website and a guided survey will be utilized in the experimental design. The proxy website will mimic the popular auction website eBay (http://www.ebay.com) to reduce bias due to unfamiliarity while controlling for market experience. The proxy website will control each of the informational constructs, including information transparency, identifiability, and

institutional reputation, and induce each of the treatments according to the informational constructs.

Respondents will be presented a list of products to choose from, including image, title, current price, and time left in auction. The selection of products is used, in part, to control for product type. The products will be ordered randomly, but each of the product types will be available on the first selection page. Upon selecting a product, the treatments for each informational construct will be generated, and the resulting product page will reflect the various treatments. For example, when a page is selected, the institutional reputation will be randomly chosen between the categorical variables, namely high and low institutional reputation. The random generation of institution reputation manifests itself in a reputation score displayed on the product page with the seller information. Information transparency with respect to the product, as another example, would manifest itself in the product specification and description disclosed in the auction. The amount of information visible to the buyer will reflect varying levels of information transparency with respect to the product, the higher levels of information transparency, the more information available to the buyer through the product specification and description.

Upon reviewing the item selected, respondents complete a questionnaire capturing several outcome variables respective to the generated auction. The outcome variables include perceived reputation, institution-based trust, trust intentions, and intention to transact. Disposition to trust is captured with the initial survey, along with other individual-level constructs, such as web and market experience.

Constructs	Definition	Source
Independent Variables		
Identifiability	The degree of identification of a person through identity knowledge in the online market.	Marx 1999 Friedman and Resnick 2001
Information Transparency	The degree of visibility and accessibility of information concerning the seller, product, or auction.	Zhu 2002 Zhu 2004
Institutional Reputation	Digitized and aggregated feedback through a market mechanism, such as feedback scores.	Resnick 2002
Disposition to Trust	Propensity to trust others without prior knowledge or institutional support.	McKnight and Chervany 2002 McKnight et al. 2002 McKnight et al. 1998
Dependent Variables		
Perceived Reputation	Socially constructed, public perception of a person, thing, or action, either favorable or unfavorable.	Rein 2005 Resnick 2002 Jarvenpaa 2000
Institution-Based Trust	Willingness to be vulnerable given structural and environmental factors.	Idib.
Trust Belief	Initial trust belief other parties will fulfill the terms of the transaction.	Idib.
Transaction Intention	Intention to engage in the on-line auction transaction.	Liu, et al. 2004
Control Variables		
Web Experience	The amount of time a person spends on the Internet.	McKnight and Chervany 2002
Market Experience	The amount of time a person spends on the specific online market.	MacInnes et al. 2005
Product Price	The monetary price of the product being purchased or sold.	MacInnes et al. 2005
Product Type	Categorization of the product (as antique, clothes, electronics, etc.)	MacInnes et al. 2005

Table 1: Definition and sources of major constructs

Instrument and Measures

Several measures, having not been operationalized in this context in past research, require validation before conducting the study. The measures in question include information transparency (to establish a difference between and high or low levels of each dimension), identifiability (successfully mapping the categorized degrees of identity knowledge to each of the three stages), and the discrepancy between institutionalized reputation and perceived reputation.

Information transparency is operationalized through the three dimensions identified in the previous section: (1) product, (2) auction, and (3) seller. Each dimension is dichotomously separated measuring high and low levels of information transparency, resulting in a three by two matrix for information transparency. *Product*

information transparency is manipulated through the availability of additional product information, or the absence of important information. For example, the specifications for a computer may be left from the auction description, having only a make and year purchased. *Auction information transparency* is manipulated through the absence of information regarding shipping or warranties. Finally, seller information transparency is manipulated through the absence of available information regarding the seller, such as geographical location, contact information, etc.

To operationalize identifiability, this study uses the seven degrees of identity knowledge outlined in Marx (1999). Three categories, or states, of identifiability are operationalized using these seven degrees of identity knowledge, and the categories are anonymous, pseudonymous, and identified. Identified individuals may be known through the their (1) legal name, (2) location, and (3) identifiable pseudonyms. Therefore, for online markets, the identified state will be operationalized through either the disclosure of legal names or identifiable pseudonyms. Location is often disclosed after the transaction to complete the shipping process. Finally, the anonymous state is only applied to the final three states of identity knowledge, knowing (1) behavioral patterns, (2) social organizations, and (3) symbolic behaviors.

Discussion and Contribution

This research seeks to contribute to theory in several ways. First, we investigate several constructs largely ignored by research in reputation systems, namely identifiability and information transparency. Although identifiability has been explored in an e-commerce context using C2C markets, such research primarily established a link between the creation of and ease of creating pseudonyms and establishing a new reputation in the market (Cvcrek and Matyas 2004; Friedman and Resnick 2001). Our study expands on identifiability and pseudonimity research in reputation systems by exploring market-based outcomes, such as purchasing intention. Our second contribution concerns the decision-making processes of consumers in online auction markets, involving the formation of trust through reputation, identifiability, and information transparency. Much research in the area of online auction markets uses data from past transactions to support relationships between institutionalized reputation and outcome variables (e.g. Brown and Morgan 2006; Gregg and Scott 2006; MacInnes et al 2005). Our research explores perceptual measures of reputation and trust through the decision-making and trust formation processes towards intentions to transact with the seller. While using theory of

reasoned action based models in assessing transaction intention with web vendors has been used widely (e.g. Gefen and Straub 2003; Jarvenpaa et al 2002; McKnight and Chervany 2002), its presence in reputation systems *and* online auction markets is not as prevalent. Finally, our research hopes to differentiate between previously synonymous views of reputation, namely institutional and perceived reputation. While we suspect the correlation between these two perceptions to be significant, the nature of each of these perspectives on reputation is markedly different.

Two stakeholders may benefit from the insights of this research: sellers and auctioneers. Sellers bear the burden of maintaining an attractive reputation; but nevertheless benefit from having a positive reputation through price premiums, for example (e.g. Ba and Pavlou 2002). Understanding how additional information about the individual as a seller (identifiability) or controlling the amount of information about previous or present transactions (information transparency) may help improve the seller's reputation, and the ease that buyers trust the seller. Improving one's reputation and increasing trust with other parties not only brings a price premium on the product, but also may increase the likelihood, the willingness of buyers to purchase, or bid on the product. Auctioneers, the individuals or businesses who operate the online auction market, also have significant gains to be realized from the prosperity of the seller. For one, by increasing the number of transactions and the success of those transactions, auction websites are more able to maintain and attract new buyers and sellers to the market. Both by increasing the number of transactions and the number of individuals participating in the market, the auctioneers are able to expand their revenue through fees, either from posting a product on the market, or a percentage of the winning bid on the product. Thusly, any additional insight into the type of reputation mechanisms that is more beneficial to improving this "bottom line" would be a boon to the auctioneer. Through studying the amount of information and visibility of buyer and sellers on the market, auctioneers may be able to construct a reputation mechanism that communicates trust and reputation, the number of successful transactions and overall satisfied customers.

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