

## **EXAMINING THE CONSTRUCT VALIDITIES AND INFLUENCE OF AFFECTIVE RISK IN B2C E-COMMERCE**

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### **ABSTRACT**

*This research examines whether consumers' affective risk feelings could significantly influence intentions to engage in business-to-consumer e-commerce beyond cognitive risk beliefs. Current IS research indicates that cognitive risk is a salient factor in impacting consumers' online intentions. It is unclear that whether affective risk, consumers' feelings of risk, might also play significant roles as key determinants of consumers' intentions. The articulation of affective risk is based on the theory of affect and the risk-as-feelings theory. These theories propose that people's anticipatory visceral feelings can influence their behavior over and above the impact of their cognitive evaluations. Data were collected through a field study, and the findings supported the convergent, discriminant and predictive validities of affective risk. Affective risk was a significant determinant of behavioral intentions. Cognitive risk was found to influence behavioral intentions through affective risk, which indicates that affective responses of a risky situation could have dominant responses.*

Keywords: Cognitive risk, Cognitive trust, Affective risk, Feelings, B2C e-commerce

### **INTRODUCTION**

Business-to-consumer (B2C) e-commerce grew tremendously over the last decade. Well established e-commerce pioneers such as Amazon are gaining much larger shares of the overall retail market. Many traditional retailers such as Sears and JCPenny are in much more difficult, competitive situations. Even with such tremendous growth, relatively unknown vendors such as web store fronts from many small businesses could still face stiff challenges. Some of the challenges might come from customers who may believe that it is too risky to purchase online, particularly from unfamiliar vendors. Examining the mechanism of these concerns became an important research stream in the Information Systems (IS) literature. The concerns about potential risks in online transaction situations are examined by IS researcher in varying terms, such as risk perception (Jarvenpaa, et al., 2000), perceived web risk (McKnight, et al., 2002a, b), risk (Bhatnagar, Misra & Rao, 2000), consumer risk (Jarvenpaa & Todd, 1996-97) or perceived risk (Featherman & Pavlou, 2003; Fortis & Rita, 2016; Kim, Ferrin & Rao, 2008, 2009; Yang, et al, 2015; Yen, 2015), etc. These constructs were conceptualized as an individual's salient beliefs about the probabilities of negative outcomes for a given transaction or situation in B2C e-commerce. Due to the cognitive nature of these largely similar constructs, this research uses an umbrella construct, cognitive risk, to categorize them together.

Customers' online experiences are not limited to just cognitive in nature. Their feelings may also play vital roles in determining behavioral intentions. The theory of affect emphasizes the importance of feelings in human behaviors, and proposes that affective responses could have significant or even primary influence on behavioral intentions (Crites, Fabrigar & Petty, 1994; Loewenstein, Weber, Hsee & Welch, 2001). Some IS research indicated that people's risk concerns could have both cognitive and affective components (Bhattacharjee, 2002; Featherman & Pavlou, 2003; Gefen et al., 2003). These research found that uncertain circumstances could cause feelings of conflict, anxiety or discomfort. In general, these negative feelings did not receive enough attention as much as their cognitive counterparts in IS research. The current study aims to fill the gap by examining and validating the role of the affective components of risk concerns in determining behavioral intentions in B2C e-commerce. This research labels the affective components of risk concerns as affective risk. Built on the theory of affect and the risk-as-feeling theory, this research explores the origin and nature of affective risk feelings, and investigates whether these feelings could influence behavioral intentions beyond salient cognitive risk beliefs. The results from this examination and validation would provide a more complete picture about consumer behaviors in B2C e-commerce.

The rest of the paper is organized as follows: first, the construct of affective risk is introduced and a research model is proposed based on the theory of affect and the risk-as-feeling theory; second, results from the analysis of data gathered through a survey is presented, and the nomological network validity of affective risk is analyzed; and, third, discussion, contributions and limitations of the research are presented.

## LITERATURE REVIEW

Current IS research on risk in B2C e-commerce mostly follows the expectancy framework. For example, Jarvenpaa, et al. (2000) conceptualized risk perception as a “trustor’s beliefs about likelihoods of gains and losses outside of considerations that involve the relationships with the particular trustee” (p. 49). Featherman and Pavlou (2003) defined perceived risk in e-service context as “the potential for loss in the pursuit of a desired outcome of using an e-service” (p. 454). Perceived web risk, a construct about general risks on transactions over the web, is about “the extent to which a user believes it is unsafe to use the web or that negative consequences are possible” (Grazioli & Jarvenpaa, 2000; McKnight, et al., 2002b). Risk beliefs could be further divided into individual categories, such as performance risk, financial risk, time risk, psychological risk, social risk and privacy risk (Featherman & Pavlou, 2003; Bhatnagar, Misra & Rao, 2000). Risk beliefs could also have dimensions such as product benefit risk, information misuse risk, and functionally inefficiency risk (Glover & Benbasat, 2011). Overall, these constructs were conceptualized and measured as cognitive constructs. Sometimes a negative emotion term such as fear can be included in the naming of a perceived risk construct such as fear of seller opportunism (Jones & Leonard, 2014; Bandal & Zahedi, 2014). The actual measurement items for those constructs still only capture a subject’s cognitive risk beliefs.

Although researchers have found that risk concerns could have both cognitive and affective components (Bhattacharjee, 2002; Featherman & Pavlou, 2003; Gefen et al., 2003; Loewenstein, et al., 2001), research that incorporated feelings of risk are limited. The lack of research interests could be due to how feelings of risk are conceptualized in IS research. Feelings of risk are largely treated as epiphenomenal, and are not an integral part in the decision-making process. For example, Featherman and Pavlou (2003) did not incorporate the negative feelings into their conceptualization and measurement of cognitive risk, even though they acknowledged the existence of feelings of uncertainty, conflict, anxiety or discomfort in an uncertain environment. The exclusion of feelings of risk leaves the examination of the interaction between consumers and a web vendor incomplete.

Feelings of risk consist of a person’s anticipatory negative feelings, such as worry, fear or anxiety about loss, vulnerability or threat in an uncertain environment, and is defined as affective risk in this research. Essentially, affective risk is about a person’s feelings of worry or fear in an uncertain environment. People may experience negative feelings when they face choices that could have serious consequences. The effect of these feelings could guide people to a choice or course of action different from the one which would be otherwise selected based on their cognitive and rational evaluations of the situation. The theoretical sources of affective risk can be traced to the theory of affect which emphasizes the importance of affect in human behaviors. Affect, a categorical construct, is one of three components of people’s attitudinal responses, i.e. affect, cognition, and conation (Bagozzi, Gopinath, & Nyer, 1999; Crites, Fabrigar & Petty, 1994). This tripartite separation of people’s attitudinal responses argues that people’s behavior is determined not only by their cognitive evaluations of the situation but also by their feelings. The risk-as-feeling theory more specifically examines the underlining mechanism of the negative feelings on behavioral responses (Loewenstein, et al., 2001). The risk-as-feeling theory particularly proposes that behavioral response can be triggered by affective risk alone. This unique effect of affective risk can be attributed to the separate set of antecedents for affective risk, such as vividness, time immediacy and background mood. These antecedents do not influence the anticipated outcomes or probabilities, and therefore should have no impact on cognitive risk. Since affective risk can exist independent of cognitive risk, it is possible that people’s behaviors would be influenced by their affective risk alone without any involvement or realization of their cognitive evaluations of the risky situation. Both theory of affect and risk-as-feeling theory emphasize the importance of feelings, but differ in significant ways. The theory of affect is about the importance of affect. Affective feelings are examined in general and are usually measured as positive affect. The risk-as-feeling theory drills deeper by examining specific set of feelings, i.e. negative feelings. In order to emphasize the significant contribution of Loewenstein and Weber (2001), the studies that specifically examined negative feelings are grouped together under the umbrella term “risk-as-feelings.” These two theories form similar and distinct theoretical support for this study. In B2C e-commerce, it is risky for consumers to purchase online,

especially from unknown web vendors, because of consumers' unfamiliarity with the legitimacy, privacy and security of unknown web vendors (Torkzadeh & Dhillon, 2002). People may experience negative feelings when they encounter these web vendors. These negative feelings of risk in turn may prompt them to abandon their shopping cart, or to browse a competitor's website for more information. Based on the theory of affect and the risk-as-feeling theory, this research proposes affective risk as a separate construct from cognitive risk, and the impact of affective risk is hypothesized as below:

Hypothesis 1 (H1): Affective risk will have significant effect on a customer's intentions toward a web vendor.

People's behavioral choice is a function of both their cognitive evaluations of the uncertain or risky situation and their emotional reactions to the situation. When customers have strong cognitive risk beliefs, it is likely that their affective risk feelings could also be stronger. Research has shown that cognitive risk could significantly reduce the likelihood of a person's intentions, such as the likelihood to purchase from the store (Jarvenpaa et al., 2000), the likelihood to adopt a e-service (Featherman & Pavlou, 2003), the likelihood to share personal information with a web (McKnight, et al., 2002b), and the likelihood of being a loyal customer (Gefen, Karahanna, & Straub, 2003), etc. Examining the impact of cognitive risk on intention together with affective risk would provide a contrast and another validation to both the theory of affect and the risk-as-feeling theory. Therefore, the impact of cognitive risk is hypothesized as below:

Hypothesis 2 (H2): Cognitive risk will have significant effect on a customer's intentions toward a web vendor.

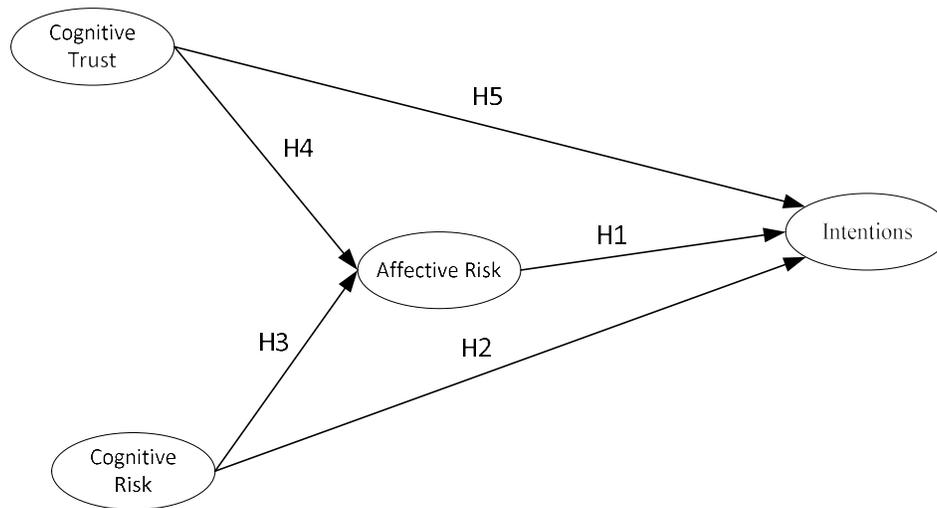
Hypothesis 3 (H3): Cognitive risk will have significant effect on a customer's affective risk.

Trusting beliefs are usually defined as a truster's specific beliefs about a trustee's "competence (ability of the trustee to do what the truster needs), benevolence (trustee caring and motivation to act in the truster's interests), and integrity (trustee honesty and promise keeping)" (McKnight, Choudhury & Kacmar, 2002a, p. 337). These beliefs reflect the truster's salient, subjective assessments of the situation and the truster's interaction with the trustee (Ba & Pavlou, 2002). Having cognitive trust beliefs indicates that a customer is willing to depend on a web vendor and believes in the vendor. It is unlikely that the customer would have strong affective risk feelings in this situation. Therefore, the existence of cognitive trust beliefs should reduce the extent of affective risk feelings. The impact of cognitive trust on affective risk is hypothesized as below:

Hypothesis 4 (H4): A customer's trusting beliefs will have a significant effect on the customer's affective risk feelings.

Although there are empirical evidence for the relationship between behavioral intentions and trusting beliefs, reconfirm these relationships would provide additional evidence of nomological validity for the model. It is also important to demonstrate convergent validity and discriminant validity from affective risk against cognitive trust. Furthermore, the proposed research model emphasizes the significant, additional influence of affective risk on intention beyond that of cognitive beliefs, including trusting beliefs. The validation of the significant relationship between trusting beliefs and behavioral intentions could provide the base to which the influence of affective risk could be compared to. This comparison may further show affective risk's unique and significant influence on behavioral intentions. Therefore, the impact of trusting beliefs on behavioral intentions is hypothesized as below:

Hypothesis 5 (H5): A customer's trusting beliefs will have a significant effect on the customer's trusting intentions toward a web vendor.



**Figure 1.** Proposed Research Model

## METHODOLOGY

The proposed research model is examined through data collected using a field survey. Questionnaire items are adapted from validated instruments when possible, and all items are seven point Likert-type scales, anchored with “strongly disagree” at 1 and “strongly agree” at 7. The survey was conducted in the fall of 2016. Questionnaires were completed by 203 students in a Midwestern university, 131 males and 72 females. Most of the respondents were between 20 to 23 years old and were Internet savvy users. Subjects mostly used the Internet to purchase electronic products, concert tickets, text books, and clothing from various online stores. An email with an embedded link to the online questionnaire was sent to the subjects to invite them to participate in the study. The subjects were first asked about their demographic information and their general online shopping experience. They were then directed to the questionnaire to complete the survey. All the data entry was completed online.

New items were developed for affective risk because of a lack of suitable instruments. The development of the scales followed the three-step approach proposed by Clark and Watson (1995): conceptualization of the construct and generation of an initial item pool, item selection and psychometric evaluation, and the testing of external validity. Domain experts examined the item wordings to make sure the items were written properly so that participants could understand the items correctly while the intended domain areas of the items were still intact. Established scales were used to measure cognitive trust, cognitive risk and behavioral intentions. All the items were adapted to reflect the online shopping context. The items for cognitive trust were constructed based on the instrument for trusting beliefs (Gefen & Pavlou, 2012). The measurement items for cognitive risk were adapted from perceived risk (Featherman & Pavlou, 2003; Pavlou, & Gefen, 2005). Four items adopted from McKnight’s et al. (2002 a, b) instrument for trusting intentions were used to measure participants’ behavioral intentions. More specifically, two items were used to measure participants’ willingness to depend, i.e. the extent to which participants were willing to rely on a web vendor, and two items were used to measure participants’ behavioral intentions, including purchase intentions. The items for these constructs are listed in Table 1.

**Table 1.** Cognitive Trust, Cognitive Risk and Behavioral Intention Items

Constructs	Items	Studies
Affective Risk	I feel tense when I am going to purchase from this web vendor.	New scale
	I worry about my order if I purchase from this web vendor.	
	I feel uneasy about the quality of the product offered by this web vendor.	
Cognitive Risk	This web store might ship me products that do not function properly.	Featherman & Pavlou, 2003; Pavlou & Gefen, 2005
	I might receive wrong products from this store.	
Cognitive trust	This web store is honest.	Gefen & Pavlou, 2012
	Overall, this web store is trustworthy.	
Behavioral Intentions	I can rely on this web store to purchase to purchase my product.	McKnight, et al., 2002 a, b
	I trust this web store completely.	
	I am very likely to provide the web store with my personal information.	
	I intend to purchase the product from this web store.	

## RESULTS

The first step in validating the proposed research model is to examine the convergent and discriminant validity of the constructs. An exploratory factor analysis with varimax rotation was conducted to verify whether the items would load on their intended constructs. The results are listed in table 2, and show that the items loaded on their proposed constructs appropriately, with a few items with loadings lower than 0.70.

**Table 2.** Statistics from Exploratory Factor Analysis with Varimax Rotation

	Affective Risk	Intentions	Cognitive Trust	Cognitive Risk
prisk1				.900
prisk2				.752
ptrust1			.848	
ptrust2			.846	
arisk1	.869			
arisk2	.806			
arisk3	.800			
pi1		.731		
pi2		.699		
pi3		.667		
pi4		.832		

Confirmatory factor analysis was conducted by using IBM SPSS AMOS 22.0, 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 ( $\chi^2/df$ ;  $df$  = degrees of freedom), the adjusted goodness-of-fit (AGFI), the comparative fit index (CFI), the normative fit index (NFI), the Tucker-Lewis Index (TLI), the incremental fit index (IFI) 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 & Todd, 1995). The CFI, TLI, and IFI should be greater than 0.9 (Chin & Todd, 1995). The RMSEA should be below or equal to 0.08 for a good fit and below 0.05 for an excellent fit (Browne & Cudeck, 1993). The instruments fit the data satisfactorily with appropriate fit indices such as the discrepancy ratio (1.65), the AGFI (0.92), the CFI (.98), TLI (0.98), IFI (0.98) and the RMSEA (0.057). The item loadings, standard errors and their corresponding t-values are listed in Table 2. The results show that convergent validity is demonstrated.

**Table 3.** Measurement Item Statistics

Constructs	Items	Loadings	Standard Error	Critical Value	P Value
Affective Risk	AR1	0.680	0.066	8.136	***
	AR2	0.922	0.051	2.568	*
	AR3	0.615	0.075	8.730	***
Cognitive Trust	CT1	0.824	0.051	2.580	*
	CT2	0.916	0.060	5.150	***
Cognitive Risk	CR1	0.473	0.118	7.716	***
	CR2	0.905	0.13	1.113	ns
Behavioral Intentions	PI1	0.677	0.075	7.457	***
	PI2	0.744	0.074	6.473	***
	PI3	0.642	0.203	7.483	***
	PI4	0.319	0.203	9.494	***

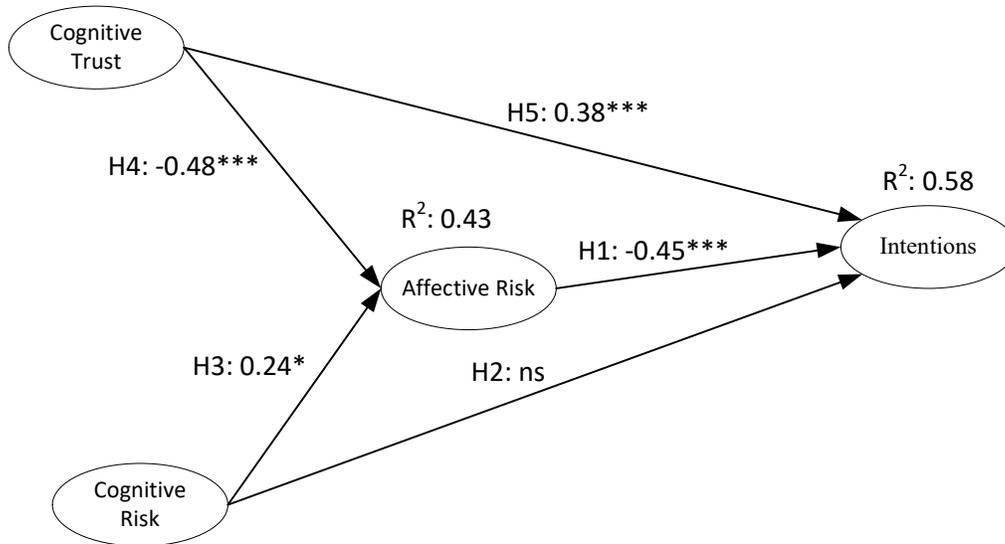
To demonstrate the convergent and discriminant validity of the constructs, average variance extracted (AVE) values for each construct were calculated. The convergent validity can be established if AVEs of each construct exceed the criteria (0.5) set by Fornell and Larcker (1981). Table 3 lists the correlations, the AVEs and the composite reliability (similar to Cronbach Alpha) for the constructs. The square root of the AVEs are listed along the diagonal. Discriminant validity can be shown if the AVEs are greater than the cross correlations among constructs. As shown in Table 3, all the constructs met the criteria suggested by Fornell and Larcker (1981). The test shows that affective risk is unique construct and can be separated from cognitive trust, cognitive risk and behavioral intentions.

**Table 4.** Correlations and AVEs from SEM Analysis

Constructs	Cognitive trust	Affective risk	Cognitive risk	BI
Cognitive trust	<b>0.93</b>			
Affective risk	-0.63	<b>0.86</b>		
Cognitive risk	-0.65	0.55	<b>0.83</b>	
BI	0.68	-0.70	-0.51	<b>0.77</b>
AVE	0.87	0.74	0.69	<b>0.60</b>
Composite reliability	<b>0.93</b>	<b>0.89</b>	<b>0.81</b>	<b>0.85</b>

The predictive validities of the constructs were assessed by associating the affective risk, cognitive trust and cognitive risk with consumer behavioral intentions in a nomological network. The joint influence of affective risk, cognitive risk and cognitive trust explained 58% of the variance of behavioral intentions. 43% of variance of affective risk can be explained by the join effect of cognitive trust and cognitive risk. Affective risk (H1) indeed has significant negative influence on intentions. Compared with other constructs in the model, affective risk has the highest influence on behavioral intentions. Cognitive risk is surprisingly not significant on behavioral intentions. Therefore, H2 is not supported. Both H3 and H4 are supported. This indicates that the existence of cognitive risk could increase affective risk, and the existence of cognitive trust could indeed reduce affective risk. Cognitive trust had the second-best influence on behavioral intentions. The influence is both significant and positive. H5 is supported by the results. The

results are shown in figure 2. RMSEA is 0.057 which is just above the recommended guidelines (0.05) for an excellent fit. Overall, the predictive validity for affective risk is supported.



**Figure 2.** Testing Results for the Proposed Model

## DISCUSSIONS

Traditional risk theories mainly focus on examining cognitive risk, and treat the decision-making process under risk as a conscious expectation based calculative process. These theories propose that a person's behaviors are largely determined by the person's cognitive evaluations of the available choices. Although feelings of risk are examined in the selection process, they are usually not an integral part in the decision-making process. The impact of feelings of risk on intentions is hypothesized through a cognitive evaluation process. On the contrary, the theory of affect and the risk-as-feeling theory emphasizes that feelings in a risky situation could have unique influence on a person's choices of action. These two theories propose that feelings evoked by the risky choices are critical in the sense that these risk feelings could influence behaviors alone, or mediate the causal connection between cognitive evaluations of risk and behaviors. Therefore, feelings no longer play trivial input in decision making. The results from this study provided evidence to support the theory of affect and the risk-as-feeling theory, particularly its application in the B2C e-commerce.

The measurement instruments developed for affective risk demonstrated appropriate convergent validity and discriminant validity. The scale for affective risk consists of items about customers' feelings of worry or fear about potential negative consequences that could result from their actions. This scale is the first scale to measure feelings of risk in an uncertain or risky environment, particularly in B2C e-commerce. This scale can be compared with the scales for computer anxiety. The scales for computer anxiety might be the closest scales to affective risk in IS research. Most of items for various computer anxiety scales only measure negative feelings about using computers in general (Compeau, Higgins, & Huff, 1999; Venkatesh 2000). In contrast, the affective risk scale focuses on the potential negative feelings in B2C e-commerce, and ties the negative feelings with customers' behavioral dispositions. The comparison between affective risk items and computer anxiety items is listed in Table 4.

**Table 5.** Comparison Between Affective Risk Scale and Computer Anxiety Scales in IS Research

Constructs	Items	Studies
Affective Risk	I feel tense when I am going to purchase from the web store.	New Scales
	I worry about my order if I purchase from this web store.	
	I feel uneasy about the quality of the health products offered by this store.	
Anxiety	It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.	Compeau, Higgins, and Huff, 1999
	I feel apprehensive about using computers.	
	I hesitate to use a computer for fear of making mistakes I cannot correct.	
	Computers are somewhat intimidating to me.	
Computer Anxiety	Computers do not scare me at all.	Venkatesh 2000
	Working with a computer makes me nervous.	
	I do not feel threatened when others talk about computers.	
	It wouldn't bother me to take computer courses.	
	Computers make me feel uncomfortable.	
	I feel at ease in a computer class.	
	I get a sinking feeling when I think of trying to use a computer.	
	I feel comfortable working with a computer.	
Computer Anxiety	Computers are a real threat to privacy in this country.	Stewart and Segars, 2002
	Sometimes I am afraid the data processing department will lose my data.	
	I am anxious and concerned about the pace of automation in the world.	
	I am easily frustrated by computerized bills.	
	I am sometimes frustrated by increasing automation in my home.	

The data also demonstrated that customers' behavioral intentions with web vendors can be influenced by the customers' feelings of risk toward them. The hypotheses were supported by the results. Affective risk showed significant influence on customers' intentions to conduct business with a web vendor beyond the influences of cognitive trust and cognitive risk. Cognitive trust beliefs also had significant influence on intentions. These findings also corroborate the finding of previous studies on the importance of cognitive trust (Gefen, et al., 2003; McKnight, et al., 2002a, b). The demonstrated predictive validity provided confidence for the appropriateness of the scale and the generalization ability of the model in other contexts or settings.

Cognitive risk was not significant in explaining the variance of behavioral intention directly. A post hoc analysis shows a significant relationship between cognitive risk and behavioral intentions. However, when other constructs were present in the model, the influence of cognitive risk on behavioral intentions was no longer significant. This indicates that the influence of cognitive risk on intentions is mediated by affective risk. The risk-as-feelings theory suggested that feelings of risk could have dominant effect on intentions and behaviors. People could take actions to evade risks based on negative feelings alone. Therefore, the non-significant effect on cognitive risk on intentions could be at least partially explained by the risk-as-feeling theory.

### IMPLICATIONS AND LIMITATIONS

This study defined the construct of affective risk, and identified the theoretical bases for this construct. This study also developed measurement scales for affective risk in B2C e-commerce context. The results demonstrated satisfactory psychometric properties. The results also found that in B2C e-commerce, affective risk indeed have unique and significant influence on behavioral intentions beyond cognitive risk and cognitive trust. Affective risk could

completely mediate the influence of cognitive risk on people's intentions. Future research may expand the boundary of this study by examining the validity of the proposed model in other research contexts. The effect of web design features on affective risk can also be explored in future studies. This study did not examine the antecedents of affective risk. Therefore, future research may be directed at examining potential antecedents of affective risk besides the limited experimental exploration in this study. Web vendors can benefit from this study by shifting their attention from solely focusing on increasing trusting beliefs and reducing risk perception to reduce their customers' dreaded feelings. One way that web vendors can use to reduce affective risk feelings is to place seals of assurance from reputable institutions on their websites. Research has shown that seals of approvals can reduce cognitive risk beliefs. The results from this study demonstrates that reduced cognitive risk might lead to reduced affective risk. Thus, adopting seals of approval could be an effective and efficient way to reduce affective risk feelings.

The first limitation is that a convenient sample were used in the processes of instrument development and experiment validation. Although IS researchers have presented arguments about the appropriateness of using students as subjects in B2C e-commerce environments, this still presented a challenge to the validity of the instrument and the proposed model. More representative samples are needed for future studies. Second, other important constructs might be omitted from the proposed model, 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 affective risk on intentions.

## CONCLUSIONS

This paper examined the nature of affective risk and its construct validities in B2C e-commerce environment. Drawing on the theory as affect and the risk-as-feeling theory, this research provided the definitions for affective risk and developed measurement items for the construct. Data were collected through a field study, and the findings supported the conceptualization of affective risk and its convergent, discriminant and predictive validities. The results also found that affective risk and cognitive trust were significant determinants of behavioral intentions. The findings from this research provide another step toward further our understanding of the nature and mechanisms of consumers' feelings of risk in B2C e-commerce environment.

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