



# A Study of the Impact of Individual Differences on Online Shopping

*Jianfeng Wang, Indiana University of Pennsylvania, USA*

*Linwu Gu, Indiana University of Pennsylvania, USA*

*Milam Aiken, University of Mississippi, USA*

---

## ABSTRACT

*Previous studies explored the effects of individual cognitive and affective reactions on online shopping and those of individual differences on usage of information systems. However, few studies evaluated how individual differences affect online shopping. This paper draws on the theory of reasoned action (TRA) and the technology acceptance model (TAM) as it attempts to gain understanding of individual difference impacts on online shopping attitudes. The model was tested using data collected from a Web survey, and 171 questionnaires were collected and analyzed. Results show that online shopping experience, level of Internet usage, cognitive absorption, personal innovativeness, and computer self-efficacy positively influence online shopping attitudes, and that perceived usefulness is a significant mediator; but only between online shopping attitudes and two individual differences variables: the level of Internet usage and cognitive absorption.*

*Keywords: E-Business, E-Commerce Strategy, Individual Differences, Online Shopping, Perceived Risk, Perceived Usefulness*

---

## INTRODUCTION

In 2008, about 1.4 billion people (22% of the world's population) used the Internet (Internet World Stats, 2009), and in the United States, almost 60% of the 220 million Internet users spent \$138 billion online, an increase of 7.6% from the prior year (U.S. Census Bureau, 2009). Yet, there are many questions remaining about why consumers buy online. According to the Nielson Company (2009), about 40% of the

world's online population has made a purchase online (an increase of 10% from two years ago), and 60% of global online consumers used their credit card for a recent online purchase. Given the rapid growth of electronic commerce, continued research on the factors that influence online shopping is vital.

Within IS usage research, individual differences can be classified into four categories: cognitive style, personality traits, demographics, and situational factors (Alavi & Joachimsthaler, 1992; Karahanna, Ahuja, Srite, & Galvin, 2002). Many variables have been discussed

DOI: 10.4018/jebr.2010100904

in studies of online shopping such as product perceptions, shopping experience, perceived characteristics of the Web, consumer characteristics, and consumer risks (Chang, Cheung, & Lai, 2005), and demographic information has been collected by der Heijden, Verhagen, & Creemers (2003), Shih (2004), and Torkzadeh and Dhillon (2002). However, no single study has explored all four categories of individual differences, and this paper attempts to address this shortfall by incorporating TRA (Fishbein & Ajzen, 1975) and TAM (Davis, 1989) into the study of online shopping attitudes.

### Theoretical Foundation

Davis (1989) found that an individual's attitude towards using a computer system is directly affected by two beliefs: perceived usefulness and perceived ease of use. The goal of TAM (Figure 1) is to explain the general determinants of computer acceptance, and this model has been used in many studies to explore user perceptions of system use and the probability of adopting an online system.

Further, TAM has been used to predict user acceptance (Lederer, Maupin, Sena, & Zhuang, 2000). The model helps researchers

understand the factors of technology adoption that affect user acceptance and why people resist using computers (Chung & Tan, 2004). A few studies have augmented TAM with other theories in order to improve its specificity and explanatory power (e.g., Hu, Chau, Sheng, & Tam, 1999; Legris, & Collette, 2003), and the model has also been extended to explore the user acceptance of an online system (Chung & Tan, 2004; Shang, Chen, & Shen, 2005; Shih, 2004).

Attitudes toward behavior and subjective norm are two independent variables used in TRA (Fishbein & Ajzen, 1975). The first variable in the model (Figure 2) is defined as the individual's positive or negative feelings about performing a behavior, and the second is defined as an individual's perception of whether people important to the individual think the behavior should be performed. TRA explicitly describes the mechanisms through which individual differences influence behavior, and it proposes that attitudes are impacted by people's beliefs about whether others think they should perform the action. TRA has been used for predicting cognitive and affective behavior using the belief-attitude relationship in social psychology (Shih, 2004), and Ajzen and Fishbein (1980)

Figure 1. Technology acceptance model (TAM) (From Davis, 1989)

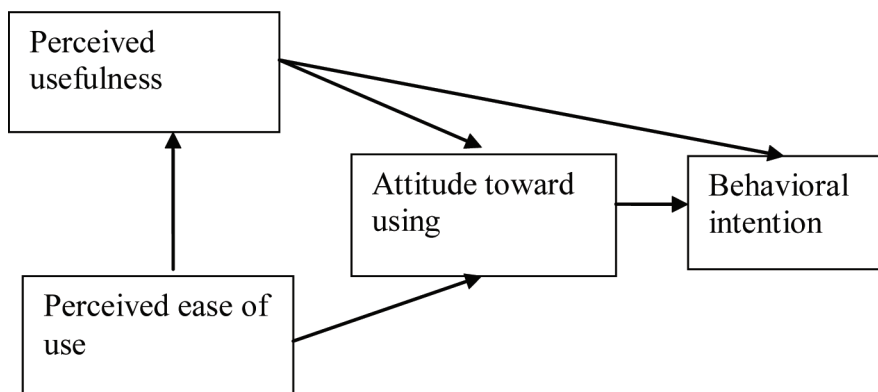
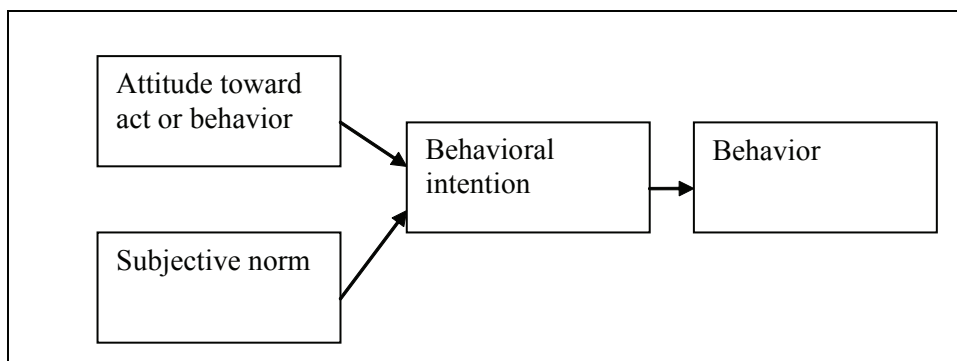


Figure 2. Theory of reasoned action (TRA) model (From Fishbein and Ajzen, 1975)



have shown how individual differences such as personality, cognitive style, demographic traits, situational factors, and behavior, reciprocally influence each other.

Integrating TAM with other theories could improve its specificity and explanatory power (Legris et al., 2003; Shang et Al., 2005). For example, normative beliefs and self efficacy were added to the TAM in the research of online shopping performed by Vijayasarathy (2004). By incorporating factors from both TRA and TAM, a new model can be used to predict and explain how individual differences affect online attitudes. In this model (Figure 3), perceived risk is treated as one of the two mediating variables between individual differences and online shopping attitudes. Online consumers are concerned with risks about the security of transmitting credit card information over the Internet, and they can also be worried about buying something without touching it (Bhatnagar et al., 2000). Obviously, when consumers perceive lower risks associated with online shopping, their online shopping attitudes become more positive.

## RESEARCH AND HYPOTHESIS

### Perceived Usefulness

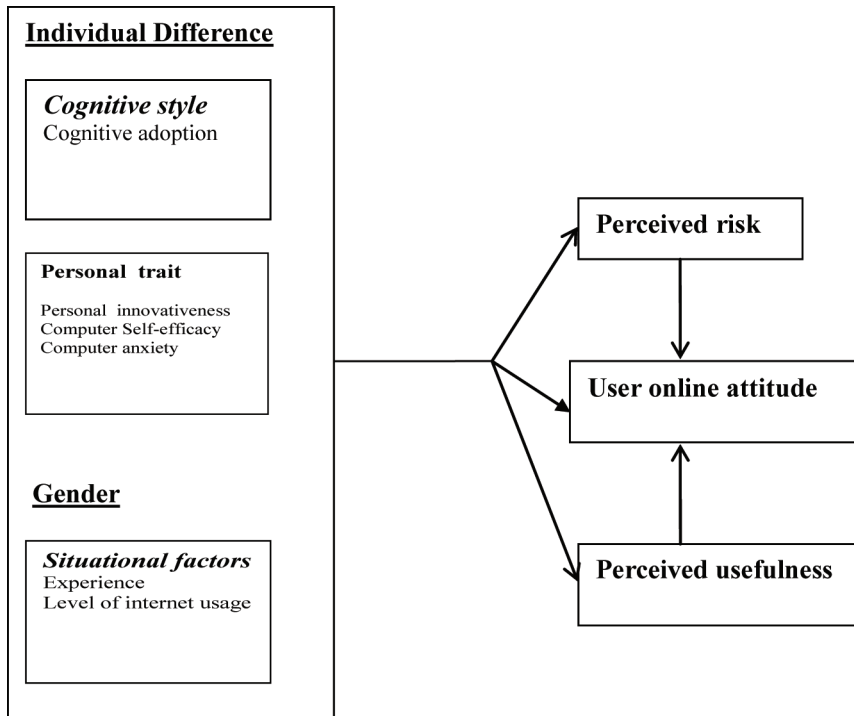
Davis (1989) defines perceived usefulness as “the degree to which a person believes that

using a particular system would enhance his or her job performance,” and the effects of perceived usefulness on online shopping have been tested in previous studies (e.g., Shang et al. 2005; Vijayasarathy, 2004). Perceived usefulness is operationalized as perceived value (Shih, 2004). In this paper, we define perceived usefulness as the degree to which an individual believes that online shopping will enhance his/her benefits. Therefore, perceived usefulness concerns cost reduction, product value, and time-saving in our study. Cost saving might increase customer satisfaction and loyalty (Phillips et al., 1997). Time-saving is an important perceived consequence of online shopping, and is a vital predictor of online buying (Limayem, Khalifa, & Frini, 2000). In addition, product value is an important factor that influences the success of Internet commerce (Torkzadeh & Dhillon, 2002).

### Perceived Risks

Perceived risks are commonly thought of as the uncertainty felt in a situation. It is defined as “a combination of uncertainty plus seriousness of outcome involved” (Bauer, 1967). Further, perceived risks have significant and negative influences on online shopping attitudes (Jarvenpaa, Tractinsky, & Vitale, 2000; Kimery & McCord, 2002). In at least one study (Chang et al., 2005), these risks have been measured by asking respondents to assess whether buying

Figure 3. Research model of individual differences on online shopping attitudes



goods online was risky and whether they were concerned with system security, credit card fault, and product risk.

Perceived risks are prominent barriers to the completion of online purchases (Hoffmann, Novak, & Peralita, 1999; Jarvenpaa & Tractinsky, 1999). Consumers who think they are risk-averse have more online purchases (den Poel & Leunis, 1999), and perceived risks are antecedents of attitudes towards online purchasing (der Heijden et al., 2003). Further, consumers might have a low intention of purchasing due to the inconvenience of online shopping (Hoffman, Novak, & Chatterjee, 1995), and they might hesitate to use their credit card numbers for online shopping because they have concerns for security (Salkin, 1999). Like perceived usefulness, which relates to personal traits (Karahanna et al., 2002), individuals can have different perceived risks when evaluating

products and services for purchase (Featherman & Pavlou, 2003).

### Individual Differences

Individual differences influence behavior via their effects on individual beliefs (Karahanna et al., 2002), and cognitive style, personality traits, demographic features, and situational factors are four groups of differences often used in social psychology research.

#### Cognitive Style

Cognitive style refers to experience and common sense and an individual's characteristic way of thinking, using information, solving problems, and making decisions (Alavi & Joachimsthaler, 1992; Karahanna et al., 2002). Cognitive style is also correlated with job function and job level. In this paper, cognitive style focuses on cognitive absorption or

personal cognitive state, which was defined by Agarwal and Karahanna (2000) as “a state of deep involvement with software.” It impacts the intrinsic motivations of online shopping and can also influence online shopping indirectly through its effects on perceived usefulness. Higher cognitive absorption is associated with a satisfied shopping experience, and consumers with high cognitive absorption online will be more likely to have a positive online shopping attitude and be more likely to shop online (Shang et al., 2005). Therefore, we propose:

**H<sub>1a</sub>**: *Cognitive absorption positively influences perceived usefulness.*

**H<sub>1b</sub>**: *Cognitive absorption negatively influences perceived risks.*

**H<sub>1c</sub>**: *Cognitive absorption positively influences online shopping attitudes.*

### **Personality**

Personality is defined as “the cognitive and affective structures maintained by individuals to facilitate judgment to the events, people, and situation” (Alavi & Joachimsthaler, 1992).

Online shopping self-efficacy is a consumer’s self-assessment of his/her capabilities to shop online. Computer self-efficacy refers to an individual assessment of one’s capability to use a computer and has been found to affect computer usage (Compeau & Higgins, 1995). Computer anxiety is the tendency of an individual to be uneasy, apprehensive, or fearful about the current or future use of computers (Parasuraman & Igbaria, 1990). While computer self-efficacy relates to individual judgments about their ability, computer anxiety is a negative affective reaction toward computer use.

Innovativeness refers to “the degree to which an individual is receptive to new ideas” (Chang et al., 2005) and has a significant positive relationship with online shopping (Blake et al., 2003; Goldsmith, 2002).

The perceptions about the innovation and perceived behavioral control were significant predictors of the intentions to adopt online services (Tan & Teo, 2000).

We propose that:

**H<sub>2a</sub>**: *Personal innovativeness and computer self-efficacy have positive but computer anxiety has negative influences on perceived usefulness.*

**H<sub>2b</sub>**: *Personal innovativeness and computer self-efficacy have negative but computer anxiety has positive influences on perceived risks.*

**H<sub>2c</sub>**: *Personal innovativeness and computer self-efficacy have positive but computer anxiety has negative influences on online shopping attitudes.*

### **Demographic Features**

Demographic information of individuals such as gender, age, race, income level, and education are commonly used as independent variables. Differences between males and females were found to affect decision-making and information preferences (Powell & Johnson, 1995). Males were found to purchase more online in some studies, but there were no differences in others (Burroughs & Sabherwal, 2001; Chang, Torkzadeh, & Dhillon, 2004; Donthu & Garcia, 1999; Li et al., 1999), and there are mixed reports on whether consumers’ income and age have significant positive effects on online shopping (Bhatnagar et al., 2000; Goldsmith & Goldsmith, 2002). To simplify our analysis, we use gender as a moderating dummy variable in the model, where male is assigned a value of 1 and female a value of 0.

We propose that:

**H<sub>3a</sub>**: *Gender positively influences perceived usefulness.*

**H<sub>3b</sub>**: *Gender negatively influences perceived risks.*

**H<sub>3c</sub>:** *Gender positively influences online shopping attitudes.*

### **Situational Factors**

User situational factors include training, experience, and user involvement. Experience using a Web site is found to be one of the important factors in e-commerce (Jarvenpaa & Todd 1996). Online shopping experience, which is typically used as a variable of the situational factor construct, is concerned with user-friendliness and the fun of shopping online (Shang et al., 2005), and some studies suggest that online shopping experience relates to Internet acceptance (Lederer et al., 2000; Pitknow & Kehoe, 1996) and evaluated effort, compatibility, and playfulness (Chang et al., 2004). The second variable for the situational factors is the level of Internet usage which influences perceived consequences (Chang et al., 2005).

We propose that:

**H<sub>4a</sub>:** *Level of Internet usage and shopping experience positively influence perceived usefulness.*

**H<sub>4b</sub>:** *Level of Internet usage and shopping experience negatively influence perceived risks.*

**H<sub>4c</sub>:** *Level of Internet usage and shopping experience positively influence online shopping attitudes.*

### **Attitudes**

Belief is associated with the individual subjective assessment present with some behavior, whereas attitudes are associated with individual affective feelings about presenting the behavior (Hubona & Blanton, 1996). Shih (2004) defined attitudes as “the positive or negative feelings of an individual toward a specific behavior.” Attitude has been characterized as a person’s preference of a certain response to a concept or object and it is defined as “the extent to which a

consumer likes on-line shopping and considers it to be a good idea” (Vijayasarathy, 2004).

Previous studies’ results show that perceived usefulness and perceived risk are highly relevant in assessing attitude towards on-line shopping. For example, Kimery and McCord (2002) found perceived risk reduction had a positive influence on the attitude towards online shopping, and Torkzadeh and Dhillon (2002) found shipping errors had negative effects on online shopping attitude.

We propose that:

**H5a:** *Perceived usefulness positively influences online shopping attitudes.*

**H5b:** *Perceived risks negatively influence online shopping attitudes.*

## **RESEARCH AND METHODOLOGY**

### **Variables**

The dependent variable in our study is the online shopping attitude of an individual consumer. The independent variables are grouped into four categories: personality traits, cognitive style, demographic features, and situational factors, and there are two mediate variables: perceived risks and perceived usefulness. All variables except gender, online shopping experience, and level of Internet usage, are measured by asking users their perceptions, and all instruments use a 7-point Likert-type scale, where 1= strongly disagree and 7= strongly agree.

### **Independent Variables**

This paper uses measures of computer anxiety developed by Parasuraman and Igbaria (1990), personal innovativeness by Karahanna et al. (2002), cognitive absorption by Shang, et al. (2005), and computer self-efficacy by Compeau and Higgins (1995). There are 10 items for computer self-efficacy, 3 items for personal innovativeness, 14 items for cognitive absorp-



tion, and 5 items for computer anxiety. The online shopping experience is measured by the frequency of online shopping purchases, and the level of Internet usage is measured in terms of hours per week.

### **Mediator Variables**

The measure of perceived usefulness consists of Internet shopping convenience, product value, time-saving, and cost reduction. The perceived risks are measured by shipping errors and uncertainty. Internet shopping convenience, product value, and shipping errors are all measured using the scale developed by Torkzadeh and Dhillon (2002). Time saving was measured following the scale developed by Vijayarathy (2004), cost reduction using Kuk (2004), and uncertainty using Devaraj, Fan, and Kohli (2002).

### **Dependent Variables**

Online shopping attitude is measured using the scale provided by Limayem et al. (2000). We used the 4 items of attitudes with a 7-point Likert-type scale, where 1=“strongly disagree” and 7=“strongly agree.”

### **Subjects and Procedure**

A survey instrument containing 60 questions for 11 variables (see Appendix 1) was administered to students in multiple sections of an undergraduate MIS course and students in an MBA course at a large state university in the northeast region of the United States.

## **DATA ANALYSIS AND RESULTS**

### **Data Summary**

The mean age of the 171 students (99 males, 72 females) who participated in the survey was 21.53 years, and 81.87% of the students were between 18 and 22. There were no significant differences among the age groups, and 137 were White, 16 were Black, 12 were Asian, and 6 were categorized as “others.” As shown in Table 1,

only about 10% of those surveyed spent fewer than 5 hours online, and only 4% never made a purchase online (see Table 2).

## **TESTING THE RESEARCH MODEL**

### **Construct Reliability**

The reliability (internal consistency) of the items in each scale was examined using Cronbach’s alpha to confirm the adequacy of the measures for testing hypotheses (see Table 3). The coefficients confirmed the results of earlier studies and provided confidence in testing the hypotheses.

### **Testing the Effects of Individual Differences on Online Shopping Attitude**

Multiple regression analysis was used to test the individual difference effects on the online shopping attitude. Table 4 shows that the effects of all the individual difference variables except gender are significant. Computer anxiety negatively influences online shopping attitudes. Experience, level of Internet usage, cognitive absorption, personal innovativeness, and computer self-efficacy positively affect online shopping attitudes. So H1c, H2c, and H4c are accepted, but H3c is rejected.

### **Testing the Effects of Perceived Usefulness and Perceived Risks on Online Shopping Attitude**

Perceived usefulness and perceived risks both are shown to have significant effects on online shopping attitude (Table 5), although in different directions. Therefore, H5a and H5b are accepted. Perceived risks negatively affect online shopping attitudes, just as Kimery and McCord (2002) predicted. Perceived usefulness has a positive influence on online shopping attitudes.

Table 1. Weekly hours of Internet use

Participants	No. of hours online weekly
30	More than 15 hours
64	10-15 hours
60	5-10 hours
16	fewer than 5 hours

Table 2. Number of online purchases

Participants	Frequency of online purchases
10	More than 10 times
29	5 to 10 times
54	3-5 times
60	1-3 times
7	0 time

Table 3. Construct reliability test

Constructs	Number of items	Construct reliability
Cognitive absorption	14	.847
Computer Self-Efficacy	10	.896
Computer Anxiety	5	.747
Personal innovativeness	3	.779
Perceived usefulness	18	.895
Perceived risks	6	.832
Online shopping Attitude	4	.857

Table 4. The effects of individual differences on online shopping attitudes

Dependent variable	Independent variable	Beta	t	Sig.
Online shopping attitude	Gender	-.041	-.977	.330
	Experience	.112	1.998	.047
	Level of Internet usage	.536	8.911	<.001
	Cognitive absorption	.162	3.335	.001
	Personal innovativeness	.128	2.869	.005
	Computer Self-efficacy	.146	2.795	.006
	Computer anxiety	-.087	-2.024	.045

## Mediation Test

Three serial regressions are required in testing mediation as suggested by Baron and Kenny

(1986). The regressions of perceived usefulness and risks on the individual difference variables were done in the first step to test whether the independent variables affect the



*Table 5. The effects of perceived usefulness and perceived risks on online shopping attitudes*

Dependent variable	Independent variable	Beta	t	Sig.
Online shopping attitude	Perceived Usefulness	.582	9.732	<.001
	Perceived Risks	-.210	-3.504	.001

mediate variables. The independent variables must have significant effects on the mediators. Otherwise, there is no mediation. Tables 6 and 7 show that cognitive absorption, computer self-efficacy, and level of Internet usage significantly influence perceived usefulness, but they have no significant effects on perceived risks. In addition, online-shopping experience significantly influences perceived risks, but it has no significant effects on perceived usefulness. Therefore, H1a is accepted and H1b is rejected. H2a, H4a, and H4b are partially accepted. Among the independent variables, only personal innovativeness significantly affects both perceived usefulness and perceived risks at the 0.2% and 2% level of significance respectively. Only computer anxiety is not shown to have any effects on perceived usefulness or perceived risks. Gender has an insignificant effect on perceived risks.

The regression of individual difference variables on online shopping attitude is the second step to check how independent variables affect the dependent variables (Table 4). The regression results indicate that all the individual

difference variables except gender significantly affect online shopping attitudes.

The third step is a pooled regression of the dependent variables on both independent variables and mediate variables (Table 8). During this third step, perceived usefulness and perceived risks are shown to have significant effects on online shopping attitude (Table 8).

If there is mediation, and the above conditions all hold, the coefficients (the absolute values) of the independent variables must be smaller in the third regression than those in the second regression. In Table 8, level of Internet usage, cognitive absorption, and computer anxiety are significant individual differences, but they are insignificant with respect to perceived risks (Table 7). As a result, perceived risks cannot be considered as a significant mediator. In Table 6, computer anxiety is an insignificant individual difference with respect to perceived usefulness, but the level of Internet usage and cognitive absorption are significant. The coefficients of the two individual differences variables are smaller in Table 8 than in Table 4, and thus, the perceived usefulness is

*Table 6. The effects of individual differences on perceived usefulness*

Dependent variable	Independent variable	Beta	t	Sig.
Perceived usefulness	Gender	-.019	-.317	.752
	Experience	-.003	-.034	.973
	Level of Internet usage	.265	3.146	.002
	Cognitive absorption	.195	2.871	.005
	Personal innovativeness	.196	3.130	.002
	Computer Self-efficacy	.300	4.106	<.001
	Computer anxiety	.058	.960	.339

Table 7. The effects of individual differences on perceived risks

Dependent variable	Independent variable	Beta	t	Sig.
Perceived risks	Gender	.146	1.927	.056
	Experience	-.218	-2.160	.032
	Level of Internet usage	.044	.407	.684
	Cognitive absorption	.036	.412	.681
	Personal innovativeness	-.188	-2.343	.020
	Computer self-efficacy	-.073	-.773	.440
	Computer anxiety	.101	1.311	.192

Table 8. Coefficients of pooled regressions of online attitude on individual differences effects

Dependent variable	Independent variable	Beta	t	Sig.
Online attitude	Gender	-.019	-.468	.640
	Experience	.084	1.579	.116
	Level of Internet usage	.495	8.523	<.001
	Cognitive absorption	.132	2.830	.005
	Personal innovativeness	.069	1.579	.116
	Computer Self-efficacy	.083	1.618	.108
	Computer anxiety	-.084	-2.072	.040
	Perceived usefulness	.178	3.340	.001
	Perceived risks	-.132	-3.163	.002

a significant mediator, but only between online shopping attitudes and two individual differences variables: the level of Internet usage and cognitive absorption.

## Discussions and Business Implications

All the tested individual differences variables except gender had significant effects on online-shopping attitude, as expected. Online shopping experience, level of Internet usage, cognitive absorption, personal innovativeness, and computer self-efficacy positively influence online shopping attitudes. The results imply online shopping attitudes can be changed when consumers gain more knowledge about the Internet,

when they use the network more, and when they gain more confidence in their capabilities with it and related applications.

Improved online shopping attitudes can boost online sales, and long-term investment in e-commerce is worthwhile. Though there are many people still not willing to disclose their credit card information or banking information online or are afraid of shopping online, the number will most likely decrease year by year.

The findings in this survey are also confirmed by recent developments in the business world such as increasing sales on Amazon and eBay. Our survey subjects are college undergraduates and graduates very active in using online services and entertainment. They spend a large amount of time online, and when these

students get older, we expect that a larger percentage of the overall population consequently will be shopping over the Internet.

The coefficient of the level of Internet usage in the regression is .536 (Table 4). With the decreasing cost of using broadband Internet service and decreasing cost in computing overall, more people will try to be online and spend more time online. In addition, online businesses should make their online services or shopping systems easier, more secure, and more enjoyable as the coefficient of the cognitive absorption has a positive influence on both online shopping attitudes and perceived usefulness (Tables 4 and 5).

Cognitive absorption, level of Internet usage, personal innovativeness, and computer self-efficacy all affect perceived usefulness, but gender, experience, and computer anxiety had no significant effects on perceived usefulness. This implies that an easy and enjoyable online system is very important to attract users, even those who are not comfortable using computers or surfing the Internet. As long as consumers are willing to or can be motivated to use online systems, they will slowly discover the usefulness of the technology and their computer anxiety will be reduced.

Personal innovativeness and online shopping experience both significantly affected perceived risks negatively. That is, more innovative people perceive e-commerce to be less risky, and more online shopping experience reduces perceived risks.

A better understanding of the effects of individual differences upon online shopping attitudes will help e-businesses develop better strategies. Researchers might find that the TRA model is a very good predictor of consumer behavior, and practitioners can use the results to better design marketing and promotion programs and provide a more personalized service.

## CONCLUSION AND LIMITATIONS

This paper explores the effects of four individual difference categories on perceived usefulness and risks and online shopping attitudes, based on the TRA and TAM models. The online shopping experience, the level of Internet usage, cognitive absorption, personal innovativeness, and computer self-efficacy all affect online shopping attitudes, which in turn can affect e-commerce sales, but this latter relationship was not explored.

There are some limitations in the research, however. First, the paper focuses on online shopping attitudes only; not upon how these attitudes could influence e-commerce sales. In addition, a better conceptualization of perceived risks might be needed. That is, the instrument for measuring perceived risks included shipping errors and uncertainty, but it did not include product risks and transaction risks. Finally, subjects were not sampled randomly but came from a specific population, i.e., college students. This population uses the Internet, but their shopping behavior might be different from older Web users with higher incomes, for example.

## REFERENCES

- Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, 24(4), 665–694. doi:10.2307/3250951
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Alavi, M., & Joachimsthaler, E. (1992). Revisiting DSS implementation research: A meta-analysis of the literature and suggestions for researchers. *MIS Quarterly*, 16(1), 95–116. doi:10.2307/249703
- Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182. doi:10.1037/0022-3514.51.6.1173

- Bauer, R. (1967). Consumer behavior as risk taking. In D. Cox, *Risk taking and information handling in consumer behavior*. Cambridge, MA: Harvard University Press.
- Chang, J., Torkzadeh, G., & Dhillon, G. (2004). Re-examining the measurement models of success for Internet commerce. *Information & Management, 41*, 577–584. doi:10.1016/S0378-7206(03)00091-0
- Chang, M., Cheung, W., & Lai, V. (2005). Literature derived reference models for the adoption of online shopping. *Information & Management, 42*(4), 543–559. doi:10.1016/S0378-7206(04)00051-5
- Compeau, D., & Higgins. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, 19*(2), 189–211. doi:10.2307/249688
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 318–339. doi:10.2307/249008
- den Poel, D., & Leunis, J. (1999). Consumer acceptance of the Internet as a channel of distribution. *Journal of Business Research, 45*(3), 249–256. doi:10.1016/S0148-2963(97)00236-1
- der Heijden, H., Verhagen, T., & Creemers, M. (2003). Understanding online purchase intentions: Contributions from technology and trust perspectives. *European Journal of Information Systems, 12*(1), 41–48. doi:10.1057/palgrave.ejis.3000445
- Devaraj, S., Fan, M., & Kohli, R. (2002). Antecedents of B2C channel satisfaction and preference: Validating e-commerce metrics. *Information Systems Research, 13*(3), 316–333. doi:10.1287/isre.13.3.316.77
- Featherman, M., & Pavlou, P. (2003). Predicting e-services adoption: A perceived risk facets perspective. *International Journal of Human-Computer Studies, 59*(4), 451–474. doi:10.1016/S1071-5819(03)00111-3
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Hoffman, D., Novak, T., & Chatterjee, P. (1995). Commercial scenarios for the Web: Opportunities and challenges. *Journal of Computer-Mediated Communication, 1*(3).
- Hoffman, D., Novak, T., & Peralita, M. (1999). Building consumer trust online. *Communications of the ACM, 42*(4), 80–85. doi:10.1145/299157.299175
- Hu, P., Chau, P., Sheng, O., & Tam, K. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems, 16*(2), 91–112.
- Hubona, G., & Blanton, J. (1996). Evaluating system design features. *International Journal of Human-Computer Studies, 44*(1), 93–118. doi:10.1006/ijhc.1996.0005
- Internet World Stats. (2009). *Internet world stats: Usage and population statistics*. Retrieved January 24, 2009, from <http://www.internetworldstats.com/stats.htm>
- Jarvenpaa, S., & Todd, P. (1996). Consumer reactions to electronic shopping on the World Wide Web. *International Journal of Electronic Commerce, 1*(2), 59–88.
- Jarvenpaa, S., & Tractinsky, N. (1999). Consumer trust in an Internet store: A cross-cultural validation. *Journal of Computer-Mediated Communication, 5*(2), 1–35.
- Jarvenpaa, S., Tractinsky, N., & Vitale, M. (2000). Consumer trust in an Internet store. *Information Technology and Management, 1*(1-2), 45–71. doi:10.1023/A:1019104520776
- Karahanna, E., Ahuja, M., Srite, M., & Galvin, J. (2002). Individual differences and relative advantage: The case of GSS. *Decision Support Systems, 32*(4), 327–341. doi:10.1016/S0167-9236(01)00124-5
- Kimery, K., & McCord, M. (2002). Third party assurances: Mapping the road to trust in e-retailing. *Journal of Information Technology Theory and Application, 4*(2), 63–81.
- Kuk, G. (2004). Effectiveness of vendor-managed inventory in the electronics industry: Determinants and outcomes. *Information & Management, 41*(5), 645–654. doi:10.1016/j.im.2003.08.002
- Lederer, A., Maupin, D., Sena, M., & Zhuang, Y. (2000). The technology acceptance model and the World Wide Web. *Decision Support Systems, 29*(3), 269–282. doi:10.1016/S0167-9236(00)00076-2
- Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management, 40*(3), 191–204. doi:10.1016/S0378-7206(01)00143-4

- Limayem, M., Khalifa, M., & Frini, A. (2000). What makes consumers buy from Internet? A longitudinal study of online shopping. *IEEE Transactions on Systems, Man, and Cybernetics*, 30(4), 421–432. doi:10.1109/3468.852436
- Nielson Company. (2009). *Global online shopping report, February 2008*. Retrieved January 24, 2009 from <http://www.nielson.com/solutions/GlobalOnlineShoppingReportFeb08.pdf>
- Parasuraman, S., & Igarria, M. (1990). An examination of gender differences in the determinants of computer anxiety and attitudes toward microcomputers among managers. *International Journal of Man-Machine Studies*, 32(3), 327–340. doi:10.1016/S0020-7373(08)80006-5
- Pitknaw, J., & Kehoe, C. (1996). Emerging trends in the WWW user population. *Communications of the ACM*, 39(6), 106–108. doi:10.1145/228503.228525
- Salkin, S. (1999). Fear of buying. *Logistics Management and Distribution Report*, 8(5), 101–104.
- Shang, R., Chen, Y., & Shen, L. (2005). Extrinsic versus intrinsic motivations for consumers to shop online. *Information & Management*, 42(3), 401–413. doi:10.1016/j.im.2004.01.009
- Shih, H. (2004). An empirical study on predicting user acceptance of e-shopping on the Web. *Information & Management*, 41(3), 351–368. doi:10.1016/S0378-7206(03)00079-X
- Tan, M., & Teo, T. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, 1(1).
- Torkzadeh, G., & Dhillon, G. (2002). Measuring factors that influence the success of Internet commerce. *Information Systems Research*, 13(2), 187–204. doi:10.1287/isre.13.2.187.87
- U.S. Census Bureau. (2009). *Service sector statistics quarterly retail e-commerce sales*. Retrieved January 24, 2009, from <http://www.census.gov/mrts/www/ecommm.html>
- Vijayasathya, L. (2004). Predicting consumer intentions to use on-line shopping: The case for an augmented technology acceptance model. *Information & Management*, 41(6), 747–762. doi:10.1016/j.im.2003.08.011

## **APPENDIX A**

### **Cognitive Absorption (Agarwal & Karahanna, 2000)**

1. Time appears to go by very quickly when I am using the Web
2. I often spend more time on the Web than I had intended.
3. While using the Web, I am able to block out most other distractions.
4. While on the Web, I am immersed in the task I am performing.
5. When on the Web, I get distracted by other attentions very easily.
6. I have fun interacting with the Web.
7. Using the Web provides me with a lot of enjoyment.
8. I enjoy using the Web.
9. Using the Web bores me.
10. I feel that I have control over my control with the Web.
11. The Web allows me to control my computer interaction.
12. Using the Web excites my curiosity.
13. Interacting with the Web makes me curious.
14. Using the Web arouses my imagination.

### **Computer Self-Efficacy (Compeau & Higgins, 1995)**

I could complete the job using a software package. . .

1. . . . if there was no one around to tell me what to do as I go.
2. . . . if I had never used a package like it before.
3. . . . if I had only the software manuals for reference.
4. . . . if I had seen someone else using it before trying it myself.
5. . . . if I could call someone for help if I got stuck.
6. . . . if someone else had helped me get started.
7. . . . if I had a lot of time to complete the job for which the software was provided.
8. . . . if I had just the built-in help facility for assistance.
9. . . . if someone showed me how to do it first.
10. . . . if I had used similar packages before this one to do the same job.

### **Computer Anxiety (Parasuraman & Igarria, 1990)**

1. Computers are a real threat to privacy in this country.
2. Sometimes I am afraid the data processing department will lose my data.
3. I am anxious and concerned about the pace of automation in the world.
4. I am easily frustrated by computerized bills.
5. I am sometimes frustrated by increasing automation in my home.

### **Personal Innovativeness (Karahanna et al., 2002)**

1. I use only computer tools that have a proven track record.
2. Among my colleagues and coworkers, I tend to be among the first to try new computer tools.

3. I leave it to others to work out the “bugs” in the new computer tools before I will consider them.

## **Perceived Usefulness**

### *Time saving* (Vijayasathy, 2004)

1. It is important to minimize payment time.
2. It is important to minimize time pressure when shipping.

### *Internet shopping convenience* (Torkzadeh & Dhillon, 2002)

3. It is important to make shopping easy.
4. It is important to minimize effort of shopping.
5. It is important to minimize queuing time.
6. It is important to minimize time to select a product.
7. It is important to minimize personal hassle.
8. It is important to minimize payment time.
9. It is important to minimize time pressure when shopping.

### *Internet product value* (Torkzadeh & Dhillon 2002)

10. It is important to minimize product cost.
11. It is import to minimize tax cost.
12. It is important to ensure quality of product.
13. It is important to maximize

### *Cost reduction* (Kuk, 2004)

14. Inventory holdings/levels should be reduced.
15. Lower transportation costs due to more efficient planning.
16. Faster inventory turns.
17. Less wastage as work in progress is affected when quality issues are encountered.
18. Fewer product returns due to low quality or obsolescence.

## **Perceived Risk**

### *Internet shipping errors* (Torkzadeh & Dhillon, 2002)

1. I worry about receiving wrong products.
2. I am concerned about shipping errors.

### *Uncertainty* (Devaraj et al., 2002)

3. It was easy for me to get relevant quantitative (price, taxes, etc.) information.
4. I believe that it was possible for me to evaluate the various alternatives.



5. The store's Web site provided adequate information.
6. The online site provided sufficient information for the product.

### **Attitude (Limayem et al., 2000)**

1. Online shopping is a good idea.
2. I like to shop through the Web.
3. Purchasing through the Web is enjoyable.
4. Online shopping is exciting.

*Jianfeng Wang, PhD, is currently associate professor of MIS at Indiana University of Pennsylvania. He earned his bachelor's degree in economics from Fudan University in 1991 and his PhD in MIS from the University of Mississippi in January 2003. His research areas include economics of information technology, group decision support systems, database technology, and organizational impacts of information technology.*

*Linwu Gu, PhD, is currently associate professor of MIS at Indiana University of Pennsylvania. She earned her master's degree in computer science in 2001 and her PhD in MIS in 2005, both from the University of Mississippi. Her research areas include group decision support systems, strategic information systems, and e-business.*

*Milam Aiken, PhD, is currently professor of MIS and Chair of the MIS/POM Department in the School of Business Administration at the University of Mississippi. He received his PhD degree in MIS from the University of Arizona in 1991. Since 1990, he has published more than 120 journal articles on group decision support systems and artificial intelligence.*