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Does Within-Culture Variation Matter?

An Empirical Study of Computer Usage

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ABSTRACT

This article examines within-culture variance in the influence of values on perceptions and use of information technology (IT). Based on cross-cultural research, we suggest that cultural values influence technology acceptance and use. Specifically, we argue that masculinity/femininity and individualism/collectivism directly influence personal innovativeness with IT, computer anxiety, and computer self-efficacy, and have a mediated effect on perceived usefulness, perceived ease of use, and use of IT. Overall, analysis provides support for the research model. Our results suggest that masculinity/femininity influences computer self-efficacy, computer anxiety, and personal innovativeness with IT. We also offer implications for research and practice.

Keywords: culture; personality; technology acceptance

INTRODUCTION

Because migration has resulted in increasingly diverse nation states, information technology (IT) managers have had to develop IT implementation strategies that accommodate diverse cultural values in organizations. Within the existing cross-cultural MIS literature, researchers have examined national culture's influence on IT use in organizations. In general, culture has been synonymous with national boundaries, but a nation could be composed of people of various cultures, and these cultures could also

be present in more than one country (Straub, Loch, Evaristo, Karahanna, & Srite, 2002).

Despite challenges posed by globalization for IT managers, limited management information system (MIS) research has examined the cultural implications of values for IT in organizations (Gallupe & Tan, 1999), a notable exception being Cyr, Bonanni, Bowes, and Ilsever's (2005) study of within and between culture preferences of Web design elements, and Zahedi, van Pelt, and Srite's (2006) study of cultural signifiers of masculinity/femininity

in Web sites. Within-culture differences refers to examining the relationship between cultural values and beliefs, attitudes, or behaviors of individuals within a single nation-state (Berry, 1979). Examining within-culture differences is important because cultural psychologists generally agree that indicators such as citizenship or location are weak proxies for individuals' value systems (Fiske, 2002). Research has found that variations in cultural values within nation-states influence individuals' situation-specific behavior and beliefs (Oysterman, Coon, & Kemmelmeir, 2002). When extended to the domain of IT, this suggests that cultural values may predispose individuals to respond differently to information technologies (Karahanna, Evaristo, & Srite, 2005). Hence, this article examines the following question: Does within-culture variation influence information technology acceptance and use?

The article unfolds as follows: First, cultural values and their relationship to situation-specific traits are reviewed. The research model is then developed. The next section empirically examines the hypothesized relationships, and the article concludes with a discussion of findings, limitations, implications for research and practice, and future directions.

LITERATURE REVIEW

Culture refers to values, traits, beliefs, and behavioral patterns that may characterize a group of people. Hofstede (1991) suggests that culture reflects a composite of human nature (i.e., inherited predispositions shared by all human beings) and personality (i.e., values and more malleable traits inherited or learned by individuals). Although human nature is intransigent, values and traits are shaped by individuals' life experiences (Hofstede, 1991). Values are acquired early in life, mainly through the family, the neighborhood, and later through school (while traits are learned later).

Within countries, individuals' values vary with their participation in groups based on, for example, nationality, religion, and ethnicity. As a result, Straub et al. (2002) suggest that an individual's cultural values "represent that

amalgamation of cultures across boundaries (national, organizational, professional, etc.) which fuse together to create one's overall culture. This combination is unique to each individual" (p. 4). Because values are enduring and relatively stable, they may influence the development of more malleable traits that influence individuals' behavior. Traits (also termed practices) are learned later, through socialization at the workplace, after an individual's values are firmly in place. In this article we look at two particular measures of cultural values (masculinity/femininity and individualism/collectivism) and how these values influence three traits (personal innovativeness with IT, computer anxiety, and computer self-efficacy). In turn we examine how these traits affect beliefs of usefulness and ease of use and, ultimately, IT usage.

Traits refer to predispositions to respond to stimuli. Individual traits can be viewed on a continuum from stable to malleable (Ghiselli, Campbell, & Zedeck, 1981). Not unlike values, stable traits influence individual behavior across situations. However, some traits are considered to be more malleable, such as computer anxiety and computer self-efficacy, as examined in this article (Chen, Gully, Whiteman, & Kilcullen, 2000). Unlike stable traits, malleable, situation-specific traits may vary with the stimuli and may be changed through interventions such as training. For example, where the general trait of anxiety exerts an influence across multiple stimuli, computer anxiety is a response linked to a specific stimulus (i.e., computers or IT) that may be reduced through training or experience. Research suggests that values may predispose individuals to express malleable, situation-specific traits (Bandura, Adams, & Beyer, 1977; Draguns, 1979; Steenkamp, Hofstede, & Wedel, 1999). Hence, while organizational interventions may evoke changes in malleable traits, cultural values may predispose individuals to express malleable traits such as computer anxiety or innovativeness over time.

Within the cross-cultural psychology literature, a growing body of research suggests that examining links between values and malleable traits should extend understanding of how to

manage increasingly multi-ethnic workforces (Pineda & Whitehead, 1997; Oysterman et al., 2002). However, to the best of our knowledge, MIS researchers have left unexamined the influence of within-culture differences on individuals' IT-specific traits and related beliefs or behaviors. In general, MIS studies assume that individuals possess the cultural values associated with their country of residence (Straub et al., 2002; Gallivan & Srite, 2005). In reality, there might be a great deal of cultural variation within a multi-ethnic nation with several dominant languages and religions (e.g., India).

To extend our understanding of within-culture differences' influence on IT acceptance and use, this article examines the relationship between cultural values and malleable traits that lead to IT-focused beliefs and behaviors. We suggest that broad cultural values directly affect individuals' malleable, IT-specific traits. In turn, individuals' IT-specific traits influence beliefs about IT. Through gaining a deeper understanding of the influence of values on IT-specific traits and consequently their relation-

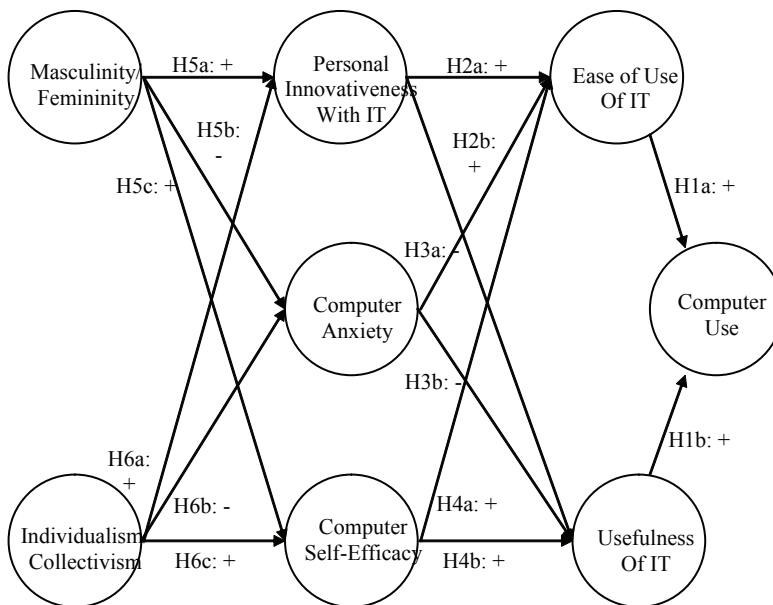
ship to beliefs, we contend research may inform how to develop IT implementation strategies and training programs that encourage IT use in culturally diverse environments. The next section of the article develops hypotheses that link variance in cultural values to individuals' usage of information technology.

RESEARCH MODEL

Technology Acceptance

The research model (see Figure 1) uses the Technology Acceptance Model (TAM) as a starting point. Rooted in the Theory of Reasoned Action (TRA), TAM (Davis, 1989) posits that two beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), are important predictors of IT use. In the model, perceived ease of use influences perceived usefulness, and in turn, both beliefs influence behavioral intention to use, which is a measure of the strength of a person's intention to use an IT (Ajzen & Fishbein, 1980).

Figure 1. Research model



Numerous studies have provided empirical support for TAM (Davis, 1989, 1993; Szajna, 1994; Keil, Beranek, & Konsynski, 1995; Taylor & Todd, 1995; Morris & Venkatesh, 2000; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh, Morris, Davis, & Davis, 2003). It should be noted however that a few studies have found non-significant (Jackson, Chow, & Leitch, 1997) or marginally significant (Chan & Lu, 2004; Elbeltagi, McBride, & Hardaker, 2005) relationships between perceptions of usefulness and behavioral intentions to use/IT use. Elbeltagi et al. (2005) also found a negative relationship between perceptions of usefulness and usage. Additionally, the relationship between perceptions of ease of use and intentions/use has also been found non-significant in some studies (Adams, Nelson, & Todd, 1992; Bagozzi, Davis, & Warshaw, 1992; Igbaria, Guimaraes, & Davis, 1995; Hu, Chau, Sheng, & Tam, 1999). Furthermore, early TAM studies (Davis, 1989; Mathieson, 1991) incorporated attitudes toward the technology and/or behavioral intention to use as a mediating variable. Attitudes were subsequently dropped from the model, and BIU was modeled as a direct function of PU and PEOU (Taylor & Todd, 1995; Szajna, 1996). Since then, a number of studies have also posited a direct relationship from perceived usefulness and ease of use to self-reported IT use (Szajna, 1994; Straub, Limayem, & Karahanna-Evaristo, 1995; Gefen & Straub, 1997; Karahanna & Straub, 1999). This article will utilize the simpler configuration of TAM, which has perceptions of usefulness and ease of use directly influencing IT use. Hence:

H1a: *Perceived usefulness will have a positive effect on IT use.*

H1b: *Perceived ease of use will have a positive effect on IT use.*

Antecedents to Perceived Ease of Use and Perceived Usefulness of IT

Prior research suggests that malleable IT-specific traits may influence the development of PU and PEOU (Agarwal & Karahanna, 2000;

Venkatesh, 2000). As noted by Davis (1989), external variables such as attitudes and values are antecedents to perceived usefulness and perceived ease of use.

This article examines three antecedents: personal innovativeness with IT, computer anxiety, and computer self-efficacy. These antecedents were chosen over other antecedents for two reasons. First, our interest in this study is in integrating within-culture variance of values with the existing literature on technology acceptance. Since the 1980s, computer anxiety and computer self-efficacy have been extensively examined in the MIS literature (Marakas, Yi, & Johnson, 1998). Although introduced relatively recently, personal innovativeness with information technology has received substantial attention in the top management information systems journals (see Agarwal & Karahanna, 2000; Thatcher & Perrewe, 2002)). In order to extend the nomological net surrounding IT acceptance and use, we felt it important to theoretically and empirically link values to well-established antecedents to IT use. Second, as noted by Hofstede (1984), culture is composed of the enduring ways of thinking of a group. If cultural values exert a pervasive influence on the formation of individual traits and beliefs, theory suggests that cultural values should influence malleable traits/practices such as innovativeness, computer anxiety, and computer self-efficacy (Straub et al., 2002). Additionally, it was felt that more malleable traits/practices such as innovativeness, computer anxiety, and computer self-efficacy would be more likely to be homogenous within specific cultures and yet vary across cultures than would more quantifiable variables such as level of prior experience. Each antecedent will be discussed in detail in the sections that follow.

Personal Innovativeness with IT

Personal innovativeness with IT refers to “the willingness of an individual to try out any new IT” (Agarwal & Prasad, 1998, p. 205). Agarwal and Prasad (1998) proposed a dual role for personal innovativeness in relation to technology acceptance. They posited that

personal innovativeness moderates both the relationship between information about a new IT from alternative channels and perceptions about a new IT (such as perceived usefulness), and the relationship between perceptions about a new IT and intentions to use a new IT. Ndubisi, Gupta, and Ndubisi (2005) also proposed and tested innovation as a moderating relationship. Other research has modeled personal innovativeness as a direct antecedent to IT-related beliefs. Karahanna, Straub, and Chervany (1999), drawing on the same definition of personal innovativeness, found that personal innovativeness had a direct effect on perceived usefulness and perceived ease of use, as did Mao, Srite, Thatcher, and Yaprak (2005). Consequently, instead of looking at personal innovativeness as a moderator, it will be posited as a direct antecedent of perceived usefulness and perceived ease of use. It can be argued that an individual who is more innovative will be better able to see alternative ways of using a technology and be better able to identify useful applications of a technology. Hence:

H2a: *Personal innovativeness with IT will have a positive effect on perceptions of usefulness of IT.*

H2b: *Personal innovativeness with IT will have a positive effect on perceptions of ease of use of IT.*

Computer Anxiety

Anxiety refers to an unpleasant emotional state or condition characterized by feelings of tension or worry (Spielberger, Gorsuch, & Lushene, 1970). Anxious people frequently exaggerate the threat posed by a situation and avoid stimuli likely to generate feelings of anxiety (Tellegen, 1985). Computer anxiety (CA) refers to "fear of impending interaction with a computer that is disproportionate to the actual threat presented by the computer" (Howard, Murphy, & Thomas, 1986). Computer anxiety has been conceptualized as a malleable trait that reflects responses to the environment and stable, broadly defined traits or values (Thatcher & Perrewe, 2002). Research has consistently found a direct link

from CA to computer attitudes and computer use (Igbaria, Parasuraman, & Baroudi, 1996; Brosnan, 1999). People who report high levels of computer anxiety frequently choose not to use information technology (Igbaria, Pravir, & Huff, 1989) and report less positive attitudes towards information technology (Igbaria & Chakrabarti, 1990). For example, Brown, Fuller, and Vician (2004) found that CA had a positive effect on computer-mediated communication anxiety and a mediated effect on attitude towards IT use and actual usage behavior. Consistent with prior MIS research (Venkatesh, 2000; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000), we propose that computer anxiety negatively affects beliefs leading to IT use. Hence:

H3a: *Computer anxiety will have a negative effect on the perceived usefulness of IT.*

H3b: *Computer anxiety will have a negative effect on the perceived ease of use of IT.*

Computer Self-Efficacy

The construct of self-efficacy, as opposed to computer self-efficacy, has been extensively studied in the field of social psychology (Bandura, 1977; Brown & Inouye, 1978; Barling & Beattie, 1983; Wood & Bandura, 1989). General self-efficacy can be defined as an individual's belief that he or she has the ability to perform a particular behavior (Compeau & Higgins, 1995a). Self-efficacy has also been examined with respect to a number of management situations (Betz & Hackett, 1981; Taylor, Locke, Lee, & Gist, 1984; Jones, 1986; Frayne & Latham, 1987; Latham & Frayne, 1989).

Computer self-efficacy (CSE), a situation-specific form of efficacy, refers to individuals' judgment of their capabilities to use computers (Compeau, Higgins, & Huff, 1999). Evidence has been found that supports a relationship between CSE and a number of computer-related behaviors (Hill, Smith, & Man, 1986, 1987; Gist, 1989; Burkhardt & Brass, 1990; Webster & Martocchio, 1992; Webster & Martocchio, 1993). Research has also suggested that those individuals who have high CSE beliefs are more likely to report higher perceptions of usefulness

and perceptions of ease of use (Marakas et al., 1998). Prior research supports the notion that computer self-efficacy positively influences beliefs about diverse information technologies (Marakas et al., 1998). Hence:

H4a: *Computer self-efficacy will have a positive effect on the perceived usefulness of IT.*

H4b: *Computer self-efficacy will have a positive effect the perceived ease of use of IT.*

Culture

The final series of hypotheses link cultural values to personal innovativeness, computer anxiety, and computer self-efficacy. Cross-cultural researchers have identified an array of cultural values such as masculinity/femininity, individualism/collectivism, power distance, time orientation, and uncertainty avoidance (Hofstede, 1991; see Straub et al. (2002) for a more complete listing of cultural dimensions). Although each value may influence IT use, due to space limitations we focus on two frequently researched values in this study, masculinity/femininity and individualism/collectivism. Although numerous other dimensions of culture exist and could be seen as potential candidates for this study, particularly uncertainty avoidance, power distance, and long-term orientation, we chose to narrow the focus of our study to the two chosen dimensions for three reasons. First, our subjects had a limited time to complete the survey, and as we wanted to examine the participants' actual cultural values, the addition of other dimensions would have made the survey considerably longer. Second, given the complexity of our model, the addition of more paths could have led to issues of validity and reliability. Third, we do feel that masculinity/femininity and individualism/collectivism are the more salient dimensions with respect to the other constructs of the study. To some extent, uncertainty avoidance, which focuses on risk, is already in the model as personal innovativeness incorporates the idea of risk. Power distance, we also feel, was less applicable in that the technology (that of PC use) was volitional, whereas power distance would seem to relate

to more mandatory technology use situations. However, we also feel that the influence of other dimension of culture on our research model would be a valid area for future research.

There have been a number of criticisms of Hofstede's measures and method, as well as his country-level scores being reused by later researchers studying different populations (Erez & Early, 1993; Tayeb, 1994; Myers & Tan, 2002; Gallivan & Srite, 2005). In spite of these issues, his dimensions have been well received by both practicing managers and academics. These limitations are less of an issue in this study as we are directly measuring the two cultural dimensions in question with revised and updated scales.

Masculinity/Femininity

Masculinity/femininity refers to the beliefs of individuals about gender roles. Masculine cultures tend to have distinct gender roles that expect men to emphasize work goals such as earnings, advancement, and assertiveness. Feminine cultures tend to emphasize personal goals such as maintaining a friendly atmosphere, getting along with coworkers, and having a comfortable work environment (Hoecklin, 1995). At the individual level of analysis, masculinity and femininity are rooted in a person's socialization rather than biological sex (Stets & Burke, 2000). Society provides cues on appropriate gender roles, and males frequently assume more masculine roles while females assume more feminine roles. However, because the gender roles are socially defined, it is possible for individuals to be biologically one sex and perceive themselves in the opposite sex's gender role.

Masculinity/femininity may influence traits and beliefs that lead to IT use. Cultural values embedded in gender roles may send signals about appropriate responses to and uses of IT (Gefen, 2000). For example, when compared to girls, boys receive more encouragement to use computers and participate in computer training programs (Ahuja, 2002). Research suggests that due to their socialization, women and men demonstrate distinct electronic com-

munication styles (Stowers, 1995) and report different reasons for accepting new ITs (Gefen & Straub, 1997). Research (Trauth, 2002) has also examined gender differences, particularly women's interactions with IT, and found disparity in computer conferencing and communications styles between women and men. Taken together, this research suggests that one's perceptions of what is appropriate or inappropriate behavior may vary with one's conception of masculinity and femininity (Trauth, 1999; Kase & Trauth, 2003).

Even though masculinity/femininity reflect socialization, MIS researchers frequently use biological sex, not individuals' values, as a proxy for individuals' beliefs about gender roles and associated responses to IT (Venkatesh & Morris, 2000). Within the domain of MIS, studies have found that biological sex influences malleable traits such as computer anxiety, self-efficacy, or innovativeness (Ahuja, 2002), as well as technology acceptance decisions (Gefen & Straub, 1997). Using biological sex as a proxy for masculinity/femininity is problematic because it frequently does not necessarily map to beliefs about gender roles (Ashmore, Del Boca, & Wohlers, 1986). As a result, we extend prior research by examining whether variance in masculinity/femininity influences individuals' predispositions towards IT use. Due to differences in socialization, we hypothesize that individuals from more masculine cultures will express greater computer self-efficacy, report less computer anxiety, and are more willing to explore new uses of IT. Hence:

H5a: *Masculinity/femininity will have an effect on personal innovativeness with information technology such that individuals high in masculinity will be more innovative.*

H5b: *Masculinity/femininity will have an effect on computer anxiety such that individuals high in masculinity will report less computer anxiety.*

H5c: *Masculinity/femininity will have an effect on computer self-efficacy such that individuals high in masculinity will report greater computer self-efficacy.*

Individualism/Collectivism

Individualism/collectivism refers to the extent to which individuals' emphasis and identity is centered on the self or the group. People who are high on individualism tend to think of themselves as "I," classify themselves by their individual characteristics, and prefer independent action. On the other hand, people high on collectivism tend to focus on the needs of the group over their personal needs (Hoecklin, 1995). Societies differ in their emphasis on individual rights and obligation to society. Individualism describes societies in which the ties between individuals are loose and people are expected to look after themselves. Collectivism is the other extreme where people are integrated into strong, cohesive groups that protect an individual. Within the cross-cultural psychology literature, individualism/collectivism is perhaps the most frequently researched cultural dimension (Oysterman et al., 2002). Within the MIS literature, researchers have found that people from nations characterized by higher individualism are more likely to accept ITs (Gefen & Straub, 1997).

Individualism/collectivism may influence personal innovativeness with information technology. Theorists suggest that people who are high on individualism are likely to be more inventive and non-conformist when compared to their more collectivist peers. When high on individualism, people are less susceptible to social pressure to conform with accepted practices and consequently more likely to be inventive (Hampden-Turner & Trompenaars, 1993) or independent in their search for personal fulfillment (Redding & Baldwin, 1991). Empirical research supports the notion that individualism/collectivism influences innovativeness within specific domains. For example, Steenkamp et al. (1999) found that people from more individualistic cultures were likely to express more personally innovative consumption patterns. When using IT, highly individualistic people's non-conformist values should pre-dispose them to express higher levels of personal innovativeness with IT. The opposite should hold true for people with highly collectivistic values: their desire to

conform to societal norms should lower their personal innovativeness with IT.

Not unlike personal innovativeness with IT, individualism/collectivism may influence computer anxiety and computer-self efficacy. Highly individualistic people value independent initiative, capability, and achievement. People in individualistic cultures are more likely to stay current in terms of management ideas and hence be more receptive to, and less anxious regarding, new technologies (Hofstede, 1984). Because individual initiative and achievement may lead to a strong sense of personal capability and lower anxiety, higher levels of individualism may negatively influence a person's computer

anxiety and positively influence a person's judgment of their capabilities to use computers in diverse situations (i.e., result in higher self-efficacy) (Bandura, 1997). Because people from individualistic cultures may have a higher sense of their capability, we posit that they will express less computer anxiety and greater computer self-efficacy. Hence:

H6a: *Individualism/collectivism will have an effect on personal innovativeness with IT such that individuals who are high in individualism will be more innovative.*

H6b: *Individualism/collectivism will have an effect on computer anxiety such that individuals*

Table 1. Sample characteristics

		Number		
Total		350		
Sex	Male	172		
	Female	168		
Ethnicity	African-American	50		
	Hispanic-American	123		
	White	145		
	Asian-American	8		
	Multiple Responses	6		
	Other	18		
			Mean	Standard Deviation
	Age	23.4	4.8	
	Years of College	3.5	1.5	
	Years of Computer Use	7.9	3.9	
	Number of Computer Courses	3.6	2.6	
	Hours of Computer Use Per Week			
	School	6.0	5.4	
	Work	7.1	8.3	
	Other	6.2	5.9	

who are high in individualism will express less computer anxiety.

H6c: Individualism/collectivism will have an effect on computer self-efficacy such that individuals who are high in individualism will express greater computer self-efficacy.

METHOD

Subjects and Measures

A survey was administered to 350 students enrolled in business classes at three public universities in the United States. Table 1 presents sample characteristics. Although data were collected at U.S. schools, recent research suggests that American students possess more heterogeneous value systems when compared to peers in more culturally homogenous countries such as Japan or Korea (Oysterman et al., 2002). To test the heterogeneity of American students, they were asked a series of Likert-type items about their views on two of the four cultural dimensions identified by Hofstede (1984). Our inspection of means and standard deviations suggested that there was substantial variance in cultural values within our sample (see Table 2).

Measures were drawn from the management of information systems and cultural literatures, and were distributed throughout a larger questionnaire examining beliefs, perceptions, and use of information technology. Items and their sources may be found in the Appendix. All items were anchored with 1 = strongly disagree and 7 = strongly agree. To measure use, respondents were asked to identify how many hours they used computers for school, work, and other activities each week. The responses were summed and used as a single item in the data analysis. Table 2 presents construct means, standard deviations, and reliabilities. Data was analyzed for outliers and normality; in fact, the data displayed a normal distribution curve and no significant outliers were discovered. We elected to survey our participants as to their perceptions regarding general computer usefulness and ease of use, as opposed to perceptions of a specific system to ensure familiarity with

the technology as well as having well-formed beliefs regarding the technology. Although there might be some issues of habitual use with our selection, we feel that the general perceptions are appropriate to tie into our dependent variable of actual general computer use.

Table 2. Descriptive statistics and covariance of latent constructs

Construct	Items	Mean	S.D.	Covariance of Latent Constructs ^a										
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)			
(1) Individualism/Collectivism	5	3.85	1.13	<u>0.78</u>										
(2) Masculinity/Femininity	5	2.71	1.38	<u>0.84</u>										
(3) Computer Anxiety	4	2.58	1.20	.07	<u>0.81</u>									
(4) Computer Self-Efficacy	10	6.50	2.10	.02	.11	-.03	<u>0.88</u>							
(5) Personal Innovativeness with Information Technology	3	4.94	1.43	.03	.13	-.04	.02	<u>0.83</u>						
(6) Perceived Ease of Use of IT	4	5.24	1.11	.02	-.22	-.53	.12	.60	<u>0.93</u>					
(7) Perceived Usefulness of IT	4	5.85	1.00	.00	.14	-.25	.11	.52	.44	<u>0.92</u>				
(8) Hours of Computer Use	1	19.31	14.6	.00	.00	-.17	.04	.21	.19	.32	<u>n.a.</u>			

^a Diagonal element of the correlation of constructs is the Cronbach's α .

Analysis

The model was tested using LISREL 8.54 (Joreskog & Sorbom, 2003). Analysis was patterned after Andersen and Gerbing's (1988) two-step structural equation modeling procedure. In the first step, the fit of the measurement model was assessed. In the second step, the full structural model was tested.

RESULTS

Step One: Measurement Model

The measurement model examines the relationships of the observed variables to the underlying latent constructs. In this study, 36 observed variables (items) were used to predict eight latent constructs. With a ratio of observations ($n = 350$) to observed variables ($n = 35$) or latent constructs ($n = 8$) greater than 5:1, our sample size was sufficient to evaluate the measurement model (Bentler & Chou, 1987).

To demonstrate unidimensionality of the constructs, a confirmatory factor analysis was performed. A correlation matrix of the 36 items was entered into LISREL. Each item was mapped to the appropriate latent construct. Results from this analysis (CFI = .96, PNFI = .77, RMSEA = .04) indicated a strong fit of the overall measurement model. Inspection of standardized path loadings revealed that they were significant and ranged from 1.15 to .26. These results suggest that the observed variables uniquely represent the latent constructs.

Having established unidimensionality, convergent and discriminant validity were examined. Convergent validity was established by comparing the coefficient for the indicators with their standard errors (Anderson & Gerbing, 1988). To be convergent, the standardized path loading for the indicators of a construct must be at least twice its standard error (Anderson & Gerbing, 1988). Because all of the standardized path loadings (.89 to .96) were greater than twice their standard errors (.04 to .20), convergent validity was demonstrated for this study. Discriminant validity was tested by constraining the estimated correlation parameter between

two scales to 1.00 and comparing the resulting chi-square (X^2) to the X^2 obtained from the measurement model (Anderson & Gerbing, 1988). If the chi-square of the measurement model is significantly lower than when the correlation is set to 1.00, discriminant validity is shown. This test required calculating 25 chi-square different tests for each pair of latent constructs. Results showed that all chi-square difference tests were significant, thus indicating discriminant validity. Because the measurement model demonstrated overall fit, and requirements for convergent and discriminant validity were satisfied, the next step tested the structural model.

Step Two: Structural Model

To rigorously assess the measurement model, Anderson and Gerbing (1988) suggest conducting a series of nested model comparisons (see Table 3). Each model represents a competing explanation for the relationships found in the data. Support for a theoretical model is found when it achieves the "best goodness of fit" relative to less or more complex rival models.

The structural model was tested by examining five nested alternative models. Each model was estimated using the covariance matrix of latent constructs derived from the item correlation matrix. The models were estimated in the following sequence. First, the structural null model (Model 1) was estimated (Anderson & Gerbing, 1988). This model restricted all relationships between latent constructs to 0. Next, the research model (Model 2) that included the proposed relationships between latent constructs was estimated. The next three models tested whether adding more paths increased the models' fit. These models were estimated to test alternative explanations of the relationships between the constructs presented in the research model. Because personal innovativeness with IT, computer anxiety, and computer self-efficacy might have influenced computer usage, Model 3 added paths from these constructs to computer usage. Because cultural values might have influenced specific beliefs, Model 4 added paths from masculinity/femininity and individualism/collectivism to perceived ease

Table 3. Structural model and overall goodness of fit indices^{abcdef}

Model	d.f.	X ²	X ² /d.f.	GFI	AGFI	CFI	PNFI	RMSEA
Model 1—Structural Null Model	583	894.22	1.53	0.88	0.85	0.96	0.77	0.04
Model 2—Research Model	596	1020.44	1.71	0.86	0.84	0.94	0.78	0.04
Model 3—Partial Mediation Model A	593	1011.3	1.71	0.87	0.84	0.94	0.77	0.04
Model 4—Partial Mediation Model B	592	1016.6	1.72	0.87	0.84	0.94	0.77	0.05
Model 5—Nearly Saturated Model	591	993.68	1.68	0.87	0.84	0.94	0.77	0.04

^a X²/d.f.—To show good fit, Gefen et al (2000) suggest that this ratio needs to be between 1 and 2.

^b GFI (Goodness of Fit Index) indicates how well the covariance matrix estimated by the hypothesized model reproduces the observed covariance matrix. Values greater than .90 indicate good fit.

^c AGFI (Adjusted Goodness of Fit Index) adjusts the GFI by the degrees of freedom to take into consideration the sample size and reflects the parsimony of the model. Values greater than .80 indicate good fit.

^d CFI (Comparative Fit Index) provides a measure of the proportion of total covariance accounted for by a model. Values less than .90 indicate that the model can be substantially improved.

^e PNFI (Parsimony Fit Index) is a ratio between covariance explained and number of parameters estimated. A good PNFI indicates that a large amount of variance is explained with only a few parameters. Values greater than .60 illustrate good fit.

^f RMSEA (Root Mean Square Error of Approximation) represents the average of the residuals of the fitted covariance matrix from the observed covariance matrix and approximates the amount of error in the model. It should be less than .08 and cannot be used to compare models, only to illustrate fit.

of use and usefulness of IT. Finally, a nearly saturated model that included the direct and indirect effects examined in Models 2, 3, and 4 was estimated. To evaluate alternative models, methodologists suggest using parsimony as a decision rule (Anderson & Gerbing, 1988). Table 3 presents and explains goodness of fit measures for the structural models.

All five structural models demonstrated reasonably good fit with the observed data. Models 1 to 5 demonstrated comparable X² to degrees of freedom (DF) (1.53 to 1.72), AGFI's (.85 to .84), and RMSEA's (0.06). It is important to note that we did not meet the heuristic of .90 suggested by Gefen, Straub, and Boudreau (2000) for the GFI. Although the GFIs were not at an ideal level, they were sufficiently close to the .90 threshold (.88 to .86) to move forward with evaluating the model. Also, because we met the heuristics for using the other measures, we were comfortable with the overall fit of the research model (Bollen, 1989; Gefen et al., 2000).

Because the nested models demonstrated comparable fit, a second way of comparing models is to identify which possesses the fewest number of insignificant paths (Kacmar, Bozeman, Carlson, & Anthony, 1999). A review of the models revealed that paths added in Models 3, 4, and 5 were not significant. This suggests that the research model (Model 2) presents the most parsimonious explanation for the relationships between constructs examined in this study.

Analysis provides support for the research model. Figure 2 presents research model results. Beliefs about information technology explained moderate amount of variance in information technology use (R² = .10). Perceived ease of use was a strong positive predictor of IT use (H1b: p < .01). However, perceived usefulness did not demonstrate a direct effect on IT. This lack of support for the relationship between usefulness and use is interesting. Showing where well-supported theories do not hold up can provide insight complementary to showing where they are supported. It is possible that utility may not

be a particularly strong driver with respect to students. They may use a computer for other reasons such as entertainment and communicating with friends and family.

Large amounts of variance were explained in the perceived ease of use ($R^2 = .62$) and perceived usefulness of IT ($R^2 = .33$). As hypothesized, personal innovativeness with IT demonstrated a strong positive relationship with perceived usefulness (H2a: $p < .05$) and perceived ease of use (H2b: $p < .05$). Computer anxiety showed a significant negative relationship with perceived usefulness (H3a: $p < .01$) and perceived ease of use (H3b: $p < .01$). Computer self-efficacy demonstrated a statistically significant relationship with perceived usefulness (H4a: $p < .05$) and perceived ease of use (H4b: $p < .05$).

Within-culture variance in values demonstrated a modest relationship to computer anxiety, computer self-efficacy, and personal innovativeness with IT. Cultural values explained a small amount of variance in computer anxiety ($R^2 = .07$), and minor amounts of variance in computer self-efficacy ($R^2 = .01$) and personal innovativeness with information technology ($R^2 = .03$) use (H1a: n.s.). Next we turn to discussing the implications of the results.

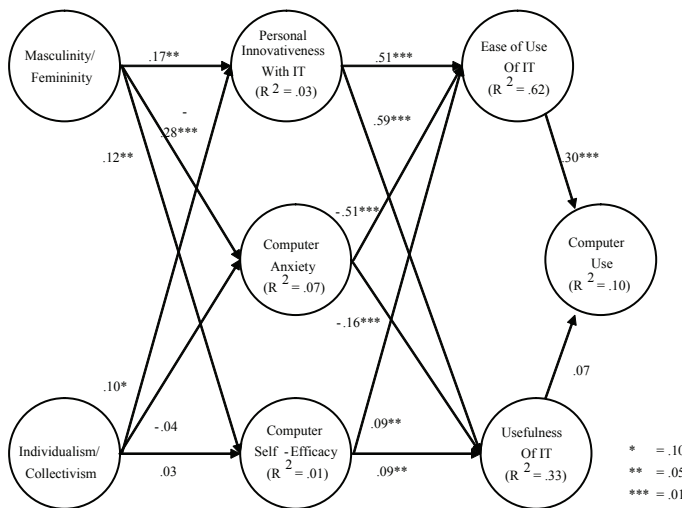
Masculinity/femininity was significantly related to personal innovativeness with information technology (H5a: $p < .05$), computer anxiety (H5b: $p < .01$), and computer self-efficacy (H5c: $p < .01$). Individualism/collectivism was not significantly related to computer anxiety (H6b: n.s.) or computer self-efficacy (H6c: n.s.) and demonstrated a weak relationship with personal innovativeness with information technology (H6a: $p < .10$).

DISCUSSION

Data analysis provided limited support for within-culture variance in values influencing IT-specific traits, beliefs, and behavior. Masculinity/femininity was found to influence the malleable traits (personal innovativeness with IT, computer avoidance, and computer self-efficacy). However, individualism/collectivism did not demonstrate significant relationships to these malleable traits. Personal innovativeness with IT, computer anxiety, and computer self-efficacy influenced beliefs about information technology (perceptions of use and perceptions of ease of use). Perceptions of ease of use were found to influence use.

Our findings provide mixed support for relationships found in prior MIS research.

Figure 2. Research model results



Perceived ease of use (H1a: $p < .01$) positively influenced IT use. However, perceived usefulness of IT (H1b) did not significantly affect use. Our results contrast with findings in the broader IT diffusion literature that suggest perceived usefulness, not ease of use, is the most salient predictor of technology use (see Davis, 1989; Venkatesh et al., 2003). Our findings may differ from prior research in that we focused respondents' attention on their mandated use of IT within an educational context. We speculate that when individuals have volitional control over IT use in these situations, ease of use, not perceived usefulness, might be the more salient predictor of IT use. Additional research is required to determine whether this is a consistent pattern in educational settings, or whether our findings are an anomaly.

Consistent with prior research, personal innovativeness with IT (H2a and H2b), computer anxiety (H3a and H3b), and computer self-efficacy (H4a and H4b) influenced beliefs about the perceived usefulness and ease of use of IT (Igbaria & Ivvari, 1995; Venkatesh & Davis, 1996; Srite, 2000). Our results counter theory and research that suggests self-efficacy, not anxiety or innovativeness, is the primary predictor of beliefs leading to behavior (Bandura, 1997). A plausible explanation for this difference may lie in our research design. In this study, we measured computer self-efficacy, computer anxiety, and personal innovativeness at relatively broad levels. Although this is consistent with prior research (see Agarwal, Sambamurthy, & Stair, 2000; Thatcher & Perrewew, 2002), analysis of these relationships may differ when respondents' attention is directed to specific situations (Bandura, 1997). For example, if using a specific application to complete a task, situation-specific efficacy beliefs may exert greater influence than anxiety or innovativeness (Ghiselli et al., 1981; Agarwal et al., 2000). Hence, our findings provide support for the notion that the relative influence of efficacy may vary with the context considered by the researcher.

Our findings suggest that cultural values may predispose individuals to report personal innovativeness with IT, computer self-efficacy,

and computer anxiety. Each cultural dimension will be discussed in turn.

Masculinity/Femininity

Individuals who reported high levels of femininity were found to be less innovative with respect to IT (H5a: $p < .05$), to feel more computer anxiety (H5b: $p < .01$), and to express lower computer self-efficacy (H5c: $p < .01$) than individuals who reported high levels of masculinity. These results suggest that culture influences the antecedents to individuals' beliefs about, and use of, information technology. When introducing new information technologies in culturally diverse environments, IT managers may want to pay attention to IT users' cultural values. For people with more feminine values, managers may want to stress the benefits of, and encourage, innovative behavior. Additional training to promote familiarity with, and reduce anxiety about, computers could prove beneficial for individuals who possess "feminine" value systems. Training could also increase levels of self-efficacy. For individuals with more masculine values, IT managers may want to reinforce existing dispositions to respond positively to IT. Alternatively, training on both masculinity and femininity could be provided to all employees to increase their understanding of this dimension's influence in the workplace. It is important to note that we are not suggesting that trainers use biological sex as a justification for providing different kinds of instruction; rather we are suggesting that they be sensitive to how cultural values may influence trainees' responses to IT instruction. Taken together, these findings suggest that an individual's place on the masculinity/femininity continuum influences malleable IT-specific traits.

Individualism/Collectivism

Results did not confirm our hypotheses linking individualism/collectivism to malleable IT-specific traits. Marginal support (H6a: $p < .10$) was found for individuals who reported greater individualism being more innovative with information technology. Because experimentation and other exploratory behavior linked to innovation

may foster greater perceptions of ease of use and ultimately greater IT use, this finding suggests that organizations that emphasize collectivist values may have to proactively encourage individual innovation with IT. Our results did not support a relationship between individualism/collectivism to computer anxiety (H6b) or computer self-efficacy (H6c). Although failing to reject a null hypothesis does not necessarily make the null hypothesis true (Levine, Berenson, & Stephan, 1999), some conclusions can be drawn from this non-significant relationship. While acknowledging the potential limitations of our sample, we can conclude that respondents who were high in individualism were as likely to report similar levels of anxiety regarding computers and self-efficacy as individuals from collectivistic cultures.

LIMITATIONS

An important limitation of this study is the sample. Even though recent research has shown that students and workers essentially have the same values and beliefs (Voich, 1995), there have been several general criticisms of using students. Critics suggest that students might not be representative of the broader population. They tend to be more homogenous and consequently are difficult to generalize to a larger population (Fowler, 1988). However, we felt that college students were an appropriate population to examine because they frequently have significant experience with, and strongly held beliefs about, information technology. Within the domain of MIS, researchers have used student samples to examine a wide range of traits and beliefs linked to technology acceptance (Agarwal & Karahanna, 2000; Agarwal et al., 2000). In light of this research, we felt students were a good population to examine for the influence of within-culture differences on technology use.

To capture within-culture variance, our study sampled students from schools with geographic and demographic differences. In terms of geography, we drew our sample from schools that were in different states. By drawing a sample from widely separated schools, we

hoped to capture variance that might be tied to geographic differences within a larger nation state. In terms of demographic differences, we sampled students from schools noted for their affiliation with different ethnic/regional groups with diverse demographic bases. Within the applied marketing literature, ethnic affiliation has been tied to willingness to adopt new technologies (Cellular News, 2005). In light of our findings, we conducted a supplemental MANCOVA analysis to determine whether there was variation in the sample along ethnic lines. When controlling for gender, education, and computer experience, our analysis indicates that ethnicity was not a source of variation in computer use, perceived ease of use, perceived usefulness, computer self-efficacy, computer anxiety, personal innovativeness, masculinity/femininity, and individualism/collectivism. When controlling for different relevant characteristics, our study suggests that ethnicity is not a source of variance in beliefs about computing among students.

Despite our efforts to capture variance, we found within-culture differences among students to be weakly related to IT adoption variables. Our findings suggest that factors such as age, national origin (i.e., U.S. nationality), or training (i.e., business education) may be more salient factors than within-culture variance in the influence of cultural values on technology adoption. For example, the relative widespread diffusion of cell phone technologies among Hispanics and African-Americans may be attributed to the relative youth of the population, not to cultural differences, when compared to the broader U.S. population (Morrison, 2006). Given the sample's homogeneity in terms of age and education and our limited results, future research should examine whether within-culture differences in technology use are more pronounced across more diverse age and educational groups.

It should also be noted that the use of the computer has been relatively well dispersed among student populations. Most students have access to a personal computer either at home or at a university computer lab. Our conclusions

relating to the overall area of adoption and diffusion need to be understood within this context. However, findings of this study could generalize to other less well-diffused technologies such as mobile computing via enhanced mobile phones. Additionally our dependent variable, computer use, focused on time spent at a computer. It did not address the issue of downtime, time waiting for the PC to start up, time spent waiting for downloads, and so forth. A future study might want to examine use at this finer level of granularity.

It is important to note that our findings may be an artifact of how we measured IT-related beliefs and behavior. TAM research typically focuses on specific information technologies (Davis, 1989). To ensure consistent target objects across research sites, we directed respondents' attention to beliefs about IT in general, rather than a specific technology. Due to this difference, we speculate that the network of relationships leading to peoples' use of specific information technologies may differ from those leading to use of information technology in general. This study also employed a single method to examine the research model. Although constructs covaried at different levels, future efforts at examining this relationship could use a variety of methodologies (interviews, qualitative methods, etc.) to yield additional insight into cultural links to technology acceptance. Further, values, traits, beliefs, and behaviors are not necessarily static, and a cross-sectional study, such as this one, might not fully capture the complexity of technology adoption. Longitudinal studies that examine how cultural values can influence the evolution of beliefs linked to innovation diffusion would extend our understanding of the influence of cultural values on perceptions and use of IT.

IMPLICATIONS

This study contributes to research and practice. In terms of research, this study makes two contributions to our understanding of technology acceptance and national culture. First, it uses a theory-driven approach to link within-culture variance in values to widely accepted constructs

in the technology acceptance literature. We offer a theoretical explanation for how cultural dimensions should influence the development of important individual traits (i.e., personal innovativeness, computer anxiety, and computer self-efficacy) and consequently relate to IT-specific beliefs. Second, although we explained a relatively small amount of variance in our dependent variable, our analysis provides initial evidence that masculinity/femininity is a significant predictor of computer anxiety, computer self-efficacy, and personal innovativeness with information technology.

In light of the study's robust theoretical base, yet limited support for the research model, our findings suggest that future studies should examine how other cultural values relate to traits and beliefs linked to IT use. Research on culture and behavior in the workplace suggests that many aspects of broadly defined culture influence situation-specific beliefs and behaviors. For example, uncertainty avoidance has been linked to individuals reporting greater anxiety and stress (Peterson, Smith et al., 1995). It would be interesting to examine whether this relationship extends to individuals' beliefs and behavior within specific domains such as information technology. Although limited, this study does provide empirical evidence that cultural dimensions may influence IT acceptance. In light of our findings, we suggest that research examine additional cultural values as potential sources of variation in technology acceptance and use. In addition, few studies have examined both technology acceptance and national culture (Gallivan & Srite, 2005; Srite & Karahanna, 2006). This study provides a series of hypotheses that integrate cultural dimensions into an extended technology acceptance model. This integration is particularly relevant given the growing importance of global information technologies such as the Internet, the internationalization of markets, and the increasing use of dispersed teams operating across several time zones, countries, or continents.

It should also be noted that this study examined culture within a single country as opposed to much cultural research that com-

compares and contrasts findings across multiple countries (Gallivan & Srite, 2005). As stated in the Limitations section, our findings show within-culture differences to be weakly related to IT adoption decisions. Although our subjects came from universities with different historical ethnic affiliations, no attempt has been made in this study to examine differences in adoption across ethnicities. Such future studies could have significant implications within the overall issue of the digital divide.

Results from this study have direct managerial implications. Managers should recognize the cultural aspects of technology acceptance. This awareness may affect how a manager chooses to handle the planning, design, introduction, and implementation of new technologies. The support of peers with different national backgrounds and the reactions from subordinates from other cultures to new technologies can vary. Cultural awareness should be part of the training process for IT managers and planners. Reactions to IT implementations can have cultural variations. Resistance to a planned technology implementation may signal some cultural dimension that needs to be addressed. Strategies that take culture into account can be developed to overcome resistance and to learn from the different reactions. It may also be beneficial to consider different implementation strategies in different cultures. For instance, group-based training in the technology and roundtable discussions might be more appropriate in a culture high on femininity and/or collectivism, while individual online training could work better in masculine and/or individualistic cultures.

A further practical implication of this study involves the design of IT training programs and their relationship with cross-cultural training. Cross-cultural training facilitates effective interactions between people of different cultures by reducing the anxiety and disorientation a person feels when placed in a new environment (i.e., culture shock). Perhaps with a lesser degree of intensity to culture shock, but deserving of an equal degree of attention, is the concept of subculture shock. Subculture shock is the term used when a person is sent to another

part of his or her same country where cultural differences vary from that of their own region so much so that the person feels alienated. As noted (Deresky, 2006) when someone from New York moved to Texas: "These differences exist within Texas, with cultures that range from roaming ranches and high technology to Bible-belt attitudes and laws and to areas with a mostly Mexican heritage" (p. 365). Hofstede's cultural dimensions widely cited in the literature apply to subcultures within the United States to the degree that individuals are affected by the culture of their country of origin. "Living or working overseas or within a multicultural context in one's own home requires an individual to use interaction skills that transcend those that are effective when dealing with others from one's immediate in-group" (Black & Mendenhall, 1990).

Cross-cultural training increases the trainees' confidence in themselves and their ability to act effectively. As trainees receive either verbal or visual models of appropriate or inappropriate behaviors, they create cognitive maps that increase their efficacy and outcome expectations (Black & Mendenhall, 1990). Adjusting to a cultural change, including that brought about by a new IT environment, involves the gradual development of familiarity, comfort, and proficiency regarding expected behavior and the values and assumptions inherent in the new culture, all of which are different than the native culture (Black & Mendenhall, 1990; Davidson, 2002; Walenta, 2004). Therefore, the more the trainee and trainer are able to understand and predict the behavior of each other, the better the relationship between them will be (Walenta, 2004). This can be seen to tie into the issue of trust. The prevailing view of trust in the IS literature is that trust has direct positive effects on cooperation and attitudes in a work environment. Trust is an intention or willingness to depend on another party. Individuals use their own preexisting dispositions and social categorizations about another person's initial trustworthiness. Trust affects how one assesses the future behavior of another party and how

one interprets past behavior (Jarvenpaa, Shaw, & Staples, 2004).

FUTURE DIRECTIONS

Future research should examine sources of variance in cultural values such as subcultures or ethnic groups within single national states (Pineda & Whitehead, 1997). Subcultures within larger cultures could influence how individuals within organizations perceive artifacts such as IT and associated organizational structures (Pineda & Whitehead, 1997). As noted, "In pluralistic nations with more than one subculture, organizational members from different subcultures (also called ethnological groups) bring the values and norms of their respective ethnological groups into the organization" (Pineda & Whitehead, 1997). In order to examine this diversity, a future study might compare ethnic groups within a single nation. Additionally, the design of Web sites that work in multiple cultures or contain elements to elicit responses from a specific culture is an area that has great potential for future research (see Zahedi et al., 2006).

Also, although our findings suggest that broadly defined cultural values influence IT-specific beliefs and attitudes, this research should be considered a first step towards fully integrating the notion of cultural values into the domain of management information systems. In the MIS literature, broadly defined personality traits such as extraversion have been more narrowly defined as personal innovativeness in the domain of IT (Agarwal & Prasad, 1998). By more carefully defining and operationalizing the broad trait, MIS research has been able to more effectively account for personality's influence on beliefs and attitudes towards information technology (Thatcher & Perrewe, 2002). Consistent with this stream of research, our findings suggest that there might be value in developing IT-specific measures of culture, and examining whether they exert a greater influence on IT-related constructs than general measures of national culture. Hence, in future research, academics might consider more narrowly focusing how they define and opera-

tionize culture within the domain of MIS.

The limited findings of this study also suggest some avenues for future research. Greater effects of culture on technology acceptance variables could result from increased variability of the subjects sampled. Future studies may wish to examine participants from a wider variety of backgrounds or from multiple countries.

Finally, extensions of this research should use a more fine-grained approach to examining how individuals with different cultural orientations use specific technologies or engage in a range of activities with technology. For example, one might expect an individual from a collectivist culture to be more likely to join an online community. In contrast, one might expect an individual higher on individualist values to engage in more solitary activities such as "blogging" on the Web. Although this study provides support for cultural values' influence on technology use, richer evidence for cultural dimensions' influence might be found through examining the relationship between specific cultural values and attributes of technologies.¹

CONCLUSION

This study suggests that cultural values can influence IT-related traits and beliefs. For IT implementation, this suggests that resistance to a planned technology implementation may be rooted in extra-organizational cultural values. Strategies that take cultural values into account can be developed to overcome resistance and to learn from the different reactions to an IT. It may also be beneficial to consider adapting training programs to be consistent with participants' cultural values.

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APPENDIX

Items and Sources

Computer Self-Efficacy (Compeau & Higgins, 1995b)

For the following statements, imagine you are given a new software package that you have never used. For each condition described below, first indicate if you could use the software under the condition by circling YES or NO. For each condition that you answered "Yes," please rate your confidence about your ability to do the job, by writing in a number from 1 to 10, where 1 indicates "Not at all confident" and 10 indicates "Totally confident." You may only enter numbers between 1 and 10.

I could complete my assignments using the software if...

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

Computer Anxiety (*Heinssen, Glass, & Knight, 1987*)

Indicate the extent to which the following statements reflect your feelings when you think about computers.

Once I start working on the computer, I find it hard to stop.

1. I like working with computers.
2. I look forward to those aspects of this course that require me to use IT.
3. Using a computer is frustrating for me.
4. I get bored quickly when working on a computer.
5. I feel apprehensive about using computers.
6. It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.
7. I hesitate to use a computer for fear of making mistakes that I cannot correct.
8. Computers are somewhat intimidating to me.
9. Computer terminology sounds like confusing jargon to me.

Personal Innovativeness (*Agarwal & Prasad, 1998*)

Using computers improves my performance.

1. I like to experiment with new information technologies.
2. If I heard about a new information technology, I would look for ways to experiment with it.
3. In general, I am hesitant to try out new information technologies.
4. Among my peers, I am usually the first to try out new information technologies.

Masculinity/Femininity (*Hofstede, 1980; Dorfman & Howell, 1988*)

In general, I think that...

1. It is preferable to have a man in highlevel position rather than a woman.
2. It is more important for men to have a professional career than it is for women to have a professional career.
3. There are some jobs in which a man can always do better than a woman

4. Women do not value recognition and promotion in their work as much as men do.

Individualism/Collectivism (*Hofstede, 1980; Dorfman & Howell, 1988; Srite & Karahanna, 2006*)

In general, I think that...

1. Being loyal *to a group* is more important than individual gain.
2. Being accepted as a member of a group is more important than having autonomy and independence on the job.
3. Group success is more important than individual success.
4. It is more important for a manager to encourage loyalty and a sense of duty in subordinates than it is to encourage individual initiative.
5. Individual rewards are not as important as group welfare.
6. I value my independence more than being accepted by others.
7. Being accepted as a member of a group is more important than being independent.
8. Group welfare is more important than individual rewards.

Perceived Usefulness (*Davis, 1989*)

In general, I believe that...

1. Using computers enhances my productivity.
2. I find computers useful.
3. Using computers enhances my effectiveness

Perceived Ease of Use (*Davis, 1989*)

1. It is easy for me to become skillful using computers.
2. I find computers easy to use.
3. I find it easy to get a computer to do what I want it to do.
4. Learning to operate a computer is easy for me.

Computer Use

In a typical week, I use a computer for

____ hours for school
____ hours for work
____ hours for other activities

Demographic Information

Date of birth
Sex
Ethnicity
Number of years at this university
Number of years of college education
Number of years of computer experience
Number of computer courses taken

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