

The Impact of Knowledge and Trust on E-Consumers' Online Shopping Activities: An Empirical Study

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Abstract—Lack of consumer trust is a critical obstacle to the success of online retailing. Knowledge is one important factor influencing the level of trust. However, there is no consensus on the relationship between knowledge and trust. Some studies argued a negative relationship between knowledge and trust while the others argued positive. This study discussed the relationship among knowledge, trust in online shopping, and the intention to go shopping online. The results revealed that knowledge is positively associated with trust and online shopping activities. In other words, people who know more about online shopping will trust and go shopping more online. Online retailing practice should make the public knowledgeable about online transaction security mechanisms to build users' trust in online shopping.

Index Terms—knowledge, trust, online shopping, empirical study

I. INTRODUCTION

Trust is an especially important factor under conditions of uncertainty and risk [1]. It helps ensure that one party will not take advantage of the vulnerability of the other during or after a transaction. Trust is quite challenging to define because it manifests itself in many different forms [2]. Mayer, Davis, and Schoolman defined trust as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will

perform a particular action important to the trustors, irrespective of the trustors' ability to monitor or control that other party” [3] (p. 712).

Lack of consumer trust is a critical obstacle to the success of transactions [4]. This obstacle is especially difficult as it relates to online shopping, where parties to transactions cannot physically see each other. According to Naquin and Paulson, people have lower levels of trust when communication is via the Internet rather than face-to-face [5]. Hoffman, Novak and Peralta pointed out in 1999 that trust is important to online exchanges characterized by uncertainty, anonymity, lack of control, and potential opportunism [6]. Chen and Barnes concluded that both online initial trust and familiarity with online purchasing have a positive impact on purchase intention [7]. When conducting transactions online, a consumer cannot physically check the product quality before making a purchase, or monitor the safety and security of his or her personal information or credit card numbers [1].

The success of electronic commerce is determined in part by whether consumers trust sellers and products they cannot see. Without trust, it is difficult to imagine a transactional relationship could be developed or maintained. Since the Internet is a new distribution channel with enormous potential, there is a strong need to explore the impact of trust on online shopping activities, as well as to explore the factors influencing consumers' trust.

The current empirical survey was conducted to assess the influence of knowledge on trust and the intent to shop online.

II. HYPOTHESES

This study discusses the influence of a subject's level of knowledge on trust of online shopping and on the intention to go shopping online. The trustor's knowledge about the trustee could be used to predict the behavior of the trustee, as Doney, Cannon and Mullen indicated [8]. Knowledge or familiarity reduces social uncertainty through increased understanding of what is likely to happen. This reduction of uncertainty will contribute to increasing trust [9].

However, there is no consensus of empirical survey results on the relationship between knowledge and trust although Doney et al. [8] argued that knowledge reduces uncertainty and less uncertainty increase trust. Hoffman et al. reported a negative relationship between trust and users' skill in using the Internet [6], but Koehn indicated that knowledge-based trust occurs when Internet users familiar to one another interact frequently [10]. McCole and Palmer conducted an empirical study discussing the relationship between transaction frequency and trust in Internet buying behavior and found that trust increased with increasing use of the Internet [11]. It is reasonable to infer that positive relationships existed between individuals' online transaction frequency and skill in using the Internet. According to McCole and Palmer [11], mistrust may be based on fear of the unknown, so mistrust in the Internet might be based on respondents' lack of familiarity with this new medium. It is possible that consumers may become more trusting when they are more familiar with online shopping.

In addition to the direct influence of knowledge on trust, Genfen, Karahanna and Straub indicated an indirect influence, where knowledge would influence trust through the mediate of perceived ease of using online retailing [12]. However, they found that the direct influence of knowledge on trust was not significant.

This means that past empirical results were inconsistent. Hoffman et al. reported a negative relationship between knowledge and trust [6], while McCole and Palmer [11] and Genfen et al. [12] reported a positive relationship. It is important for academic as well as practical reasons to find the real relation between trust in online shopping and knowledge of using the Internet.

A possible explanation for the inconsistency of past studies may be that Internet users were shocked when they heard about the possible of non-secure online transaction in the early stages of online shopping. However,

knowledge of the online transaction process should engender trust [13]. The more Internet users know about the Internet, the more likely they are to understand that non-secure transactions happen infrequently. In 1999 or before, only those users most familiar with the Internet were concerned about the trustworthiness of online transactions. The rest of Internet users were oblivious, still trying to figure out how to access a webpage. However, now that time has passed, more users are very familiar with the Internet and well aware of the potential dangers of non-secure transactions. Now the roles have changed: The users with the richest knowledge of the Internet know how to avoid security issues online, and that knowledge means trust is not a big factor for them. Now it is the rest of us who have become aware of the potential pitfalls of Internet use, but are not adept enough to find our way out of the traps. This may have led to the different results between later studies and the pioneer study conducted by Hoffman et al. [6]. As a result of this inference, this study proposed that, the more Internet users know, the more they trust online retailing. Based on these inferences, the following two hypotheses are provided.

Hypothesis 1: Knowledge is positively associated with trust in online shopping.

Hypothesis 2: Knowledge is positively associated with online shopping activities.

Javenpaa et al. found that trust in online stores influences individuals' willingness to buy [14]. Similarly, Yoon found that trust in a particular website influences the consumers' intention to purchase online [15]. The more the consumers trust in online shopping, the more they conduct online shopping activities. This leads to the following hypothesis.

Hypothesis 3: Trust in online shopping is positively associated with online shopping activities.

Some factors influence consumers' trust in online shopping. The consumers' propensity to trust at all, a dimension of personality, is one of them. Chen and Dhillon indicated that a consumer's disposition to trust is an important variable influencing trust [16]. Trust propensity is viewed as a trait that is stable across situations [17] and leads to the formation of attitude. A user's trust propensity may influence his or her level of trust in online shopping. A study considering consumer trust in online shopping that did not examine trust propensity would be quite inadequate, as Lee and Turban [1] mentioned.

The propensity to trust is likely to have a significant effect on a person's initial trust [18]. However, when a consumer has had experience in online shopping, the

propensity to trust is no longer an important factor. Since the Internet is extremely popular and widely used, most Internet users have at least some experience in online shopping. Therefore, the propensity to trust is no longer as important a factor as before for determining the level of trust in online shopping. According to this inference, this study proposed the following hypothesis.

Hypothesis 4: Trust propensity is not associated with trust in online shopping.

The consumer’s perception of an online shopping website’s integrity is often thought to be another important antecedent of trust [1]. Integrity is the perception that the trusted party, i.e., the seller, will be honest and adhere to an acceptable set of principles [1]. Perceived integrity infuses the trustor’s confidence in trustee behavior and reduces perception of risk [7]. The less the risk consumers perceive, the more their intention to shop online. Based on this discussion, this study proposed following hypothesis.

Hypothesis 5: The perceived integrity of an online shopping website is positively associated with trust in online shopping.

The model this study proposed does not attempt to capture all possible influenced factors of trust and is not an all-embracing model. The focus of the study is on the influence of knowledge. Perceived integrity and trust propensity are treated as moderate variables which influence users’ trust in online shopping.

III. METHODOLOGY

A paper-and-pencil questionnaire survey was conducted among students enrolled in the undergraduate College of Business in order to identify the levels of knowledge and trust in online shopping. College students were chosen as the subjects for this survey because they constitute one of the major target markets for online shopping.

In this study, the scales on which perceived integrity, trust propensity and trust in online shopping were measured were modified from Lee and Turban [1], Moorman Deshpande and Zaltman [19], and Chow and Holden [20]. Knowledge and online shopping activities were measure by scales developed by this study. Table 1 describes items these two constructs, knowledge and online shopping activities, in detail. Awareness of online payment security was measured by the five-item scale developed by Torkzadeh and Dhillon [21]. Seven-point scales, anchored with 1 = “strongly disagree” and 7 = “strongly agree,” were used in the questionnaire for all

items. The subjects were asked to indicate their tendency to agree with statements.

254 subjects participated in the survey, 3 of them were discarded because of missing data, leaving 251 respondents in the final sample. Of the sample, 61.1% (n=154) reported that they had experience in purchasing online, and 31.3% of subjects (n=80) reported experience in providing credit card numbers when shopping online. To determine the users’ impressions of online security, this study used a seven-point Likert-type scale developed by Torkzadeh and Dhillon [21] for measuring online payment security awareness, and yielded an average score of 6.17 (where 7 indicated high levels of concern about online payment security and 1 indicated no concern about online payment security), with a standard deviation of 1.16. This finding revealed that almost all subjects were concerned about online payment security. This provided as evidence that trust is an important issue for online retailing.

TABLE I.
KNOWLEDGE AND ONLINE SHOPPING ACTIVITIES
MEASUREMENT ITEMS

Variable	Items
Knowledge	♦ I am familiar with online shopping.
	♦ I have sufficient knowledge for online shopping.
	♦ I understand the transaction model of online shopping.
	♦ I understand the online transaction security issues.
Online Shopping Activities	♦ I buy merchandises online frequently.
	♦ I go shopping online frequently.
	♦ I have numerous experiences of online purchasing.

IV. RELIABILITIES AND VALIDATION

This study measured five constructs, including knowledge, trust propensity, perceived integrity, trust in online shopping, and online shopping activities. Cronbach alphas were calculated in order to measure the reliability of these five constructs. (See Hair Anderson, Tatham and Black [22] for a detailed description of the Cronbach alpha formula) The results of the empirical study revealed Cronbach alphas of 0.929, 0.854, 0.848, 0.894, and 0.961 for knowledge, trust propensity, perceived integrity, trust in online shopping, online payment security concerns, and online shopping activities, respectively, confirming the reliabilities of these scales. The construct reliabilities,

listed in Table 2, are all within the commonly accepted range, exceeding 0.70.

TABLE II.
RELIABILITY OF SCALES

	Scales from	#of Items	Reliability (Cronbach α)
Knowledge	This study	4	0.929
Trust Propensity	[1]	4	0.854
Perceived Integrity	[1], [19]	2	0.848
Trust in Online Shopping	[1], [20]	4	0.894
Online Shopping Activities	This study	3	0.961

For the survey questionnaire, common method variance could cause an effect that is significant in statistics when the only real effect is due to the method employed [23]. Since this study collected data at the same time using the paper-and-pencil questionnaire, we needed to address the potential for common method variance [12]. This study adopted Harmon's one-factor test [24, 25]. We performed an exploratory factor analysis of all 17 items in our survey and extracted five factors with eigenvalues greater than 1. Just less than one-third (29.76%) of all variance was explained by the first factor. Therefore, we concluded that common method variance did not affect the data.

Convergent validity, which could be assessed by checking factor loading of a measurement model [26], is assumed if the factor loadings for all indicators measuring the same construct are statistically significant. Convergent validity of this study is acceptable since all factor loadings in this research were identified as significant.

Discriminant validity addresses the degree to which measures of different variables are unique [27]. This is achieved when correlations between any two latent variables are found to be significantly different from unity, i.e., significantly less than 1.00 [28, 29, 30]. Correlations among knowledge, trust propensity, perceived integrity, trust in online shopping and online shopping activities are listed in Table 3. The confidence intervals of the correlations show that the values were significantly less than unity (1.00), thus confirming discriminant validity.

V. DATA ANALYSIS

This study adopted linear regression and the Structure Equation Model (SEM) for hypotheses testing. The results of linear regression, shown in Table 4, indicated that both perceived integrity and knowledge were positive relative to trust in online shopping. In addition, the online shopping activities are influenced positively by the level of knowledge and trust in online shopping. However, the relationship between trust propensity and trust in online shopping was not significant. This means that consumers' trust propensity is not an important moderator variable in this study and does not significantly influence consumers' feeling of trust in online shopping. Propensity to trust is likely to have a significant effect on a person's initial trust [18], but once a consumer has experience, propensity to trust is no longer an important factor. As mentioned above, 61.1% of this study's subjects had online shopping experiences; trust propensity would not have a serious influence on level of trust when they have experience. The multiple linear regression provided evidence to support Hypotheses 1, 2, 3 and 5, but Hypothesis 4 is not supported.

To examine the impact of knowledge, perceived integrity, and trust propensity on trust and on online shopping activities, this study adopted the structure equations model (SEM) analysis. In total, 17 measured items (questions) were used to measure the five latent constructs: perceived integrity, perceived ability, trust propensity, knowledge, trust in online shopping and online shopping activities. The SEM model indicated the hypothesized relations among these latent constructs were supported.

Several goodness-of-fit indices accessed the adequacy of the proposed model. The chi-square value is 225.965. The degree of freedom (df) of the proposed model is 114. The chi-square/df ratio is 1.982. The less-than-2.0 chi-square/df ratio indicated a good fit. The Steiger-Lind RMSEA Index was 0.063, less than 0.07, indicating a good fit. The Goodness of Fit Index (GFI) was 0.903 and the Adjusted Goodness of Fit Index (AGFI) was 0.870. GFI was greater than 0.9, and AGFI was greater than 0.8 and close to 0.9; both demonstrate an acceptable fitness. Overall, all these indicators demonstrate good model fit.

Figure 1 summarized the results of SEM analysis and showed that the influence of knowledge on online shopping activities was positive and significant at $p < 0.05$. The influence of knowledge and trust to online shopping was also significant at $p < 0.05$, while trust in online shopping was positively correlated with online shopping activities. These confirmed H1 and H2, that knowledge directly and indirectly affects online shopping activities, as

well as H3, that trust in online shopping is a determinate factor for online shopping activities.

H4 was not supported, the data indicated that trust propensity did not influence trust in online shopping significantly. The results of this hypothesis testing were similar to the argument of McKnight et al. [18] that propensity to trust is likely to have a significant effect on a person's initial trust. However, when an individual has had experience, propensity to trust is no longer is an important factor.

The data supported H5, that trust integrity is positively associated with trust in online shopping and is an important moderator factor when considering the influence of knowledge on trust and intent to shop online. The empirical study results showed that the parameter is significantly positive between perceived integrity and trust in online shopping. This parameter is high, so it is not a good idea to consider a trust study with this moderator variable. This hypothesis testing results are similar to those of Cheung and Lee, where a positive correlation existed between perceived integrity and trust in online shopping.

TABLE III.
CORRELATIONS AMONG CONSTRUCTS FOR DISCRIMINANT VALIDITY TESTS

	Knowledge	Trust Propensity	Perceived Integrity	Trust in Online Shopping
Trust Propensity	0.183 (0.004)			
Perceived Integrity	0.179 (0.004)	0.208 (0.001)		
Trust in Online Shopping	0.279 (0.000)	0.133 (0.035)	0.446 (0.000)	
Online Shopping Activities	0.572 (0.000)	0.174 (0.006)	0.266 (0.000)	0.445 (0.000)

Note: Numbers in parentheses represent standard errors. All correlations' difference from unity (1.00) were statistically significant at p<0.05.

TABLE IV.
RESULTS OF THE REGRESSION ANALYSIS

Dependent Variable	Independent variable	Beta	t-value	p-value	The whole model multiple R
Trust in Online Shopping	Perceived Integrity	0.407	7.119	0.000*	0.490
	Trust Propensity	0.010	0.182	0.855	(p<0.001)*
	Knowledge	0.205	3.595	0.001*	
Online Shopping Activities	Knowledge	0.310	6.154	0.000*	0.645*
	Trust in Online Shopping	0.485	9.615	0.000*	(p<0.001)*

Note: * t-test significant at the p<0.05 level.

Several goodness-of-fit indices accessed the adequacy of the proposed model. The chi-square value is 225.965. The degree of freedom (df) of the proposed model is 114. The chi-square/df ratio is 1.982. The less-than-2.0 chi-square/df ratio indicated a good fit. The Steiger-Lind RMSEA Index was 0.063, less than 0.07, indicating a good fit. The Goodness of Fit Index (GFI) was 0.903 and the Adjusted Goodness of Fit Index (AGFI) was 0.870. GFI was greater than 0.9, and AGFI was greater than 0.8 and close to 0.9; both demonstrate an acceptable fitness. Overall, all these indicators demonstrate good model fit.

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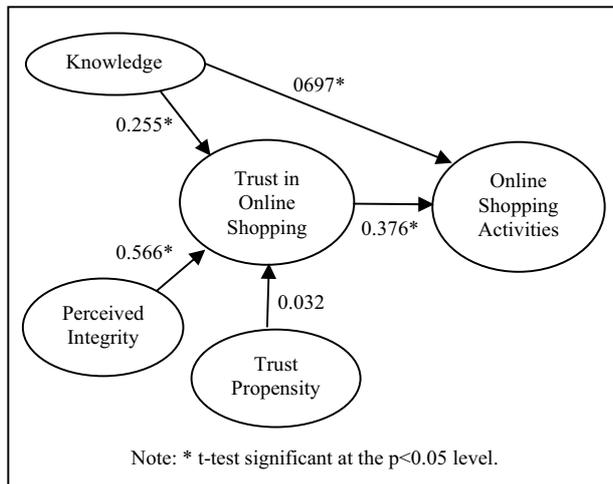


Figure 1. Results of the SEM analysis

This study focused on the relationship between knowledge and trust. Ruling out the moderator variables, such as trust propensity and trust integrity, would help to concentrate our attention. In order to assess the impact of knowledge on trust and on online shopping activities only, this study adopted another structure equations model (SEM) analysis, as Figure 2 showed. In total, three latent constructs—knowledge, trust in online shopping, and online shopping activities—were included. Figure 2's structural equations model indicated the hypothesized relations H1, H2, and H3 among these three latent constructs.

The goodness-of-fit indicators also indicate Figure 2 is an acceptable model. The chi-square value is 88.338. The degree of freedom (df) of the proposed model is 41. The chi-square/df ratio is 2.154. The close to 2.0 and less than 3.0 chi-square/df ratio indicated a good fit. The Steiger-

Lind RMSEA Index is 0.0692, less than 0.07, indicated again a good fit. The goodness of Fit Index (GFI) is 0.938 and the Adjust Goodness of Fit Index (AGFI) is 0.901. Both GFI and AGFI are greater than 0.9 and demonstrate an acceptable fitness.

Figure 2 showed that the influence of knowledge on online shopping activities was positive and significant at p<0.05. The influence of knowledge and trust on online shopping was positive and also significant at p<0.05, while trust in online shopping is positively correlated with online shopping activities. These confirmed H1 and H2, that knowledge directly and indirectly affects online shopping activities and H3 that trust in online shopping is a determinate factor for online shopping activities.

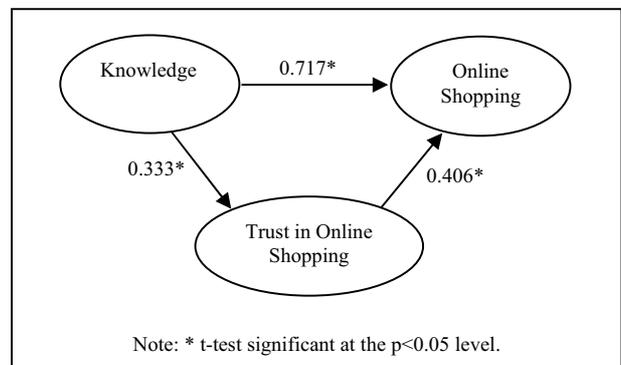


Figure 2. Results of the SEM analysis – knowledge, trust, and online shopping

VI. DISCUSSIONS AND CONCLUSIONS

The success of electronic commerce is determined in part by whether consumers trust sellers and products they cannot see [1]. The results of this empirical study revealed that trust in online shopping is positively associated with online shopping activities; in other words, online retailers should work to increase consumers' trust in online stores to increase their intention to purchase online.

Many factors influence consumers' trust in online shopping, but knowledge is one of the strongest. According to the empirical results of this study, knowledge is positively associated with trust in online shopping and is positively associated with online shopping activities. This means that consumers' knowledge may determine their level of trust in online retailers and their intention to purchase online. The more the consumers know, the more they trust online shopping. This finding was inconsistent with Hoffman et al. [6], who found a negative relationship between trust and users' skill in using the Internet. A possible explanation is that, in 1999 or before, few users

gave any thought to the online trust issue; only those who were more familiar with the Internet had trust issues. Now, however, the Internet is ubiquitous, many people are highly familiar with it, and the online trust issue is frequently discussed. Still, many Internet users may regard the Internet as non-secure. The users with the richest knowledge about the Internet may know how to avoid the security issues online and consider trust as a not-so-serious problem. This may be the cause of the differing results between this study and Hoffman et al. [6].

Lack of trust is one of the most frequently cited reasons for consumers' not shopping online [1]. The results of this study will be useful for academics interested in exploring the antecedents and consequences of trust and for practical use in building consumer trust. As the empirical study results indicated, the more users know about online shopping, the more they trust in online shopping; the more they trust, the more they shop online. Therefore, consumer education is important for electronic commerce, since consumers will not be afraid of shopping online if they know more about Internet security.

This study benefits scholars and online business practices by clarifying the influence of knowledge on users' level of trust. In addition to knowledge, this study discusses the influence of trust in online shopping, of perceived integrity, and of the propensity of users to trust. The results of the empirical study showed that consumer's perceived integrity of an online shopping website is positively associated with trust in online shopping. This means that the integrity of the online retailer is an important moderator influencing individuals' intention to purchase online. However, trust propensity is not associated with trust in online shopping, according to the survey results. This finding matched McKnight et al. [18], who argued that the propensity to trust has a significant effect on a person's initial trust. However, when a consumer has experience in online shopping, propensity to trust is not as an important a factor as before.

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