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Trust in Online Prescription Filling

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ABSTRACT

This paper examines the impact of trust and uncertainty on online prescription filling. Drawing on prior research in consumer trust and theory of transaction cost economics, this paper proposes a research model to investigate the precedents of trust, the sources of uncertainty, and their relationships with the consumer's intention to adopt online prescription filling. The model was empirically tested using a large sample. It is found that (1) calculative, knowledge-based, and institutional antecedents of trust significantly affect trust, (2) information asymmetry and online drug retailers' opportunistic behavior contribute to perceived uncertainty of online prescription filling, (3) trust reduces uncertainty and positively affects intention, and (4) uncertainty has a negative influence on intention. A major contribution of this paper is that the understanding of trust on consumer intention is augmented by including uncertainty and its sources explicitly in the research model.

Keywords

Trust, uncertainty, calculative, institutional, knowledge-based, opportunistic behavior, information asymmetry

INTRODUCTION

Online prescription filling is an emerging phenomenon that has a great potential. According to Forrester, Americans in 1999 bought $158 million worth of prescription drugs over the Internet, and online prescription drug sales will reach $15 billion by the year 2004 (Pastore, 2004). Although online demand for prescription drugs is growing rapidly, online pharmacies are struggling to attract customers and make profits (Saliba, 2001). The institutional environment for online drug selling is chaotic. A recent survey revealed that half of the popular online pharmacies were unlicensed, and one-third did not have adequate privacy measures to protect patients (Silverman and Perlstein, 2003). A number of online pharmacies which are not licensed with state pharmacy boards and have no addresses and phone numbers are trying to hide from law enforcement (Richards, 2001). Complicated legal controversy may arise when cross-border prescription filling is involved (Schick, 2002). As a consequence, online pharmacies and online prescription filling services are facing a survival crisis.

Trust has been widely recognized as an important factor affecting consumer behavior, especially in the e-commerce context where uncertainty abounds (Ba and Pavlou, 2002, Friedman, Kahn and Howe, 2000, Gefen, Karahanna and Straub, 2003, Pavlou, 2003). Previous research has identified several antecedents of trust such as calculative, institutional, and knowledge-based trust (Gefen et al., 2003, McKnight, Choudhury and Kacmar, 2002, Rousseau, Sitkin, Burt and Camerer, 1998). Since products have diverse characteristics, these antecedents may have variant effects on trust. Prescription drugs differ dramatically from other types of products sold online given that they can be life threatening. Therefore, trust issues in online prescription filling are likely to be different from those involving other online products, and need to be investigated.

According to transaction cost economics, consumers tend to choose sellers associated with the lowest possible transaction cost (Williamson, 1981). Uncertainty can increase the transaction cost and erode consumers' buying intention (Liang and Huang, 1998). Uncertainty in an e-commerce buyer-seller relationship has two sources: opportunistic behavior of the sellers and information asymmetry between buyers and sellers (Ba and Pavlou, 2002, Mishra, Heide and Cort, 1998). In the context of online prescription filling, uncertainty needs to be reduced by building trust.

The objective of this paper is to examine various antecedents of trust, the sources of uncertainty, and the relationship among trust, uncertainty, and consumer intention to use online prescription filling. The rest of the paper is organized as follows. The next section presents the research model and proposes the hypotheses. Following that, research methods are described. Then data analysis and results are depicted. Finally, the findings are discussed and a brief conclusion ends the paper.

LITERATURE REVIEW AND RESEARCH MODEL

Given that online prescription filling is an emergent phenomenon which could be subject to a number of uncertainties, trust building is essential for e-vendors to attract consumers. Some interesting topics of investigation include antecedents of trust, sources of uncertainty, and the relationship between trust, uncertainty, and intention to use. Based on the past research on trust and transaction cost economics, a research model is designed to facilitate the investigation (Figure 1). This section elaborates the theoretical bases and derives the hypotheses.
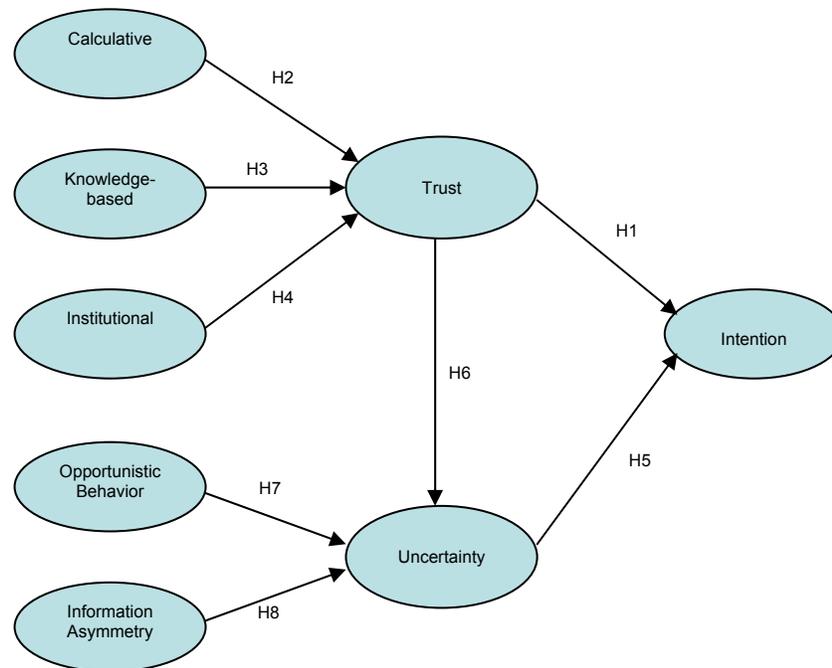

Figure 1. Research Model

Trust beliefs and trust intention

Trust means that "one believes in, and is willing to depend on, another party" (McKnight et al., 1998, p.474). Based on the theory of reasoned action, McKnight et al. (1998) breaks the high level trust concept into two constructs, trusting beliefs and trusting intention. Trusting beliefs are one's beliefs that the other person is likely to behave in a way that is benevolent, competent, honest, or predictable in a situation. Trusting intention is the extent to which one is willing to depend on the other person in a given situation. The theory of reasoned action supports the proposition that "positive beliefs regarding an action have a positive effect on intentions to perform that action" (Stewart, 2003). McKnight et al. (1998) propose that trusting beliefs have a significant positive influence on trusting intention. Stewart (2003) explained that there are several intended actions that represent trusting intentions such as the intent to continue a relationship (Crosby, Evans and Cowles, 1990), the intent to pursue long term orientation toward future goals (Ganesan, 1994), and intent to make a purchase (Doney and Cannon, 1997, Jarvenpaa, Tractinsky and Vitale, 2000). For the purpose of this research, we focus on the intent to buy from online prescription drug vendors. Trust is a critical aspect of e-commerce (Gefen et al., 2003, Reichheld and Schefter, 2000). Online purchase renders a customer vulnerable in many ways due to the lack of proven guarantees that an e-vendor will not behave opportunistically (Gefen, 2000). The Internet is a complex social environment, which still lacks effective regulation. According to Luhmann (1979), when a social environment cannot be regulated through rules and customs, people adopt trust as a central social complexity reduction strategy. Therefore, online customers have to trust an e-vendor from which they purchase; otherwise, the social complexity will cause them to avoid purchasing (Gefen, 2003). Empirical evidence has indicated that online customers generally stay away from e-vendors whom they do not trust (e.g., Jarvenpaa and Tractinsky,

1999; Reichheld and Schefter, 2000) and that the trusting belief in an e-vendor has a positive influence on intention to buy (e.g., Stewart, 2003; Gefen, 2000, 2003). Hence, the following hypothesis is developed.

H1: Trust will positively affect intention to adopt online prescription filling.

Antecedents of Trust

Trust in e-commerce is influenced by the nature and complexity of the interaction between different agents (Gefen, 2000). Trust has emerged as complex and multidimensional in nature (Butler Jr., 1991, Ganesan, 1994, Zucker, 1986). Multiple research streams in the past have shed light on various antecedents of trust (McKnight, Cummings and Chervany, 1998). Major antecedents of trust include calculative-based trust, knowledge-based trust, and institution-based trust (Gefen et al., 2003, McKnight et al., 1998).

Calculative Antecedents

Williamson (1975) expanded the concept of trust to economic transactions. He, and other researchers, proposed that in such transaction parties develop trust in a calculative manner (Buckley and Casson, 1988, Dasgupta, 1988). Two schools of thought projected somewhat different, yet related explanations of calculative antecedents to trust. As per the first one, to make a calculative trust choice, one party rationally calculates the costs and benefits of other party's cheating or cooperating in the transaction (Doney, Cannon and Mullen, 1998, Lewicki and Bunker, 1995). Trust develops if "the probability of that party performing an action that is beneficial or at least not detrimental to the first party is high" (Dasgupta, 1988). As per the second school of thought, calculative trust decisions involve gauging the nature of negative consequences of violating trust (Shapiro, Sheppard and Cheraskin, 1992). In other words, calculative trust is "dissuasive" in nature. Hosmer's (1995) elaboration of trust in economic transactions and the two points of view about calculative antecedents to trust, facilitate their generalization to the area of e-commerce (Gefen et al., 2003). In the absence of any confirmation that the e-vendor will not indulge in mistrustful behavior, calculative antecedents prominently influence online customers' trust decisions (Kollock, 1999, Reichheld and Schefter, 2000). A customer can develop more trust for an online prescription drug vendor if the customer infers that the vendor's costs for breaking the trust exceed the benefits (Gefen et al., 2003). In this research we examine how the calculative antecedents influence respondents' trust in online prescription drug vendors.

H2: Calculative antecedents will positively affect trust.

Knowledge-based Antecedents

Previous research proposes that trust develops as a result of the aggregation of trust related knowledge by the involved parties (Holmes, 1991; Lewicki & Bunker, 1995). This knowledge is accumulated either first-hand (based on an interaction history) or second-hand (such as reputation) (McKnight et al., 1998). One of the knowledge-based antecedents for trust tested by previous researches is familiarity (Gulati, 1995, Kumar, 1996). Familiarity is an understanding of what, why, where, and when others do what they do (Gefen et al., 2003). Luhmann (1979) argued that familiarity emerges as a result of one's learning gained from previous interactions and experiences. For example, familiarity with an e-vendor like www.online-prescriptiondrugs.com would be the knowledge of the web site gained by visiting the site. He added that familiarity reduces environmental uncertainty by imposing a structure (Luhmann, 1979). In our previous example, this would refer to the understanding of the site map and the ordering process. In general, familiarity with the situation and various parties involved is found to build trust in business relationships (Kumar, 1996, McKnight et al., 1998). Past researchers have specifically observed that familiarity with an e-vendor and the website of that vendor positively influences trust in that e-vendor(Gefen, 2000). In this research we examine how knowledge-based antecedents influence respondents' trust in prescription drug e-vendors.

H3: Knowledge-based antecedents will positively affect trust.

Institutional Antecedents

Institutional-based trust means that one believes the necessary impersonal structures are in place to enable one to act in anticipation of a successful future endeavor (McKnight et al., 1998). Such trust reflects the security one feels about a situation because of guarantees, safety nets, or other structures. McKnight et al. (2002) explained that the concept of

institution-based trust comes from sociology, which deals with the structures (e.g., legal protections) that make an environment feel trustworthy. Two types of institution-based trust have been discussed in the literature: situational normality and structural assurance (McKnight et al., 1998). Situational normality is an assessment that the success is likely because the situation appears to be normal or favorable. Structural assurance is an assessment that the success is likely because safeguard conditions such as legal recourse, guarantees and regulations are in place (Gefen et al., 2003, McKnight et al., 1998, Shapiro, 1987, Zucker, 1986). McKnight et al. (1998) proposed that institution-based trust will affect trusting beliefs. Gefen et al. (2003) reported that institutional-based trust positively affects trust in an e-vendor. To extend this relationship to online prescription filling leads to the following hypothesis.

H4: Institutional-based antecedents will positively affect trust.
UNCERTAINTY

Uncertainty is well grounded in transaction cost economics (Williamson, 1981) which posits that people tend to conduct transactions in a way that minimizes their transaction cost. Uncertainty refers to the degree to which an individual or organization cannot anticipate or accurately predict the environment (Pfeffer and Salancik, 1978). Prior research has demonstrated that uncertainty increases transaction cost and decreases acceptance of online purchasing (Liang and Huang, 1998). Another construct closely related to uncertainty is risk. Given the empirical evidence of the causal relationship between uncertainty and risk, we contend that the concepts of risk and uncertainty could be used interchangeably. Risk is defined as the probability of loss as perceived by a decision maker (Chiles and McMackin, 1996). Uncertainty regarding whether trading parties intend to and will act appropriately is the source of transaction risk (Rousseau et al., 1998). Transaction risks can result from the impersonal nature of the electronic environment. These risks are rooted in two types of uncertainties: about the identity of online trading parties or about the product quality (Ba and Pavlou, 2002). Similarly, Liang and Huang (1998) suggested that two types of uncertainties are relevant in an e-commerce transaction: product uncertainty and process uncertainty. Prior research has found that risk or uncertainty has a negative influence on consumer acceptance of e-commerce (Jarvenpaa et al., 2000, Pavlou, 2003). Therefore, the following hypothesis is proposed.

H5: Uncertainty will negatively affect intention to adopt online prescription filling.

Trust is crucial in exchange relationships, more so in an uncertain environment, especially the Web-based business environment in which the behavior of an e-vendor cannot be easily guaranteed or monitored (Reichheld and Schefter, 2000). Rousseau et al. (1998) observed that scholars in various disciplines have reached a consensus that trust is a psychological state developed under conditions of risk and interdependence. Trust is necessary only when there is some degree of uncertainty. If all transactions can be carried out under conditions of absolute certainty, there would be no need for trust (Lewis and Weigert, 1985, Zazzali, 2003). As a consequence, uncertainty and trust are closely related in a logical sense. They can be viewed as a pair of opposing forces shaping exchange relationships. One objective of trust building is to reduce the trustor's perceived uncertainty so that transaction cost is lowered and a long-term exchange relationship sustains (Ganesan, 1994). Prior studies have stressed the important role of trust in reducing risk or uncertainty in Internet shopping (Gefen, 2000, Jarvenpaa et al., 2000). It has been found that trust mitigates opportunism (Doney and Cannon, 1997) and information asymmetry (Ba and Pavlou, 2002) in uncertain contexts.

H6: Trust will negatively affect perceived uncertainty.

Sources of Uncertainty

Zazzali (2003) argues that uncertainty originates from two sources. The first pertains to the potential for different goals between transacting partners and recognizes that either party could take opportunistic behavior to serve its self-interest. The second relates to information asymmetry which accounts for the fact that either party may not have access to all of the information it needs.

Opportunistic behavior is prevalent in exchange relationships. In the online buyer-seller relationship, the seller may behave opportunistically by trying to meet its own goals without considering the consumer's benefits. Examples of opportunistic behavior could include misrepresentation of the true quality of a product or service, incomplete disclosure of information, actual quality cheating, contract default, or failure to acknowledge warranties (Mishra et al., 1998). In the online prescription filling situation, buyers may question whether they will receive quality health products and services, given high probability of prescription drug e-vendors behaving opportunistically. For example, in order to save costs, the drug e-vendor might not hire a licensed pharmacist to check drug-drug interactions for patients although its website claims so. Opportunistic behavior has

drawn much attention, and some studies imply that it is the primary source of uncertainty (Bradach and Eccles, 1989, Ganesan, 1994). Therefore, we propose the following hypothesis.

H7: Opportunistic behavior by prescription drug e-vendors will positively affect perceived uncertainty.

Information asymmetry is defined as the difference between the information possessed by buyers and sellers (Ba and Pavlou, 2002). It adds an additional layer of uncertainty to exchange relationships. Due to information asymmetry, it is difficult and costly for buyers to ascertain the attributes of products and services before purchase (Nayyar, 1990). Necessary information regarding quality of products or services may be incomplete or not readily available. Health care is characterized by serious informational asymmetry since health professionals control a specialized body of knowledge that is difficult for patients to access (Arrow, 1963). Similarly, information asymmetry is a problem for Internet shopping due to the physical distance between buyers and sellers (Huston and Spencer, 2002). Two sets of problems result from information asymmetry (Nayyar, 1990). The first are moral hazard problems associated with the buyer's inability to observe actions taken by the seller. The second are adverse selection problems which take place when the buyer is not capable of knowing the seller's characteristics or the contingencies under which the seller operates. Some marketing researchers have observed that most buyer-seller relationships are characteristic of information asymmetry (Mishra et al., 1998). When consumers cannot be adequately informed to make a judgment, they are likely to subject to moral hazard and adverse selection problems and perceive a high degree of uncertainty.

H8: Information asymmetry will positively affect perceived uncertainty.
RESEARCH METHOD

A survey method is adopted for this study to gather responses from consumers who have no online prescription filling experiences so that their intention can be measured. At first, a literature review was conducted to identify measurement items for the proposed constructs. Then the items reviewed by an expert panel for their face validity, and 22 undergraduate business students were asked to pretest the questionnaire. Finally, a total of 180 MIS undergraduate students were asked to participate in the survey. Each of the three steps is depicted in detail next.

Although all of the constructs are theoretically grounded, there are no preexisting items for each construct that can be utilized directly for this study. When designing the scale items for a construct, we took as many as possible items that have been used in prior studies. In addition, more items were created on the basis of the construct's substantive meaning.

The face validity of the items was examined by an expert panel consisting of two licensed pharmacists and 14 MIS PhD students. After some modifications, the questionnaire was pretested in a paper based format with 22 undergraduate students to check the psychometric properties of the scales. The construct validity of each scale in the questionnaire was verified with an exploratory factor analysis (EFA). The factor loadings indicated that the items of each scale have loaded on the latent variable that they were expected to belong to. After the questionnaire was finalized, a Web-based questionnaire was created for the study.

The main data collection targeted at the online consumers who were undergraduate business students at a college of business in a major university in the southeast region of the United States. At the beginning of the data collection session, an introduction to online prescription filling was presented to inform the students about procedures needed to fill prescriptions online. Two online pharmacy websites were also listed on the questionnaire and respondents were requested to browse through them. Respondents were then asked to complete the online questionnaire based on their perceptions of online prescription filling. A dataset of 145 responses was obtained.

Of the respondents, 60 were women and 82 were men, with some missing values in the dataset. Most respondents had previous online shopping experience (n = 129). The average age of the respondents was 21.58 (SD = 2.92) ranging from 18 to 43. Descriptive statistics are displayed in Table 1. All scales ranged from 1 (strongly disagree) to 7 (strongly agree), and showed a reasonable dispersion in their distributions across the ranges, as seen in the standard deviations.

Construct	Mean (SD) of Construct
Calculative	3.68 (1.05)
Knowledge-based	2.81 (1.40)
Institutional	4.32 (1.12)
Trust	3.39 (1.32)

Uncertainty	5.14 (1.29)
Opportunistic behavior	5.21 (1.15)
Information asymmetry	4.76 (1.30)
Intention	2.16 (1.45)

Table 1. Descriptive Statistics

DATA ANALYSIS AND RESULTS

Partial Lease Square (PLS) was used for data analysis since it is appropriate for dealing with small samples (Chin, 1998a). Chin (1998b) recommended that PLS outputs could be used to assess both the outer measurement and the inner causal relationships of a research model. Adopting this recommendation, we employed the PLS statistics to analyze the reliability and validity of the measurements and test the proposed hypotheses.

Construct	Cronbach alpha	Composite Reliability
Calculative	.80	.86
Knowledge-based	.89	.92
Institutional	.77	.84
Trust	.94	.95
Uncertainty	.89	.92
Opportunistic behavior	.87	.91
Information asymmetry	.91	.94
Intention	.94	.96

Table 2. Construct Reliabilities

Construct	Cal.	KB	Inst.	Trust	U	OB	IA	Int.
Calc.	.55*							
KB	.35	.75*						
Inst.	.58	.22	.51*					
Trust	.68	.38	.52	.78*				
U	-.38	-.31	-.19	-.58	.70*			
OB	-.32	-.19	-.18	-.33	.59	.66*		
IA	-.25	-.09	-.19	-.36	.43	.33	.84*	
Int.	.30	.28	.22	.43	-.59	-.37	-.22	.90*

* AVE of the construct.

Table 3. Construct Correlations

Table 2 exhibits the Cronbach alpha and the composite reliability of the constructs. All the reliability coefficients are above .70, showing sufficient internal consistency. Table 4 shows the factor loadings of the items of each construct. The loadings are in acceptable range and the t values indicate that all of them are significant at the .01 level. The discriminant validity of a construct was examined by comparing the square root of the construct's average variance extracted (AVE) and the correlations between the construct and any other construct. The criterion is that in order to show sufficient discriminant validity the square root of the AVE should be greater than all of the correlations (Chin, 1998b). As Table 3 demonstrates, the constructs used in this study have sufficient discriminant validity.

Figure 2 presents the estimates obtained from PLS analysis. The R^2 value of .36 indicates that the model explains a good amount of variance in intention to use online prescription filling. We find support for H2, H3 and H4, where we expected calculative and institutional antecedents to positively impact trust (b = 0.53; b = 0.15; b = 0.17). Opportunistic behavior and information asymmetry significantly lead to uncertainty, showing support for H7 and H8. As predicted by H6, perceived uncertainty can be reduced by trust (b = -0.39). While trust plays an important role in increasing consumers' intention of adopting online prescription filling (b = 0.14), uncertainty seems to have an even more salient effect on decreasing this intention (b = -0.51). Thus, we have found support for all of the research hypotheses.
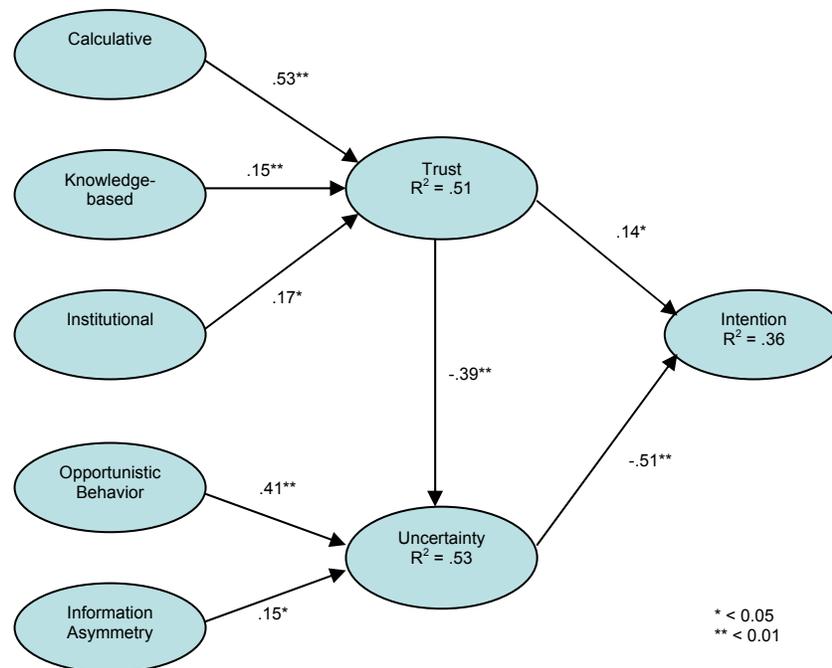
Figure 2. PLS Analysis Results

DISCUSSION

There are many factors affecting consumer decision to purchase prescription drugs from an e-vendor. This study examined two critical factors, trust and uncertainty. The results indicate that both trust and uncertainty significantly affect intention. According to the path weights in Figure 2, it appears that uncertainty has a stronger effect on intention than trust. Given that trust also reduces uncertainty, it is clear that uncertainty takes a mediating role between trust and intention. This finding is consistent with the theoretical conceptualization of trust which suggests that trust is a psychological state developed to cope with uncertainty and reduce transaction cost. Since prescription drugs have a health-related nature, consumers consider them to be more important than regular products such as books and electronics. Consequently, the same degree of uncertainty or risk may be perceived differently by consumers when they are purchasing prescription drugs and other products from the Internet. Trust may be built to enhance consumer intention to use online prescription filling; however, it is uncertainty that plays the primary role in shaping this intention.

CONCLUSION

Drawing on prior research in consumer trust and theory of transaction cost economics, this paper proposes a research model to investigate the precedents of trust, the sources of uncertainty, and their relationships with the consumer's intention to adopt online prescription filling. It is found that (1) calculative, knowledge-based, and institutional antecedents of trust significantly affect trust, (2) information asymmetry and online drug retailers' opportunistic behavior contribute to perceived uncertainty of online prescription filling, (3) trust reduces uncertainty and positively affects intention, and (4) uncertainty has a negative influence on intention. A major contribution of this paper is that the understanding of trust on consumer intention is augmented by including uncertainty and its sources explicitly in the research model.

This study has a limitation since the sample we used consists of undergraduate students who are young and have extensive experiences in using computers. The characteristics of this sample cannot be generalized to older populations. Hence, the findings of this study need to be tested in other populations. Our speculation is that the strength of trust will decrease and the effect of uncertainty will increase given that older people tend to be more scrupulous than their younger generation.

Construct	Indicator	Loading	T value
Calculative	1	.70	17.54
	2	.54	10.20
	3	.76	21.90
	4	.83	42.40
	5	.81	33.28
Knowledge-based	1	.84	29.76
	2	.91	55.26
	3	.87	41.01
	4	.83	25.21
Institutional	1	.61	9.87
	2	.74	18.18
	3	.78	25.20
	4	.77	23.81
	5	.66	11.33
Trust	1	.78	22.97
	2	.87	47.25
	3	.93	81.96
	4	.91	77.58
	5	.92	67.85
	6	.87	48.55
Uncertainty	1	.79	22.78
	2	.91	66.81
	3	.93	116.87
	4	.88	64.00
	5	.63	10.94
Opportunistic behavior	1	.71	16.83
	2	.81	26.38
	3	.91	60.52
	4	.83	27.04
	5	.79	26.55
Information asymmetry	1	.91	73.32
	2	.94	79.67
	3	.90	45.78
Intention	1	.94	69.30
	2	.95	45.02
	3	.95	95.42

Table 4. Construct Factor Loadings

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