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# **A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents**

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## **Abstract**

Are trust and risk important in consumers' electronic commerce purchasing decisions? What are the antecedents of trust and risk in this context? How do trust and risk affect an Internet consumer's purchasing decision? To answer these questions, we i) develop a theoretical framework describing the trust-based decision-making process a consumer uses when making a purchase from a given site, ii) test the proposed model using a Structural Equation Modeling technique on Internet consumer purchasing behavior data collected via a Web survey, and iii) consider the implications of the model. The results of the study show that Internet consumers' trust and perceived risk have strong impacts on their purchasing decisions. Consumer disposition to trust, reputation, privacy concerns, security concerns, the information quality of the Website, and the company's reputation, have strong effects on Internet consumers' trust in the Website. Interestingly, the presence of a third-party seal did not strongly influence consumers' trust.

## **Keywords**

Role of trust, Electronic commerce, Antecedents of trust, Consumer trust, Perceived risk, Internet consumer behaviour, Trusted third-party seal, Privacy and security

## **1. Introduction**

Despite the recent difficulties experienced by dot-com companies, according to the Forrester report<sup>1</sup>, Business to Consumer (B-to-C) Internet commerce enjoys a steady growth rate (about 19% per year), and it is a familiar mode of shopping for many consumers [1]. Many scholars have argued that trust is a prerequisite for successful commerce because consumers are hesitant to make purchases unless they trust the seller [62], [77], [82] and [135]. Consumer trust may be even more important in electronic, "cyber" transactions than it is in traditional, "real world" transactions. This is because of some of the characteristics of Internet cyber transactions — they are blind, borderless, can occur 24 h a day and 7 days a week, and are non-instantaneous (payment may occur days or weeks before delivery is completed) — can cause consumers to be concerned that the seller won't adhere to its transactional obligations. Consequently, trust in an Internet business is focused much more on transaction processes [82], in contrast to that of traditional transactions involving brick-and-mortar stores where trust tends to be focused on face-to-face personal relationships. Quite possibly, the key to success in Internet business is the establishment of trusted transaction processes where e-sellers create an environment in which a prospective consumer can be relaxed and confident about any prospective transactions [66].

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<sup>1</sup> Forrester, US e-business Overview: 2003–2008, July 25, 2003.

Since trust is likely to play an essential role in online transactions, it is important to identify the antecedents of a consumer's trust in the context of an Internet transaction.

In prior research, trust has been viewed through diverse disciplinary lenses and filters: economic [43], [65] and [132], social/institutional [26], [39] and [58], behavioral/psychological [47] and [70], managerial/organizational [9], [79], [112], [125] and [135], and technological [23], [27] and [96]. Trust is considered essential in exchange relations because it is a key element of social capital [98] and is related to firm performance, satisfaction, competitive advantage, and other economic outcomes such as transaction cost [9], [41] and [68] and search cost reductions [67].

Because trust has been studied through these different disciplinary lenses, previous research related to trust in the e-commerce context tends to be disjointed, case-specific, and/or loosely integrated. For example, most studies on technological trust have focused narrowly on issues of privacy, security, public key infrastructure, and other technical aspects of trust [13], [16], [72] and [94]. Some recent studies [64], [82], [115] and [117] have focused on the social and behavioral elements of trust in an e-commerce context, however these were again narrowly focused (e.g., they focused on a limited number of trust antecedents, or focused on trust in the community of sellers as a group), and therefore researchers have not yet developed a comprehensive understanding of the factors that predict consumer trust in the e-commerce context. Given the increasing prevalence of B-to-C Internet commerce, there is an urgent need to analyze an online consumer's decision-making process from a holistic standpoint which can provide an understanding of the complex and dynamic phenomena of trust in online exchanges. Accordingly, the specific research questions for the present study are as follows: What are the roles of trust and risk in a consumer's B-to-C online purchasing decision? Are they critical in B-to-C online transactions? And what antecedents can be identified that affect a consumer's trust and risk toward a B-to-C online transaction?

Since research on trust has been conducted from a variety of disciplinary perspectives, many definitions of trust have evolved. Prior research on traditional commerce focused primarily on interpersonal trust such as a customer's trust in a salesperson. Plank et al. [120] recognized that consumer trust could have multiple referents — salesperson, product, and company — and accordingly defined trust as a global belief on the part of the buyer that the salesperson, product, and company will fulfill their obligations as understood by the buyer. Similarly, in the e-commerce context [7], [11], [15], [24], [42], [62], [69], [76], [101], [103], [115], [122] and [135], researchers have tended to define describe trust as a subjective belief, a subjective probability, the willingness of an individual to be vulnerable, reliance on parties other than oneself, or a person's expectation. In our study, we will focus on the trust that a consumer has in an Internet vendor. Logically, this should include trust in the Website (e.g., [www.amazon.com](http://www.amazon.com)), the Website brand, and the firm as a whole. Accordingly, in this paper an online consumer's trust is defined as a consumer's subjective belief that the selling party or entity will fulfill its transactional obligations as the consumer understands them.

This paper provides several contributions. First, in order to uncover the role of trust, risk and their antecedents in B-to-C Internet commerce, this study develops a holistic trust-based consumer decision model to describe the decision-making process that a consumer uses when making a purchase from a given site. Second, to the best of our knowledge, most studies in the e-commerce environment have collected data concerning a consumer's successful purchasing experiences. Yet, because successful cases represent only a fraction of all consumer transaction behaviors, these past studies may have painted an incomplete picture (i.e., a biased view) of B-to-C electronic commerce transactions. Accordingly, in the present study we present a research design that enables us to examine transaction experiences that resulted in non-purchases in addition to completed purchases. In other words, we collected data from both "successful" cases and "unsuccessful" cases, and therefore can provide a

more complete picture of a consumer's B-to-C decision-making process. Third, our testing of the proposed model with the Partial Least Squares (PLS) Structural Equation Modeling technique [48] provides empirical evidence that trust, perceived risk, and perceived benefit are strong determinants of a consumer's e-commerce transaction decision. Finally, the findings of this study provide several insights which should help practitioners better understand the role of trust and its antecedents in e-commerce, and ultimately add trust-building mechanisms into e-retailers' Websites.

This paper is organized as follows. The next section presents the theoretical framework for the study along with background theories that provide the foundation for the framework. The section also proposes the extended research model, referred to as a trust-based consumer decision-making model in e-commerce, with research hypotheses. The third section describes the research methodology and data collection. An analysis of results follows in the fourth section. The final section provides a discussion of the findings, and concludes with limitations and implications of this study.

## **2. Conceptual development: the research model and hypotheses**

### **2.1. Basic theoretical model**

Consumers often act on information that is less than complete and far from perfect. As a result, they are often faced with at least some degree of risk or uncertainty in their purchasing decisions. However, risk is not the only factor consumers are sensitive to in the context of an Internet purchase; the perceived benefit provides consumers with an incentive for purchase behavior [137]. Combining perceived risk and perceived benefit, Tarpey and Peter [119] provided a valence framework which assumes that consumers perceive products as having both positive and negative attributes, and accordingly consumers make decisions to maximize the net valence resulting from the negative and positive attributes of the decision. This framework is consistent with Lewin's [89] and Bilkey's [17] and [18] theories, which provide a theoretical framework for this study.

#### **2.1.1. Purchase and intention to purchase**

Drawing on the Technology Acceptance Model [45], Theory of Reasoned Action (TRA) [51], and Theory of Planned Behavior [5], many e-commerce studies have shown that consumer intentions to engage in online transactions are a significant predictor of consumers' actual participation in e-commerce transactions [116]. The relationship between intention and behavior is based on the assumption that human beings attempt to make rational decisions based on the information available to them. Thus, a person's behavioral intention to perform (or not to perform) a behavior is the immediate determinant of that person's actual behavior [3]. Based on the intention-behavior relationship, we argue that behavioral intention, or more specifically intention to purchase (INTENTION) from a certain vendor through the Web, is a predictor of a consumer's actual behavior or purchase decision (PURCHASE).<sup>2</sup> Therefore:

#### **Hypothesis 1.**

A consumer's intention to purchase (INTENTION) through a vendors' Website positively affects the purchase decision (PURCHASE).

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<sup>2</sup> Inherently, a consumer's actual behavior is dichotomous since consumers typically have to either purchase or not purchase the item.

### **2.1.2. Perceived risk (RISK)**

A consumers' perceived risk is an important barrier for online consumers who are considering whether to make an online purchase. In this study we define perceived risk (RISK) as a consumer's belief about the potential uncertain negative outcomes from the online transaction. Since the concept of perceived risk appeared in the marketing literature, various types of risk have been identified [75], [118] and [143]. For example, Jacoby and Kaplan [75] identified seven types of risks: financial, performance, physical, psychological, social, time, and opportunity cost risk. In the case of Web shopping, three types of risk are said to be predominant [14]: financial risk, product risk, and information risk (security and privacy). Product risk is associated with the product itself; for example the product may turn out to be defective. Financial risk, including opportunity cost and time, is related not to the product but to the marketing channel (the Internet); for example the online transaction may be duplicated because of technological error or unintended double-click the purchase button. Information risk is associated with transaction security and privacy; for example, the requirement that a consumer submits credit card information through the Internet can evoke apprehension due to the possibility of credit card fraud [54].

A consumer's perceived risk has been found to influence his or her online decisions [4]. It is common for a customer who is making an online transaction to be reluctant to purchase on the Web because the sense of risk may be overwhelming when compared to the traditional mode of shopping. In the case of a brick-and-mortar retail store (e.g., Wal-Mart), consumers can walk into the store and usually touch, feel, and even try the product before deciding whether to purchase it. This immediately reduces the amount of perceived risk, and probably strengthens customers' positive opinions about the brick-and-mortar stores. In contrast, when purchasing from an Internet store, a customer has to provide substantial personal information, including address, phone number, and even confidential credit card information. After providing the necessary information, the shopper can only hope that the transaction will be processed completely and accurately. In most cases, he or she has to wait for days until the product or service is delivered and the transaction completed. Thus, it should not be surprising that consumers will be attentive to risk in online transactions, and such risk may influence their decisions about whether or not to purchase from an online vendor. Therefore, we hypothesize that:

#### **Hypothesis 2.**

A consumer's perceived risk (RISK) negatively affects a consumer's intention to purchase (INTENTION) on the Internet.

### **2.1.3. Perceived benefit (BENEFIT)**

We define perceived benefit (BENEFIT) as a consumer's belief about the extent to which he or she will become better off from the online transaction with a certain Website. Internet consumers report that they purchase on the Web because they perceive many benefits (e.g., increased convenience, cost savings, time savings, increased variety of products to select from) compared to the traditional mode of shopping [95]. Thus, in contrast to perceived risk which provides a potential barrier to the online purchase, an Internet consumer's perceived benefit provides a major incentive for making a purchase online. Consequently, the more consumers perceive benefits related to the online transaction with a certain Website, the more likely they are to make online transactions. Thus, we propose that:

#### **Hypothesis 3.**

A consumer's perceived benefit (BENEFIT) positively affects a consumer's intention to purchase (INTENTION) on the Internet.

#### **2.1.4. Trust (TRUST)**

Due to the inherent nature of Internet shopping, consumers will always experience some level of risk. In essence, they make bets about the uncertainty of the future and the free actions of others (e.g., potentially trustworthy Web vendors, hackers, and unknown new technologies). In these uncertain situations, when consumers have to act, trust comes into play as a solution for the specific problems of risk [92]. Trust becomes the crucial strategy for dealing with an uncertain and uncontrollable future. As Gambetta [57] argued, trust is particularly relevant in conditions of ignorance or uncertainty with respect to the unknown or unknowable actions of others.

Scholars have provided different views regarding the relationship between trust and risk, i.e. whether trust is an antecedent of risk, the same as risk, or a by-product of risk. It is common to treat trust and risk as different concepts [19], [39], [80], [92] and [138]. Mayer et al. [98] defined trust as a behavioral one person based on his/her beliefs about the characteristics of another person. Based on this definition, Mayer et al. [98] proposed a model of dyadic trust in organizational relationships that includes characteristics of both the trustor and trustee that influence the formation of trust. The three characteristics included in the model to represent the perceived trustworthiness of the trustee are ability, benevolence, and integrity. The logic of this model is that if the trustor perceives a trustee's (e.g., a vendor's) ability, benevolence, and integrity to be sufficient, the trustor will develop trust (an intention to accept vulnerability) toward the trustee. If the level of trust in a vendor surpasses a threshold of perceived risk, then the trustor will engage in a risky relationship with the vendor. In other words, trust is a key determinant of action in a situation in which there is perceived risk of a negative outcome [92]. Yet, trust may not be involved in all risk-taking behaviors. Of course, trust is not the sole predictor of Internet purchase behavior. People may make a risky Internet purchase without trust or with a low level of trust. For example, a consumer might purchase a computer from a suspicious, generic Internet vendor simply because the price of the computer is highly discounted from the regular price. As recognized in Hypothesis 3, this reflects the powerful incentive that perceived benefits can exert on a purchase decision.

In sum, trust can operate in two ways to alleviate the effect of risk on online purchase decisions. First, trust is relevant in situations where one must enter into risks but has incomplete control over the outcome [46], [121] and [127]. Therefore, as trust increases, consumers are likely to perceive less risk than if trust were absent; the effect of trust is mediated by risk on the consumer's intention to purchase. Second, several trust researchers have shown a direct relationship between trust and willingness to buy online from Internet vendors [15], [62] and [102]. Therefore, we expect that increases in trust will directly and positively affect purchase intentions. Based on the arguments above, we propose:

#### **Hypothesis 4a.**

A consumer's trust (TRUST) negatively affects the consumer's perceived risk (RISK) of a transaction.

#### **Hypothesis 4b.**

A consumer's trust (TRUST) positively affects the consumer's intention to purchase (INTENTION).

Finally, we have extended the valence framework, which recognized the impact of perceived risk and perceived benefit on the purchase decision, by adding trust as a critical variable in electronic commerce. Our model allows us to examine the direct and indirect effects of trust on a consumer's intention to purchase. Fig. 1 shows the basic theoretical framework of this study. The underlying logic

of the framework is that a consumer makes a purchasing decision (PURCHASE) based on his or her purchase intention (INTENTION). The consumer's intention (INTENTION) is affected by his or her perception of benefit (BENEFIT), risk (RISK), and trust (TRUST) toward the Internet selling entity. The consumer will be more likely to engage in an Internet purchase when perceived risks are low, when perceived benefits are high, and when trust is high (direct effect). The consumer's trust toward the selling party or entity will also increase his intention to purchase indirectly by reducing his or her perceptions of risk (indirect effect).

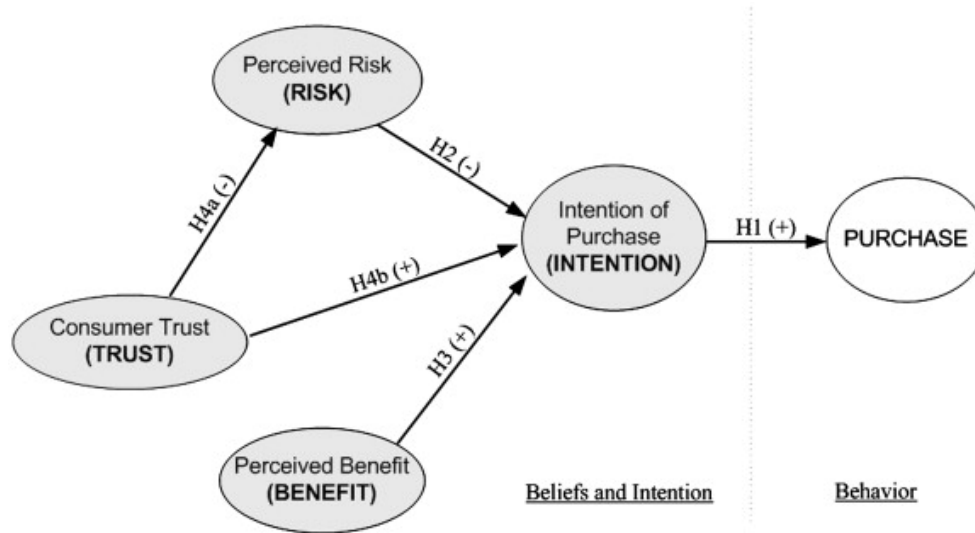


Fig. 1 Basic theoretical framework

## 2.2. Antecedents of trust and perceived risk

Understanding the antecedents of consumer trust and perceived risk can provide Internet business managers with insights and tools that they can use to build consumer trust (e.g. [12]) and manage the perceived risks that are inherent in the online purchase experience. In traditional commerce, the trust-building process is affected by the characteristics of customers, salespersons, the company, and interactions between the two parties involved [25], [50], [128] and [134]. This is also true in the context of electronic commerce. We argue that there are four categories of antecedents that influence consumer trust and consumers' perceived risk towards electronic commerce entities [10], [32], [50], [103], [136] and [144]. These comprise the following:

- *Cognition (observation)-based*: e.g., privacy protection, security protection, system reliability, information quality, etc.
- *Affect-based*: e.g., reputation, presence of third-party seals, referral, recommendation, buyers' feedback, word-of-mouth, etc.
- *Experience-based*: e.g., familiarity, Internet experience, e-commerce experience, etc.
- *Personality-oriented*: e.g., disposition to trust, shopping style, etc.

The cognition-based trust antecedents [32] and [99] are associated with consumers' observations and perceptions (e.g., concerning information quality, perceived privacy protection, security protection, brand image, fancy design) regarding the features and characteristics of the trustee entity. The affect-based trust antecedents [32] and [99] are related to indirect interactions with the trustee such as inputs from others (e.g., trusted third-party seal, referral, review comments, recommendation, etc). The experience-based trust antecedents are related to the personal experiences of consumers with the vendor and Internet shopping in general. Finally, the personality-oriented trust antecedents are related to consumers' dispositional characteristics and shopping habits, which by their nature are quite stable and therefore difficult for Internet vendors to manage.

Since the primary focus of this paper is on a consumer's online trust and purchase intentions toward an Internet selling party, this study will concentrate primarily on cognition-based and affect-based trust antecedents. However, in the interest of developing a more comprehensive framework, we will also consider some selected aspects of experience-based and personality-oriented categories. Specifically, we will examine perceived information quality, perceived privacy protection, and security protection as cognition-based trust antecedents, and third-party seal and reputation as the affect-based antecedents because they are considered to be the factors most directly relevant to an Internet selling party. We will also examine familiarity and consumer disposition to trust to reflect experience-based and personality-oriented trust antecedents. Given our interest in the antecedents of trust and perceived risk, we will also consider the impact that these factors are likely to have on perceived risk.

Combining major trust antecedents and the theoretical framework above, we propose a trust-based consumer decision-making model in electronic commerce. Fig. 2 presents the proposed research model with hypotheses.

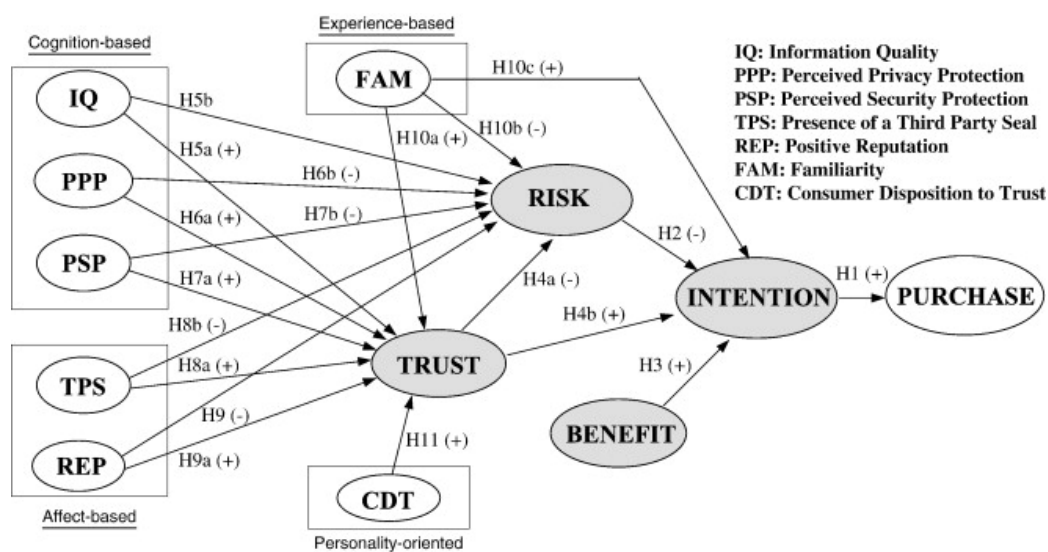


Fig. 2 A trust-based consumer decision-making model

### 2.2.1. Cognition-based trust antecedents

Information Quality (IQ) refers to a consumer's general perception of the accuracy and completeness of Website information as it relates to products and transactions. It is well recognized that information on the Internet varies a great deal in quality, ranging from highly accurate and reliable, to inaccurate and unreliable, to intentionally misleading. It is also often very difficult to tell how frequently the information in Websites is updated and whether the facts have been checked or not [113]. Thus, potential buyers on the Internet are likely to be particularly attentive to the quality of information on a Website because the quality of information should help them make good purchasing decisions. Acquiring and processing high quality information are critical activities for decision makers [105]. As buyers perceive that the Website presents quality information, they will perceive that the seller is interested in maintaining the accuracy and currency of information, and therefore will be more inclined, and in a better position, to fulfill its obligations. To the extent that consumers perceive that a Website presents quality information, they are more likely to have confidence that the vendor is reliable, and therefore will perceive the selling entity as trustworthy.

At the same time, high quality information (IQ) helps reduce the levels of perceived uncertainty and risk related to an electronic commerce transaction because such information (i.e., accurate, current,



and relevant) should provide what is needed to conduct the transaction in a controlled manner and should therefore alleviate the uncertainty and risk regarding the transaction. Accordingly, we argue that there is negative relationship between information quality and risk. We propose the following hypotheses.

**Hypothesis 5a.**

A consumer's perceived information quality (IQ) positively affects the consumer's trust (TRUST).

**Hypothesis 5b.**

A consumer's perceived information quality (IQ) negatively affects the consumer's perceived risk (RISK).

Perceived Privacy Protection (PPP) refers to a consumer's perception of the likelihood that the Internet vendor will try to protect consumer's confidential information collected during electronic transactions from unauthorized use or disclosure. At the time of a transaction, the online seller collects the names, e-mail addresses, phone numbers, and home addresses of buyers. Some sellers pass the information on to spammers, telemarketers, and direct mailers. The illegal collection and sale of personal information could harm legitimate consumers in a variety of ways, ranging from simple spamming to fraudulent credit card charges and identity theft [123]. Therefore, for many online consumers, loss of privacy is a main concern, and the protection of transaction information is crucial. In a recent survey, 92% of survey respondents indicated that they do not trust companies to keep their information private even when the companies promise to do so [90]. These increasing consumer concerns are forcing sellers to adopt privacy protection measures to increase their perceived trustworthiness and thereby to encourage online transactions.

Similarly, consumers often perceive that one of the obligations of a seller is that the seller should not share or distribute the buyer's private information. Consequently, if buyers perceive that the seller is unlikely to protect their privacy, they will perceive greater risk concerning the transaction with the seller. The arguments above suggest:

**Hypothesis 6a.**

A consumer's perceived privacy protection (PPP) positively affects the consumer's trust (TRUST).

**Hypothesis 6b.**

A consumer's perceived privacy protection (PPP) negatively affects the consumer's perceived risk (RISK).

Perceived Security Protection (PSP) refers to a consumer's perception that the Internet vendor will fulfill security requirements such as authentication, integrity, encryption, and non-repudiation. How a consumer perceives security protection when making online transactions depends on how clearly she or he understands the level of security measures implemented by the seller [55]. When an ordinary consumer finds security features (e.g., a security policy, a security disclaimer, a safe shopping guarantee, etc.) and protection mechanisms (e.g., encryption, protection, authentication, SSL technology, etc) in the seller's Website, he or she can recognize the seller's intention to fulfill the

security requirements during online transactions [29]. This helps the buyer to make a purchase decision since all the above artifacts will emphasize that the vendor is making efforts to earn the consumer's trust and diminish the amount of risk that the customer perceives. Consequently, the consumer's perception of security protection increases the consumer's trust toward the vendor, and it also decreases the consumer's perceived risk in completing the transaction. Based on the arguments above, we propose the following hypotheses.

**Hypothesis 7a.**

A consumer's perceived security protection (PSP) positively affects the consumer's trust (TRUST).

**Hypothesis 7b.**

A consumer's perceived security protection (PSP) negatively affects the consumer's perceived risk (RISK).

**2.2.2. Affect-based trust antecedents**

The Presence of a Third-Party Seal (TPS) refers to an assurance of an Internet vendor provided by a third-party certifying body such as a bank, accountant, consumer union, or computer company. Recently, a wide variety of trusted third-party seals have been introduced to help reduce consumer risk in electronic commerce [131] and [142]. The purpose of trusted third-party seals is to help reduce consumers' perceived risk in electronic commerce, provide assurance to consumers that a Website discloses and follows its operating practices, that it handles payments in a secure and reliable way, that it has certain return policies, and/or that it complies with a privacy policy that says what it can and cannot do with personal data it has collected online [28], [81], [85] and [129]. An example of third-parties involved related to online transactions is WebTrust, a non-profit comprehensive assurance program which addresses consumer concerns in a comprehensive fashion. The WebTrust mark on Websites informs buyers that the owners have openly agreed to disclose their information gathering and dissemination practices, and that their disclosure is backed by credible third-party assurance [131].

Since trusted third-party guarantors are considered to have some coercive power over the Web vendor through the promulgation and enforcement of explicit rules [56] and [142], seals issued by certificate authorities may help decrease the risk that consumers perceive in a transaction even if the consumer doesn't have prior direct experience with the Website [33]. And by the same token, the display of a third-party seal such as WebTrust indicates to consumers that the vendor will make a sincere effort to uphold its transactional obligations, which should increase the consumer's trust in the vendor. Therefore, when Internet customers see the seals on a given site, it helps to increase the degree of trust and reduce the actual level of risk they perceive. Accordingly, we propose that:

**Hypothesis 8a.**

The presence of a third-party seal (TPS) positively affects the consumer's trust (TRUST).

**Hypothesis 8b.**

The presence of a third-party seal (TPS) negatively affects the consumer's perceived risk (RISK).

Positive Reputation of Selling Party (REP) has been considered a key factor for reducing risk [4], [22], [108] and [125] creating trust [50], [59] and [77] because it provides information that the selling party has honored or met its obligations toward other consumers in the past. REP refers to the degree of esteem in which consumers hold a selling party. Reputation-building is a social process dependent on past interactions (and in particular, the degree of honesty that a selling party has demonstrated in those earlier transactions) between consumers and the selling party [141]. Based on its reputation, a consumer is likely to infer that the selling party is likely to continue its behavior in the present transaction [130]. In the case of a positive reputation, one is likely to infer that the company will honor its specific obligations to oneself, and therefore conclude that the selling party is trustworthy. In the case of a negative reputation, an individual may conclude that the selling party will not honor its specific obligations, and hence conclude that it is untrustworthy. And by the same token, consumers are likely to conclude that it is inherently risky to transact with a vendor who has a history of failing to honor its obligations, whereas it is relatively less risky to transact with a vendor who has a history of honoring its obligations. Based on the above arguments, we propose the following hypotheses.

#### **Hypothesis 9a.**

A positive site reputation (REP) positively affects the consumer's trust (TRUST).

#### **Hypothesis 9b.**

A positive site reputation (REP) negatively affects the consumer's perceived risk (RISK).

### **2.2.3. Experience-based trust antecedents**

A consumer's Familiarity with the Online Selling Party (FAM) refers to the consumer's degree of acquaintance with the selling entity, which includes knowledge of the vendor and understanding its relevant procedures such as searching for products and information and ordering through the Website's purchasing interface. Familiarity is a "precondition or prerequisite of trust" [91], because familiarity leads to an understanding of an entity's current actions while trust deals with beliefs about an entity's future actions [61]. Since consumers will typically return to Websites where they have had a favorable experience, but will not return to Websites where they have had a negative experience, more often than not consumers will have more familiarity with Websites where they have had favorable experiences. Accordingly, a consumer's familiarity based on previous good experience with a Website and the vendor's services (e.g., ease of searching for products and information) should cause the consumer to develop concrete and favorable ideas of what to expect in the future. Consequently, to the extent that a consumer is familiar with a Website, he or she is relatively more likely to expect the vendor to honor its obligations, and therefore be judged relatively more trustworthy.

In addition to the effect of familiarity on trust, it is also important to consider the relationship between familiarity and a consumer's perceived risk. Some research has reported that familiarity reduces a consumer's perceived risk, interface complexity or uncertainty because it simplifies the relationship with a selling party [61], [92] and [91]. For example, familiarity with an e-vendor (e.g., amazon.com) would reduce uncertainty and complexity through an understanding of how to search and purchase items through the site and what the transaction procedure involved is based on previous interactions and experiences [61]. Therefore, similarly we argue that familiarity alleviates some of the consumer's perceived risk.

Finally, a consumer's familiarity with a selling party through frequent interactions may directly affect the consumer's willingness to purchase [61]. Familiarity captures a consumer's subjective experience

with respect to the selling entity, and is usually created by repeated interactions (e.g., prior purchase experiences or practices with the selling party's Web interface), and therefore would not typically be present in most one-time electronic transactions [6]. In contrast, when a consumer has developed a pattern of purchasing from a given Website, due to the familiarity the consumer has developed with the Website the consumer may simply purchase again due to habit (e.g., simply returning to amazon.com without really taking the time to consider alternate Websites or vendors) or efficiency (e.g., returning to amazon.com simply because one can quickly and easily navigate the search and purchase protocols). Thus, we hypothesize that familiarity with a selling party increases customers' intentions to purchase through that vendor's Website.

Based on the above arguments we posit that:

**Hypothesis 10a.**

A consumer's familiarity (FAM) with a selling party positively affects the consumer's trust (TRUST).

**Hypothesis 10b.**

A consumer's familiarity (FAM) with a selling party negatively affects the consumer's perceived risk (RISK).

**Hypothesis 10c.**

A consumer's familiarity (FAM) with a selling party positively affects the consumer's intention to purchase (INTENTION).

**2.2.4. Consumer personality-oriented antecedents**

Consumer disposition to trust (CDT) refers to a customer's individual traits that lead to expectations about trustworthiness, a consumer-specific antecedent of trust. A consumer's disposition to trust is a general inclination to display faith in humanity and to adopt a trusting stance toward others [61]. Since consumers have different developmental experiences, personality types, and cultural backgrounds, they differ in their inherent propensity to trust. This tendency is based not upon experience with or knowledge of a specific trusted party, but is instead the result of ongoing lifelong experiences and socialization [56], [102] and [126]. If a consumer has a high tendency to trust others in general, this disposition is likely to positively affect his or her trust in a specific selling party, whereas a consumer with a low tendency to trust others in general is likely to develop a relatively lower trust in a specific selling party [102] and [126]. Therefore, it is hypothesized that:

**Hypothesis 11.**

A consumer's disposition to trust (CDT) positively affects the consumer's trust (TRUST).

**3. Research methodology and data collection**

To test the theoretical framework, we examined the perceptions and decisions of online consumers as they shopped for, and eventually decided whether or not to purchase, a product online. The research participants were undergraduate students who participated in the study voluntarily for extra credit. While students represent only a portion of the online shopper population, several studies [71], [87] and [103] have utilized them as subjects, recognizing that students are a useful surrogate for online consumers. Indeed, online consumers are generally younger and more educated than are conventional

consumers [86] and [111]. And data collected in the present study indicated that the participants in our sample were active online consumers: over 90% of our respondents reported that they purchased products at least once through the Internet in the last year, and their average self-rated Internet experience was 5.52 on a 7 point scale, with 7 being expert. Appendix 1 provides further details of the characteristics of respondents.

The participants were asked to visit at least any two B-to-C retailer Websites to comparison shop for an item of their choice [2].<sup>3</sup> Then, they were instructed to go through the entire online buying process up to but excluding the clicking of the buy button to purchase the product. At this time-point, the participants were randomly assigned to complete one of two questionnaires: one questionnaire asked questions about the site from which the student was more inclined to make a purchase; the other questionnaire asked the same questions, but about the site from which the student was less inclined to make a purchase. This was done to ensure that we had adequate variance in the purchase intention variable, i.e., that we were collecting data that were likely to predict non-purchases as well as purchases. If we had failed to do this, the data would represent only a fraction of all consumer transactions — only those that were likely to lead to an intention to purchase. Finally, after completing the survey, participants were asked to go ahead and purchase the item from their preferred site [44] and [100].

The instrument development for this study was carried out following the three stages suggested by Moore and Benbasat [106], including a pilot test conducted prior to collection of the main study data. The main study data were collected in two rounds via Web-based<sup>4</sup> surveys: a pre-purchase round, and a post-purchase round. The pre-purchase round survey comprised all the questions relating to antecedents of trust and perceived risk (IQ, PPP, PSP, TPS, REP, FAM, and CDT), trust, perceived risk, and perceived benefit (TRUST, RISK, and BENEFIT), and purchase intention (INTENTION). The post-purchase round of data collection was conducted a few weeks later, after participants had received the products they had ordered. In this second round, participants reported their actual purchase decision (PURCHASE).

A total of 512 responses were received. After eliminating incomplete and inappropriate responses (e.g., duplicates), a total of 468 usable responses were included in the sample for construct validation and hypothesis testing.

#### **4. Data analyses and results**

To test the proposed research model, data analyses for both the measurement model and structural model were performed using Partial Least Squares (PLS). We used PLS-Graph 3.0.1016 with bootstrapping [124] and [139]. PLS analyzes structural equation models, including measurement and structural models with multi-item variables that contain direct, indirect, and interaction effects [35].

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<sup>3</sup> This instruction appears to reflect actual purchase behavior. Ahuja et al. [2] asked respondents the question “how many sites do you visit before making a purchase decision?” About 75% of respondents answered that they visited one to three Websites prior to their purchase.

<sup>4</sup> Web-based surveys have many advantages over traditional methods: they are convenient, cheap, fast, more accurate, and can survey hard-to-reach respondents. On the other hand, there are some limitations to Web surveys: unequal opportunity and self-selection to participate [44] and [100]. Even though only respondents who are able to access the Internet are able to participate in this survey, this bias is exactly what is desired of the data for respondents of this study, since it provides data about actual Internet customers.

Choosing between a reflective and a formative indicator is sometimes difficult because the directionality of the relationship is not always straightforward. When indicators could be viewed as causing rather than being caused by the latent variable measured by the indicators, we operationalized the indicators as formative [93]. In this study, the BENEFIT and RISK constructs were formed with indicators that reflected different types of benefits (i.e., convenience, saving money, saving time, quick accomplishment of a shopping task, and productivity in shopping) and risks (i.e., product risk, financial risk, and overall risk), respectively; consequently, the direction of causality was from indicator to construct (i.e., formative). All the other indicators in the model were treated as reflective indicators of their respective constructs [21].

As a second generation data analysis technique [8], PLS provides a powerful method for assessing a structural model and measurement model because of the minimal demands on measurement scales, sample size, and residual distributions [34], [35] and [140]. Handling both formative and reflective indicators, PLS can be used not only for theory confirmation, but also for suggesting where relationships might or might not exist and for suggesting propositions for later testing. The combined analysis of the measurement and the structural model enables measurement errors of the observed variables to be analyzed as an integral part of the model, and factor analysis to be combined in one operation with hypothesis testing [63].

To ensure the appropriateness of the research instrument, it was tested for content validity, reliability and construct validity.

#### 4.1. Content validity

To ensure content validity, a thorough review of the literature on the subject of the study was conducted. The questionnaire was also pilot tested by having a panel of experts (professors and IS professionals) review it, after which necessary changes were made to improve both the content and clarity of the questionnaire. Then, a sample of respondents separate from those included in the pilot test was asked to check the questionnaire. These and all pilot test respondents were excluded from the main sample used for reliability testing, construct validation, and hypothesis testing.

#### 4.2. Reliability

The assessment of the measurement model includes the estimation of internal consistency for reliability, and tests of convergent and discriminant validity for construct validity [20] and [36]. Internal consistency was calculated using Cronbach's alpha and Fornell's composite reliability<sup>5</sup>[52]. Table 1 shows the descriptive statistics for the constructs, the reliability (Cronbach's alpha) of the scales, and the sources from which they were adapted.

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<sup>5</sup> Composite Reliability =  $\frac{(\sum \lambda_i)^2 \text{var}F}{(\sum \lambda_i)^2 \text{var}F + \sum \theta_{ii}}$

Table 1. Descriptive statistics and reliability indices for constructs

Construct	Types of indicators	Mean	S.D.	Alpha	Composite reliability	AVE <sup>a</sup>	Adapted from:
Information quality (IQ)	Reflective	5.60	.95	0.95	0.957	0.759	[49]
Privacy protection (PPP)	Reflective	3.96	1.42	0.90	0.924	0.669	[30]
Security protection (PSP)	Reflective	5.16	.97	0.86	0.898	0.639	[61] and [133]
Presence of third-party seal (TPS)	Reflective	4.49	1.08	0.85	0.907	0.709	[81] and [131]
Site reputation (REP)	Reflective	5.66	.98	0.84	0.906	0.708	[50], [61],[78] and [107]
Familiarity (FAM)	Reflective	4.82	1.47	0.92	0.962	0.863	[61] and [84]
Consumer disposition to trust (CDT)	Reflective	4.41	1.07	0.85	0.899	0.691	[61]
Consumer trust (TRUST)	Reflective	5.32	1.04	0.85	0.911	0.774	[60], [78] and [114]
Perceived risk (RISK)	Formative	4.11	1.28	NA	NA	NA	[53], [78] and [84]
Perceived benefit (BENEFIT)	Formative	5.36	1.09	NA	NA	NA	[14], [53] and [106]
Intention to purchase (INTENTION)	Reflective	5.03	1.26	0.79	0.879	0.708	[61] and [78]

Note: NA — Not applicable: since formative measures need not co-vary, the internal consistency of formative items is not applicable.

$$^a \text{ Average Variance Extracted} = \frac{\sum \lambda_i^2 \text{var}F}{\sum \lambda_i^2 \text{var}F + \sum \Theta_{ii}}$$

The Cronbach reliability coefficients of all variables were higher than the minimum cutoff score of 0.60 [109], 0.65 [88], or 0.70 [109] and [110]. In contrast to Cronbach’s alpha, which implicitly assumes that each item carries the same weight, composite reliability relies on the actual loadings to construct the factor score and is thus a better measure of internal consistency [52]. Composite reliability should be greater than the benchmark of 0.7 to be considered adequate [52]. All composite reliabilities of constructs had a value higher than 0.7, indicating adequate internal consistency [109]. Additionally, all Average Variance Extracted (AVE) values of constructs were higher than 0.50, the suggested minimum [52]. An AVE greater than 0.5 indicates that more than 50% of the variance of the measurement items can be accounted for by the constructs.

### 4.3. Construct validity

Construct validity was examined by assessing convergent validity and discriminant validity [37]. Convergent validity is considered acceptable when all item loadings are greater than 0.50 [139], and the items for each construct load onto only one factor with an eigenvalue greater than 1.0. As noted in Appendix 2, the items for each construct did indeed load onto only one factor with an eigenvalue greater than 1.0. The cumulative percentages of variance explained by each factor were greater than 63% for all constructs.

The average variance extracted (AVE) can also be used to evaluate discriminant validity. The AVE from the construct should be higher than the variance shared between the construct and other variables in the model [34] and [52]. Discriminant validity can be checked by examining whether the correlations between the variables are lower than the square root of the average variance extracted. Table 2 indicates that all the square roots of each AVE value are greater than the off-diagonal elements. This indicates discriminant validity among variables.

Table 2. Correlations of latent variables

	IQ	PPP	PSP	TPS	REP	FAM	CDT	TRUST	RISK	BENEFIT	INTENTION
IQ	<b>0.87</b>										
PPP	0.40	<b>0.82</b>									
PSP	-0.16	0.12	<b>0.80</b>								
TPS	0.12	0.03	0.06	<b>0.84</b>							
REP	0.50	0.25	0.13	0.10	<b>0.84</b>						
FAM	0.33	0.16	0.09	0.09	0.41	<b>0.93</b>					
CDT	0.20	0.10	0.10	0.02	0.17	0.02	<b>0.83</b>				
TRUST	0.63	0.68	0.21	0.05	0.48	0.30	0.23	<b>0.88</b>			
RISK	-0.17	-0.23	-0.03	-0.03	-0.43	-0.09	-0.03	-0.22	<b>0.83</b>		
BENEFIT	0.01	0.05	-0.01	-0.05	0.03	0.18	0.05	0.06	-0.08	<b>0.76</b>	
INTENTION	0.47	0.31	-0.13	0.02	0.35	0.36	0.13	0.50	-0.22	0.21	<b>0.84</b>

Note: Diagonal elements are the square root of average variance extracted. These values should exceed the inter-construct correlations for adequate discriminant validity.

#### 4.4. Structural model assessment

The assessment of the structural model includes estimating path coefficients and R2. Both R2 and the path coefficients indicate model fit, i.e., how well the model is performing [34], [35] and [74]. Fig. 3 shows the results of assessment and hypothesis testing. As shown in the figure, consumer trust (TRUST) had a strong positive effect on a consumer’s purchasing intention (INTENTION). TRUST had a strong negative effect on risk (RISK). As we proposed and expected, the path coefficients of both RISK → INTENTION and BENEFIT → INTENTION were significant at the 0.01 level. Thus Hypothesis 2, Hypothesis 3, Hypothesis 4a and Hypothesis 4b were supported. Three hypothesized paths from the perception-based trust antecedents (information quality, privacy protection, security protection) to TRUST were significant at  $p < 0.05$  or lower, thus validating Hypothesis 5a, Hypothesis 6a and Hypothesis 7a respectively. Among the two affect-based trust antecedents, reputation was significant at the  $p < 0.01$  level, validating H9a. The hypothesized path from consumer disposition to trust (CDT), a personality-oriented trust antecedent, had a positive significant effect on TRUST, validating H11.

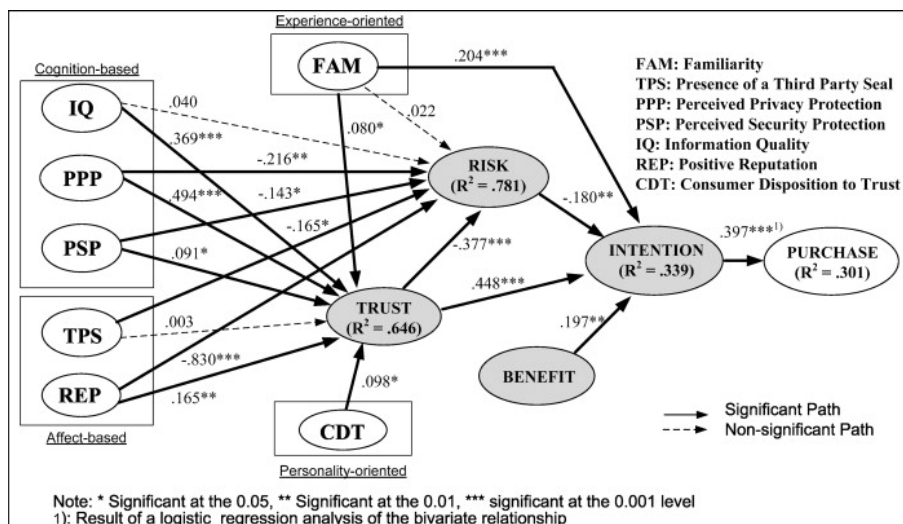


Fig. 3 Results of structural model



Among the hypothesized paths from the perception-based and affect-based trust antecedents to RISK, perceived privacy protection (PPP), perceived security protection (PSP), presence of a third-party seal (TPS), and reputation (REP) had significant negative effects on risk at the 0.05 level or lower. These findings support Hypothesis 6b, Hypothesis 7b, Hypothesis 8b and Hypothesis 9b respectively. The hypothesized path from information quality (IQ) to RISK was not significant, not supporting H5b. Interestingly, familiarity (FAM) had positive effects on a consumer's trust and purchasing intention, but the effect of familiarity on a consumer's perceived risk was not significant, validating Hypothesis 10a and Hypothesis 10c. The R2 for TRUST, RISK, and INTENTION were .65, .78, and .34 reflecting that the model provides strong explanations of the variance in consumer trust, perceived risk, and intention to purchase respectively.

The nature of our dependent variable, PURCHASE, dictates that it is measured with a single dichotomous (purchase or not purchase) indicator. PLS assumes that variables are scalar rather than dichotomous [35], therefore would underestimate the magnitude of an effect on a dichotomous variable. To more accurately estimate the effect of INTENTION on PURCHASE, we conducted a logistic regression analysis of the bivariate relationship between intention and purchase. The logistic regression model also included three other constructs (RISK, BENEFIT and TRUST) as potential predictors so that the effects of INTENTION on PURCHASE could be isolated from other effects. Table 3 presents the results from the logistic regression analysis. We found that intention was indeed a strong predictor of purchase behavior (beta = .397, R2 = .301; p < .001) while other constructs did not have a strong effect on purchase (Log Likelihood Ratio L = 606.369, p < 0.001). In sum, the results strongly suggest that when consumers have a higher level of intention to purchase from an Internet vendor's Website, they are more likely to actually purchase from that site, thus supporting H1.

Table 3. Summary of statistics and logistic regression results

PURCHASE	Intention mean	Intention S.D.	N		
Not purchase (0)	4.66	1.29	207		
Purchase (1)	5.32	1.15	261		

Results of logistic regression analysis					
	Chi-square	d.f.	Sig.		
Model	34.538	4	.000		
- 2 Log Likelihood (L)			606.369		
Variable	B	S.E.	Wald	Sig.	R <sup>2</sup>
INTENTION	.397	.102	15.231	.000	.301
RISK	.057	.082	.482	.488	
BENEFIT	.059	.110	.286	.493	
TRUST	.092	.117	.619	.431	
Constant term	- 2.791	.809	11.908	.001	

## 5. Discussion and conclusion

Past research has recognized that electronic purchase decisions are inherently risky, and therefore trust may be an important factor in giving consumers the confidence they need to engage in such transactions [7], [38], [62], [78] and [135]. Yet many researchers have not systematically explored how trust and perceived risk may operate in combination to influence such decisions and what kinds of trust and risk antecedents play a significant role in the consumer trust-building process. In this paper, based on the net valence framework [119] we developed a trust-based consumer decision-making model in electronic commerce that recognizes that trust, perceived risk, and perceived benefit

may directly influence purchase intentions and decisions, and trust may also influence purchase intentions indirectly by influencing risk perceptions. Additionally, the consumer decision-making model explores four different categories of trust antecedents that affect trust and/or perceived risk in such situations. While these represent important contributions for research, we also note that most of the predictors of trust and perceived risk identified in the model also represent factors that can be directly or indirectly controlled by vendors through Website design (e.g., information quality, security and privacy protections, third-party seals) or the conduct of business transactions (e.g., reputation). Thus, the model and results are likely to have important practical implications for merchants who wish to build their Internet business by increasing their customers' trust and decreasing their customers' risk.

### **5.1. Research findings**

The empirical results suggest that a consumer's trust directly and indirectly affects his or her purchasing intention. A consumer's trust has a strong positive effect on the purchasing intention as well as a strong negative effect on a consumer's perceived risk. This study also provides evidence that a consumer's perceived risk reduces the consumer's intention to purchase, whereas a consumer's perceived benefit increases the consumer's purchasing intention. And finally, we found that these effects of trust, perceived risk, and perceived benefit on purchase intentions, ultimately had a "downstream" effect on consumers' actual purchase decisions. Thus, these findings validate the argument that a consumer's trust is an important factor in electronic, "cyber" transaction decision, and thereby support our extended version of the valence framework. Finally, the results indicate that trust to a large degree addresses the risk problem in e-commerce in two ways: by reducing perceived risk and by increasing purchase intentions directly (trust was the strongest predictor of the online consumer's purchase intention, followed by perceived benefit and perceived risk respectively).

All of the cognition-based and affect-based trust antecedents except third-party seals (TPS) had strong positive effects on consumer trust, suggesting that consumers consider a relatively wide variety of perceptions and observations when developing their trust in a Website and vendor. In addition, all of the cognition-based and affect-based antecedents except information quality (IQ) had negative effects on a consumer's perceived risk, indicating that consumers are also attentive to a relatively wide range of factors when assessing the risk from an online transaction. Among the cognition-based trust antecedents, it is interesting to note that consumers' perceptions of privacy protection (PPP) and security protection (PSP) both had strong influences on trust and risk. This suggests that both privacy and security are important for consumers as they shop online. That is, although logically it might seem that privacy superfluous when security is present, and security is superfluous when privacy is present, our results suggest that consumers independently value privacy and security. In sum, our findings provide strong support for our arguments that cognition-based and affect-based factors increase a consumer's trust as well as decrease a consumer's perceived risk in completing an e-commerce transaction.

One interesting finding is that the presence of third-party seals (TPS) did not influence consumer's trust but they did decrease a consumer's perceived risk. This is consistent with scholars' arguments [40], [83] and [104] that the presence of assurance seals has no significant effect on the consumer's trust and intention to purchase from a Website. However, this issue is not yet resolved in the literature, since several other scholars have argued that the presence of assurance seals has a significant impact on consumers' trust [73], [87], [97] and [142]. While our results indicate that third-party seals did not influence trust, the results still emphasize that third-party seals are an important factor in online commerce, because they impact purchase intentions and decisions by reducing a consumer's perceptions of risk. We also note another potential explanation for the lack of an effect of third-party seals on trust. It may be that consumers simply do not recognize a third-party seal as an assurance of trust. In fact, despite the fact that our sample comprised relatively active online

consumers, 73.7% of our respondents reported that they were not even aware that Websites are endorsed by third parties. Considering that there is a relatively large industry centered on providing third-party seals, our results suggest that the industry should provide more consumer education about their seal services.

Interestingly, familiarity (FAM) had a strong direct influence on consumers' purchase intentions and trust as expected, however familiarity did not have a significant direct effect on consumers' perceived risk. One possible reason for this insignificant effect on perceived risk is that familiarity by its nature deals with complexity or uncertainty related to interfaces or procedures (e.g., searching and ordering products and/or services) which can reflect a vendor's competence and therefore its ability to honor its obligations (i.e., its trustworthiness), but not the presence of risk.

Finally, we found that our personality-oriented antecedent, a consumer's disposition to trust (CDT), had a significant effect on a consumer trust. This is consistent with previous studies on the relationship between trust and consumer disposition to trust [61], [102] and [117].

## **5.2. Theoretical and practical contributions**

This study has both theoretical and practical contributions. From a theoretical perspective, the trust-based consumer decision-making model provides a holistic view of an online consumer's purchase decision-making process, incorporating the effects of the consumer's trust and perceived risk and benefits, and a range of antecedents of trust and perceived risk, and assessing the impact of these factors not only on purchase intentions about also on actual purchase behaviors. Thus, our study provides perhaps the most comprehensive understanding to date of the trust- and risk-related factors that consumers consider as they engage in online commerce. In addition, prior studies have often not adequately distinguished between trust, perceived risk, and perceived benefit, and concomitantly have not understood their relationships with each other or how they work independently or in combination to influence purchase intentions and decisions. By distinguishing among the concepts both conceptually and empirically, we believe we have provided important insights into their distinct roles in the online purchase experience.

From a practical standpoint, the results highlight several trust-enhancing factors that may guide the successful completion of electronic commerce transactions in B-to-C environments. Specifically, we identified a number of potentially important determinants of consumers' trust in a Website, and ultimately of their likelihood of purchasing from a Website, and we provided empirical evidence concerning the relative impact of each of these determinants on consumers' trust and purchase intentions. Thus, the theoretical framework and results may allow Internet retailers to better incorporate trust-building mechanisms into their Websites by focusing on the factors identified in this study. More specifically, our results suggest that since consumers' perceptions of privacy and security protection, information quality, third-party seals, and reputation are strong predictors of trust and/or risk, Internet business managers should pay particular attention to these factors in order to increase transaction volume.

## **5.3. Limitations and directions for future research**

Future research will be needed to assess the generalizability of our findings. While our research participants reflect a fairly typical band of actual and potential Internet consumers, they may not be representative of all consumers. For example, older consumers may be even less comfortable with online purchasing due to their lack of familiarity with computers and the Internet. It is likely that for these consumers, trust and risk will loom even larger than for younger, more experienced individuals,

therefore our model may be equally if not more predictive of purchase decisions for such consumers. Yet research is needed to consider whether this is so. Although our model received strong empirical support, we would also like to recognize the possibility of alternative models for understanding the relationships among the constructs examined in our study. For instance, we have proposed that trust functions as a mediator. In other words, the model assumes that the exogenous variables influence purchase intentions via their effect on trust. Research by McKnight and colleagues [101] and [102] suggests that these factors might influence purchase intentions directly, rather than indirectly via trust. Alternatively, trust could be positioned as a moderator of the relationship between perceived risk and purchase intention. In this view, trust would influence purchase intention only when the transaction is perceived as risky [98]. Given the early stage of research on the topic of trust and risk in Internet transactions, our aim in the present study was only to test the theoretical framework of the study, not advocate one particular model or framework over another. Thus, future research may fruitfully consider how these alternative models of the relationships among trust, risk, purchase intentions and decisions, and their antecedents, may complement or contradict each other, the various conditions under which the models may or may not hold, and ways in which the models might potentially be integrated.

## Appendix A. Demographic Characteristics of Respondents

Characteristics	Frequency	Percentage	Mean	S.D.
Age	–	–	21.53	3.42
Gender				
Male	260	57.8	–	–
Female	206	42.2		
Education level (highest level of education completed)				
High school	66	14.1		
Some college (2 year community/vocation/technology school)	344	73.5	–	–
College graduate (4 years)	49	10.5		
Beyond master degree	6	1.2		
Household income				
Under \$20,000	173	37.5		
\$20,001–\$60,000	106	22.6		
\$60,001–\$100,000	75	16	–	–
Over \$100,000	39	8.3		
Do not want to say	52	11.1		
Products purchased				
Books/magazines	98	20.9		
Computer hardware	32	6.8		
Computer software	10	2.1		
Clothing/shoes	108	23.1		
CDs/tapes/albums	76	16.2	–	–
Travel arrangements (e.g., airline tickets)	35	7.5		
Home electronics/appliances	27	5.8		
Concerts/plays	6	1.3		
Others	66	14.1		
Money spent on this purchase				
Less than \$25	154	32.9		
\$26–\$50	125	26.7		
\$51–\$100	97	20.7	–	–
\$101–\$300	65	13.9		
\$301–\$500	10	2.1		
More than \$500	16	3.4		
Frequency of Internet purchases in last year				
Never	39	8.3		
1–5	283	60.5		
6–10	80	17.1	–	–
11–15	28	6		
16–20	12	2.6		
More than 20	20	4.3		
How many years using the Internet				
Less than 6 months	1	0.2		
6 to 12 months	4	0.9		
1–2 years	22	4.7	–	–
3–4 years	183	39.1		
5–7 years	179	38.2		
More than 7 years	78	16.7		
Experience on computer (1—novice/7—expert)	–	–	5.31	1.04
Experience on the Internet (1—novice/7—expert)	–	–	5.52	0.99

Note: Missing data are not counted in frequency.

## Appendix B. Proposed Measurement Items for Constructs

Constructs	Measurement items	Adapted from	Loading	
Familiarity with the Website (FAM)	Overall, I am familiar with this site.	[60]	0.915	
	I am familiar with searching for items on this site.	[60]	0.921	
	I am familiar with the process of purchasing from this site.	[60]	0.951	
	I am familiar with buying products from this site.	[60]	0.928	
Eigenvalue			3.45	
Percent of explained variance			86.26	
Presence of third-party seal (TPS)	Prefer to buy from Websites that carry such an endorsement.	New item	0.759	
	Third-party seals make me feel more comfortable.	New item	0.856	
	Third-party seals make me feel more secure in terms of privacy.	New item	0.859	
	Third-party seals make me feel safer in terms of the transaction.	New item	0.889	
Eigenvalue	2.83			
Percent of explained variance	70.9			
Perceived privacy protection (PPP)	I am concerned that This Website is collecting too much personal information from me.	[31]	0.803	
	This Web vendor will use my personal information for other purposes without my authorization.	[31]	0.898	
	This Web vendor will share my personal information with other entities without my authorization.	[31]	0.888	
	Unauthorized persons (i.e. hackers) have access to my personal information.	New item	0.781	
	I am concerned about the privacy of my personal information during a transaction.	[31]	0.783	
	This Web vendor will sell my personal information to others without my permission.	[31]	0.743	
	Eigenvalue			4.01
	Percent of explained variance			66.91
Perceived security protection (PSP)	This Web vendor implements security measures to protect Internet shoppers.	[31]	0.725	
	This Web vendor usually ensures that transactional information is protected from accidentally being altered or destroyed during a transmission on the Internet.	[31]	0.749	
	I feel secure about the electronic payment system of this Web vendor.	[31]	0.856	
	I am willing to use my credit card on this site to make a purchase.	[60]	0.846	
	I feel safe in making transactions on this Website.	[60]	0.813	
	In general, providing credit card information through this site is riskier than providing it over the phone to an offline vendor.	[133]	0.759	
	Eigenvalue	3.34		
	Percent of explained variance	72.9		
Information quality (IQ)	This Website provides correct information about the item that I want to purchase.	[49]	0.832	
	Overall, I think this Website provides useful information.	New item	0.891	
	This Website provides timely information on the item.	[49]	0.895	
	This Website provides reliable information.	New item	0.862	
	This Website provides sufficient information when I try to make a transaction.	[49]	0.88	

	I am satisfied with the information that this Website provides.	[49]	0.861
	Overall, the information this Website provides is of high quality.	New item	0.878
Eigenvalue		5.31	
Percent of explained variance		75.93	
Site reputation (REP)	This Website is well known.	[78]	0.88
	This Website has a good reputation.	[78]	0.891
	This Website vendor has a reputation for being honest.	[107]	0.775
	I am familiar with the name of this Website.	[60]	0.814
Eigenvalue		2.83	
Percent of explained variance		70.82	
Consumer disposition to trust (CDT)	I generally trust other people.	[60]	0.838
	I generally have faith in humanity.	[60]	0.828
	I feel that people are generally reliable.	[60]	0.856
	I generally trust other people unless they give me reasons not to.	[60]	0.802
Eigenvalue		2.76	
Percent of explained variance		69.09	
Consumer trust (TRUST)	This site is trustworthy.	[60] and [78]	0.899
	This Website vendor gives the impression that it keeps promises and commitments.	[78]	0.91
	I believe that this Website vendor has my best interests in mind.	[78]	0.83
Eigenvalue		2.32	
Percent of explained variance		77.43	
Perceived risk (RISK)□	Purchasing from this Website would involve more product risk (i.e. not working, defective product) when compared with more traditional ways of shopping.	[78]	0.822
	Purchasing from this Website would involve more financial risk (i.e. fraud, hard to return) when compared with more traditional ways of shopping.	New item	0.848
	How would you rate your overall perception of risk from this site?	[84]	0.807
Eigenvalue			2.04
Percent of explained variance			68.23
Perceived benefit (BENEFIT)□	I think using this Website is convenient.	[133]	0.786
	I can save money by using this Website.	New item	0.631
	I can save time by using this Website.	New item	0.87
	Using this Website enables me to accomplish a shopping task more quickly than using traditional stores.	New item	0.831
	Using this Website increases my productivity in shopping (e.g., make purchase decisions or find product information within the shortest time frame).	[45] and [106]	0.823
Eigenvalue			3.14
Percent of explained variance			62.79
Intention to purchase (INTENTION)	I am likely to purchase the products(s) on this site.	[60]	0.829
	I am likely to recommend this site to my friends.	[78]	0.855
	I am likely to make another purchase from this site if I need the products that I will buy.	[78]	0.84
Eigenvalue			2.12
Percent of explained variance			70.77

## References

- [1] Online Advertising To Reach \$33 Billion Worldwide By 2004. Forrester Research Press (1999)  
<http://www.forrester.com/ER/Press/Release/0,1769,159,FF.html>
- [2] M. Ahuja, B. Gupta, P. Raman. An empirical investigation of online consumer purchasing behaviour. *Communications of the ACM*, 46 (12) (2003), pp. 145–151
- [3] I. Ajzen, M. Fishbein. *Understanding Attitude and Predicting Social Behavior*. Prentice-Hall, Inc., Englewood Cliffs, NJ (1980)
- [4] S. Antony, Z. Lin, B. Xu. Determinants of escrow service adoption in consumer-to-consumer online auction market: an experimental study. *Decision Support Systems*, 42 (3) (2006), pp. 1889–1900
- [5] I. Arzen. The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50 (1991), pp. 179–211
- [6] S. Ba, P.A. Pavlou. Evidence of the effect of trust building technology in electronic markets: price premiums and buyer behaviour. *MIS Quarterly*, 26 (3) (2002), pp. 243–268
- [7] S. Ba, A.B. Whinston, H. Zhang. Building trust in online auction markets through an economic incentive mechanism. *Decision Support Systems*, 35 (3) (2003), pp. 273–286
- [8] R.P. Bagozzi, C. Fornell. Theoretical concepts, measurement, and meaning. In: C. Fornell (Ed.), *A Second Generation of Multivariate Analysis*, Praeger (1982), pp. 5–23
- [9] S. Balasubramanian, P. Konana, N.M. Menon. Customer satisfaction in virtual environments: a study of online investing. *Management Science*, 49 (7) (2003), pp. 871–889
- [10] J.B. Barney, M.H. Hansen. Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, 15 (1994), pp. 175–190
- [11] S.E. Beatty, M. Mayer, J.E. Coleman, K.E. Reynolds, J. Lee. Customer–sales associate retail relationships. *Journal of Retailing*, 72 (3) (1996), pp. 223–247
- [12] F. Belanger, J.S. Hiller, W.J. Smith. Trustworthiness in electronic commerce: the role of privacy, security, and site attributes. *Journal of Strategic Information Systems*, 11 (2002), pp. 245–270
- [13] M. Benantar. The Internet public key infrastructure. *IBM Systems Journal*, 40 (3) (2001), pp. 648–665
- [14] A. Bhatnagar, S. Misra, H.R. Rao. On risk, convenience, and internet shopping behavior *Communications of the ACM*, 43 (11) (2000), pp. 98–114
- [15] A. Bhattacharjee. Individual trust in online firms: scale development and initial test. *Journal of Management Information Systems*, 19 (1) (2002), pp. 211–242
- [16] A. Bhimani. Securing the commercial Internet. *Communications of the ACM*, 39 (6) (1996), pp. 29–35
- [17] W.J. Bilkey. A psychological approach to consumer behavior analysis. *Journal of Marketing*, 18 (1953), pp. 18–25
- [18] W.J. Bilkey. Psychic tensions and purchasing behaviour. *Journal of Social Psychology*, 41 (1955), pp. 247–257
- [19] P. Blau. *Exchange in Power and Social Life*. John Wiley, New York (1964)
- [20] K.A. Bollen. *Structural Equations with Latent Variables*. Wiley, New York, NY (1989)
- [21] K. Bollen, R. Lennox. Conventional wisdom on measurement: a structural equation perspective *Psychological Bulletin*, 110 (1991), pp. 305–314
- [22] A. Boot, S. Greedbaum, A. Thakor. Reputation and discretion in financial contracting. *American Economic Review*, 83 (5) (1993), pp. 1165–1183
- [23] S. Brainov, T. Sandholm. Contracting with Uncertain Level of Trust. Presented at E-COMMERCE, Denver, CO (1999), pp. 15–21
- [24] E. Brynjolfsson, M. Smith. Frictionless commerce? A comparison of Internet and conventional retailers. *Management Science*, 46 (4) (2000), pp. 563–585



- [25] R. Burt, M. Knez. Trust and third-party gossip. R.M. Kramer, T.R.T. (Eds.), *Trust in Organizations: Frontiers of Theory and Research*, Sage (1996)
- [26] A. Canzaroli, Y. Tan, W. Thoen. The Social and Institutional Context of Trust in Electronic Commerce. Presented at Autonomous Agents '99 Workshop "Deception, Fraud and Trust in Agent Societies" (1999), pp. 65–76
- [27] C. Castelfranchi, R. Falcone. The Dynamics of Trust: from Beliefs to Action. Presented at Autonomous Agents '99 Workshop on Deception, Fraud and Trust in Agent Societies, Seattle, WA (1999), pp. 41–54
- [28] C. Castelfranchi, Y.-H. Tan. *Trust and Deception in Virtual Societies*. Kluwer Academic Publishers (2001)
- [29] R.K. Chellappa, P.A. Pavlou. Consumer trust in electronic commerce transactions. *Logistics Information Management*, 15 (5/6) (2002), pp. 358–368
- [30] L.-D. Chen, "Consumer Acceptance of Virtual Stores: A Theoretical model and Critical Success Factors for Virtual Stores," University of Memphis, Doctoral Dissertation, (2000).
- [31] M. Chen, J. Han, P.S. Yu. Data mining: an overview from a database perspective. *IEEE Transactions on Knowledge and Data Engineering*, 8 (6) (1996)
- [32] C.C. Chen, X.-P. Chen, J.R. Meindl. How can cooperation be fostered? The cultural effects of individualism–collectivism. *Academy of Management Review*, 23 (2) (1998), pp. 285–304
- [33] C.M.K. Cheung, M.K.O. Lee. Understanding consumer trust in Internet shopping: a multidisciplinary approach. *Journal of the American Society for Information Science and Technology*, 57 (4) (2006), pp. 479–492
- [34] W.W. Chin. Issues and opinion on structural equation modelling. *MIS Quarterly*, 22 (1) (1998), pp. 7–16
- [35] W.W. Chin. The Partial Least Squares approach to structural equation modelling. G.A. Marcoulides (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates, Mahwah, NJ (1998), pp. 295–336
- [36] W.W. Chin, P.A. Todd. On the use, usefulness, and ease of use of structural equation modeling in MIS research: a note of caution. *MIS Quarterly*, 19 (2) (1995), pp. 237–246
- [37] W.W. Chin, A. Gopal, W.D. Salisbury. Advancing the theory of adaptive structuration: the development of a scale to measure faithfulness of appropriation. *Information Systems Research*, 8 (4) (1997), pp. 342–367
- [38] Y. Cho, I. Im, J. Fjermestad, R. Hiltz. The effects of post-purchase evaluation factors on online vs. offline customer complaining behavior: implications for customer loyalty. *Advances in Consumer Research*, 29 (2002)
- [39] J. Coleman. *Foundations of Social Theory*. Harvard University Press, Cambridge, Ma (1990)
- [40] L.F. Cranor, J. Reagle, M.S. Ackerman. Beyond Concern: Understanding Net Users' Attitudes about Online Privacy. AT&T Labs-Research Technical Report (1999)
- [41] L.L. Cummings, P. Bromiley. The Organizational Trust Inventory (OTI): development and validation. R.M. Kramer, T.R. Tyler (Eds.), *Trust in Organizations: Frontiers of Theory and Research*, Sage, Thousand Oaks, CA (1996), pp. 302–320
- [42] J.A. Czepiel. Service encounters and service relationships: implications for research. *Journal of Business Research*, 20 (1) (1990), pp. 13–21
- [43] P. Dasgupta. Trust as a commodity. D.G. Gambetta (Ed.), *Trust: Making and Breaking Cooperative Relations*, Basil Blackwell, New York (1990), pp. 49–72
- [44] J.L. David. You've got surveys. *American Demographics*, 22 (11) (2000), pp. 42–44
- [45] F.D. Davis. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13 (3) (1989), pp. 319–340
- [46] M. Deutsch. The effect of motivational orientation upon trust and suspicion. *Human Relations*, 13 (1960), pp. 123–139
- [47] K.T. Dirks, D.L. Ferrin. The role of trust in organizational settings. *Organization Science*, 12 (4) (2001), pp. 450–467

- [48] M.L. Doerfel, G.A. Barnett. A semantic network analysis of the International Communication Association. *Human Communication Research*, 25 (4) (1999), pp. 389–603
- [49] W.J. Doll, G. Torkzadeh. The measurement of end-user computing satisfaction. *MIS Quarterly*, 12 (2) (1988), pp. 259–274
- [50] P.M. Doney, J.P. Cannon. An examination of the nature of trust in buyer–seller relationships. *Journal of Marketing*, 61 (2) (1997), pp. 35–51
- [51] M. Fishbein, I. Ajzen. *Belief, Attitude, Intention, and Behavior: an Introduction to Theory and Research*. Addison-Wesley (1975)
- [52] C. Fornell, D. Larcker. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18 (1981), pp. 39–50
- [53] S. Forsythe, C. Liu, D. Shannon, L.C. Gardner. Development of a scale to measure the perceived benefits and risks of online shopping. *Journal of Interactive Marketing*, 20 (2) (2006), pp. 55–75
- [54] E.H. Fram, D.B. Grady. Internet shoppers: is there a surfer gender gap?. *Direct Marketing*, 59 (9) (1997), pp. 46–50
- [55] B. Friedman. Trust online. *Communications of the ACM*, 43 (12) (2000), pp. 34–40
- [56] F. Fukuyama. *Trust: The Social Virtues and the Creation of Prosperity*. Free Press, New York, NY (1995)
- [57] D.G. Gambetta, “Can We Trust Trust?,” in *Trust: Making and Breaking Cooperative Relations*, Gambetta, Ed., electronic edition ed. Department of Sociology, University of Oxford, (1988), 213–237.
- [58] D. Gambetta. *Trust: Making and Breaking Cooperative Relations*. Basil Blackwell Inc., New York, NY (1990)
- [59] S. Ganesan. Determinants of long-term orientation in buyer–seller relationships. *Journal of Marketing*, 58 (1994), pp. 1–19
- [60] D. Gefen. E-commerce: the role of familiarity and trust. *The International Journal of Management Science*, 28 (2000), pp. 725–737
- [61] D. Gefen. E-commerce: the role of familiarity and trust. *Omega: The International Journal of Management Science*, 28 (6) (2000), pp. 725–737
- [62] D. Gefen. Reflections on the dimensions of trust and trustworthiness among online consumers *ACM SIGMIS Database*, 33 (3) (2002), pp. 38–53
- [63] D. Gefen, D.W. Straub, M.-C. Boudreau. Structural equation modeling and regression: guidelines for research practice. *Communications of the AIS*, 4 (2000), pp. 1–77
- [64] D. Gefen, E. Karahanna, D.W. Straub. Trust and TAM in online shopping: an integrated model. *MIS Quarterly*, 27 (1) (2003), pp. 51–90
- [65] N.R. Goodwin. *Economic Meanings of Trust and Responsibility*. The University of Michigan Press, Ann Arbor, MI (1996)
- [66] P. Grabosky. The nature of trust online. *The Age* (2001), pp. 1–12
- [67] R. Gulati. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal*, 38 (1) (1995), pp. 85–112
- [68] C. Handy. Trust and the virtual organization. *Harvard Business Review*, 73 (3) (1995), pp. 40–50
- [69] D.L. Hoffman, T.P. Novak, M. Peralta. Building consumer trust online. *Association for Computing Machinery. Communications of the ACM*, 42 (4) (1999), pp. 80–85
- [70] M. Hollis. *Trust within Reason*. Cambridge University Press, Cambridge, UK (1998)
- [71] R.W. Houston, G.K. Taylor. Consumer perceptions of CPA Web Trust SM assurances: evidence on expectation gap. *International Journal of Auditing*, 3 (1999), pp. 89–105
- [72] H. Hsiung, S. Scheurich, F. Ferrante. Bridging e-business and added trust: keys to e-business growth. *IT-Pro* (March–April 2001), pp. 41–45

- [73] X. Hu, Z. Lin, H. Zhang. Trust-promoting seals in electronic markets: an exploratory study of their effectiveness for online sales promotion. *Journal of Promotion Management*, 9 (1–2) (2003), pp. 163–180
- [74] J. Hulland. Use of Partial Least Squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal*, 20 (2) (1999), pp. 195–204
- [75] J. Jacoby, L. Kaplan. The components of perceived risk. *Advances in Consumer Research*, 3 (1972), pp. 382–383
- [76] S.L. Jarvenpaa, K. Knoll, D.E. Leidner. Is anybody out there? Antecedents of trust in global virtual teams. *Journal of Management Information Systems*, 14 (4) (1998), pp. 29–64
- [77] S.L. Jarvenpaa, N. Tractinsky, L. Saarinen, M. Vitale. Consumer trust in an Internet store: a cross-cultural validation. *Journal of Computer Mediated Communication*, 5 (2) (1999)
- [78] S.L. Jarvenpaa, N. Tractinsky, M. Vitale. Consumer trust in an Internet store. *Information Technology and Management*, 1 (1–2) (2000), pp. 45–71
- [79] F.L. Jeffries, R. Reed. Trust and adaptation in relational contracting. *Academy of Management. The Academy of Management Review*, 25 (4) (2000), pp. 873–882
- [80] H. Kee, R. Knox. Conceptual and methodological considerations in the study of trust. *Journal of Conflict Resolution*, 14 (1970), pp. 357–366
- [81] D.J. Kim, N. Sivasailam, H.R. Rao. Information assurance in B2C websites for information goods/services. *Electronic Markets*, 14 (4) (2004), pp. 344–359
- [82] D.J. Kim, Y.I. Song, S.B. Braynov, H.R. Rao. A multi-dimensional trust formation model in B-to-C e-commerce: a conceptual framework and content analyses of academia/practitioner perspective. *Decision Support Systems*, 40 (2) (2005), pp. 143–165
- [83] K.M. Kimery, M. McCord. Third-party assurances: mapping the road to trust in e-retailing *Journal of Information Technology Theory & Application (JITTA)*, 4 (2) (2002), pp. 63–82
- [84] A. Kohli. Determinants of influence in organizational buying: a contingency approach. *Journal of Marketing*, 53 (1989), pp. 50–65
- [85] R. Koreto. In CPAs we trust. *Journal of Accountancy*, 184 (6) (1997), pp. 62–64
- [86] J. Kotkin. The mother of all malls. *Forbes*, 161 (7) (1998), pp. 60–65
- [87] S.E. Kovar, K.G. Burke, B.R. Kovar. Consumer perceptions of CPA WebTrust assurances: evidence of an expectation gap. *International Journal of Auditing*, 3 (2000), pp. 89–105
- [88] J.-N. Lee, Y.-G. Kim. Effect of partnership quality on IS outsourcing: conceptual framework and empirical validation. *Journal of Management Information Systems*, 15 (4) (1999), pp. 29–61
- [89] K. Lewin. Forces behind food habits and methods of change. *Bulletin of the National Research Council*, 108 (1943), pp. 35–65
- [90] D.A. Light. Sure, you can trust us. *MIT Sloan Management Review*, 43 (1) (2001), p. 17
- [91] N. Luhmann. *Trust and Power*. Wiley, Chichester, UK (1979)
- [92] N. Luhmann. Familiarity, confidence, trust: problems and alternatives. D. Gambetta (Ed.), *Trust: Making and Breaking Cooperative Relations*, Basil Blackwell, Oxford (1988), pp. 94–107
- [93] R.C. MacCallum, M.W. Browne. The use of causal indicators in covariance structure models: some practical issues. *Psychological Bulletin*, 114 (3) (1993), pp. 533–541
- [94] D.W. Manchala. E-commerce trust metrics and models. *IEEE Internet Computing*, 4 (2) (2000), pp. 36–44
- [95] L. Margherio. *The Emerging Digital Economy*. U.S. Department of Commerce, Washington, D.C. (1998)
- [96] S. Marsh. Formalizing trust as a computational concept. Department of Computer Science, University of Stirling, Scotland, UK (1994)
- [97] E. Mauldin, V. Arunachalam. An experimental examination of alternative forms of web assurance for business-to-consumer e-commerce. *Journal of Information Systems*, 16 (2002), pp. 33–54 (Supplement)

- [98] R.C. Mayer, J.H. Davis, F.D. Schoorman. An integrative model of organizational trust. *Academy of Management Review*, 20 (3) (1995), pp. 709–734
- [99] D.J. McAllister. Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38 (1) (1995), pp. 24–59
- [100] D. McCullough. Web-based market research: the dawning of a new age. *Direct Marketing*, 61 (8) (1998), pp. 36–37
- [101] D.H. McKnight, N.L. Chervany. What trust means in e-commerce customer relationships: an interdisciplinary conceptual typology. *International Journal of Electronic Commerce*, 6 (2) (2002), pp. 35–60
- [102] D.H. McKnight, L.L. Cummings, N.L. Chervany. Initial trust formation in new organizational relationships. *Academy of Management Review*, 23 (3) (1998), pp. 473–490
- [103] D.H. McKnight, V. Choudhury, C. Kacmar. The impact of initial consumer trust on intentions to transact with a web site: a trust building model. *Journal of Strategic Information Systems*, 11 (3–4) (2002), pp. 297–323
- [104] D.H. McKnight, C.J. Kacmar, V. Choudhury. Shifting factors and the ineffectiveness of third party assurance seals: a two-stage model of initial trust in a web business. *Electronic Markets*, 14 (3) (2004), pp. 252–266
- [105] S.M. Miranda, C.S. Saunders. The social construction of meaning: an alternative perspective on information sharing. *Information Systems Research*, 14 (1) (2003), pp. 87–107
- [106] G.C. Moore, I. Benbasat. Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2 (3) (1991), pp. 192–222
- [107] C. Moorman, R. Deshpande, G. Zaltman. Factors affecting trust in market research relationships *Journal of Marketing*, 57 (1) (1993), pp. 81–101
- [108] A. Moukas, G. Zacharia, P. Maes. Amalthea and Histos: multiagent systems for WWW sites and reputation recommendations. M. Klusch (Ed.), *Intelligent Information*, Springer-Verlag (1999)
- [109] J.C. Nunnally. *Psychometric Theory*. (2nd ed.)McGraw-Hill, New York (1978)
- [110] J.C. Nunnally, I.H. Bernstein. *Psychometric Theory*. (3rd ed.)McGraw-Hill, New York (1994)
- [111] OECD. The economic and social impact of electronic commerce. Organization for Economic Co-operation and Development (1998) [http://www.oecd.org/subject/e\\_commerce/summary.htm](http://www.oecd.org/subject/e_commerce/summary.htm)
- [112] J.S. Olson, G.M. Olson. i2i trust in e-commerce. Association for Computing Machinery. *Communications of the ACM*, 43 (12) (2000), pp. 41–44
- [113] T. Pack. Can you trust internet information? *Link-Up*, 16 (6) (1999), p. 24
- [114] A. Parasuraman, V.A. Zeithaml, L.L. Berry. SERVQUAL: a multiple-item scale for measuring customer perceptions of service quality. *Journal of Retailing*, 64 (1) (1988), pp. 12–40
- [115] P.A. Pavlou. Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7 (3) (2003), pp. 101–134
- [116] P.A. Pavlou, M. Fygenson. "Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior". *MIS Quarterly*, 30 (1) (2006), pp. 115–143
- [117] P.A. Pavlou, D. Gefen. Building effective online marketplaces with institution-based trust *Information Systems Research*, 15 (1) (2004), pp. 37–59
- [118] J.P. Peter, M. Ryan. An investigation of perceived risk at the brand level. *Journal of Marketing Research*, 13 (1976), pp. 184–188
- [119] P.J. Peter, L.X. Tarpey. A comparative analysis of three consumer decision strategies. *Journal of Consumer Research*, 2 (1) (1975), pp. 29–37
- [120] R.E. Plank, D.A. Reid, E.B. Pullins. Perceived trust in business-to-business sales: a new measure. *The Journal of Personal Selling & Sales Management*, 19 (3) (1999), pp. 61–71

- [121] P. Ratnasingam. The importance of trust in electronic commerce. *Internet Research: Electronic Networking Applications and Policy*, 8 (4) (1998), pp. 313–321
- [122] P. Ratnasingham. The importance of trust in electronic commerce. *Internet Research: Electronic Networking Applications and Policy*, 8 (4) (1998), pp. 313–321
- [123] P. Ratnasingham. Internet based EDI trust and security. *Information Management & Computer Security*, 6 (1) (1998), pp. 33–39
- [124] T. Ravichandran, A. Rai. Quality management in systems development: an organizational system. *MIS Quarterly*, 24 (3) (2000), pp. 381–415
- [125] P. Resnick, R. Zeckhauser, E. Friedman, K. Kuwabara. Reputation systems  
*Communications of the ACM*, 43 (12) (2000), pp. 45–48
- [126] J.B. Rotter. Generalized expectancies for interpersonal trust. *American Psychologist*, 26 (1971), pp. 443–450
- [127] D.M. Rousseau, S.B. Sitkin, R.S. Burt, C. Camerer. Not so different after all: a cross discipline view of trust. *The Academy of Management Review*, 23 (3) (1998), pp. 395–404
- [128] D. Shapiro, B. Sheppard, L. Cheraskin. Business on a handshake. *The Negotiation Journal*, 8 (1992), pp. 365–377
- [129] S.P. Shapiro. The social control of impersonal trust. *American Journal of Sociology*, 93 (3) (1987), pp. 623–658
- [130] K.J. Sharif, S.P. Kalafatis, P. Samouel. Cognitive and behavioral determinants of trust in small and medium-sized enterprises. *Journal of Small Business and Enterprise Development*, 12 (3) (2005), pp. 409–421
- [131] N. Sivasailam, D.J. Kim, H.R. Rao. What companies are(n't) doing about web site assurance  
*IT Pro*, 4 (3) (2002), pp. 33–40
- [132] C., Snijders, "Trust and Commitments." Utrecht, Netherlands: University of Utrecht, Doctoral Dissertation, (1996).
- [133] V. Swaminathan, E. Lepkowska-White, B.P. Rao. Browsers or buyers in cyberspace? An investigation of factors influencing electronic exchange. *Journal of Computer Mediated Communication*, 5 (2) (1999)
- [134] J.E. Swan, M.R. Bowers, L.D. Richardson. Customer trust in the salesperson: an integrative review and meta-analysis of the empirical literature. *Journal of Business Research*, 44 (2) (1999), pp. 93–107
- [135] G.L. Urban, F. Sultan, W.J. Qualls. Placing trust at the center of your Internet strategy. *Sloan Management Review*, 42 (1) (2000), pp. 39–48
- [136] R. Walczuch, J. Seelen, H. Lundgren. Psychological determinants for consumer trust in e-retailing. M. Schoop, R. Walczuch (Eds.), *Eighth Research Symposium on Emerging Electronic Markets (RSEEM 01)*, Maastricht, Netherlands (2001) <http://www-i5.informatik.rwth-aachen.de/conf/rseem2001/>
- [137] W.L. Wilkie, E.A. Pessemier. Issues in marketing's use of multi-attribute attitude models. *Journal of Marketing Research*, 10 (4) (1973), pp. 428–441
- [138] O.E. Williamson. Calculativeness, trust, and economic organization. *Journal of Law and Economics*, 36 (1993), pp. 453–486
- [139] B.H. Wixom, H.J. Watson. An empirical investigation of the factors affecting data warehousing  
*MIS Quarterly*, 25 (1) (2001), pp. 17–41
- [140] H. Wold. Partial least squares, in: S. Kotz, N.L. Johnson (Eds.), *Encyclopedia of Statistical Sciences*, vol. 6Wiley, New York (1985), pp. 581–591
- [141] G. Zacharia, P. Maes. Trust management through reputation mechanisms. *Applied Artificial Intelligence*, 14 (9) (2000), pp. 881–907
- [142] H. Zhang. Trust-promoting seals in electronic markets: impact on online shopping decisions  
*Journal of Information Technology Theory & Application (JITTA)*, 6 (4) (2004), pp. 29–40

- [143] W. Zikmund, J. Scott. A multivariate analysis of perceived risk, self confidence and information sources, in: S. Ward, P. Wright (Eds.), *Advances in Consumer Research*, vol. 1 Association for Consumer Research, Urbana, IL (1973), pp. 406–416
- [144] L. Zucker. Production of trust: institutional sources of economic structure (1840–1920). *Research in Organizational Behavior*, 8 (1986), pp. 53–111