



The Impact of Trust on the Technology Acceptance Model in Business to Consumer E-Commerce

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ABSTRACT

Although its expected growth is exciting, online consumer spending has not reached expected levels. Previous research suggests that the profit potential of B2C has been limited by consumers' inability to trust e-retailers. This study examines two forms of trust – technology trust and relational trust, and uses the technology acceptance model (TAM) to model their impact on consumer purchasing intentions. It is hypothesized that technically well-designed websites impact technology trust, while websites with emotional cues impact relational trust. In this research we develop a model that incorporates both technology trust and relational trust mechanisms by applying TAM in the context of B2C. Technology trust is hypothesized to impact relational trust, and both, as mediated through TAM, are expected to increase a consumer's purchase intention. We discuss the implications of this model and directions for future research.

INTRODUCTION

A key challenge for e-commerce firms is to how to attract customers in B2C e-commerce. Forrester research predicts that the growth of U.S. business-to-consumer (B2C) e-commerce will grow from \$95.7 billion in 2003 to \$229.9 billion in the year 2008 (Johnson, Delhagen, & Yuen, 2003). Even with such promising growth, B2C's full potential has not been fully realized. It was found that 35% of non buyers (i.e. those who have never bought any products online in North America) had abandoned a shopping cart while shopping online because they were concerned about providing their personal information, and 24% had done so due to fears about credit card fraud (Kelley, Rhineland, & DeMoulin, 2001). Previous studies point towards a lack of consumer trust as a key issue impeding the proliferation of Internet shopping (Gefen, Karahanna, & Straub, 2003).

Trust has always been an important element in influencing customer behavior (Schurr & Ozanne, 1985), as it can reduce perceived social complexity of an online transaction. Although previous research shows a positive link between trust and intentions to purchase and/or actual buying decisions, they do not completely explain how trust is developed (Gefen et al., 2003; Jarvenpaa, Tractinsky, & Vitale, 2000; Lederer & Maupin, 2001). Gefen (2003) examined different aspects of trust and its impact on intentions to purchase, but the relationship between technological aspects of website interface mechanisms and relational trust factors that impact consumers' purchasing intentions were absent.

This paper examines how technology trust and relational trust affects TAM, which will in turn impact B2C transactions. Technology trust in the e-retailer focuses on how the customer perceives that the technological website interface mechanisms are designed to ensure security assurances. Technology trust is defined as *"the subjective probability by which an individual believes that the underlying technology infrastructure and control mechanisms are capable of facilitating*

inter-organizational transactions according to its confident expectations." Alternatively, relational trust has to do with the attitude the consumer has towards the particular e-retailer and is defined as *"a consumer's willingness to accept vulnerability in an online transaction based upon positive expectations of future e-retailer behaviors."* We examine how technology trust creates facilitating conditions for first-time website customers. In particular we examine the security services and best business practices that influence customers' purchase intentions from a particular e-retailer. This study extends the literature by examining the relationship between trust in the website's interface technology (or technology trust) and trust in the website's e-retailer (or relational trust), and their impact on purchasing behaviors using TAM. We address the following research questions; (1) what impact does website interface technology mechanisms (or technology trust) have on a consumer's relational trust of an e-retailer? and, (2) what impact does technology trust and relational trust mechanisms have on a consumer's purchasing intentions from an e-retailer? In the next section we discuss the theoretical development leading to the research model, followed by a discussion and justification of the research hypotheses. Finally, we conclude the paper with implications to theory, practice and future research directions.

THEORETICAL DEVELOPMENT

Previous studies on trust in B2C found that website assurances, transaction expectations and disposition to trust had a strong impact on trust in an e-retailer thereby affecting the customer's purchasing intentions (Jarvenpaa et al., 2000; Gefen, 2000).

The Technology Acceptance Model

The Technology Acceptance Model has repeatedly shown to predict intentions to use technology (Venkatesh & Davis, 2000). A website is a type of information technology, and significant empirical evidence has shown that perceived usefulness and ease of use affect consumers' behavioral intentions on a website (Lederer & Maupin, 2001; Venkatesh & Davis, 1996). We argue that perceived usefulness and perceived ease-of-use impact attitudes toward use, which in turn impacts behavioral intentions leading to actual usage (i.e. purchasing intentions and behaviors in the context of B2C).

Technology Trust in Business to Consumer E-Commerce

Technology trust is based on technical safeguards, protective measures, and control mechanisms that aim to provide reliable transactions from timely, accurate, and complete data transmission (Cassell & Bickmore, 2000). In the context of B2C e-commerce, technology trust refers to technical adequacy and extrinsic characteristics that describe web quality. For example, Liu and Arnett (2000) applied characteristics of accuracy, completeness, relevance, security, reliability, customization,

interactivity, ease of use, speed, and search functionality. Further, the quality of web appearance reflected and contributed towards best business practices.

Relational Trust in Business to Consumer E-Commerce

Relational trust is based on the attitudes and behaviors of a customer leading to intentions to purchase on an e-retailer's website. Based on previous research this study identifies three types of relational trust, competence, predictability, and goodwill (Mayer, Davis, & Schoorman, 1995).

Figure 1 presents the research model on the impact of technology trust and relational trust in the technology acceptance model.

The model examines the indirect impact of technology and relational trust on a consumer's purchasing intentions from an e-retailer's website by applying the technology acceptance model. Technological mechanisms affect the relational trust of the e-retailer, which in turn will affect perceived usefulness of the website and eventually, purchase behavior. Relational trust consists of elements such as a privacy policy, assurance seal, and testimonial or vendor information. The consumer's general disposition to trust is also hypothesized to directly influence relational trust of the e-retailer. Perceived ease of use of the website is further posited to influence purchasing intentions and behaviors. The next section justifies each of the research hypotheses in the model. Table 1 (enclosed in the appendix) presents the constructs, sub-concepts, definitions and instruments planned for testing the model in this study.

Research Model and Hypotheses

The Relationship between Technology Trust and Relational Trust

Technology trust emphasizes institutional structures and technical solutions embedded in the e-commerce system. We identify two sub-concepts of technology trust; security services (in the form of the e-retailer's web site providing confidentiality, integrity, authenticity availability, access controls, non-repudiation mechanisms) and best business practices (in the form of customer support, policies, warranties, user friendliness, and responsiveness of the e-retailer's web site). Following McKnight et. al. (1998), situation normality and structural assurances contribute to conditions that favor a customer's likelihood to trust. Situation normality refers to the belief that success is likely because things are properly and favorably ordered (Lewis & Weigert, 1985). Structural assurances refer to beliefs that success is likely because structural conditions such as policies, procedures, guarantees and regulations are in place (Shapiro, 1987; Williamson, 1993). We argue that in the context of B2C, technology trust in the form of technical adequacy, functionality, security, quality of web content, and web appearance increases structural assurances and therefore, relational trust. Therefore we hypothesize that technology trust is positively associated with relational trust.

H-1: Technology trust of an e-retailer's website will positively affect the customer's relational trust.

The Relationship between Disposition to Trust and Relational Trust

McKnight et. al. (1998) also suggest that trusting beliefs relate to perceptions about the e-retailer's website. In particular, the customer must believe that the e-retailer is competent, shows honesty and is

benevolent (Mayer et al., 1995). Trusting intentions with regard to the customer's actions refers to characteristics of accepting vulnerability. Disposition to trust is defined as the extent to which an individual is willing to depend on others across a broad spectrum of situations (Rotter, 1967). Previous research suggest that, when the relationship between trustor and trustee is new, such as in the case between a customer and an unfamiliar e-retailer, disposition to trust will be a strong determinant of initial trust (Gefen, 2000). Therefore we hypothesize that a consumer's trust in an e-retailer is influenced, in part, by that consumer's disposition to trust

H-2: A consumer's general disposition to trust will positively affect their relational trust of an e-retailer.

The Relationship between Technology Trust and Transaction Expectations

The website interface mechanisms that facilitate technology trust can influence a consumer's expectations about the e-retailer through both informational and inferential beliefs. Inferential beliefs are based on the consumer's evaluation of evidence and relationships outside the scope of descriptive or informational beliefs. Inferential beliefs include those beliefs about future behaviors that are transferred by an individual from one target of expectations to another based on perceived association between the targets, such as assurance seals. When a consumer pays attention to the positive information engendered by a well-designed interface and perceives it as relevant and valid, it is more likely to support the development of a trusting relationship between the consumer and the e-retailer. In B2C well-designed interface mechanisms leads to perceptions that the website is easy to operate and will be more likely to trigger positive transaction expectations. For example, Fishbein, (1975:30) defined expectations as "beliefs that a given response will be followed by some event". Therefore we hypothesize that technology trust favors transaction expectations.

H-3: Technology trust will positively affect a consumer's online transaction expectations regarding an e-retailer.

The Relationship between Relational Trust and Transaction Expectations

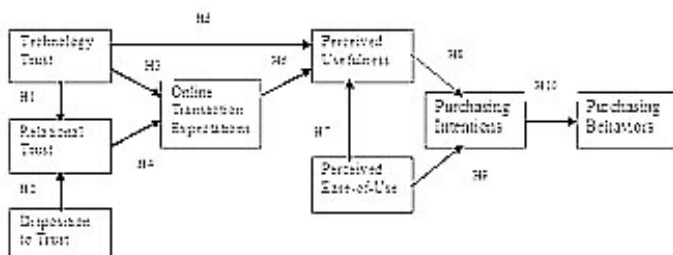
Since first time buyers lack online shopping experience, e-retailers need to impart information in order to assure their benevolent intent. Education and advertising contributes to informational beliefs. Inferential beliefs would be increased through judicial use of recommendations or testimonials that in turn increases the consumer's belief that the e-retailer is benevolent and trustworthy. Previous studies referred to the e-retailer's reputation as an important factor influencing transaction intentions (Doney & Cannon, 1997; Jarvenpaa et al., 2000). Reputation (as conferred through customers' testimonials and/or third-party seals) provides assurances of the e-retailer's ability, integrity and goodwill. Doney and Cannon (1997) defined reputation as "the extent to which buyers believe a selling organization is honest and concerned about its customers." We argue that reputation contributes to relational trust, since an e-retailer concerned about his/her reputation will exhibit benevolent and trustworthy behaviors towards their customers. Therefore we hypothesize that relational trust is positively associated with a customer's online transaction expectations.

H-4: Relational trust will positively affect a consumer's online transaction expectations.

The Relationship between Technology Trust and Perceived Usefulness

Previous studies applying TAM suggest that perceived usefulness is a response to an assessment of extrinsic (or task-oriented) outcomes. We argue that technology trust in the form of web quality, web content, and web appearance provides a perception of security, reliability, speed, completeness, and clarity of the product, services and warranty information. Conciseness and completeness of information when finding the e-retailer's general information, and ease of access contributes to

Figure 1: Research Model on the Impact of Technology and Relational Trust on the Technology Acceptance Model



extrinsic characteristics of the e-retailer. This in turn increases the likelihood of the customer to transact and purchase on the website. Further, best business practices in the form of web attractiveness, originality, proper use of fonts, style consistency, and good labeling also contributes towards perceived usefulness of website. Therefore we hypothesize that technology trust has a positive link to perceived usefulness.

H-5: Technology trust of the e-retailer's website will positively affect the perceived usefulness of a website by the customer.

The Relationship between Online Transactions Expectations and Perceived Usefulness

Previous studies examining the impact of perceived usefulness and its impact on transaction expectations and purchasing behaviors is limited. Gefen et al., (2003) found that trust increases aspects of the perceived usefulness of a website. While a consumer that trusts a website will perceive it as more useful, we suggest that trust actually affects their expectations of perceived usefulness. The consumer who has developed positive expectations of the transaction is more likely to perceive a website as a useful channel in completing the transaction, (e.g., the website can provide information regarding the product's availability, online tracking shipments, immediate credit card validation and debit information). On the other hand, low transaction expectations, coupled with utility, should lead to lower expectations and intentions to purchase. Therefore, we hypothesize that:

H-6: A consumer's online transaction expectations will positively impact the perceived usefulness of the website.

The Relationship between Perceived Ease of Use and Perceived Usefulness

Perceived usefulness is used to measure the customer's subjective assessment of the utility offered by the new IT in a specific task-related context (Davis & Bagozzi, 1992; Mathieson, 1991; Rose & Straub, 1998). We refer to the e-retailer's website as IT, while the specific task is shopping for a specific product. Research using the TAM model suggests that perceived enjoyment of using the e-retailer's website leads to a positive relationship with perceived ease of use (Moon & Kim, 2001; Venkatesh & Davis, 2000). If the consumer can easily navigate the site, click through and find the desired product, and get to the check-out cart, then perceived ease of using the website as a shopping channel should increase and should positively impact perceived usefulness. Therefore we hypothesize that:

H-7: Perceived ease-of-use will positively affect perceived usefulness of a B2C web site.

The Relationship between Perceived Usefulness, Perceived Ease-of-Use, and Purchasing intentions

Purchasing intentions refers to the degree to which a consumer intends to purchase from a certain e-retailer. According to TAM, the intention to use is impacted by both perceived ease-of-use and perceived usefulness. If the consumer is expected to voluntarily purchase they must hold positive beliefs regarding perceived usefulness and perceived ease of use. As with previous research, this study hypothesizes that relationships predicted by TAM will also apply to B2C (Gefen et al., 2003).

H-8: Perceived use will positively affect purchasing intentions when using a B2C website.

H-9: Perceived ease-of-use will positively affect purchasing intentions when using a B2C website.

The Relationship between Purchasing intentions and Purchasing Behavior

Since TAM is based on the Theory of Reasoned Action, it is assumed that B2C customers will behave rationally. Further, TAM also suggests that IT users will do what they say and intend to do, given the resources

and ability based on Theory of Planned Behavior. Based on these arguments, this study hypothesizes that online customers will behave in a manner (purchase) that they say they intend to behave (purchasing intentions).

H-10: As purchasing intentions from a B2C website increases, actual purchasing behaviors will increase.

CONCLUSIONS

Previous research in B2C and web quality mostly focused on the general description of some specific aspects of web quality while paying little attention to the importance and impact of trust. This study extends previous research by examining both technology and relational trust and by applying the TAM in the context of B2C for first time Internet shoppers at a particular website. We identified the sub-concepts and dimensions of the research model presented in Table 1. Further, we justified the link between technology trust and relationship trust and purchasing intentions of a customer via hypotheses 1 through 10. On one hand both technology trust and relational trust appears to provide the customer some level of assurance, but on the other hand, a customer's decision to purchase from an e-retailer's website may have more to do with their belief that it is both easy to use and useful. If both trust and TAM attributes are present, the consumer will likely be prepared to purchase again from the e-retailer. Future research aims to test the model via an extensive survey using undergraduate and graduate students. The study contributes to practice as it increases the awareness of merchants and vendors on the importance of building and maintaining trustworthy web sites.

APPENDIX A

Table 1: Constructs, sub-concepts, definitions and instrumentation of the research model.

Constructs/ Sub-concepts and Dimensions	Definition	Measurement Items
Technology Trust (TT) Security Services Best Business Practices	"the subjective probability by which an individual believes that the underlying technology infrastructure and control mechanisms are capable of facilitating inter-organizational transactions according to its confident expectations."	
TT: Confidentiality	Confidentiality refers to the protection of transactions sent and received against unauthorized reading, copying, or disclosure using encryption mechanisms.	The website is secured as it uses SSL, digital certificates)
TT: Authenticity	Authenticity provides transaction quality of being authoritative, valid, true, genuine, and worthy of acceptance or belief by reason of conformity to the fact that reality is present in the website	The web pages and links on this web site is consistent. Each web page has its own logo.
TT: Integrity	Integrity refers to transaction accuracy and assurance that the business transactions have not been altered or deleted.	I am always able to go back easily to the pages that I had previously visited. The coding is consistent across displays, menu options The grouping of the menu options is logical The ordering of menu options is logical
TT: Non-repudiation	Non-repudiation protects both the customers and the merchant via acknowledgement procedures	
TT: Availability	Availability mechanisms protect business transactions against weaknesses in the transmission media	I can find easily what I am looking for on this website
TT: Access Controls	Access Controls provide authorization mechanisms thereby assuring that business transactions are sent and received without interruption.	The website is easily accessible from any interior pages The search engine on this website is always accessible
TT: Best business practices	Best business practices focus on policies, procedures, standards, and top management commitment that enforces regular audit, and ensures smooth operations.	The warranty policies on this web site is clear and fair
TAM (Davis, 1989)	"an individual's usage behavior is determined by their intention to use a system, which is in turn determined by two beliefs: perceived usefulness and perceived ease of use."	
Perceived usefulness	"a measure of the individual's subjective assessment of the utility offered by the new IT in a specific task-related context"	Using this website can improve my shopping performance Using this website can increase my shopping productivity

Table 1, Cont.: Constructs, sub-concepts, definitions and instrumentation of the research model.

Perceived ease of use		<p>Learning to use this web site would be easy for me</p> <p>My interaction with this website is clear and understandable</p> <p>It would be easy for me to become skillful at using this website</p> <p>I find this website easy to use</p> <p>Learning to use this website would be easy for me</p> <p>My interaction with this website is clear and understandable</p> <p>It would be easy for me to become skillful at using this website</p> <p>I find this website easy to use</p>
Relational Trust (RT)	"a consumer's willingness to accept vulnerability in an online transaction based upon positive expectations of future e-retailer behaviors:	<p>This e-retailer is trustworthy</p> <p>I trust this e-retailer keeps my best interests in mind</p> <p>This e-retailer wants to be known as one who keeps promises and commitments</p> <p>This company will not always be honest with me</p> <p>I believe in the information that this vendor provides me</p> <p>This e-retailer is genuinely concerned about me</p>
RT: Competence	ability, skills, knowledge and competence of the vendor perform correctly and completely	<p>The e-retailer is very capable of performing their job</p> <p>The e-retailer has much knowledge about the work that needs done</p>
RT: Predictability	consistent behaviors of trading partners that allow another trading partner to make predictions and judgments due to past experiences	The e-retailer responses to the customer's questions in the same manner each time.
RT: Goodwill	care, concern, honesty, and benevolence shown by trading partners that allow the other trading partner to further invest in their trading partner relationship	<p>The e-retailer is known to be successful at the things it tries to do</p> <p>The e-retailer is very concerned about my welfare</p> <p>My desires and needs are very important to this vendor</p> <p>This e-retailer will not knowingly do anything to hurt me</p> <p>This e-retailer will go out of its way to help me</p>
Disposition to Trust (Gefen, 2000)	"the extent to which an individual is willing to depend on others across a broad spectrum of situations"	<p>I generally trust other people.</p> <p>I tend to count upon other people.</p> <p>I generally have faith in humanity.</p> <p>I feel that people are generally reliable.</p> <p>I generally trust other people unless they give me reason not to.</p>

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