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Abstract

Consumer-oriented electronic commerce is a global phenomenon. However, while online transactions are readily accepted by consumers in some countries, in others consumers seem to be less accepting. This paper uses diffusion of innovation theory in combination with literature on culture and information technology to examine the question of whether culture influences consumers' intentions to purchase goods or services online. A multi-country survey was conducted to gather data in order to empirically investigate this question. Results indicate that national culture does influence intentions to purchase online.

Introduction

Consumer-oriented electronic commerce is an increasingly global phenomenon. Consumers worldwide are turning to the Internet as a means for purchasing goods and services. While conducting transactions online is widely accepted in some countries, adoption of consumer-oriented e-commerce is lagging in others. A number of factors may contribute to this, including the impact of culture on information technology (IT) use.

In this paper, we use an innovation adoption perspective to investigate whether culture impacts consumer-oriented e-commerce adoption, given the impact of other factors known to influence e-commerce adoption. Specifically, this research addresses the following question:

Does the national culture of a consumer influence his or her intentions to purchase goods or services online?

Background

Consumer-oriented Electronic Commerce

Despite the dot-com collapse, online consumer spending continues to grow. According to a November 2003 report from Jupiter Research, holiday spending in 2003 is expected to approach $17 billion, which up 21% from 2002 (http://cyberatlas.internet.com/markets/retailing/article/0,,6061_3105491,00.html). The growth of e-commerce is not limited to the United States. Other countries, both developed and developing are seeing consumers embrace e-commerce. For

example, it is expected that China will have 200 million Internet users by 2005. This is remarkable growth from the 15,000 users in 1995 (http://cyberatlas.internet.com/big_picture/geographics/article/0,,5911_3099431,00.html#table1). Other non-western cultures are also experiencing explosive growth in Internet use. India's online population is expected to grow from 3 million in 2001 to 23 million in 2005 (http://www.internetnews.com/xSP/article.php/927821).

However, most consumer-oriented e-commerce practices and conventions were developed for use in Western cultures. If global e-commerce is to reach its promise, it is important to understand how culture impacts e-commerce use.

Innovation Adoption

Innovation adoption theory (Rogers, 1995) provides a portion of the theoretical basis for this research. This theory concerns the process by which individuals and groups make the decision to adopt or reject an innovation. Part of this theory posits that potential adopters' perceptions of the characteristics of an innovation have a strong influence on their adoption decisions. The influence of perceived innovation characteristics on use intention has been demonstrated in a number of studies of IT-related innovations, including groupware (Craig Van Slyke, Lou, & Day, 2002), smart-cards (C. R. H. Plouffe, John S. Vandenbosch, Mark, 2001), the Web (Agarwal & Prasad, 1997), and Web-based shopping (C. Van Slyke, Belanger, & Comunale, 2004). The innovation adoption perspective is an alternative to the Technology Acceptance Model (Davis, 1989). While the TAM perspective is widely used in studies of IT-based innovations, the innovation adoption perspective provides a richer set of constructs (C. R. H. Plouffe, John S. Vandenbosch, Mark, 2001).

Many different perceived innovation characteristics have been studied. Rogers (1995) conception includes five, perceived relative advantage, complexity, compatibility, observability, and trialability. The first three of these have received the most consistent empirical support (Tornatzky & Klein, 1982). One reason that perceived observability has received less consistent support is that it may actually be two related constructs; perceived result demonstrability and perceived visibility (Moore & Benbasat, 1991a). Result demonstrability refers to the tangibility of outcomes of the use of an innovation. In contrast, visibility pertains to the apparentness of the innovation itself (Moore & Benbasat, 1991a).

Two other perceptions may be particularly important in the context of consumer-oriented e-commerce is trust. Consumers' perceptions of the trustworthiness of Web merchants influence their intentions to engage in transactions with these merchants. This finding holds in studies of individual merchants (Gefen, Karahanna, & Straub, 2003) and Web merchants in general (C. Van Slyke et al., 2004). Perceived image, which is the degree to which an innovation is seen as enhancing an individual's image, also influences consumers' intentions to shop online (C. Van Slyke et al., 2004).

With the exception of perceived complexity, the perceived innovation characteristics included in this study all have a positive influence on use intention. Complexity has a negative relationship with use intentions. Table 1 provides definitions for each perceived innovation characteristics of interest in this study. Citations to representative studies of IT-related innovations are also shown. Note that these citations are not intended to be exhaustive, but rather are representative of the literature related to the characteristic.

Table 1: Definitions

Characteristic	Description	References
Relative advantage	Degree to which an innovation is seen as being superior to its predecessor (Rogers, 1995)	(Chin & Gopal, 1995); (Harrington & Ruppel, 1999); (C. R. Plouffe, Vandenbosch, & Hulland, 2000); (Craig Van Slyke et al., 2002)
Compatibility	Degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters (Rogers, 1995)	(Chin & Gopal, 1995); (C. R. Plouffe et al., 2000)
Complexity	Degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand (Rogers, 1995)	(Chin & Gopal, 1995); (C. Van Slyke et al., 2004)
Result	Degree to which the results of using an	(Karahanna, Straub, & Chervany,

demonstrability	innovation are perceived to be tangible	1999); (Craig Van Slyke et al., 2002)
Visibility	The perception of the actual visibility of the innovation itself as opposed to the visibility of outputs (Moore & Benbasat, 1991a)	(C. R. Plouffe et al., 2000); (Karahanna et al., 1999); (Agarwal & Prasad, 1997)
Image	Degree to which the use of the innovation is seen as enhancing to an individual's image or social status (Moore & Benbasat, 1991a)	(C. R. Plouffe et al., 2000); (C. Van Slyke et al., 2004)
Trust	Trustor's expectations about the motives and behaviors of a trustee. (Doney & Cannon, 1997)	(Gefen et al., 2003); (C. Van Slyke et al., 2004)

Information Technology and Culture

The cultural background of users impacts perceptions of IT innovations (Jarvenpaa, Tractinsky, Saarinen, & Vitale, 1999; Robichaux & Cooper, 1998; Straub, Keil, & Brenner, 1997). Hofstede's dimensions of national culture are widely used in cross-cultural research (e.g. (Straub et al., 1997). In his original conceptualization, Hofstede (Hofstede, 1980) included four dimensions, power distance, uncertainty avoidance, individualism and masculinity. Power distance is the extent to which those with less power expect and accept unequal power distribution. Uncertainty avoidance is the degree to which individuals are threatened by uncertain situations. Individualism is the degree to which individual, rather than collective achievement is valued. Finally, masculinity is the degree to which distinct gender roles characterize a culture (Hofstede, 1991). Hofstede developed index scores for for each dimension using data from over forty countries.

Cultures high in uncertainty avoidance, power distance and masculinity and low in individualism are expected to be less accepting of computer-based media (Straub et al., 1997). Using this thinking, the Computer-based Media Support Index (CMSI) was developed as a means of expressing the simultaneous influence of all four dimensions on technology acceptance (Straub et al., 1997). The index is calculated by summing the index scores for power distance, uncertainty avoidance, and masculinity, then adding 100 minus the individualism index score. The effect of individualism on computer-based media acceptance is expected to be the opposite of that of the other dimensions. (See (Straub et al., 1997)) for a complete discussion of CMSI.)

The CMSI has been tested in the context of electronic mail, but to our knowledge has not yet been used in a study of consumer-oriented e-commerce. We use the CMSI to operationalize culture, as shown in the research model presented in the following section.

Research Model

The model guiding this research is shown in Figure 1. Hypothesis numbers are included in the figure. Note that we have re-termed complexity as ease of use, which is the opposite of complexity. By doing this, all innovation characteristics have a positive impact on use intentions. Further, the perceived visibility scale exhibited very low reliability, so it was not included in the research model or subsequent analysis. Intentions to purchase goods or services online (use intention) is the dependent variable. Future use intention, rather than past use is employed as the dependent variable because we are interested in how current (at the time of survey administration) perceptions impact intentions to perform a behavior.

Hypothesis 1 pertains to the CMSI and can be stated as:

H1: CMSI has a negative impact on intentions to purchase goods and services online.

Hypothesis 2 concerns the perceived innovation characteristics. Individual sub-hypotheses can be stated for each innovation characteristic, as stated below.

H2a: Perceived relative advantage has a positive impact on intentions to purchase goods or services online.

Hypothesis 3 concerns the impact of Web merchant trust, and can be stated as:

H3: Trust in Web merchants has a positive impact on intentions to purchase goods or services online.

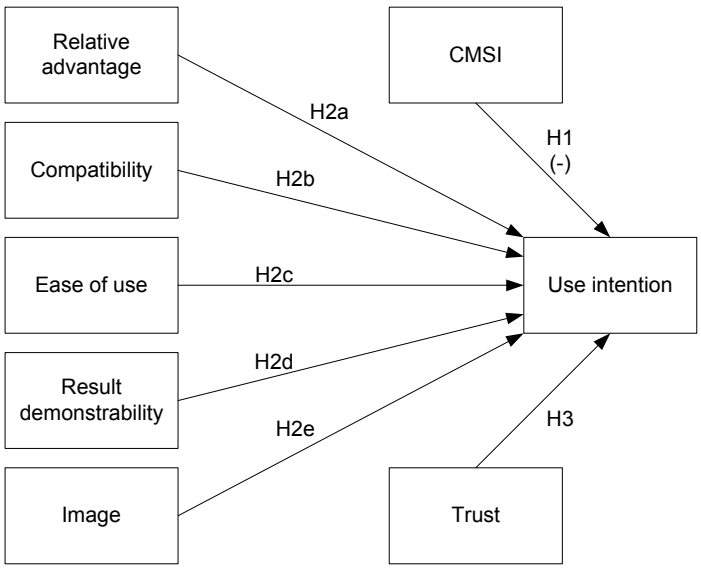

Figure 1: Research Model

Methodology

A survey was administered to 338 consumers enrolled in university programs in four countries, India (n=104), Hong Kong (n=40), China (n=63), and the United States (n=131). Demographic and experiential data were collected. The subjects were relatively young (mean age of 25.7 years), but had considerable computer experience (mean = 8.76 years), and spent a significant amount of time on the Web (mean hours per week = 15.4). All but four of the subjects have access to a computer that could be used for online purchasing. However, only 75% have access to a credit card that could be used for purchasing online. A slight majority (58%) of the subject had previously made purchases online.

The instrument used previously-validated measurement scales taken directly from a previous study of consumer e-commerce adoption (C. Van Slyke et al., 2004). Note that the visibility scale exhibited poor reliability in the cited study, so it was not included in this study. Demographic and experiential items were measured using direct questioning.

Regression analysis was used to analyze the data. CMSI, the perceived innovation characteristics, and trust were the independent variables and use intention was the dependent variable. Prior to this analysis, a preliminary analysis was conducted to see if any of the demographic or experiential variables had a significant impact on use intentions. Only computer experience and prior online purchasing were significant ($p < 0.05$). These were included as covariates in subsequent analysis. Results of the regression analysis are given in the next section.

Regression analysis allows testing the relationship of an independent variable, while accounting for the influence of all other independent variables. This goes beyond simply testing correlations, establishing a stronger case for the importance of significant independent variables. For example, if culture is found to be significant in the above-described multiple regression model, we can make a strong case for the importance of culture. This is because culture will explain a significant portion of the variance in use intentions, even when the explanatory power of the perceived innovation characteristics, trust and the covariates are taken into account.

Results

Results indicate that the overall regression model is highly significant ($F = 76.362$, 9/328 df; $p < 0.001$), and explains a large portion of the variation in use intention (adjusted $r^2 = 0.668$). In addition, the hypotheses were generally supported. Culture (as measured by CMSI), trust, and perceived relative advantage, compatibility, ease of use, and result demonstrability are all

significant, and perceived image is non-significant. Also, the covariate prior online purchasing is significant while computer experience is not. Thus, with the exception of H2e, all hypotheses were supported. Results are shown in Table 2.

Table 2: Hypothesis Testing Results

Hyp.	Independent variable	Standardized Beta	t-value	Significance
H1	CMSI	-0.128	-3.188	0.002
H2a	Relative advantage	0.129	2.636	0.009
H2b	Compatibility	0.302	6.002	<0.001
H2c	Ease of use	0.217	5.434	<0.001
H2d	Result demonstrability	0.139	3.717	<0.001
H2e	Image	0.018	0.538	0.591
H3	Trust	0.094	2.646	0.009
N/A	Computer experience	0.018	0.526	0.600
N/A	Prior online purchasing	0.194	4.817	<0.001

Discussion

Our results indicate that culture does have a significant impact on intentions to purchase goods or services online, even when the influence of other important factors are considered. This is a significant finding, given the considerable empirical support for the other components of the research model. Further evidence comes from examination of the significance values in Table 2. Culture, as represented by CMSI, is highly significant with a p value of 0.002, which is well below the commonly-used significance cutoff of 0.05.

The findings related to CMSI serve to further establish the validity of this approach to accounting for culture. Not only does this research use a different target technology (e-commerce vs. electronic mail), it also employs the CMSI in a different manner than did Straub et al. (1997). That study used CMSI to predict whether TAM would fit in a multi-country study. It did not use CMSI as a component of a regression equation, nor did it use the richer innovation adoption perspective.

As with any research, there are a number of weaknesses in this study. Perhaps the most significant of these is that we used a convenience sample of countries and subjects within each country. So, we cannot claim that these results will hold for a more general population. In addition, Hofstede's conceptualization of national culture has been the subject of considerable criticism. However, it remains in wide use in current cross-cultural studies.

Conclusion

As consumer-oriented e-commerce continues it global march, it becomes increasingly important to understand the impact of culture on consumers' intentions regarding e-commerce use. This study establishes that culture does, in fact, have a significant impact on consumers' intentions' to purchase goods and services online. While more research is needed to better understand the relationship between culture and e-commerce use, this study represents a step towards achieving that goal.

References

Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences, 28*(3), 557.

Chin, W., & Gopal, A. (1995). Adoption intention in GSS: Relative importance of beliefs. *Database, 26*(2&3), 42-61.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*(September), 319-340.

Doney, P.-M., & Cannon, J.-P. (1997). An examination of the nature of trust in buyer-seller relationships. *Journal-of-Marketing, 61*(2), 35-51.

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model, *MIS Quarterly*, 27(1), 51-90.

Harrington, S. J., & Ruppel, C. P. (1999). Telecommuting: A test of trust, competing values, and relative advantage. *IEEE Transactions on Professional Communication, 42*(4), 223-239.

Hofstede, G. (1980). *Culture's Consequences*. Beverly Hills, CA, USA: Sage Publications.

Hofstede, G. (1991). *Cultures and Organizations: Software of The Mind*. New York: McGraw-Hill.

Jarvenpaa, S. L., Tractinsky, N., Saarinen, L., & Vitale, M. (1999). Consumer trust in an Internet store: A cross-cultural validation. *Journal of Computer-Mediated Communication, 5*(2).

Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly, 23*(2), 183-213.

Moore, G. C., & Benbasat, I. (1991a). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*(3), 192-222.

Plouffe, C. R., Vandenbosch, M., & Hulland, J. (2000). Why smart cards have failed: looking to consumer and merchant reactions to a new payment technology. *The International Journal of Bank Marketing, 18*(3), 112.

Plouffe, C. R. H., John S. Vandenbosch, Mark. (2001). Research Report: Richness Versus Parsimony in Modeling Technology Adoption Decisions--Understanding Merchant Adoption of a Smart Card-Based Payment System., *Information Systems Research* 12, 208-222.

Robichaux, B., & Cooper, R. (1998). GSS participation: A cultural examination. *Information and Management, 33*, 287-300.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Straub, D., Keil, M., & Brenner, W. (1997). Testing the Technology Acceptance Model across cultures: A three country study. *Information & Management, 33*, 1-11.

Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management, 29*(1), 28-45.

Van Slyke, C., Belanger, F., & Comunale, C. (2004). Factors influencing the adoption of Web-based shopping: The impact of trust. *Database for Advances in Information Systems*.

Van Slyke, C., Lou, H., & Day, J. (2002). The impact of perceived innovation characteristics on intention to use groupware. *Information Resources Management Journal, 15*(1), 5-12.