

Types of structural assurance and their relationships with trusting intentions in business-to-consumer e-commerce

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Abstract This study examines the effects of different types of structural assurance mechanisms on trusting intention in business-to-consumer electronic commerce. Inconsistent results from prior research on structural assurance motivated the current study to further explore the nature of structural assurance. Based on the Institution-based Trust Theory, this paper proposes that different types of structural assurance mechanisms, specifically: seals of approval, vendor-specific guarantees, protections from credit card companies and transaction protections, may have their unique effects on trusting intentions. The results indicate that customer perceptions about seals of approval and vendor-specific guarantees can significantly influence trusting intentions while perceptions about protections from credit card companies, legal systems and technology infrastructures do not.

Keywords Structural assurance · Trust · Institution-based trust · Certification · Guarantees · Consumer service policies

Introduction

Consumers' lack of trust toward web vendors is a fundamental reason for consumers' lack of interest in participating in business-to-consumer (B2C) electronic commerce (e-commerce) (The Nielson Company 2008). To investigate the reasons for the lack of trust toward web

vendors, Information Systems researchers examined the nature of consumer trust to better understand how consumers form trust toward web vendors, and how this trust perception may influence their purchasing intentions from a web vendor. The antecedents of consumer trust were also examined. The focus of this research is structural assurance, one of the antecedents for consumer trust.

Structural assurance (SA) is defined as the degree to which consumers believe that institutional structures 'like guarantees, regulations, promises, legal recourse, or other procedures are in place to promote success' (McKnight et al. 2002a, p. 339). It is about the influence of existing institutional structures on consumers' beliefs and intentions. The construct of structural assurance is sometimes referred to as institution-based trust (Pavlou and Gefen 2004) or technology trust (Ratnasingam and Pavlou 2003). All these constructs share the same theme, i.e. consumers' beliefs about the available protection from institutional structures and mechanisms. Therefore, this paper will use structural assurance (SA) as the general name to refer to these constructs.

Consumers frequently encounter unfamiliar web vendors when they look for best deals by using popular price comparison websites, or when they click on a banner ad on a search engine website. There are also consumers who are used to brick-and-mortar shopping begin to try online shopping alternatives. These new generation of online shoppers would find a brand new retail environment. These situations could make SA beliefs salient to consumers when they encounter unknown web vendors. The focus of this research is to examine the effect of SA in an unknown online shopping environment. The effects of SA are hypothesized to positively influence consumers' trusting beliefs and intentions. For example, SA can provide a sense of protection for consumers against possible losses, such as

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loss of privacy, identity and money, from a web vendor's possible opportunistic behaviors. However, existing empirical results show inconsistent findings about the influence of SA on consumer trust. These research findings raise the question as to why SA is significant in explaining online consumer trust in some studies but not in others. Based on Zucker's (1986) institution-based trust theory, this research proposes that customers' perceptions about different assurance structures, particularly when they encounter unfamiliar web vendors, may form different aspects of SA, and each may have unique influences on consumer trust.

This investigation is particularly important to practitioners because less well-known web vendors need to increase their perceived trustworthiness. These vendors can easily incorporate elements of institutional structures into their website design to raise consumers' awareness of their trustworthiness if the effect of structural assurance on consumer trust is indeed valid. Otherwise, web vendors would be better off to invest their capital in other areas of their business. The rest of the paper is organized as follows: first, current research results about the influence of structural assurance on online consumer trust are reviewed; second, a decomposed structural assurance model is proposed based on Zucker's (1986) institution-based trust theory; third, supporting results from the analysis of data gathered through two field surveys are presented; and, fourth, contributions and limitations of the research are presented.

Literature review

Empirical research on the impact of SA on online consumer trust shows a wide spectrum of results. A review of studies which examined SA features indicates that the influence of SA on consumers' trusting beliefs and intentions can be classified as strong, weak, conditional, or not significant.

First, SA has been found as a strong antecedent of online consumer trust. SA can be the most significant predictor for a web vendor's perceived trustworthiness, besides calculative-based beliefs, situational normality and familiarity (Gefen et al. 2003). Wingreen and Baglione (2005) found that SA can increase both vendor trustworthiness and technology trustworthiness. In the context of online investing, investors' beliefs about the overall online investment environment and the protection from regulatory agencies have stronger influence on the perceived trustworthiness of the online broker than the perceived competence of the broker even after some of the influence of SA was channeled through perceived competence (Balasubramanian et al. 2003). Jones and Leonard (2008) found that third party recognition is one of two significant factors in influencing customer trust in customer-to-customer e-commerce. Teo

and Liu (2007) found that SA is significantly related to consumer trust across three countries, United States, Singapore and China.

Second, the impact of SA on consumer trust in some studies has been found to be weak. McKnight et al. (2002b) hypothesized SA as one of three antecedents of consumers' trusting beliefs and intentions. Although the effects of SA on consumer trusting beliefs and intentions are both significant, the impact is rather small compared to the other two antecedents—vendor reputation and site quality. Similarly, while the trust seal factor is significant in explaining online consumer trust, it contributes little to the explanation of the variance in website trust (Sultan et al. 2002). Wakefield et al. (2004) found that SA was the weakest predictor of perceived trustworthiness, below brand equity, communication, opportunism and web site attractiveness.

Third, the impact of SA on online consumer trust could be influenced by different forms of SA. Kimery and McCord's (2002) experimental study did not find significant influence of seals of approval on trusting intentions (Kimery and McCord 2002). However, their post hoc analysis found that TRUSTe had significant impact on participants' trusting intentions while BBBOnline, VeriSign and privacy statements did not (Kimery and McCord 2002). Zhang (2004) found that displaying reliability-assurance seals, such as BBB Online seal and AOL Certified Merchant Guarantee, have a stronger influence on consumers' willingness to buy across product categories (commodity and look-and-feel products) than information-assurance seals, such as VeriSign and TRUSTe. All these studies suggest a certain degree of effectiveness of seals of approvals.

Fourth, SA was found to be insignificant in determining consumers' perceived trustworthiness about online vendors. Recognitions from a third party had no effect on consumers' trusting beliefs toward online shopping in general (Lee and Turban 2001; Pennington et al. 2003). In a study which specifically examined privacy seals, more than half of the participants failed to recognize one of three major privacy seals, TRUSTe, CPA WebTrust and BBBOnline, and only about 31% of them believe these seals are 'important in deciding to trust a web site' (Moore 2005, p. 91). Web vendors' own policy disclosures might not have a better impact either. A web vendor's privacy disclosures and lenient return policy, besides seals of approval, may have no impact on consumers' perceived trustworthiness of the web vendor (Wang et al. 2004). McKnight and his colleagues (McKnight et al. 2002a) found that the correlation coefficients between trusting beliefs and institution-based trust were very low and not significant in their proposed web trust model. Additionally, Leonard and Riemenschneider (2008) found that usability of the Web is not influenced by institution-based trust.

The above research findings are summarized in Table 1. The above findings raise questions about the true effect of SA. The apparently conflicting research results regarding the general effect of SA might be due to how SA is conceptualized and measured. SA is mainly conceptualized as a unidimensional construct. Its measurement scales could capture beliefs about different institutional structures, such as legal and technological protections on the Internet (McKnight et al. 2002a, b; Leonard and Riemenschneider 2008), seals of approvals (Wakefield et al. 2004; Jones and Leonard 2008), or several institutional structures together (Gefen et al. 2003). Individual institutional structures were also studied with mixed results (Pennington et al. 2003; Wang et al. 2004). Pavlou and Gefen examined institutional structures in the online auction marketplace context in a series of studies (Pavlou 2002; Pavlou and Gefen 2004, 2005). They proposed that beliefs about four types of institutional structures (feedback mechanism, escrow services, credit card guarantees, and trust in the marketplace's intermediary) could have unique influences on auction marketplace participants' trust in the community of sellers, and their findings have been fairly consistent across studies. This raised the possibility that SA in B2C e-commerce should be decomposed in order to show that different elements of website design (seals of approval, for example) could have their unique role in the process. Since the institutional trust theory proposes that different elements of institutional structures could influence the perceived trustworthiness of an entity separately, this study will use this

theory as the theoretical basis to reconcile the difference in current research findings regarding the role of SA.

The institutional trust theory and research model

The institutional trust theory (Shapiro 1987; Zucker 1986) proposes that existing institutional structures and mechanism embedded in the social environment can foster the growth of trust and cooperation between two concerned parties, especially when both are unknown to each other, by establishing a certain degree of order which could reduce the complexity embedded in the external environment to a tolerable level (Luhmann 1979). This is particularly evident in the mid-1800s to the early-1900s when institutional structures were used to build trust to expedite business transactions when familiarity was lacking (Zucker 1986). This early-1900s period was characterized by a rapidly growing immigrant population, massive domestic migrations and frequent bankrupt companies. Additionally, there was a boom of new businesses, and many of them failed quickly. Because of rare social contacts or/and significant geographic barriers, it was difficult for business partners to know each other and to build trust. Consequently, business organizations counted on formal institutional structures to facilitate the transfer of money and goods at the same time (Zucker 1986).

There were four types of institutional structures which were used to produce trust among unfamiliar parties during the mid-1800s to the early-1900s period (Zucker 1986). The first type is a company's internal 'written rules and a formal hierarchy that produced trust between employers and employees' and between the company and its customers (Zucker 1986, p.55). The second type is the service provided by professional certification agencies to assure trustworthiness when informal reputation is hard to assess. Examples of these agencies include trade associations, the financial systems, government agencies, and systems of industrial relations and training (Lane and Bachmann 1996). The third type is the service provided by service sectors which 'arose to bridge transactions between firms and between individuals and firms' (Zucker 1986, p.55). The fourth type is the framework of regulation, legislation and specific rules regarding every transaction. One example is the legal system which can 'lend special assurance to particular expectations, and make them sanctionable' (Luhmann 1979, p. 34). These four types of formal structures facilitated the production of institution-based trust and American economic development when there was no easy assessment of either reputation or individual characteristics for transaction partners.

The characteristics of the B2C e-commerce environment closely resemble this mid-1800s to the early-1900s period.

Table 1 Comparison of SA studies

Studies	Strong	Weak	Mixed	Not significant
Gefen et al. 2003	√			
Balasubramanian et al. 2003	√			
Jones and Leonard 2008	√			
Teo and Liu 2007	√			
Wingreen and Baglione 2005	√			
McKnight et al. 2002b		√		
Sultan et al. 2002		√		
Wakefield et al. 2004		√		
Chellappa and Pavlou 2002			√	
Kimery and McCord 2002			√	
Pavlou and Gefen 2004			√	
Pennington et al. 2003			√	
Zhang 2004			√	
Lee and Turban 2001				√
Leonard and Riemenschneider 2008				√
McKnight et al. 2002a				√
Moores 2005				√
Shek et al. 2003				√
Wang et al. 2004				√

First, similar to the existence of unfamiliarity between transaction partners from the mid-1800s to the early-1900s, there is also significant unfamiliarity between consumers and web vendors. Online shoppers frequently come across unknown web vendors who may be far away from where they live. Additionally, online shopping reduces the human interaction activities inherent in traditional shopping into a series of keyboard and mouse activities. Furthermore, company instability in B2C e-commerce is as significant as in the mid-1800s to the early-1900s period. In B2C e-commerce, the attrition rate is about 20% for the dot-com companies, and about half of dot-companies which went IPO from August 1995 to March 2000 went out of business in 2004 (Goldfarb et al. 2007). Under these circumstances, building a stable, trusting relationship with a web vendor becomes very difficult. As transaction participants chose to rely on formal, institutional structures in the volatile, pre-1920 period, customers today may need to depend on the formal, institutional structures as their safety net to have a sense of assurance and protection when they shop online.

This research examines the effect of SA in consumers' online shopping experience when they encounter unfamiliar websites, and proposes that there are four types of institutional structures in B2C e-commerce, i.e. vendor specific guarantees, seals of approval, credit card guarantees, and transaction protections. These institutional structures could separately influence consumer trusting intentions. Since each customer's perception of the effect of these structures may vary, these perceptions may constitute four types of SA.

First, customer service policies are proposed as a form of SA. A web vendor's customer service policies may include privacy policies, product warranty policies, product return policies and other customer service policies. The characteristics of B2C e-commerce demands web vendors to reveal their customer service policies on information disclosure, informed consent, and handling disputes (Schoder and Yin 2000). These policies are designed to assure customers that prompt actions from the vendor can be expected if anything goes wrong. The salient beliefs about the customer service policies may be classified as a perceived vendor-specific guarantee, which is defined as the degree to which a customer believes that a web vendor's customer service policies could protect the customer's interests and well being. In brick-and-mortar retail context, customers tend to trust front line employees more if a retailer's customer policies favor the customers' best interests, indicate respect for its customers, and make returning items quick and easy (Sirdeshmukh et al. 2002). In online auction marketplace, evidence shows that online auction companies' escrow policies can increase a buyer's perceived trustworthiness in a seller (Pavlou 2002; Pavlou and Gefen 2004). In B2C e-commerce, web vendors often make promises like '100% satisfaction guarantee',

monetary refund, quality products, protection of privacy, and accurate product information, etc. These promises could be salient to consumers, and may be the basis to form psychological mutual understanding between consumers and web vendors and influence consumers' trusting intentions. Therefore, customer service policy is proposed as one type of SA, and perceived vendor-specific guarantee is expected to be positively correlated with customers' trusting intentions toward an online vendor.

H1: Perceived vendor-specific guarantee will have a positive effect on customers' trusting intentions toward an online vendor.

Second, seals of approval are proposed as the second form of SA. A seal of approval can be granted by an independent accreditation authority after a close examination and verification of an applicant's business policies and practices. Accreditation provides indicators of professionalism, ability, reliability, reputation and product quality, and can foster person or firm-specific trust (Zucker 1986). Seals of approval may be particularly helpful in providing validation of a web vendor's effort to protect customers' privacy and security (Ranganathan and Ganapathy 2002). The consumers' salient beliefs about the effectiveness of the seals of approval, triggered by the seals' existence on a website, can be classified as perceived seal of approval guarantee, which is defined as the degree to which a customer believes that seals of approval from accreditation agencies can protect the customer's interests and well being. Consumers may have faith in the vendors' trustworthiness because these vendors are associated with a trusted third party which protects consumer interests. Research shows that these beliefs could significantly influence a seller's perceived credibility in online auction contexts (Pavlou 2002). Different seals may also influence these beliefs differently (Kimery and McCord 2002). Therefore, seals of approval are considered another subtype of structural assurance, and perceived seal of approval is expected to be positively correlated with customers' trusting intentions toward an online vendor.

H2: Perceived seal of approval guarantee will have a positive effect on customers' trusting intentions toward an online vendor.

Third, credit card companies' guarantees may constitute another form of SA. Banking escrow services or insurance protections are widely used to hedge against possible loss if the transaction does not go through despite the best effort of all concerned parties in the mid-1800s to the early-1900s (Zucker 1986). Today many credit card companies promise their clients that client interests will be protected through services such as money back guarantees and identity theft protection. Consumers' beliefs about the effectiveness of

credit card company guarantees can be classified as perceived credit card guarantee, which is defined as the degree to which a customer believes that guarantees from credit card companies can protect the customer's interests and well being. Perceived credit card guarantee is proposed and tested as one type of institutional trust in online auction marketplaces (Pavlou and Gefen 2004). Though it was not significant in generating trusting beliefs of auction sellers, the construct demonstrated adequate discriminate and convergent validity. Furthermore, Chellappa and Pavlou (2002) found a weak but significant influence of credit card guarantees on trusting beliefs. Therefore, credit card guarantees are considered a subtype of SA, and perceived credit card guarantee is expected to be positively correlated with customers' trusting intentions toward an online vendor.

H3: Perceived credit card guarantee will have a positive effect on customers' trusting intentions toward an online vendor.

The fourth proposed form of SA is transaction protection. Transaction protection includes protection from both the legal system and technology infrastructures such as the secure electronic transaction infrastructure. The legal system makes each transaction partner's behavior predictable, and also sets the punitive cost of inappropriate or opportunistic behaviors higher than the benefits of violating the contractual stipulations, trade procedures and industry standards (Zucker 1986). Secure electronic transaction (SET) is the technological infrastructure built in ecommerce which will ensure the transaction is legitimate as well as secure. Examples of these include secure socket layer technologies, biometric protection, password protections, etc. Both the legal system and SET are designed to make the whole ecommerce environment safer for consumers and vendors. Perceived transaction protection is defined as the degree to which consumers believe that legal and technological protections are in place to make the Internet a safe environment in which to transact business (McKnight et al. 2002a). These beliefs were found to be related to consumers' trusting beliefs and intentions (McKnight et al. 2002b). Perceived cooperative norms, a similar construct to perceived transaction protection, is a significant part of institutional trust in B2B e-commerce (Pavlou 2002). Therefore, transaction protection is considered be a subtype of SA, and perceived transaction protection is expected to be positively correlated with customers' trusting intentions toward an online vendor.

H4: Perceived transaction protection will have a positive effect on customers' trusting intentions toward an online vendor.

See Fig. 1 for a graphical depiction of the proposed model and hypotheses.

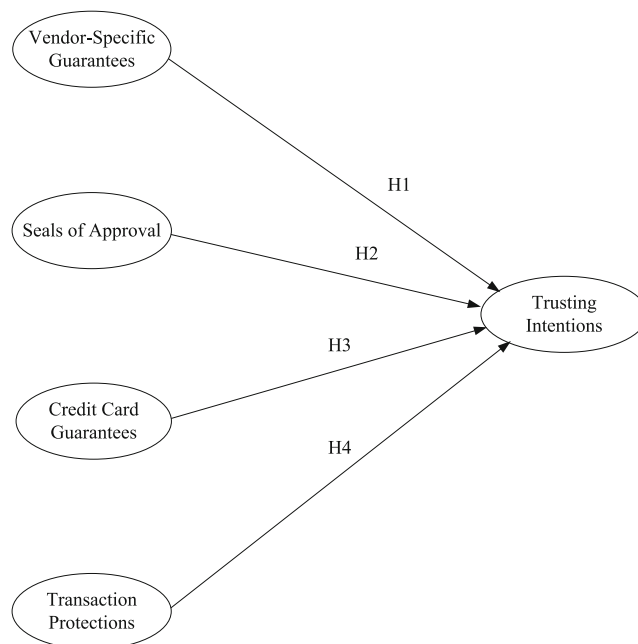


Fig. 1 Research model of structural assurance

Method

Pretest study

The purpose of the pretest study is to validate the proposed structural assurance model through data collected from a survey study. Questionnaire items were adapted from validated instruments where possible and listed in Appendix 1. All items are seven point Likert-type scales, anchored with 'strongly disagree' at 1 and 'strongly agree' at 7. Questionnaires were completed by 170 undergraduate students enrolled at a Midwestern university. Using college students as participants is deemed appropriate because they are familiar with the online shopping environments (McKnight et al. 2002a, b). Students were instructed to visit a web store to select a gift which they would be interested in purchasing. At the end, students answered the questions based on their beliefs or opinions about the online store. A total of 115 usable responses were returned, representing a 68% response rate, with 68% men and 32% women. Most of the respondents were between 20 to 23 years old and familiar with the Internet and B2C ecommerce.

Convergent and discriminant validity

The first step in validating the SA model is to examine the convergent and discriminant validity of the constructs. The validities were first examined through the principle components analysis (PCA) (Hair et al. 1998). Convergent validity can be established if there are no high cross loadings on unintended constructs. The results from PCA (Table 2)

Table 2 Factor loadings of structural assurance model

Items	Transaction protection	Vendor-specific guarantee	Credit card guarantee	Seals of approval guarantee
GENSA2	0.88			
GENSA1	0.82			
GENSA3	0.82			
GENSA4	0.69			
SPESA2		0.81		
SPESA4		0.80		
SPESA3		0.76		
SPESA1		0.71		
SEALSA2			0.83	
SEALSA3			0.81	
SEALSA4			0.75	
SEALSA1			0.70	
CCSA1				0.85
CCSA3				0.84
CCSA2				0.80
Eigenvalues	7.466	1.781	1.365	1.084
Cronbach's alphas	0.88	0.90	0.88	0.89

show that four factors with an eigenvalue greater than 1 were extracted, and these factors can explain 78% of the total variance. These four factors correspond well to the intended factor structure of structural assurance. Every item loads on its intended construct (>0.68) with no cross loadings greater than 0.4. The internal consistency reliability was assessed by calculating Cronbach's alphas. All of the constructs' Cronbach's alphas are greater than the 0.70 minimum threshold proposed by Nunnally (1978).

To further assess the convergent and discriminant validity of the proposed constructs, confirmatory factor analysis was conducted by using AMOS 6.0, a Structural Equation Modeling software package. The first indication of convergent and discriminant validity will be the overall fit of the proposed model to the data. Several fit indices can be used to assess the goodness of fit, such as the discrepancy ratio (χ^2/df ; df = degrees of freedom), the adjusted goodness-of-fit (AGFI), the comparative fit index (CFI), the normative fit index (NFI), and the root mean square error of approximation (RMSEA). The discrepancy ratio should be smaller than 3 (Kline 1998). The AGFI should be higher than 0.8 (Chin and Todd 1995). The CFI and NFI should be greater than 0.9 (Bentler 1990; Chin and Todd 1995); and the RMSEA should be below or equal to 0.08 for a good fit and below 0.05 for an excellent fit (Browne and Cudeck 1993). The results show that the model has a less than optimal fit (discrepancy ratio, 2.00; AGFI, 0.75; CFI, 0.93; NFI, 0.87; RMSEA, 0.09). With the exception of CFI and the discrepancy ratio, the other fit indices are below their thresholds. The fit of the model can be improved by dropping cross-loading items one at a time

(Gefen et al. 2000). These dropped items shared significant residual variance with other latent constructs or items for other constructs. This could indicate these items may have assessed similar customer beliefs. For example, the item "I believe it's safe to buy things from a web vendor who has seals of approval such as TRUSTe or VeriSign" shared significant residual variance with credit card protection. This is conceivable since VeriSign is specifically used to ensure safe electronic payment transaction. Some items were also deleted if they had wordings do not match well with intended construct, such as "I feel comfortable in depending on the information provided by this online store" and "I feel safe conducting business with this online store because it provides a 1-800 number." The revised model shows improved fit on all indices (discrepancy ratio, 1.59; AGFI, 0.84; CFI, 0.97; NFI, 0.93; RMSEA, 0.07).

The next step is to examine the factor loadings of items on their intended latent constructs for evidence of convergent validity. The factor loading should be greater than 0.70 to indicate each item can be explained by the latent construct more than by error (Fornell and Larcker 1981). The t -value of each loading should be twice the standard error of the loading (Anderson and Gerbing 1988). The item loadings, standard errors and their corresponding t -values are listed in Table 3. The results met the standards and show that convergent validity is demonstrated.

Average variance extracted (AVE) was also used to further examine the fit of the model. The convergent validity can be established if AVE values of each construct exceed the criteria (0.5) set by Fornell and Larcker (1981). Discriminant validity can be shown if the AVE values are greater than the cross correlations among constructs. As shown in Table 4, the lowest AVE is 0.72 (seals of approval) which far exceeds the 0.5 criteria, and is also higher than the highest squared correlation between any pair of constructs (0.70 between seal of approval and vendor-specific guarantees).

Table 3 Measurement item loadings

Items	Loadings	Standard error	T value	p value
GenSA1	0.793	0.104	9.895	0.000
GenSA2	0.892	0.101	11.77	0.000
GenSA3	0.889	0.097	11.704	0.000
SpeSA2	0.886	0.109	11.753	0.000
SpeSA3	0.908	0.101	12.208	0.000
SpeSA4	0.762	0.124	9.385	0.000
CCSA2	0.977	0.115	11.897	0.000
CCSA3	0.781	0.122	9.046	0.000
SealSA2	0.832	0.090	10.582	0.000
SealSA3	0.909	0.092	12.088	0.000
SealSA4	0.805	0.102	10.076	0.000

Table 4 AVE values and correlations of the structural assurance model

Constructs	1	2	3	4	5
1 Transaction protection	0.74				
2 Vendor-specific guarantee	0.53	0.73			
3 Credit card guarantee	0.58	0.56	0.78		
4 Seal of approval guarantee	0.42	0.70	0.44	0.72	
5 Trusting intentions	0.44	0.71	0.50	0.70	0.76
Mean	5.27	5.29	5.27	5.18	5.35
Standard deviation	1.18	1.31	1.32	1.10	1.08

The values of average variance extracted (AVEs) are displayed along the diagonal, and the correlations are displayed below the diagonal

Predictive validity

The predictive validity of the SA model is assessed by examining how well the four types of SA can explain the variance in the dependent variable, i.e. consumer trusting intentions. Model fit statistics (discrepancy ratio, 1.542; AGFI, 0.83; CFI, 0.97; NFI, 0.92; RMSEA, 0.069) indicate that the model fits the data adequately. Hypothesis testing results (see Fig. 2) show that while perceived transaction protection (H4) and perceived credit card guarantee (H3) have no significant relationship with trusting intentions, perceived seal of approval guarantee (H2) and perceived vendor-specific guarantee (H1) strongly influence a person's trusting intentions. Perceived vendor-specific guarantee and perceived seal of approval guarantee are significant in explaining 57% of the total variance of trusting intentions. Given that some of the correlations are higher than 0.70, multicollinearity was checked by calculating variance inflation factor scores (VIF) while regressing trusting intentions onto the types of structural assurance. The highest VIF is 1.955, which indicates a very low level of multicollinearity (Hair et al. 1998).

Main study

The purpose of main study was to examine the external validity of the structural assurance model by analyzing the data collected from another sample of 322 undergraduate students from the same Midwestern university. They were asked to visit an unfamiliar website to shop for a digital camera. This website is a fake website selling digital cameras. These participants have a mean age of 31, and about 61% of them are male. Their average online experience is a little bit less than seven years, older than the first group. They also have more online purchases, with average purchases at 17 times per person. Additionally, the second group shared the same set of preferred websites, such as Ebay.com, Amazon.com, Best Buy and some apparel websites. The higher number of online purchases

may reflect the increasing adoption of online B2C ecommerce. The same instruments used in the pretest study were adopted for this main study.

Convergent and discriminant validity

The validation of the convergent and discriminant validity was examined through average variance extracted (AVE). As shown in Table 5, the lowest AVE is 0.70 (seals of approval) which exceeds the 0.5 criteria. This verifies the convergent validities of these constructs. The highest correlation is 0.78 between trusting intentions and vendor-specific guarantees. The squared value of this correlation is 0.61, which is lower than 0.70, the lowest AVE. This demonstrates that the five constructs can be successfully distinguished from each other.

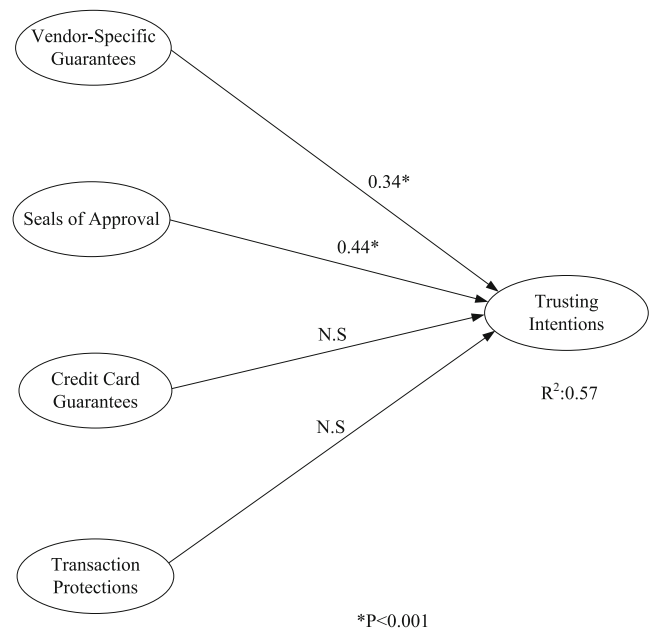


Fig. 2 Results of the research model (pretest study)

Table 5 AVE values and correlations of the structural assurance model

Constructs	1	2	3	4	5
1 Transaction protection	0.83				
2 Vendor-specific guarantee	0.23	0.84			
3 Credit card guarantee	0.38	0.33	0.87		
4 Seal of approval guarantee	0.29	0.46	0.39	0.70	
5 Trusting intentions	0.29	0.78	0.38	0.54	0.76
Mean	4.74	4.99	5.20	4.73	4.86
Standard deviation	1.30	1.08	1.26	1.10	1.30
Composite alpha	0.94	0.94	0.93	0.87	0.87

The values of average variance extracted (AVEs) are displayed along the diagonal, and the correlations are displayed below the diagonal

Predictive validity

The improved model fit statistics (discrepancy ratio, 2.20; AGFI, 0.91; CFI, 0.98; NFI, 0.97; RMSEA, 0.061) indicate that the model fits the data better than the model in the pretest study. RMSEA is still lower than the recommended guidelines (0.08) for a good fit. Hypothesis testing results (see Fig. 3) replicated findings from the pretest study. Perceived credit card guarantee (H3) and perceived transaction protection (H4) still do not significantly influence trusting intentions. Perceived vendor-specific guarantee (H1) and perceived seal of approval guarantee (H2) are significant in explaining 66% of the total variance of trusting intentions. Given that some of the correlations are higher than 0.70, multicollinearity was checked by calculating variance inflation factor scores (VIF) while regressing trusting intentions onto the types of structural assurance. The highest VIF is 1.319, which

again indicates a very low level of multicollinearity (Hair et al. 1998).

Discussion

Inconsistent research findings prompted this research to investigate whether there are different types of SA, and whether each of them may have its unique influence on trusting intentions. Based on Zucker's (1986) institutional trust theory, this research proposes that there are four types of SA: perceived vendor-specific guarantee, perceived seal of approval guarantee, perceived credit card guarantee and perceived transaction protection. The results from data analysis provided support for the SA model. The nomological validity of the SA model is assessed through examining the relationships between types of SA and trusting intentions. The results indicate that perceived seal of approval guarantee and perceived vendor-specific guarantee strongly influence trusting intentions while perceived transaction protection and perceived credit card guarantee do not. Table 6 compares the results from this study with findings from other research on the subject of SA. It can be seen that the proposed SA model confirms findings from previous studies on perceived vendor-specific guarantee and perceived credit card guarantee but not on findings regarding perceived seals of approval guarantee and perceived transaction protection.

Perceived transaction protection is not significant in explaining the variance of customers' trusting intentions in both the pretest study and the main study. The significant findings of McKnight and his colleagues' research might be attributed to the experiment context where their data was collected by evaluating subjects' experience with a legal advice website (McKnight et al. 2002a, b). The context may make the legal and technological issues particularly salient to subjects. An alternative explanation could be that perceived transaction protection may also influence trusting intentions through

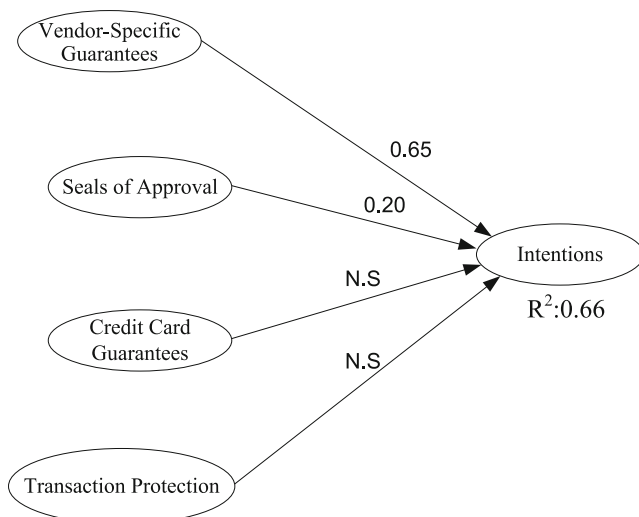


Fig. 3 Results of the research model (main study)

Table 6 Comparison of the SA model with other research

Types	Studies	Supported?
Perceived transaction protection	McKnight et al. 2002a	No
	McKnight et al. 2002b	Yes
	Wingreen and Baglione 2005	Yes
	SA Model	No
Perceived vendor-specific guarantee	Gefen et al. 2003	Yes
	Belanger et al. 2002	Yes
	Pavlou and Gefen 2002	Yes
	Chellappa and Pavlou 2002	Yes
Perceived credit card guarantee	SA Model	Yes
	Chellappa and Pavlou 2002	No
	Pavlou and Gefen 2002	No
Perceived seals of approval guarantee	SA Model	No
	Jones and Leonard 2008	Yes
	Kimery and McCord 2002	No
	Lee and Turban 2001	No
	Pavlou 2002	No
	Shek et al. 2003	No
	Sultan et al. 2002	Yes
	Teo and Liu 2007	Yes
SA Model	Yes	

consumers' perceptions about a web vendor's specific guarantees. A post hoc analysis suggests that the influence of transaction protection on trusting intentions could be fully mediated by vendor-specific guarantees and seals of approval.

Contrary to previous findings, this research found that perceived seal of approval guarantee is indeed significant in predicting customers' trusting intentions. The insignificant findings from previous studies might be explained by how their instruments for the perceived seal of approval guarantee construct were developed. The items for the construct used in this research are anchored in the customers' beliefs about the effectiveness of seal of approval on a web vendor and the effectiveness of the effort of accreditation agencies in the seal granting processes. The instruments used in previous studies did not address these two aspects. The measurement items adopted by Kimery and McCord (2002) only measure whether customers notice a seal or not. Lee and Turban's (2001) items did tap into the effectiveness of accreditation agencies but did not examine whether a given web store has a seal perceived to be effective to consumers. The study by Sultan et al. (2002) focused on whether there is a seal of approval on a website or not. Customers' perceptions of the effectiveness of the

existing seal were not captured in their study. Items chosen by Pavlou (2002) captured the perceived effectiveness of the effort of accreditation agencies. There was no indication of consumers' perceptions of the effectiveness of existing seals of approval on their trusting intentions.

Contributions and implications

Structural assurance received considerable attention from Information System researchers because of its importance to practitioners. Previous research results revealed how SA beliefs are formed and how these beliefs are related to other constructs in B2C e-commerce. However, these results also revealed inconsistent findings about the influence of SA on trusting intentions. This influence can be strong, weak, conditional, or not significant, depending on individual studies. This inconsistency may hamper further understanding of SA construct.

To resolve these inconsistent findings, this study adopted the institutional trust theory to further examine the nature of SA. The institutional trust theory proposes that different elements of institutional structures could have their unique influence on the perceived trustworthiness of an entity. Therefore, this study proposed that four subcomponents of SA, seals of approval, vendor-specific guarantees, credit card guarantees, and transaction protection, may influence consumer trusting intentions differently. The SA model received empirical support through two rounds of data collection and analysis. The findings of this study showed that perceived vendor-specific guarantees and perceived seal of approval guarantee are the two major types of structural assurance. Perceived seal of approval guarantee and perceived vendor-specific guarantee have strong influence on trusting intentions while perceived transaction protection and perceived credit card guarantee do not. These new findings indicate that the seemingly conflicting results from previous research actually address the unique influence of different types of SA, and the conflicting results can be reconciled with the proposed model. This research confirmed that previous significant findings about the influence of SA on trusting intentions when the research focus of SA is about vendor-specific guarantee and previous insignificant findings on the influence of SA on trusting intentions when the focus of SA is on credit card protection and transaction protection. Besides confirming previous research results, this study contributes to IS literature by finding the significant influence of perceived seal of approval guarantee on trusting intention. This research finding, along with findings from other recent studies on SA (Jones and Leonard 2008; Teo and Liu 2007) should

encourage further research on the adoption of seals of approval in B2C e-commerce.

This study also answers the calls to further examine the nature of institution-based trust in the B2C ecommerce context (McKnight et al. 2002a, b; Pavlou 2002; Pavlou and Gefen 2002). McKnight et al. (2002a) suggested two ways to further investigate the issue: (1) link the existing conceptualization of the institution-based trust construct with a specific B2C web vendor; (2) anchor the institution-based trust in the specific attributes of a web vendor. This current study followed their suggestions and found that particular types of structural assurance, especially those within a web vendor's direct control, have significant influence on a customer's trusting intentions.

The success of e-commerce lies in how well web vendors can persuade customers to trust the vendors and subsequently make online purchases. This research shows that online vendors can influence consumers' trusting intention by adopting seals of approval and service guarantees, such as customer service policies, return guarantees, and privacy guarantees. Many web vendors' business practices tend to concentrate on the aesthetic side of interface design, the efficiency of order processing and inventory management. Seals of approval and service policies often receive less attention because many customer service policies are either limited in content or just in standard form. Obtaining seals of approval can be achieved in a relatively short time. There is a positive correlation between commercial enterprise websites' privacy and security policies and consumers' online purchase intentions (Miyazaki and Fernandez 2001). Customer service policies that are generic or limited in content may not be useful in building consumers' perception of web vendor quality (Liao and Cheung 2001). Therefore, web vendors need to focus more on their customer service policies. The use of customized, consumer centered vendor guarantees should be helpful in convincing consumers that the vendor is reliable.

Limitations and conclusions

First, the proposed SA model does not include reputation. Reputation could influence customer trusting intentions through customer feedback postings or scores on various websites, or through word-of-mouth communications. The viral nature of reputation could make customer feedback mechanism in particular a part of the formal market mechanism. This customer feedback mechanism may function as a formal community collective guarantee or protection, especially in online auction marketplaces (Ba

2001; Ba and Pavlou 2002). Therefore the nature and influence of reputation need to be further examined. On the other hand, web vendors have less direct control over the contents of comments a customer will post on a review website, comparing with other assurance features, such as seals of approval or customer service policies, which are under vendors' control. Therefore, there might be limited practical application for web vendors even though they would prefer to have better reviews about their products and services. The second limitation is that this research does not investigate the effect of contingency constructs such as trust propensity or risk propensity. A closer examination of the moderating influence of these constructs could provide a richer understanding of the impact of structural assurance on trusting intentions. The third limitation is that this research does not investigate the possibility that the significant influence of structural assurance on trusting intentions might be because important intervening constructs are omitted from the model, particularly perceived risk (Grazioli and Jarvenpaa 2000; Miyazaki and Fernandez 2001). However, this might not be a significant issue given that over 60% of the variance of trusting intention can be explained by perceived specific guarantee and perceived seal of approval. Fourth, this research does not capture the potential effect of familiarity on SA. Once customers become familiar with a vendor, they may visit or purchase from the vendor out of habit, and thus overlook the SA design features on the vendor's website. It is likely that SA could become insignificant in predicting trusting intentions when familiarity or habit is introduced in the model. Future studies should examine whether familiarity or habit diminish the influence of SA mechanisms in B2C ecommerce.

This paper answers explicit calls to further examine the nature of structural assurance and its relationship with trusting intentions (McKnight et al. 2002a, b). Drawing on Luhmann's (1979) system trust theory and Zucker's (1986) institution-based trust mechanisms theory, this research finds that SA does have multiple types, and these types of SA have unique roles in the trust building process. Particularly, seals of approval and vendor-specific guarantees strongly influence trusting intentions while credit card guarantees and transaction protection do not. The supporting empirical evidence from this research provides another step towards furthering our understanding of the nature and mechanisms of online institutional trust. Practitioners can also benefit from this study in terms of building customer assurances through customer service policies and certifications from third party accreditation agencies.

Appendix 1—survey items

Constructs	Items	Sources
Perceived transaction protection	The Internet has enough safeguards to make me feel comfortable using it to transact personal business	McKnight et al. 2002a, b
	I feel assured that legal and technological structures adequately protect me from problems on the Internet	McKnight et al. 2002a, b
	I feel confident that encryption and other technological advances on the Internet make it safe for me to do business there	McKnight et al. 2002a, b
	In general, the Internet is now a robust and safe environment in which to transact business. (Dropped)	McKnight et al. 2002a, b
Perceived vendor-specific guarantee	I feel safe conducting business with this online store because it provides a 1–800 number. (Dropped)	Gefen et al. 2003
	I feel safe conducting business with this online store because of its return guarantees	Gefen et al. 2003
	I feel assured conducting business with this online store because of its customer service policies	Gefen et al. 2003
	I feel comfortable conducting business with this online store because of its warranty policy	Gefen et al. 2003
Perceived credit card guarantee	I believe my credit card company will protect me in case of problematic transactions with this online store. (Dropped)	Pavlou and Gefen 2002
	I am confident that my credit card payments are safe in case of disputed purchases from this online store	Pavlou and Gefen 2002
	My credit card company will stand by me if problems occur during transactions with this online store	Pavlou and Gefen 2002
Perceived seal of approval guarantee	I believe it's safe to buy things from a web vendor who has seals of approval such as TRUSTe or VeriSign. (Dropped)	New item
	I believe that seal of approval issuing agencies make substantial efforts to assess this online store's true competencies.	Pavlou (2002)
	I feel seals of approval are important in my decisions to purchase online	Belanger et al. 2002
	I believe that seal of approval issuing companies undertake a thorough screening process before this store is allowed to do business online	Pavlou (2002)
Trusting intentions	I feel comfortable in depending on the information provided by this online store. (Dropped)	McKnight et al. 2002b
	I can always rely on this online store to meet my shopping needs	McKnight et al. 2002a, b
	I trust this online store completely	New item

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