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UNDERSTANDING THE SOURCES AND IMPACTS OF TRUST IN E-COMMERCE: A META-ANALYSIS

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ABSTRACT

Trust plays a vital role in e-commerce to encourage desired transaction attitudes and behaviors from consumers. Research on trust in e-commerce has employed many different theoretical frameworks and tested a variety of variables, resulting in fragmented findings. This study attempts to synthesize previous empirical findings regarding antecedents and consequents of trust in e-commerce. A meta-analysis is conducted. 52 empirical studies have been identified, and 207 effect sizes are collected and meta-analyzed. Implications for future research are also discussed.

Keywords

Meta-Analysis, Trust, E-Commerce.

INTRODUCTION

Online transactions require customers to provide sensitive information in the absence of formal control mechanisms to monitor such information being appropriately used (Hoffman et al., 1999). Also, compared with the traditional “brick and mortar” retailers, e-vendors lack some common means such as physical proximity and history of being in business to boost customer awareness and confidence (Bhattacharjee, 2002). Therefore, initiating, building, and maintaining trust among customers are widely believed to be the key drivers of success for e-vendors (Ba and Pavlou, 2002; Friedman et al., 2000; Gefen et al., 2003; Pavlou and Gefen, 2004).

E-commerce represents a complex blend of human actors and technological systems (Friedman et al., 2000). The formation and development of trust in such a rich context are shaped by various forces including economic, psychological, social, technological, and environmental factors. It is common for researchers to integrate different theoretical frameworks and develop a comprehensive model to study trust in e-commerce (e.g., Gefen et al., 2003; McKnight et al., 2002; Rousseau et al., 1998). Not surprisingly, empirical research in the field has employed different perspectives and addressed a variety of variables, resulting in fragmented findings in the literature.

This study attempts to systematically review empirical studies that have been conducted on trust in e-commerce. The purpose is to synthesize what we have examined, and make suggestions for future research. To serve the end, meta-analysis is selected as the primary method for the study. The remainder of the paper is organized as follows: first, the theoretical backgrounds of trust research in e-commerce are discussed; then, the meta-analytic procedure is described, and the results are reported. The paper ends with a discussion of the findings and the implications for future research.

THEORETICAL BACKGROUND OF TRUST

Conceptualization of Trust

Trust has been studied in several disciplines including economics, sociology, marketing, and organizational behavior (Rousseau et al., 1998; Bhattacharjee, 2002). Although there is no universally agreed definition of trust, a generic typology proposed by Mayer et al. (1995) has been widely adopted among trust researchers (Rousseau et al., 1998). According to Mayer et al. (1995), the construct of trust consists of three key dimensions of ability (trustor’s perception of trustee’s competencies and knowledge salient to the expected behavior), integrity (trustor’s perception that the trustee will adhere to a set of principles that the trustor finds acceptable), and benevolence (the extent to which a trustee is believed to intend doing good to the trustor, beyond its own profit motive).

Accordingly, IS researchers commonly define and operationalize trust in e-commerce as a collection of beliefs in an e-vendor’s ability, integrity, and benevolence (Bhattacharjee, 2002). There are other aspects of trust being discussed in the literature, such as honesty (Gefen et al., 2003), perceived risks (Connolly and Bannister, 2007), vendor legitimacy (Torkzadeh and Dhillon, 2002) and security (Torkzadeh and Dhillon, 2002; McCloskey, 2007). But the three dimensions of ability, integrity, and benevolence are most adopted in the research of trust in e-commerce.

The Formation and Development of Trust - Antecedents

The research of trust in e-commerce has referenced different theoretical frameworks from economics, sociology, psychology, marketing, and organizational behavior.

Personal Characteristics-based Trust Antecedents

Personal characteristics have been widely studied in the research of organizational behavior, especially in the area of group research (Milliken and Martins, 1996). An assumption of characteristics-oriented research is that people with similar characteristics have comparable experiences and tend to behave in similar ways (Zenger and Lawrence, 1989). In the field of information systems, many researchers recommend to incorporate individual characteristics into a research model either as control variables or as independent variables to study the cognitive, affective, and/or behavioral reactions of individuals to technology (Gefen and Straub, 1997; Venkatesh and Morris, 2000; King and He, 2005a).

Personal characteristics include salient (or observable) attributes such as age and gender, and subtle (or unobservable) attributes such as education and personality (Milliken and Martins, 1996). In e-commerce, the type of personality that receives most research attention is one's propensity to trust, or the tendency to believe or not to believe in others and so trust them (Gefen et al., 2003). Characteristics-based trust antecedents are most relevant in the initial stage of trust building, when individuals have no direct experience with the target e-vendor (Koufaris and Hampton-Sosa, 2004; Gefen et al., 2003).

Knowledge-based Trust Antecedents

Knowledge-based trust antecedents include knowledge, experience, and self-efficacy with online transactions. These factors can find their theoretical roots in human capital model (Ratchford, 2001) of marketing and social cognitive theory (Bandura, 1977) of sociology. Human capital model treats consumer knowledge as human capital, which affects search activities and consumption prices. Human capital can be acquired through investments in formal or informal education, training, or learning by doing. In contrast, social cognitive theory centers on the concept of self-efficacy as the main mechanism to regulate one's behavior. Self-efficacy, defined as beliefs about one's ability to perform a specific behavior, is induced from psychological procedures of deliberating information from various sources including direct and vicarious experiences. Both theories agree that knowledge and experience with target behaviors will help individuals to behave efficiently and decisively in similar contexts. In e-commerce, the more knowledge and experience one has accumulated with a website, the more trust one is likely to form in that website (Gefen et al., 2003).

Deterrence-based Trust Antecedents

Deterrence-based trust is based on the assumption that individuals are rational and will not engage in opportunistic behavior whose consequences of being untrustworthy are possibly severe (Shapiro et al., 1992). Thus, individuals can calculate the consequences of another party's cheating or cooperating in the relationship, and form beliefs whether the party can be trusted (or, unlikely to perform untrustworthy activities).

Main types of deterrence-based trust antecedents been studied in e-commerce include calculative trust and legal framework. Calculative trust is derived from classic economic theories with a utilitarian tradition (Granovetter, 1985). Trust is viewed as a result of rational calculation of individual gains (Williamson, 1993). In the context of e-commerce, a consumer can trust an e-vendor if he/she believes that "the e-vendor has more to lose than to gain by cheating or has nothing to gain by breaking customer trust" (Gefen et al., 2003; p. 64).

Legal framework also falls in the category of deterrence-based trust antecedents. Legal framework refers to the perceived regulations and law enforcements in online transactions (Connolly and Bannister, 2007). Consumers tend to develop trust in e-vendors if they believe the existing laws and regulations are adequate to protect their interests. E-vendors are unlikely to perform untrustworthy activities in the fear of severe punishments.

Social Influence-based Trust Antecedents

The influence of social factors on trust can find its theoretical ground in the social theory of human behavior. Contrast to economists' view of human behavior as resulting from rationality and self-interest, sociologists emphasizes on the role of social relations (Granovetter, 1985), and frequently "call attention to the intensity with which men desire and strive for the good opinion of their immediate associates in a variety of situations" (Wrong, 1961; p. 189). People's purposive actions are constrained by concrete, ongoing systems of social relations including social networks, culture, politics and religion (Granovetter, 2005).

In the research of e-commerce, social norms (Karahanna and Straub, 1999; Venkatesh and Davis, 2000), ratings from fellow consumers (Ziegler and Golbeck, 2007), and references from friends (i.e., word-of-mouth) (Walczuch and Lundgren, 2004) have been studied as important social factors that affecting the formation and development of trust..

Technological Attributes-based Trust Antecedents

Viewing an e-vendor's website as a special information system, online transaction behaviors can be partially explained by the technological attributes of the website (Gefen et al., 2003). Technological attributes derived from the research of technology acceptance model (TAM) have been widely incorporated into trust model as antecedents. These technical factors include perceived ease of use and perceived usefulness (Davis 1989; Davis et al. 1989), perceived enjoyment (e.g., Hampton-Sosa and Koufaris, 2005; Hwang and Kim, 2007), website quality (e.g., Koufaris and Hampton-Sosa, 2004; Jones and Leonard, 2008) and privacy and security protections (e.g., Walczuch and Lundgren, 2004). All these factors reflect the technical wellness of an e-vendor in terms of supporting transactions.

Vendor-image-based Trust Antecedents

Derived from consumer behavior theories, vendor-image-based trust antecedents include reputation, company size, and product choices of a target e-vendor. These factors are able to convey to consumers an image of the e-vendor, helping them develop "brand" awareness and make favorable decisions toward the e-vendor by employing simple heuristic choices (Hoyer and Brown, 1990). These vendor-image factors are particularly important for first-time visitors, who have no previous experience with the target website but rely heavily on website cues and company reputation to form their initial trust beliefs (Koufaris and Hampton-Sosa, 2004).

Institution-based Trust Antecedents

In the research of e-commerce, institution-based trust refers to a buyer's perception that third-party guarantees are in place to facilitate online transactions (Pavlou and Gefen, 2004). Certain design of IT infrastructure and artifacts, such as strategic alliance, third-party assurance and certification (including credit card guarantees), can effectively boost institution-based trust and create conditions that will facilitate transaction success (Gefen et al., 2006).

Situational normality (and similar concepts of compatibility as in (Poong et al., 2009; Slyke et al., 2010), defined as the assessment that the transaction will be a success based on how normal or customary the situation appears to be (Baier, 1986), also falls into the category of institution-based trust antecedents (Gefen et al., 2003). Situational normality helps assure people that everything in a standard setting is as it ought to be (McKnight et al., 1998) and strange behaviors (e.g., cheating) are unlikely to happen.

The Effects of Trust – Consequents

In contrast with the complicated nature of the formation and development of trust, trust consequents that have been studied in e-commerce are comparatively cohesive – encouraging online consuming activities by affecting the attitudes, intentions, and eventually the actual behaviors of online transaction (Gefen et al., 2003). Trust effects on these consequents can find strong support in behavior research about behavior formation (e.g., the theory of reasoned action (Ajzen, 1987) and psychology research about behavior regulation and change (e.g., the social cognitive theory (Bandura, 1977)). In addition, TAM also provides theoretical support that favorable beliefs (including trusting beliefs) help to form positive attitudes and intentions, and ultimately lead to desired behaviors (Davis 1989, Davis et al. 1989).

An Integrated Model of Trust

The discussion of trust antecedents and trust consequents is summarized in Figure 1. The model integrates different theoretical perspectives regarding the formation and development of trust in e-vendors without probing any possible interwoven relationships among the suggested factors. The model also implies that trust plays an important role in e-commerce by mediating the effects of various factors on individual behaviors in online transactions.

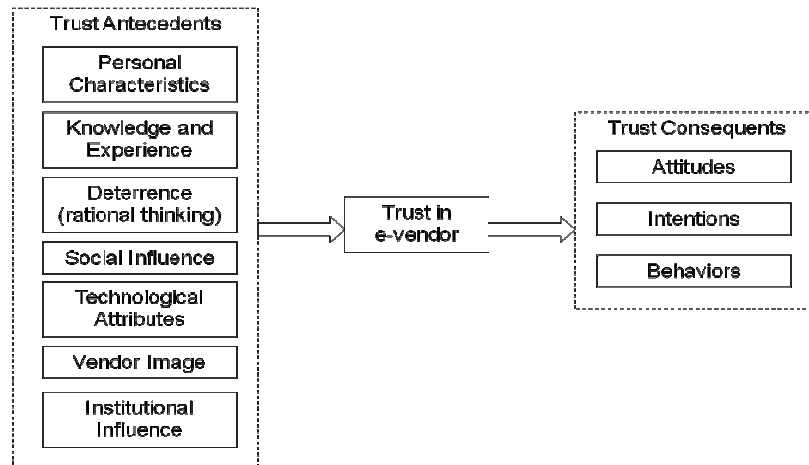


Figure 1: An Integrated Model of Trust in E-Commerce

RESEARCH METHOD – META-ANALYSIS

This study attempts to systematically review what we have empirically examined in the literature of trust in e-commerce. Meta-analysis is employed for its unique strength of viewing the “whole picture” in a research context by combining and analyzing the quantitative results of many empirical studies (Glass, 1976). Comparing with other literature review methods such as narrative review, meta-analysis is less judgmental and subjective with a focus on data and the use of rigorous statistical procedures (King and He, 2005b).

Selection of Relevant Studies

To systematically sample relevant studies, two popular business research databases – ABI/INFORMS and Social Science Citation Index (SSCI) – were searched using the keywords of “trust”, and “e-commerce” or “online transactions.” The search resulted in 172 articles in total. Of these, 120 articles were eliminated because they (a) were not empirical studies, (b) did not study e-commerce, (c) did not measure trust, or (d) did not report the effects (as explained below) that can be used for the meta-analysis. The resulting 52 studies provided 207 effect sizes for this meta-analysis.

The Treatment of Effect Sizes

Effect sizes used in this meta-analysis were Pearson’s correlation coefficients. Most studies reported correlation coefficients between trust and antecedents/consequents. If such correlation coefficients were not available, other statistics (e.g., descriptive statistics, p-values, T-tests, F-tests, and d-tests) were examined for possible conversion to correlation coefficients by following the procedures described by Rosenthal and DiMatteo (2001).

If a study had more than one effect size regarding a particular relationship in terms of the previously-discussed classification of variables, the effect sizes were treated by following the decision rules suggested by King and He (2006): multiple effect sizes are averaged if they are homogeneous in both magnitudes and research contexts; otherwise, they will be treated separately.

Meta-Analytic Calculations

This meta-analysis collected 207 effect sizes from 52 studies. Hedges-Olkin’s (1985) random effects method was used as the calculation procedure. Hedges-Olkin is one of three well-developed meta-analytic procedures that have been widely applied in the social and behavioral sciences (Field, 2001; 2003). Basically, effect sizes are first transformed into Fisher’s z; weights of individual studies are calculated basing on sample sizes (using a chi-square analysis of sampling errors); a homogeneity test (Q test) is performed to justify the use of an effect-size-integration model (in this case, the random model); then, a weighted average is calculated from transformed effect sizes, the associating standard deviation, Z-statistic, and 95% confidence intervals. Finally, these statistics are transformed back to their standard forms for interpretation.

Results of the meta-analysis are presented in Table 1-7 for trust antecedents, and Table 8 for trust consequents.

	Gender	Age	Education	Trust Propensity	Income
# of sampled studies	2	3	2	16	1
Total sample size	2820	2453	855	6641	745

Homogeneity Test (Q)	1	1.931	0.111	17.069	
p (heterogeneity)	0.317	0.381	0.739	0.315	
Avg (r)	-0.012	-0.047	-0.007	0.201	0.17
Z	-1.167	-0.793	-0.149	5.157	
p (effect size)	0.878	0.786	0.559	0.000	
95% Low (r)	-0.031	-0.163	-0.094	0.125	
95% High (r)	0.008	0.070	0.081	0.273	

Table 1: Personal Characteristics-based Antecedents of Trust

Despite the call for incorporating personal characteristics into IS research (Gefen and Straub, 1997; Venkatesh and Morris, 2000; King and He, 2005a), not many studies have examined the effects of demographics and personalities in their research of trust in e-commerce. The extensive search in the literature has identified 21 studies in this particular area. The focus has been mostly placed on trust propensity (16 out of 21 sampled studies); other demographic factors, including gender, age, education, and income, have received less research attention.

The direct effects of gender, age, and education on trust are found to be frivolous (r close to 0), while trust propensity is found to exert a notable, although small in magnitude, influence on trust ($r=0.201$, $p<0.001$). Interestingly, income level is also found to significantly correlate with one's trust in e-commerce; high-income individuals are more likely to trust e-vendors and purchase online than low-income individuals are (Qureshi et al., 2009). However, the lack of repeated empirical tests in various research contexts excludes the factor from being meta-analyzed.

	Familiarity with E-vendor	Self-Efficacy	Internet Experience
# of sampled studies	8	5	5
Total sample size	2358	1318	1991
Homogeneity Test (Q)	4.934	3.776	7.192
p (heterogeneity)	0.668	0.437	0.126
Avg (r)	0.442	0.267	0.109
Z	3.184	3.586	1.062
p (effect size)	0.001	0.000	0.144
95% Low (r)	0.181	0.123	-0.093
95% High (r)	0.645	0.400	0.303

Table 2: Knowledge-based Antecedents of Trust

Knowledge-based antecedents of trust include familiarity with the e-vendor, self-efficacy, and Internet experience. The former two factors are found to strong antecedents of trust, with notable effect sizes ($r=0.442$ and 0.267 respectively) and strong statistic significance ($p<0.001$). Interestingly, Internet experience is found to have limited effects on the formation and development of trust in e-commerce ($r=0.109$, $p=0.144$). This finding suggests that trust in e-commerce is more relevant with the special knowledge of target e-vendors (i.e., familiarity with e-vendor) and confidence in conducting online transactions (i.e., self-efficacy), and less relevant with the general knowledge of Internet. In other words, knowing Internet is an insufficient condition for one to embrace e-commerce if the person does not have the special knowledge of conducting transactions with certain e-vendors.

	Calculative Trust	Legal Framework
# of sampled studies	5	5
Total sample size	1745	2398
Homogeneity Test (Q)	3.631	2.841
p (heterogeneity)	0.458	0.585
Avg (r)	0.453	0.358

Z	3.672	3.574
p (effect size)	0.000	0.000
95% Low (r)	0.224	0.168
95% High (r)	0.634	0.523

Table 3: Deterrence-based Antecedents of Trust

In the literature, two factors - calculative trust and legal framework – have been examined as deterrence-based antecedents of trust. The two factors present strong influence on trust ($r=0.453$ for calculative trust, and $r=0.358$ for legal framework; both with $p<0.001$). The results suggest that people are likely to trust a web-site if they are convinced that the web-site is held accountable for any misbehavior either by economic means or by law enforcements.

	Reference/Word-of-mouth	Negative Rating	Social Norms
# of sampled studies	6	4	0
Total sample size	1382	1181	0
Homogeneity Test (Q)	5.044	2.83	
p (heterogeneity)	0.411	0.419	
Avg (r)	0.264	-0.46	
Z	1.711	-3.878	
p (effect size)	0.087	0.000	
95% Low (r)	-0.039	-0.635	
95% High (r)	0.522	-0.241	

Table 4: Social-based Antecedents of Trust

Social-based antecedents of trust include reference/word-of-mouth from others, negative rating, and social norms. Of these antecedents, negative rating presents a strong negative effect on trust ($r=-0.46$, $p<0.001$), highlighting the detrimental effects of disapproving information to a web-site. Contradictory to common understanding, references or word-of-mouth from others demonstrate a marginal effect on trust ($r=0.264$, $p=0.087$). As for social norms, no study has been found to address the particular factor.

	Perceived Ease of Use	Perceived Usefulness	Website Quality	Perceived enjoyment	Feedback Mechanisms	Privacy & Security
# of sampled studies	12	15	13	5	5	13
Total sample size	2776	3740	7505	854	848	4918
Homogeneity Test (Q)	8.664	14.403	15.280	4.081	2.971	8.523
p (heterogeneity)	0.653	0.420	0.226	0.395	0.563	0.743
Avg (r)	0.444	0.491	0.413	0.403	0.381	0.441
Z	5.750	9.159	9.815	5.353	2.693	4.791
p (effect size)	0.000	0.000	0.000	0.000	0.004	0.000
95% Low (r)	0.305	0.399	0.338	0.265	0.109	0.273
95% High (r)	0.565	0.574	0.483	0.526	0.601	0.583

Table 5: Technological Attributes-based Antecedents

Studying the technological attributes of a target e-vendor’s website is found to be popular in the research of trust in e-commerce. The factors that have been examined in the literature include perceived ease of use, perceived usefulness, website quality, perceived enjoyment, feedback mechanisms, privacy and security. Overall, these technological attributes are found to be very influential for one to develop trust beliefs toward the target website.

	Reputation	Company Size	Product Choices
# of sampled studies	6	1	1
Total sample size	2756	692	421
Homogeneity Test (Q)	6.533		
p (heterogeneity)	0.258		
Avg (r)	0.471	0.44	0.21
Z	7.451		
p (effect size)	0.000		
95% Low (r)	0.360		
95% High (r)	0.569		

Table 6: Vendor-image-based Antecedents of Trust

The comprehensive search of the empirical studies in the literature of trust in e-commerce shows that IS researchers have placed limited attention on the vendor-image-based antecedents such as reputation, size, and product choices. The latter two factors have each received only one empirical test in the literature. However, the three factors demonstrate remarkable effect sizes, with reputation having $r=0.471$, company size having $r=0.44$, and product choices having $r=0.21$. More research attention needs to be placed on this group of factors for studying trust in e-commerce.

	Assurance /Certification	Alliance	Situational Normality
# of sampled studies	6	2	5
Total sample size	1293	520	1813
Homogeneity Test (Q)	4.153	1	4.135
p (heterogeneity)	0.528	0.317	0.388
Avg (r)	0.435	0.383	0.546
Z	3.417	5.741	11.251
p (effect size)	0.000	0.000	0.000
95% Low (r)	0.196	0.260	0.467
95% High (r)	0.626	0.494	0.616

Table 7: Institution-based Antecedents

At a conference panel discussion, Gefen and colleagues (2006) highlighted the importance of studying institutional trust in IS research. Since then, institution-based antecedents of trust have received increased attention among IS researchers. However, as demonstrated in Table 7, limited attempts have been conducted in the context of e-commerce. Similar to that of vendor-image-based antecedents, the three institution-based antecedents present strong influences on the formation and development of trust in e-commerce, with notable effect sizes (ranging from 0.383 to 0.546) and distinct significance ($p<0.001$). More research attention needs to be placed on this group of factors in the future research of trust in e-commerce.

	Attitude	Behavioral Intention	Behavior	User Loyalty	Price Premiums	Perceived Risk	Perceived Usefulness	Perceived Ease of Use
# of sampled studies	8	34	7	1	3	4	3	1
Total sample size	1955	10102	2327	351	935	635	591	258
Homogeneity Test (Q)	6.958	21.131	5.172		1.480	2.286	1.671	
p (heterogeneity)	0.433	0.945	0.522		0.477	0.515	0.434	
Avg (r)	0.437	0.512	0.252	0.27	0.437	-0.539	0.421	0.08
Z	2.915	9.103	3.059		7.276	5.836	2.595	
p (effect size)	0.002	0.000	0.001		0.000	0.000	0.009	

95% Low (r)	0.152	0.417	0.092		0.330	-0.667	0.109	
95% High (r)	0.654	0.596	0.399		0.533	-0.380	0.657	

Table 8: Consequents of Trust

The importance of studying trust in e-commerce centers on the arguments that trust facilitates online consuming activities by affecting the attitudes, intentions, and eventually the actual behaviors of online transaction (Gefen et al., 2003). Thus, the constructs of attitude, behavioral intention, and/or actual behavior are widely accepted as key consequents of trust in the e-commerce literature of trust research. In the meta-analysis, 30 out of 33 studies that have tested trust effects in e-commerce select one or more of the three constructs as the dependent variables in their empirical investigations.

Some researchers have extended their investigations to other trust-triggered attitudes and behaviors such as user loyalty and the acceptance of price premiums. Overall, trust exerts large effects on attitudinal and intentional factors (absolute effect sizes ranging from 0.437 to 0.537, with the exception of user loyalty of 0.27), and moderate effects on actual transaction behaviors (Avg(r) = 0.252, $p=0.001$), lending support to the importance of studying trust in the research of e-commerce.

With limited attempts (6 out of the 33 sampled studies that have tested trust effects in e-commerce), the literature has tested the extent to which trust reshapes consumers' perceptions of target e-vendors. The effects of trust on perceived risks and perceived usefulness are found to be large. In contrast, perceived ease of use of a website is found to be little affected by the development of trust.

DISCUSSIONS

This study intends to synthesize the empirical findings of previous trust studies in the context of e-commerce. 52 relevant studies were identified from the literature, and 207 effect sizes were collected and analyzed. The results demonstrate the importance of studying trust as a key intervening mechanism of shaping one's behaviors in the context of e-commerce.

As many as 25 trust antecedents were analyzed. The broad range of antecedents suggests that forming and developing trust in e-commerce is a complicated phenomenon influenced by affective, cognitive, technological, and social forces beyond the boundary of any single theory. Among these factors, deterrence-based, social and institution-based, and technological attributes-based antecedents are found to be the most influential forces on the formation and development of trust. This finding suggests that trust in e-commerce is much in line with technology usage (Friedman, et al., 2000; Gefen et al., 2003), cognitive and rational transaction behavior (Shapiro et al., 1992; Ratchford, 2001), and social and institutional influences (Granovetter, 1985; Pavlou and Gefen, 2004), probably because e-commerce is in nature a technology-driven and transaction-driven environment.

Some factors have received limited attention in the literature. The exhaustive search of empirical studies on trust in e-commerce has not located any test for the effect of social norms, a widely acknowledged factor for shaping individual's behavior in technology adoption and usage (Venkatesh et al., 2003). The search has located only one test for the effects of company size, product choices, and income, two tests for the effects of alliance, education, and gender, and three tests for the effect of age. As results from few studies cannot serve as the basis for strongly generalizable conclusions, future research that refines and replicates the testing of these factors should be encouraged.

The small direct effects of personal characteristics on trust need further investigation. The effects of personal characteristics observed in the literature are typically small or negligible. Even the effect of trust propensity, which is widely acknowledged as a strong trust antecedent evidenced by the large number of empirical tests, is limited in magnitude (Avg (r) =0.2). The influence of personal characteristics on trust is based on the assumption that people with similar backgrounds and experiences will behave in similar ways. Such a contention suggests that personal characteristics exert a moderating role in the development of trust. However, it is a rare endeavor in the literature to examine personal characteristics as moderators rather than determinants of trust in e-commerce. One exception is Qureshi et al. (2009), in which gender and age were found to indirectly influence one's trust in e-vendors by affecting his/her perception of vendors' website and service quality. Thus, studying the mechanisms through which personal characteristics affect individual trust beliefs and behaviors will be a promising area for future research.

Another promising area in trust research will be to develop complex trust models that integrate different theoretical perspectives. Although meta-analysis can help us view the "whole picture" of a literature by systematically synthesizing effect sizes studied in the area, the effect sizes are primarily zero-order correlations (Rosenthal and DiMatteo, 2001); structural relationships among the investigated factors are not examined. Studies that integrate different theoretical perspectives and test the structural relationships among key trust antecedents will enrich our understanding of the complicated phenomenon.

As for the consequents of trust, the literature is quite coherent on what trust may affect in the context of e-commerce. Most empirical studies select consumers' attitude, behavioral intention, and/or actual behavior as the dependent variables. Some researchers have studied the extent to which trust re-shapes one's perceptions toward a target website such as perceived risk, perceived usefulness, and perceived ease of use. As Bem (1972) pointed out, the behavioral experiences, if they are mindful and reflect the person's willingness, define and change attitudes, and direct the performance of future behaviors. Thus, the antecedents-trust-behavior relationship can therefore be viewed as a comprehensive interactive system in which the antecedents, trust, and behaviors exert reciprocal influences on one another. The investigation of the interactive system especially on the reciprocal relationships between trust and trust antecedents will strengthen the theoretical foundations of trust research in e-commerce.

To my knowledge, this study is so far the most comprehensive attempt to quantitatively synthesize research findings of trust in e-commerce. However, some limitations of the study should also be acknowledged. One limitation is about the coverage of sampled papers. The exhaustive search does not cover all research databases and may have failed to find some articles online or through the employed university research library system. However, given the overall large number of sampled studies, adding a few additional studies would unlikely to alter the conclusions.

Another limitation is about the treatment of effect sizes. This study used reported effect sizes without adjustments on their measurement errors, such as perception-perception bias, single-method bias, and "attenuation effect" caused by imperfect construct reliabilities. Techniques of estimating and reducing these measurement errors are available, but require additional examination of each sampled study of its detailed research setting and methods, and probably over-modified statistical procedures, which are beyond the scope of the current study. Both the number of the sampled studies and the total cumulated sample size are satisfactorily large, granting credibility to these results.

REFERENCES

1. Ajzen, I. (1987) Attitudes, traits, and actions dispositional predictions of behavior in personality and social psychology, in Berkowitz, L. (Ed.), *Advances in Experimental Social Psychology* (Vol. 20), Academic Press, San Diego, CA, 1-64.
2. Ba, S., and Palvou, P.A. (2002) Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behavior, *MIS Quarterly*, 26, 3, 243-268.
3. Baier, A. (1986) Trust and antitrust, *Ethics*, 96, 231-260.
4. Ballou, D.J., and Huguenard, B.R. (2008) The impact of students' perceived computer experience on behavior and perform in an introductory information systems course, *Journal of Information Systems Education*, 19,1, 87-97.
5. Bandura, A. (1977) Self-efficacy: Toward a unifying theory of behavioral change, *Psychological Review*, 84,2, 191-215.
6. Bem, D.J. (1972) Self-perception theory, *Advances in Experimental Social Psychology*, 6, 1-63.
7. Bhattacharjee, A. (2002) Individual trust in online firms: scale development and initial test, *Journal of Management Information Systems*, 19, 1, 211-241.
8. Bozionelos, N. (1996) Psychology of computer use: XXXIX. Prevalence of computer anxiety in British managers and professionals, *Psychological Reports*, 78, 995-1002.
9. Connolly, R., and Bannister, F. (2007) Consumer trust in Internet shopping in Ireland: Towards the development of a more effective trust measurement instrument, *Journal of Information Technology*, 22, 2, 102-118.
10. Davis, F.D. (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quarterly*, 13, 3, 318-340.
11. Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. (1989) User acceptance of computer technology: A comparison of two theoretical models, *Management Science*, 35, 8, 982-1003.
12. Field, A.P. (2001) Meta-analysis of correlation coefficients: A Monte Carlo comparison of fixed- and random-effects methods, *Psychological Methods*, 6, 2,161-180.
13. Field, A.P. (2003) The problem in using fixed-effects models of meta-analysis on real-world data, *Understanding Statistics*, 2, 2, 105-124.
14. Friedman, B., Khan, Jr. P.H., and Howe, D.C. (2000) Trust online," *Communications of the ACM*, 43, 12, 34-40.
15. Gefen, D., and Straub, D.W. (1997) Gender differences in the perception and use of E-mail: An extension to the technology acceptance model, *MIS Quarterly*, 21,4, 389-400.

16. Gefen, D., Karahanna, E., and Straub, D.W. (2003) Trust and TAM in online shopping: An integrated model, *MIS Quarterly*, 27, 1, 51-90.
17. Gefen, D., Pavlou, P., Benbasat, I., McKnight, H., Stewart, K., and Straub, D.W. (2006) ICIS panel summary: Should institutional trust matter in information systems research? *Communications of the Association for Information Systems*, 17, 205-222.
18. Granovetter, M. (1985) Economic action and social structure: The problem of embeddedness, *The American Journal of Sociology*, 91, 3, 481-510.
19. Granovetter, M. (2005) The impact of social structure on economic outcomes, *Journal of Economic Perspectives*, 9, 1, 33-50.
20. Hampton-Sosa, W., and Koufaris, M. (2005) The effect of web site perceptions on initial trust in the owner company, *International Journal of Electronic Commerce*, 10, 1, 55-81.
21. Hedges, L.V., and Olkin, I. (1985) *Statistical methods for meta-analysis*, Academic Press, San Diego.
22. Hoffman, D.L., Novak, TP., and Peralta, M. (1999) Building consumer trust online, *Communications of the ACM*, 42, 4, 80-85.
23. Hoyer, W.D., and Brown, S.P. (1990) Effects of brand awareness on choice for a common, repeat-purchase product, *Journal of Consumer Research*, 17, 2, 141-148.
24. Hwang, Y., and Kim, D.J. (2007) Customer self-service systems: The effects of perceived Web quality with service contents on enjoyment, anxiety, and e-trust, *Decision Support Systems*, 43, 3, 746-760.
25. Igbaria, M. and Chakrabarti, A. (1990) Computer anxiety and attitudes towards microcomputer use, *Behavior and Information Technology*, 9, 3, 229-241.
26. Jones, K., and Leonard, L.N.K. (2008) Trust in consumer-to-consumer electronic commerce, *Information & Management*, 45, 2, 88-95.
27. King, J., Bond, T., and Blandford, S. (2002) An investigation of computer anxiety by gender and grade, *Computers in Human Behavior*, 18, 1, 69-84.
28. King, W.R. and He, J. (2005a) External validity in IS survey research, *Communications of the Association for Information Systems*, 16, 880-894.
29. King, W.R. and He, J. (2005b) Understanding the role and methods of meta-analysis in IS research, *Communications of the Association for Information Systems*, 16, 665-686.
30. King, W.R. and He, J. (2006) A meta-analysis of the technology acceptance model, *Information & Management*, 43, 7, 740-755.
31. Koufaris, M., and Hampton-Sosa, W. (2004) The development of initial trust in an online company by new customers, *Information & Management*, 41, 3, 377-397.
32. Mayer, R.C., Davis, J.H., and Schoorman, F.D. (1995) An integrative model of organizational trust, *Academy of Management Review*, 20, 3, 709-734.
33. McCloskey, D.W. (2006) The importance of ease of use, usefulness, and trust to online consumers: An examination of the technology acceptance model with older consumers, *Journal of Organizational and End User Computing*, 18, 3, 47-65.
34. McKnight, D.H., Choudhury, V., and Kasmir, C. (2002) Developing and validating trust measures for e-commerce: An integrative typology, *Information Systems Research*, 13, 3, 334-359.
35. McKnight, D.H., Cummings, L.L., and Chervany, N.L. (1998) Initial trust formation in new organizational relationships, *The Academy of Management Review*, 23, 3, 473-490.
36. Milliken, F.J., and Martins, L.L. (1996) Searching for common threads: Understanding the multiple effects of diversity in organizational groups, *Academy of Management Review*, 21, 2, 402-433.

37. Morris, M.G., Venkatesh, V., and Ackerman, P.L. (2005) Gender and age differences in employee decisions about new technology: An extension to the theory of planned behavior, *IEEE Transactions on Engineering Management*, 52, 1, 69-84.
38. Pavlou, P.A., and Gefen, D. (2004) Building effective online marketplaces with institution-based trust, *Information Systems Research*, 15, 1, 37-59.
39. Poong, Y.S., Eze, U.C., and Talha, M. (2009) B2C e-commerce in Malaysia: Perceived characteristics of innovating and trust perspective, *International Journal of Electronic Business*, 7, 4, 2009.
40. Qureshi, I., Fang, Y., Ramsey, E., McCole, P., Ibbotson, P., and Compeau, D. (2009) Understanding online customer repurchasing intention and the mediating role of trust - an empirical investigation in two developed countries, *European Journal of Information Systems*, 18, 3, 205-222.
41. Ratchford, B.T. (2001) The economics of consumer knowledge, *Journal of Consumer Research*, 27, 397-411.
42. Rosenthal, R., and DiMatteo, M.R. (2001) Meta-analysis: Recent developments in quantitative methods for literature reviews, *Annual Review of Psychology*, 52, 1, 59-82.
43. Rousseau, D.M., Sitkin, S.B., Burt, R.S., and Camerer, C.C. (1998) Not so different after all: A cross-discipline view of trust, *Academy of Management Review*, 23, 3, 393-404.
44. Shapiro, D.L., Sheppard, B.H., and Cheraskin, L. (1992) Business on a Handshake, *Negotiation Journal*, 3, 365-377.
45. Slyke, C.V., Lou, H., Belanger, F., and Sridhar, V. (2010) The influence of culture on consumer-oriented electronic commerce adoption, *Journal of Electronic Commerce Research*, 11, 1, 30-40.
46. Taylor, W.A. (2004) Computer-mediated knowledge sharing and individual user differences: an exploratory study, *European Journal of Information Systems*, 13, 1, 52-64.
47. Torkzadeh, G., and Dhillon, G. (2002) Measuring factors that influence the success of Internet commerce, *Information Systems Research*, 13, 2, 187-204.
48. Venkatesh, V., and Morris, M.G. (2000) Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior, *MIS Quarterly*, 24, 1, 115-139.
49. Walczuch, R., and Lundgren, H. (2004) Psychological antecedents of institution-based consumer trust in e-retailing, *Information & Management*, 42, 1, 159-177.
50. Wareham, J., Zheng, J.G., and Straub, D. (2005) Critical themes in electronic commerce research: a meta-analysis, *Journal of Information Technology*, 20, 1-19.
51. Williamson, O.E. (1993) Calculativeness, trust and economic organization, *Journal of Law and Economics*, 30, 131-145.
52. Wrong, D. (1961) The oversocialized conception of man in modern sociology, *American Sociological Review*, 26, 2, 183-193.
53. Zenger T.R., Lawrence B.S. (1989) Organizational demography: The differential effects of age and tenure distributions on technical communication, *Academy of Management journal*, 32, 2, 353-376.
54. Ziegler, C.N., and Golbeck, G. (2007) Investigating interactions of trust and interest similarity, *Decision Support Systems*, 43, 2, 460-475.