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How Old are You, Really?: Cognitive vs. Chronological Age in Technology Acceptance Decisions

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ABSTRACT

With increasing trends toward global aging and accompanying tendencies of (older) individuals to feel younger than they actually are, an important research question to ask is whether factors influencing IT acceptance are the same across individuals who perceive themselves to be as old as they actually are (i.e., cognitive age = chronological age) and those that perceive themselves to be younger than they actually are (i.e., cognitive age < chronological age). We conduct an empirical analysis comparing these two groups in the context of mobile data services (MDS). Our results show that for the “young at heart”, perceived usefulness, perceived ease of use and perceived enjoyment play significant roles in their IT acceptance decisions, whereas for those who perceive themselves to be as old as they actually are, perceived ease of use and subjective norms were significant. Implications for research and practice are discussed.

Keywords

Age, chronological age, cognitive age, technology acceptance, mobile data services

INTRODUCTION

Age differences have been known to play an important role in understanding human perceptions and behavior in various research domains including psychology (e.g., Salthouse, 1996), organizational behavior (e.g., Goldberg, et al., 2004), marketing (e.g., Yoon, 1997) and information systems (e.g., Morris et al., 2005). Within this stream of research, age has typically been treated as a demographic variable measured by the number of years from birth (i.e., chronological age) without much consideration about the meaning of age in the individuals' minds. However, a growing body of research in various disciplines has begun to question the appropriateness of using simple chronological measures of age for making

inferences or predictions about attitudes or behaviors (e.g., Barak and Schiffman, 1981; Neugarten and Hagestad, 1976; Schiffman and Sherman, 1991; Sherman et al., 2001). According to Barak and Schiffman (1981), the inadequacy of using chronological age may stem from the fact that people often perceive themselves to be at an age different from their chronological age. Furthermore, individual perceptions, attitudes and behaviors are influenced to a greater extent by how old a person feels (i.e., cognitive age) than how long she has lived (i.e., chronological age).

The current study investigates whether the theoretical relationships in models of technology acceptance vary depending on how age is conceptualized. We focus on discrepancies in age perceptions (i.e., differences between birth-date-based *chronological* age and self-perceived *cognitive* age). Can cognitive age reveal heterogeneity among chronologically homogeneous users in IT acceptance? This question is particularly important with the rapid growth of IT-based consumer product markets (e.g., mobile data services, iPods, PlayStations, etc.) where IT products and services are targeted at multiple heterogeneous consumer segments. If there are significant differences among chronologically homogeneous but cognitively heterogeneous users, traditional user segmentations approaches based solely on chronological age may produce limited (and perhaps misleading) insights into users' needs.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Cognitive age

Cognitive age has been validated and is widely used in aging research (e.g., Baum and Boxley, 1983; Neugarten and Hagestad, 1976) as well as in consumer research (e.g., Underhill and Cadwell, 1984; Wilkes, 1992). Cognitive age comprises of four dimensions of age perception: (1) how old an individual feels, (2) how old

an individual looks; (3) how an individual does things favored by members of a certain age group; (4) how similar an individual's interests are to members of a certain age group (Kastenbaum et al., 1976; Barak and Schiffman, 1981). Evidence from aging research suggests that most adults who have reached their middle-age tend to feel younger than they actually are and such tendencies become more pronounced as people get older (Kastenbaum et al., 1976). Furthermore, consumer research has found that cognitive age influences consumption orientation and purchasing behaviors (Goulding and Shankar, 2004; Sherman, et al., 2001). As IT products and services are increasingly being targeted to consumers, who exhibit great heterogeneity in attitudes and behaviors, it is important to understand the impacts of how (older) people perceive themselves with regard to aging (Wilkes, 1992).

Age and technology acceptance

Only a few studies investigated the influence of age on users' technology adoption decisions in organizational settings (Morris and Venkatesh, 2000; Morris et al., 2005; Venkatesh et al., 2003). It is interesting to note, however, that all prior IT acceptance research that investigated age relied solely on measures of chronological age. Given the general population trends toward global aging and the aforementioned discrepancies in perceptions, attitudes and behaviors due to differences in age perceptions, it is worthwhile to revisit the role of age in IT acceptance and use while directing attention to discrepancies in self-age perception. Whether or not the effects of (chronological) age documented in prior studies persist for people whose cognitive age is different from their chronological age is still unknown.

RESEARCH MODEL AND HYPOTHESES

Technology acceptance has a rich body of literature and there seems to be general consensus with respect to the factors that influence an individual's technology acceptance decision (Venkatesh et al., 2003). Although different terminology may be used, these factors include some form of performance expectancy (e.g., perceived usefulness), effort expectancy (e.g., perceive ease of use) and social influence (e.g., subjective norm), and finally, facilitating conditions. Depending on the target technology of focus and other situational factors of relevance (e.g., voluntary vs. mandatory use contexts) some of these factors may be more or less prominent and while other factors may additionally need to be included.

In the present study, the target technology of focus is mobile data services (MDS). Our data collection efforts were targeted toward current users of MDS, thus the dependent variable of interest was behavioral intention to *continue* to use MDS. Furthermore, data was collected in Hong Kong, a country which boasts a world-class infrastructure for mobile IT applications. Since MDS is a personal technology widely used for services that not only relate to work (i.e., utilitarian purposes) but also to

personal enjoyment (i.e., hedonic purposes), we include perceived enjoyment as an important construct in the research model (van der Heijden, 2004). Also, since the mobile communications infrastructure in Hong Kong already provides excellent support, the influence of facilitating conditions on technology acceptance and use was deemed to be minimal. Consequently, we exclude this construct from our model. The overall research model used is presented in Figure 1.

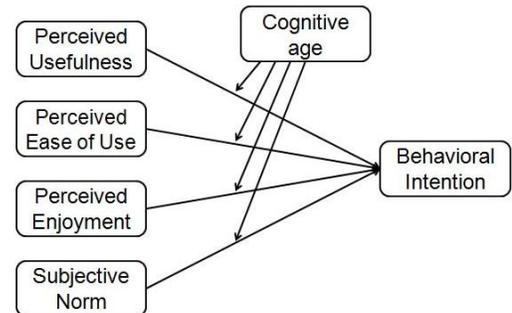


Figure 1 – Research Model

The focus of our research is whether cognitive age would impact the overall mechanism of technology acceptance differently compared to chronological age. The impact of cognitive age has not received attention from the IS literature. Our interest here lies in exploring whether individuals who perceive themselves to be younger (or older) than they actually are exhibit heterogeneity in the strengths of the theoretical relationships. In other words, the comparison is between individuals of varying age; the necessary comparison for our purposes involves contrasting those who perceive themselves to be younger than they are (i.e., cognitive age < chronological age) and those who perceive themselves to be as old as they actually are (i.e., cognitive age = chronological age). Consequently, we formulate our hypotheses as null hypotheses for each of the theoretical relationships in our research model:

- H1₀*: The influence of **perceived usefulness** on behavioral intention is the same for individuals whose cognitive age is the same as their chronological age and those whose cognitive age is younger than their chronological age.
- H2₀*: The influence of **perceived ease of use** on behavioral intention is the same for individuals whose cognitive age is the same as their chronological age and those whose cognitive age is younger than their chronological age.
- H3₀*: The influence of **perceived enjoyment** on behavioral intention is the same for individuals whose cognitive age is the same as their chronological age and those whose cognitive age is younger than their chronological age.
- H4₀*: The influence of **subjective norm** on behavioral is the same for individuals whose cognitive age is the same as their chronological age and those whose

cognitive age is younger than their chronological age.

RESEARCH METHODOLOGY

An online survey was conducted to empirically test our research hypotheses. Survey respondents were recruited using a banner advertisement made available on a non-profit public website run by the Hong Kong government. To encourage participation in the online survey, a number of prizes (e.g., mobile handsets and mp3 players) were offered based on a random draw. The online survey was accessible for three weeks. A total of 664 valid responses were collected from individuals who currently use MDS mainly for communication purpose.

The survey items were extracted from previous studies (van der Heijden, 2004; Venkatesh, et al., 2003) and reworded to suit the context of MDS.

Chronological age was obtained via self-reported date of birth. Cognitive age was assessed using the age-decade scale (Barak and Schiffman, 1981; Gwinner and Stephens, 2001).

The correspondence between chronological and cognitive age for the sample ($N = 664$) is shown in Table 1. Our analyses focus on only those who are (chronologically) at least in their 30s (see shaded cells in Table 1). This was because it is commonly believed that people would feel younger than they actually are only after reaching a certain age (e.g., at least 30) (Underhill and Cadwell, 1984). The dataset was divided into two groups: (1) those who perceive themselves to be as old as what they actually are (i.e., chronological age = cognitive age); and (2) those who perceive themselves to be younger than they actually are (i.e., cognitive age < chronological age). The size of the final sample used in the analysis was $N = 266$.

DATA ANALYSIS AND RESULTS

The research model was tested using partial least squares (PLS), a powerful second-generation multivariate technique for analyzing causal models that involve multiple constructs with multiple observed items (Chin, et al., 2003). All constructs were modeled as reflective measures. The significance of path coefficients was determined using 200 bootstrap samples of 200 randomly selected observations (with replacement) from the original dataset.

Measurement model

As can be seen in Table 1, the composite reliabilities were above the recommended 0.70 level (Hair et al., 1998; Nunnally and Bernstein, 1994), whereas the average variances extracted were above 0.50 for all constructs. Hence, the instrument demonstrated adequate reliability and convergent validity. Discriminant validity was assessed by verifying that the shared variance (or squared correlation) between any two constructs was less than the

average variance extracted by the items measuring the constructs (Fornell and Larcker, 1981).

	CR	AVE	Shared Variance				
			(1)	(2)	(3)	(4)	(5)
(1) <i>BI</i>	0.96	0.93	1.00				
(2) <i>PU</i>	0.93	0.77	0.46	1.00			
(3) <i>PEOU</i>	0.96	0.85	0.52	0.34	1.00		
(4) <i>ENJ</i>	0.97	0.89	0.50	0.63	0.41	1.00	
(5) <i>SN</i>	0.97	0.91	0.50	0.51	0.37	0.58	1.00

Notes: CR = composite reliability; AVE = average variance extracted; BI= behavioral intention; PU= perceived usefulness; PEOU= perceived ease of use; ENJ= perceived enjoyment; SN= subjective norm

Table 1 – Properties of Measurement Scales

Test of hypotheses

Following the confirmation of acceptable psychometric properties in the measurement model, we tested the structural model. First, the structural model was tested with the pooled dataset ($N = 266$), which did not take into consideration discrepancies in self-age perception. This analysis is what one would expect to conduct when it is assumed that cognitive age is the same as chronological age (i.e., when discrepancies in self-age perception is not accounted for). The results are presented in the first column of Table 2. The results suggest that all four antecedent constructs have significant impacts on behavioral intention to use MDS. Of the four constructs, perceived ease of use and subjective norm seem to have the greatest impact.

In order to test our hypotheses, we conducted tests of the structural model with the two subgroups divided depending on whether discrepancies in self-age perception exist. The first subgroup is composed of those respondents whose cognitive age was the *same* as their chronological age ($N_1 = 173$) and the second subgroup was composed of those whose cognitive age was *less* than their chronological age ($N_2 = 93$). The results show that each subgroup exhibited differences in relationships compared to the pooled sample and that the two subgroups exhibit distinctive patterns.

	Pooled Sample	Subgroup 1 (Cog = Chron)	Subgroup 2 (Cog < Chron)
<i>PU</i>	0.122***	0.053	0.215***
<i>PEOU</i>	0.323***	0.256***	0.458***
<i>ENJ</i>	0.136***	0.079	0.198***
<i>SN</i>	0.272***	0.392***	0.074
Obs (N)	266	173	93
R^2	43.3%	40.4%	55.0%

Significance Levels: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Notes: The dependent variable (DV) is behavioral intention (BI). Standardized path coefficients are reported.

Table 2 – PLS Results

In summary, three of our four original null hypotheses were rejected (H1: perceived usefulness, H3: perceived

enjoyment, and H4: subjective norm). That is, cognitive age and chronological age seem to have different impacts on the formation of IT acceptance intentions.

DISCUSSION

In the current study, we investigated the impact of cognitive age on user IT acceptance decision processes. A model of technology acceptance model was empirically tested with MDS users of two groups: (1) a group of users who perceive themselves to be younger than their chronological age; and (2) a group of users who perceive themselves as being as old as they actually are. Our findings indicate that the factors determining the behavioral intention to accept IT in each group were quite different (i.e., three of four determinants in the model).

The observed differences in perceptions, attitudes and behaviors due to discrepancies in self-age perception are quite revealing and call for additional research on the effects of cognitive age on human behavior as we have been witnessing over the last few decades a steady growth of aging population in many nations (United Nations, 2002). Given these trends, it is reasonable to expect that today's middle-aged people will identify themselves with a relatively younger (cognitively) age group in the future. Advances in medical science will help people become much healthier and live longer, enabling us to predict that the notion of *being* old or young will continue to change as this aging trend continues. Although the long-term effects of global aging will be an important area for future research, we end the paper by discussing more immediate managerial and theoretical implications.

Managerial implications

Our findings have implications for various facets of IT management. For example, practitioners involved in marketing of IT products/services should be able to better understand their customers. The current study clearly suggests that the concept of age is not as simple as it seems. Customers, especially those in their 30s or 40s may perceive their age differently, and such self-perceived age (i.e., cognitive age) seems to play an important role in their IT acceptance decision-making processes. As shown in our results, the typical market segmentation approaches based on chronological age will incorrectly identify the needs of the customers whose cognitive age is not identical to their chronological age. Hong and Tam (2006) suggest that there is an intrinsic force from the demand side to intensify the personalization of IT products and services. In addition, the ever-increasing variety of IT products and services call for a dear necessity to refine consumer target segmentation approaches. Using cognitive age as a basis for customer segmentation and personalization can help practitioners better understand what consumers really need.

Customer information that incorporates cognitive age should be able to help develop better promotion plans and

overall resource allocation for marketing activities. Furthermore, the use of cognitive age in the analysis of elderly people should help improve sales from IT products and services, as more new IT products and services become available at the individual consumer market level. The global aging trend has increased the size of the elderly customer segment, a segment which shows great marketing potential due to its strong purchasing power – e.g., affluent disposable income and high spending propensity (Sherman et al., 2001). Given that the success of many IT companies lies heavily on consumer IT markets, it is critical to better understand the various needs of the elderly people. Similar notion can be applied to the design of IT products and services. Identifying the factors that drive IT acceptance is critical for designers/developers of IT products and services (Ginzberg, 1981). As the manufacturing paradigm has shifted to mass-customization, developing IT products and services that suit various customer needs is crucial for market success. Designers can gain further insights into customers' needs through the concept of cognitive age.

Theoretical implications and future research

Prior age research suggests that defining the age of a person should not be a monolithic process (e.g., Sherman et al., 2001). Indeed, the current study suggests that the role of age in IT acceptance processes may be dependent on how age is defined and perceived. Our results imply that cognitively young users consider different factors in their IT acceptance decisions, compared to other users, all of whom are of the same chronological age. In line with this reasoning, it would be worthwhile to empirically explore the moderating effect of cognitive age on the theoretical relationships in other IT acceptance frameworks, so as to build a more holistic view of IT acceptance processes.

Cognitive age can provide interesting future directions for research in human-computer interaction (HCI). As age is one of the most inherent and fundamental characteristics of all living organisms – especially humans, it surely embodies interpretations and implications for numerous interactions between the organisms and objects in a variety of contexts, including between humans and computers (i.e., HCI). For example, the role of cognitive age can be examined in the contexts of older workers' performance or productivity, and IT-based training. Popular media often report cases that the elderly have the ability and desire to continue to work productively (e.g., Coy, 2005). Typically age has been equated with a degradation function and older workers have been portrayed with negative stereotypes (e.g., low productivity, decreased memory and intellectual capacity). However, our research opens up interesting and important venues for future research. Whether these characteristics persist among cognitively younger workers, or whether IT-based training can show different degrees of effectiveness to cognitively young workers, or whether different types of user interfaces are more usable

for cognitively young users are all interesting HCI issues that would need to be addressed in order to better prepare ourselves for an era of global aging.

Although the present study presents a simple result – that the factors influencing technology acceptance decisions depend on the age concept, this simple finding opens up many important research issues related to cognitive age, chronological age, and their role and impact in many IT management contexts.

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The Role of Authenticity in the Experience of Visitors Interacting with Museum Technologies

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ABSTRACT

Cultural places such as museums tend to rely on Information Technologies (IT) to support their exhibition and communication to the public. Although technology has undeniable advantages for museums and their visitors, it is not evident that IT contributes both to more enjoyment and to an experience of authenticity. Indeed, little attention has been paid to user reactions with hedonic systems available in cultural heritage sites.

The objective of this research is to assess affective and cognitive reactions of museum visitors interacting with IT. We also try to determine the role played by authenticity in visitor interactions with museum technologies. To test our hypotheses, a free simulation experiment was conducted at a French national museum where 184 questionnaires were completed. The results indicate that technologies are not incompatible with perceptions of authenticity and that IT can contribute to edutainment experiences of visitors.

Keywords

Authenticity, enjoyment, emotions, learning, immersion; museum technologies.

INTRODUCTION

Cultural tourism is an important phenomenon describing the fact that people increasingly include cultural activities during their trips, activities such as museum visits, historic sites or cultural events (NASAA, 2004). Indeed, The Travel Industry Association and the Smithsonian Magazine report that in 2002 nearly 118 million American adults had an artistic or cultural activity while traveling (NASAA, 2004).

This phenomenon is explained by several factors. One that has been particularly studied by researchers working in the tourism area is authenticity. The search of authenticity performed by tourists takes different forms: people who look for authenticity may want to see genuine things (Bruner, 1994), to meet locals and live like them

when traveling (Cohen, 1988). Tourists seeking authenticity can also be reluctant to interact with virtual copies of artifacts or with any other reproductions (Amirou, 2000). Actually, people seem to engage in cultural activities during their trips in order to escape monotony and to have authentic experiences (McCannell, 1973, 1976).

Cultural places such as museums rely on information technology (IT) to organize their exhibitions and their communications with the public. Nevertheless, even though these technologies have undeniable advantages for museums and their visitors, it is not evident that they contribute both to a deeper sense of flow and authenticity.

Therefore, the research question and its respective sub-questions that guide this study are the following:

1. What are the affective and cognitive reactions of museum visitors when interacting with museum technologies?
 - a. Do visitors experience authenticity, enjoyment and immersion when using museum technologies?
 - b. Does the use of museum technologies facilitate the experience with museological content, more particularly an increased learning experience?

AUTHENTICITY

At first glance, one might think that with the continuous progress being made in technology development, there is no need to study perceptions of authenticity when users interact with IT. However, given that Featherman et al. (2006) have shown that perceptions of authenticity can influence IT usage, the issue of authenticity does seem to deserve attention. Featherman et al. (2006) studied perceptions of authenticity in the context of e-services, and came to the insight that when users perceive e-services to be artificial and non-authentic, their risks perceptions increase. Additionally, Featherman et al.

(2006) explain that perceived authenticity can explain technology adoption.

Authenticity with IT has also been lightly addressed in the context of cultural heritage. Several researchers have proposed features or design characteristics for IT in order to improve user experience of authenticity. For instance, Epstein and Vergani (2006) relied on the theoretical background of authenticity to develop their IT artifact. It is a mobile technology named the History and Unwired media, which assists individuals visiting Venice, Italy. Visitors particularly appreciate the interactivity of the device that enables intimacy and immersion in the environment, but also connection with the Venetian characters (Epstein and Vergani, 2006). The authors point out that their device also includes video, audio content and a narrative structure. The research that is the closest to ours is the evaluation of cultural heritage Web sites made by Sigala (2005). Actually, Sigala (2005) adopts the constructive perspective on authenticity as well and applies it to the evaluation of IT. More precisely, Sigala (2005) addresses how authenticity is constructed in online environments and she also highlights the main features that facilitate an authentic experience with Web sites. The findings of this research lead to the conclusion that the principal features, which can contribute to meaning-making experiences of online visitors, are: search, navigation, multimedia and personalization (Sigala, 2005). However, our research departs from hers in that we do not address Web sites, nor do we highlight features of technology. We rather focus on user reactions to authenticity perceptions and we investigate the consequences of authenticity for user interaction with IT.

We conclude this literature review by noting that, in the context of IT use, research on authenticity is still limited. Nonetheless, as suggested in the literature, authenticity plays a significant role in user interactions with IT. Furthermore, the school of constructivism views authenticity as an affective reaction (Selwyn, 1996). Therefore, we need to show how this emotion can be embedded in IS frameworks and linked to other emotional reactions of IT users.

EMOTIONS IN HCI RESEARCH

This research aims at measuring visitors' affective (entertainment and authenticity) and cognitive (learning) reactions when they interact with technology. Since studying human interaction with technologies is at the heart of the Human-Computer Interaction (HCI) field, the questions addressed by this research falls directly into the HCI sub-discipline.

Sun and Zhang (2006) elaborated a model of Individual Interaction with IT (IIIT) to assess both affective and cognitive reactions of users interacting with any type of technology. The IIIT model helps us identify the relevant variables to be studied in order to assess user reactions towards IT use. In that the IIIT model includes a large number of variables, we will only focus on those that are

the most salient for the purposes of our research, i.e., personal innovativeness with IT, enjoyment, cognitive absorption (immersion) and ease of use.

Personal innovativeness with IT will enable us to determine the profile of museum visitors and more precisely how they generally behave with IT, independently from museums. Ease of use has been used in several studies that show its relevance for evaluating technologies usability (Gefen and Straub, 2000).

Enjoyment and focused immersion are the concepts used to measure the entertainment aspects of visitor experience. Perceived enjoyment is a relevant predictor for hedonic information systems use as shown by Atkinson and Kydd (1997) and Van der Heijden (2004). Furthermore, Shaw (1985) produces evidence that enjoyment is one of the most important dimensions for people during their leisure time. Similarly, immersion is supposed to reflect an entertaining aspect of visitor experience (Belaen, 2003).

Although the IIIT model provides strong support for our research, we think that Sun and Zhang (2006) leave out other important variables such as learning. In effect, Sun and Zhang (2006) only identify one outcome of the interaction process, which is IS usage. IS usage is a key construct that needs further research as pointed out by several researchers (Burton-Jones and Straub, 2006, Barki et al., 2007), but learning appears as a more relevant outcome variable in the context of museum technologies. Indeed, a survey conducted with 6000 American households report that more than 87% households view learning as the principal outcome of their museum visit (Griffiths et al., 2007).

RESEARCH MODEL AND HYPOTHESES

We propose a research model (Figure 1) that includes a user trait, personal innovativeness, which is posited as predictor of ease of use. The latter represents the cognitive reaction towards using IT and it has direct influence on enjoyment and focused immersion. We also hypothesize that the affective variables (enjoyment, authenticity and focused immersion) are direct antecedents of learning. The constructivist view of authenticity is represented in the model by 1) perceived authenticity, which reflects the emotional aspects of authenticity, and 2) authenticity disposition, which accounts for *a priori* visitor attitudes towards museum technologies.

This research model includes nine hypotheses.

Hypothesis 1 (H1). A positive assessment of personal innovativeness with IT will positively influence perceived ease of use.

Hypothesis 2 (H2). A positive assessment of perceived ease of use will positively influence perceived enjoyment.

Hypothesis 3 (H3). A positive assessment of perceived ease of use will positively influence focused immersion.

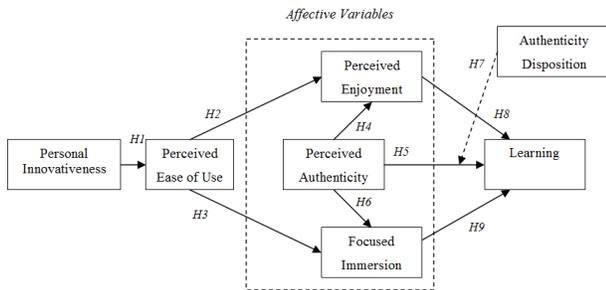


Figure 1. Research Model and Hypotheses

Hypothesis 4 (H4). Perceived authenticity toward IT positively influences enjoyment.

Hypothesis 5 (H5). Perceived authenticity toward IT positively influences learning.

Hypothesis 6 (H6). Perceived authenticity toward IT positively influences focused immersion.

Hypothesis 7 (H7). Authenticity disposition moderates the relationship between perceived authenticity and learning.

Hypothesis 8 (H8). A positive assessment of enjoyment will positively contribute to increased learning.

Hypothesis 9 (H9). A positive assessment of focused immersion will positively contribute to increased learning.

METHODOLOGY

This research was conducted at the National Center of the History of Immigration (NCHI), a French museum located within Paris. This museum was selected as a setting for our field study for several reasons. First, the learning and affective experience are among the objectives of this museum, which aims at *educating* the public and providing an *emotional experience* on the history of immigration. The aspects of authenticity are also addressed by the museum in its approach to present people's traditions, memories and history. Hence, the museum goals correspond to our research variables. Third, we had another imperative, which was the presence of technologies in the museum in order to assess visitor reactions to IT. The NCHI offers different types of IT for the use of the public, they are: audioguides, computers, videos, and interactive kiosks.

The methodology that we implemented was a field study and more specifically a free simulation experiment (Fromkin and Streufert, 1976). In this experimental methodology, participants are studied in a closed setting that is the museum. However, we have relatively less control over the manipulated independent variables and the subjects' approach to the experimental task. Actually, there are not treatment conditions, but rather a stimulation to which subjects can freely respond (Straub et al., 2004).

Thus, the values of the independent variables can vary freely with respect to subject interactions with the system. For this research, the stimulation given to the subjects was their interaction with the museum technologies. The independent variables that varied freely were the affective and cognitive reactions to IT use, namely authenticity and ease of use.

The stimulation given to subjects consisted in the interaction with the technologies available at the NCHI. However, we did not survey visitor perceptions of each tool provided by the museum. We decided to focus on two types of technologies: the audioguides and the set of interactive kiosks and computers.

Our data collection technique was the questionnaire (Straub et al., 2004). The questionnaire distributed to visitors was composed of existing scales for the IS constructs. Learning was measured with the self-reported learning and learning interest scales of Alavi (1994). Perceived ease of use items were originally developed by Davis (1989), while we borrowed the items of perceived enjoyment from Davis et al. (1992). The PIIT items and focused immersion were adapted from Agarwal and Karahanna (2000). Perceived authenticity scales were adapted from Featherman et al. (2006). Relying on the literature and the help of three judges, we developed new scales for authenticity disposition.

We followed this approach to survey NCHI visitors. In order to include the maximum of persons, we installed at the museum entrance where visitors borrow the audioguides. Therefore, we stayed behind the desk with the employees in charge of 1) providing guidance to visitors and 2) of distributing the free audioguides required for visiting the permanent exhibition. This position was strategic because visitors had to return to this desk at the end of their visit to give back the audioguides. We took advantage of this time to ask visitor feedback regarding their interaction with the museum technologies. Surveying the visitors just at the end of their visit appeared also as a good way to ensure that their experience was still memorized. Our sample was randomized to the greatest extent possible. We conducted the study during weekends and weeks so that different types of visitors would be included. In order to encourage people taking part in this research, we also used incentives that consisted in NCHI branded notebooks.

In sum, we collected 183 questionnaires over a period of one month and a half. This pooled sample includes 113 questionnaires dealing with the museum audioguide and 70 questionnaires pertaining to the set of interactive kiosks and computers.

Results

The data analyses were performed with SmartPLS 2.0 (Ringle et al., 2005).

Testing the model, we found a reasonable percentage of explained variance for our dependent variables. Explained

variances for our dependent variables are the following. “Ease of use” has an R^2 of 0.07, “immersion” has an R^2 of 0.194, “enjoyment” has an R^2 of 0.515 and “learning” has an R^2 of 0.451. It is noteworthy that our research model accounts for more than 45% of the explained variance of the outcome variable, which is learning.

Eight out of nine hypotheses were validated, providing strong support for our research model. Except for H3, which is not significant, path coefficients are significant at the .05 alpha level. More specifically, PIIT positively influences ease of use ($B=0.265$, $p<0.001$), validating H1. Perceived ease of use has a strong positive effect on enjoyment ($B=0.485$, $p<0.001$) but no effect on immersion ($B=0.158$, $p>0.05$). As hypothesized, a positive assessment of perceived authenticity has a positive influence on enjoyment ($B=0.337$, $p<0.001$) and immersion ($B=0.339$, $p<0.001$). So H4 and H6 are validated. The affective variables retained to evaluate the entertainment aspect of museum visit (authenticity, enjoyment and immersion) all have a significant positive effect on learning, supporting H5, H8, and H9.

In order to assess the effect of the moderator variable, disposition towards authenticity (H7), we performed an effect size test (Mathieson et al., 2001, Carte and Russell, 2003). This test compares the variation of explained variance between a) the model that includes the moderator and b) the original model and determines the level of significance of the moderator effect. We used the formula proposed by Mathieson et al. (2001): $f^2 = (R^2 \text{ full model} - R^2 \text{ partial model}) / (1 - R^2 \text{ full model})$.

We first measured the variation of change in R^2 and second we tested the significance of this change. The change in R^2 is 0.62 and the effect size (f^2) is 0.124, so the inclusion of the moderator in the research model leads to a medium effect size.

DISCUSSION AND CONCLUSION

This research investigates the affective and cognitive reactions of visitors interacting with museum technologies. We showed that the use of technologies contribute both to learning and enjoyment for visitors. More precisely, the visitors who interacted with the audioguides, interactive kiosk and computers all perceived authenticity during their visit. This research shows that the use of IT during a museum visit is not incompatible with perceptions of authenticity.

Hypothesis 3 was not validated suggesting that ease of use does not influence visitor perceptions of immersion. This result can be explained by the particular setting that we used to conduct our field study. As it turns out, NCHI is a museum that puts forward immersion and its exhibition has been designed in a way that visitors have the sensations to be projected into the past from the beginning of their visit. For instance, the museum displays video of immigrants and audio content in the entire museum. The curators have also privileged a dark

atmosphere in order to create a feeling of intimacy. As a result, even if technologies are not easy to use, we can understand that visitors still felt immersed during the exhibition.

Contributions

Several researchers in the HCI field call for more studies measuring IT phenomena in a natural or real-world context. For instance, Finneran and Zhang (2005) encourage more research on the experience of flow occurring in a naturalistic context. Boehner et al. (2007) also urge researchers to assess emotions as they occur in daily life.

“Given the pervasiveness of computing technology in our everyday lives and its concomitant societal impact, it is essential that we address people’s actual lived emotional experiences” (Boehner et al., 2007, p. 289)

By surveying visitors in a real museum setting, the present research contributes to 1) the study of emotions as lively experienced by visitors and 2) the study of information systems in their context of use. In the study, we measured visitor perceptions towards IT actual use. Generally research assessing visitor reactions towards IT has relied on laboratory experiments, which simulates user environments. These studies also measure intentions rather than actual behaviors. By surveying visitors who interacted with IT in a natural life context (leisure time), we are very close to real life experiences. Consequently, this research can contribute to building the IS and HCI research traditions in natural contexts.

While previous HCI research has mainly focused on computers in a business context, this study includes other types of digital technologies dedicated to entertainment and education, namely audioguides, interactive kiosks and computers. These technologies are particularly common in tourist and cultural settings and represent relevant hedonic information systems to be studied.

According to the International Council of Museums (ICOM, 2002), enjoyment and education of the public correspond to the core missions of museums. This research examines both entertainment aspects (enjoyment, authenticity and immersion) and learning reactions of visitors. These factors are also important for cultural institutional business. Markedly, Chhabra et al. (2003) observes that individuals who perceive a high degree of authenticity during their visit tend to spend more money in the cultural setting. They even purchase objects to keep a souvenir of their authentic experience. Even while the aim of cultural institutions is not to profit, they still need to raise money over and beyond expenses to satisfy new goals for efficiency in the modern era. Our study also show that positive reactions towards IT contribute to increased learning.

Limitations

Although using real museum visitors to test our research model adds value to this research, it also added complexity to our research methodology. More precisely, because the participants were tired at the end of their visit or had little time to participate in the research, we had to create a short instrument.

Furthermore, our research model principally accounts for positive reactions towards IT use. However, IT use in museums may produce negative outcomes like anxiety, frustration or distrust. Future research should investigate this other side of visitor experience by including negative reactions and extending the set of variables. We also decided to focus on learning instead of IT use as outcome variable. Nonetheless, extent of use and frequency of use are relevant dimensions to be assessed in future research.

Another limitation that can be mentioned is the scale used to measure perceived authenticity. To be sure, we wanted to rely on an IS scale to assess this construct, but the scales provided by Featherman et al. (2006) may not be very descriptive of authenticity as it was experienced by our participants. Future research should try to improve these scales by adding other facets of authenticity like escapism. Moreover, this research only takes into account the constructive perspective of authenticity. It would be interesting to study existential authenticity.

We also point out that this research employs subjective scales to assess learning. Consequently, we did not use objective measures for the outcome variable.

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Website Design, Trust and Culture: An Eight Country Investigation

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ABSTRACT

Website design elements (information design, information content, navigation design, visual design), disposition to trust, website trust, and transaction security are examined for differences in an eight country sample with a total of 1156 participants (including Canada, the United States, India, Germany, Japan, Mexico, Chile, and China). Within Canada, users from English Canada and French Canada were also compared. In a theoretical context that includes cultural differences for uncertainty avoidance (e.g. Hofstede's classification) and the GLOBE study which identifies similar country clusters, overall and as predicted, low uncertainty avoidance countries of French Canada, English Canada, and the United States have the highest scores on the various constructs indicating more favorable reactions by users. Largest differences across most of the constructs occur between Germany, Japan, and China with other countries in the sample.

Keywords

website design, culture

INTRODUCTION

E-business vendors seek to develop websites that are visually pleasing, easy to navigate, rich in information content, and secure. In the current research these topics are examined with global users from Canada, the United States, India, Germany, Japan, Mexico, Chile, and China. Within Canada users for both English Canada and French Canada were included to examine within country differences when two diverse cultures are represented within the same nation state.

This investigation is aimed to achieve the following goals based on user perceptions of the same e-commerce website professionally adapted for the user's local culture in each of the eight countries included in this study.

- (1) Examine website design elements for information content, information design, navigation design and visual design to determine user perceptions of each element and how these differ between country groups.
- (2) Investigate user disposition to trust, perceptions of website trust and transaction security.

- (3) Examine if differences exist for English Canadian and French Canadian participants.
- (4) Develop and validate a new construct for Information Content.

CULTURAL CONSIDERATIONS

Researchers have often used Hofstede's classifications to study social psychological phenomena. In this research, one of Hofstede's classifications (for uncertainty avoidance) will be considered for its relevance to website design, as well as to trust and security issues related to e-commerce. Uncertainty avoidance characterizes how societies accommodate high levels of uncertainty and ambiguity in the environment. Members of very high uncertainty avoidance societies such as Japan seek to reduce personal risk and to augment security. Individualism-collectivism is a second dimension that has been previously used to examine user reactions in e-commerce (e.g. Jarvenpaa et al., 1999). Individualistic cultures place greater importance on the needs, values and goals of the individual over those of the group, while in collectivist cultures the needs, values, and goals of the group prevail (Hofstede, 1980). Countries high on individualism are usually low on uncertainty avoidance and countries that are low on individualism are usually high on uncertainty avoidance.

Complementary to the work by Hofstede (1980) and relevant in the current research, House and his colleagues (2002) conducted an extensive study of leadership and organizational effectiveness in 61 nations which they called the GLOBE project. Country clustering was determined based on similarities and differences concerning societal values and beliefs. Of 10 cultural clusters identified in the GLOBE research five are represented in the current study. These are: South Asia (India), North America (Canada, the United States), Germanic Europe (Germany), Confucian Asia (Japan, China), and Latin America (Mexico, Chile) as indicated in Table 1. In alignment with theoretical premises from the GLOBE project, culture is determined not only by commonality among members of the collective based on psychologically based values and beliefs, but also by "commonality of observed and reported practices of entities such as families, schools, work organizations, economic and legal systems, and political institutions" (House, Javidan, Hanges, and Dorfman, 2002, p.5). This

raises the question as addressed in the current study whether in a country like Canada where both English Canadian and French Canadian groups reside, whether or not within country cultural diversity will be a stronger group identifier than country based identifiers such as economic, legal or political systems.

Table 1. Country Classifications

	Uncertainty Avoidance	Individualism-Collectivism
<i>North America</i>		
Canada	48 (L)	80 (H)
United States	46 (L)	91 (H)
<i>Germanic Europe</i>		
Germany	65 (M)	67 (M)
<i>Confucian Asia</i>		
Japan	92 (H)	46 (L)
China	60 (M)	20 (L)
<i>Latin America</i>		
Mexico	82 (H)	30 (L)
Chile	80 (H)	23 (L)
<i>South Asia</i>		
India	40 (L)	48 (L)

Note: L=Low M=Medium H=High

Sources: Hofstede (1980) and House et al. (2002)

CULTURE AND WEBSITE DESIGN

Acceptance of website design features differs among cultures (Cyr and Trevor-Smith, 2004). Both the quality and content of information is important, as well as the design and layout of that information (Garrett, 2003). As defined in this study Information Content refers to information that is complete, sufficient, and effective; Information Design refers to information that is logically presented and organized (Marcus and Gould, 2000). While Information Design has been used previously by Cyr (2008), the separation of information into two separate constructs is new to this project. In one cross-cultural study user design preferences including perceived access and presentation of product information were compared for Canada, the USA, Germany and Japan. Results indicated few significant differences between the USA, Canada, and Germany but significant differences ($p < .01$) between these countries and Japan (Cyr, Bonanni, Bowes, and Ilsever, 2005). Japanese had a less favorable impression of the local website related to these select information components.

Navigation Design refers to the navigational scheme used to help or hinder users as they access different sections of a website (De Wulf, Schillewaert, Muylle, and Rangarajan, 2006). Preferences for the form of navigational scheme are expected to vary by culture

(Marcus and Gould, 2000). In Cyr et al. (2005) noted above, differences were found between the USA, Canada, and Germany with Japan. Japanese had a less favorable impression of navigation of the local website.

Visual Design relates to emotional appeal or aesthetics of the website and may include colors, photographs, shapes, or font type (Garrett, 2003). In a study that compared Canadian, American, German and Japanese users, Japanese participants favored a visual approach which they said appeals to the user's "emotion" (Cyr et al., 2005). With respect to screen design of the local website, Japanese had a less favorable impression compared to Canadians and Germans.

It is expected that information content, information design, navigation design and visual design enable a user to access information regarding online products or services. Further, and based on Hofstede's (1980) research with reference to uncertainty avoidance, it is expected members of high uncertainty avoidance cultures would find these four design elements more important to determine product or service options on a website than members from lower uncertainty avoidance cultures. In turn, the higher the uncertainty avoidance requirements of the user, then a perceived lack of these design elements would result in a less favorable assessment of the design element. In other work, it was expected and confirmed that individuals from high uncertainty avoidance cultures would place less trust in the IT artifact (a mobile device) than individuals from low uncertainty avoidance culture (Vance, Elie-Dit-Cosaque, Straub, 2008).

In addition, and based on the GLOBE studies, we might expect certain cultures to be similar and to cluster together such as Canada and the United States, Japan and China, or Mexico and Chile. Considering the within Canada comparison between French and English Canadians, and based on an institutional perspective as outlined as part of the GLOBE theory, it is proposed that English and French Canadians would be similar in their perceptions. This leads to the following hypotheses:

H1a: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for information content than members from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H1b: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for information design than members from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H1c: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for navigation design than members

from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H1d: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for visual design than members from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H2a: User responses for website design features in the North American cluster (Canada and the United States) will be similar compared to users outside the cluster.

H2b: User responses for website design features in the in the Asia cluster (Japan and China) will be similar compared to users outside the cluster.

H2c: User responses for website design features in the Latin American cluster (Mexico and Chile) will be similar compared to users outside the cluster.

H3: User responses for website design features in French Canada and English Canada will be similar.

DISPOSITION TO TRUST, WEBSITE TRUST, AND TRANSACTION SECURITY ACROSS CULTURES

Disposition to trust and propensity to risk are influenced by culture (Vance et al., 2008). On the Internet when institutional safeguards are not as readily identifiable as in a traditional retail store, individualists with low uncertainty avoidance might be more comfortable shopping online than collectivists with high uncertainty avoidance (Jarvenpaa et al. 1999). Individuals from high uncertainty avoidance cultures exhibit less trust than those from low uncertainty avoidance cultures when using a mobile device (Vance et al., 2008).

Online shopping is deterred by absence of payment security, payment-clearing structures, or privacy policies (Jarvenpaa et al., 1999). In a study of online consumer behavior in which U.S., Brazilian, and Latin American consumers were compared, Latin Americans and Brazilians (both from high uncertainty avoidance cultures) indicated the presence of credit card symbols on websites was more important than Americans who are low on uncertainty avoidance (Cheskin, 2000).

In sum, it appears that trust is influenced by culture although few studies examine this phenomenon. As a baseline measure of trust, in each of the countries in the current investigation data was gathered on general disposition to trust unrelated to the Internet or e-commerce. More specifically, in this research disposition to trust generally refers to an expectation that people are trustworthy and honest. In addition, website trust was examined in terms of whether users feel they can trust the website viewed. Finally, transaction security of the website was considered and whether or not shopping on

the website is deemed by the user as secure. It is expected that members of low uncertainty avoidance countries will more likely exhibit higher levels of trust than members from medium or higher uncertainty avoidance countries.

H4a: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for disposition to trust than members from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H4b: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for website trust than members from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H4c: Members from low uncertainty avoidance cultures (Canada, the United States, India) will provide higher ratings for transaction security than members from medium uncertainty avoidance cultures (Germany, China) or high uncertainty avoidance cultures (Chile, Mexico, Japan).

H5a: User responses for disposition to trust, website trust, and transaction security in the North American cluster (Canada and the United States) will be similar compared to users outside the cluster.

H5b: User responses for disposition to trust, website trust, and transaction security in the in the Asia cluster (Japan and China) will be similar compared to users outside the cluster.

H5c: User responses for disposition to trust, website trust, and transaction security in the Latin American cluster (Mexico and Chile) will be similar compared to users outside the cluster.

H6: User responses for disposition to trust, website trust, and transaction security in French Canada and English Canada will be similar.

METHODOLOGY

1156 participants located in English Canada (232), French Canada (80), the United States (197), India (106), Germany (122), Japan (78), Mexico (71), Chile (48), and China (222) completed an experimental task and online survey. Participants were recruited from a wide range of sources including universities, institutes, and companies. Average age across countries is 27.4 years.

Participants responded to the local version of the SonyStyle website represented in their native language. Users were requested to view the home page of the local website, followed by navigation of the website to choose a cell phone they would hypothetically purchase. Once participants concluded this task each completed an online questionnaire. Background information to the study, and all other written content including the questionnaire were

translated and back-translated into each required language.

While details are not provided here due to length limits, the questionnaire utilized in this study exhibited satisfactory content validity (established through literature reviews); satisfactory convergent validity (demonstrated by the principle component factor analysis, α -values and AVE values); and satisfactory discriminant validity (shown from inter-construct correlation analysis). Between country comparisons were conducted using Tukey HSD testing ($N=1156$).

RESULTS

Design Elements

In H1a it is proposed that Canada, the USA and India will provide higher ratings for information content than the other countries. Overall, this premise is true with mean scores for English Canada (5.1), French Canada (5.3), and the USA (5.4). Significant between country differences occurred between English Canada, French Canada, and the USA with Germany and China ($p = .000$ in all cases). India scored 4.8 but with no significant differences with Japan (4.8), Mexico (4.9) and Chile (5.0). Overall the USA had the highest score for information content (5.4) while Germany had the lowest (4.5).

H1b tests whether Canada, the USA and India have higher ratings for information design than other countries in the sample. H1c examines if Canada, the USA and India have higher ratings for navigation design than other countries. Support for these hypotheses is limited.

In H1d it is proposed that Canada, the USA and India will provide higher ratings for visual design than the other countries. There is support for this hypothesis. English Canada, French Canada, the USA and India have highest scores for visual design (5.5, 6.0, 5.8, 5.5 respectively), although English Canada and India are tied with Mexico (5.5). Significant differences ($p = .000$) exist for English Canada, French Canada, the USA and India with Germany (4.6), China (4.7) and Japan (5.0), with the exception of English Canada and India with Japan with no significant differences. Overall French Canada had the highest score (6.0) while China (4.7); Germany (4.6) had the lowest.

With respect to the GLOBE clusters it was expected and supported in H2a that the North American cluster would be similar compared to other countries. Of 12 comparisons, only one significant difference occurred for information design between the USA and English Canada. In H2b was expected and supported that Japan and China are similar compared to other countries. Again, based on 12 comparisons, the only significant difference was for navigation design. In H2c which was supported, there were no differences between the Latin American countries of Mexico and Chile. Finally, there were no

differences between French Canada and English Canada in support of H3.

Trust and Security

It is expected in H4a that Canada, the USA and India will provide higher ratings for disposition to trust than the other countries. Overall, scores on this dimension are the lowest of all the constructs tested with no country score reaching greater than 5 out of 7. As predicted, scores are highest for English Canada, French Canada, the USA and India (4.6, 4.8, 4.5, 4.8 respectively), although Japan ties for the highest score on disposition to trust (4.8) with French Canada and India. Significant differences occur between French Canada with China (4.4 $p = .045$), Germany (4.3 $p = .041$) and Mexico (4.2 $p = .025$). Significant differences also occur between India with China ($p = .014$), Germany ($p = .015$) and Mexico ($p = .011$). Overall French Canada, India, and Japan had the highest score (4.8) while China (4.4), Germany (4.3) and Mexico (4.2) had the lowest.

H4b tests if Canada, the USA and India have higher ratings for disposition to trust than the other countries. As with the results of other hypotheses, English Canada, French Canada, the USA have the highest scores (5.5, 5.6, 5.6 respectively) with India somewhat lower (5.2) and in the latter case lower than Chile (5.6) and Mexico (5.3). Significant differences ($p = .000$) are exhibited for English Canada, French Canada, the USA, and India with Germany (4.9), China (4.4) and Japan (4.3). Overall, French Canada, the USA and Chile had the highest score (5.6) and Japan (4.3) the lowest.

In H4c it is expected that transaction security will be highest for English Canada, French Canada, the USA and India. This is the case for French Canada (5.4) and the USA (5.3), but English Canada (5.1) and India (5.0) score very close to Mexico (5.0) and Chile (4.9). Further, Japan scores highest of all the countries on transaction security (5.5). Significant differences ($p = .000$) occur between English Canada, French Canada, the USA with China (4.5) and Germany (4.4). India also exhibits significant differences with China ($p = .040$) and Germany ($p = .005$). Japan has the highest score for transaction security and Germany has the lowest score (4.4).

In support of H5a, there are no differences in the three constructs of disposition to trust, website trust, and transaction security within the North American cluster including English Canada, French Canada and the USA. Alternately, H5b is not supported for China and Japan since differences between these two countries occur for both disposition to trust and for transaction security. H5c is supported for Mexico and Chile with no differences between the countries. Similarly, H6 is supported with no differences between French Canada and English Canada.

Summary of Results

- (1) The four design constructs show considerable variation across countries with most differences in information design and navigation design.
- (2) Scores for disposition to trust are low overall, and unexpectedly high uncertainty avoidance Japanese had the highest scores for website trust and transaction security.
- (3) Overall, French Canada, English Canada and the United States have the highest scores on the various constructs over those in other countries.
- (4) No differences exist for any of the constructs for French Canada and English Canada, and there is only one difference (for navigation design) between French Canada and English Canada with the USA.
- (5) Large numbers of differences on various constructs occurred between Germany, Japan, and China with the other countries in the sample.
- (6) As expected, no differences for any constructs exist between Chile and Mexico which are both high uncertainty avoidance cultures. Unexpected, there were no differences between Chile and Mexico with India (low uncertainty avoidance culture) except for disposition to trust between Mexico and India.
- (7) China and Japan are similar except for navigation design, disposition to trust and transaction security.
- (8) A new construct was successfully developed and validated for Information Content, and serves to confirm the distinctiveness of Information Content from Information Design.

CONCLUSION

Variation in perceptions of design elements exists across cultures, and supports the notion that websites require localization of design content for unique cultural groups (Cyr and Trevor-Smith, 2004). These results represent an extension of Cyr et al. (2005) in which design (although differently construed than here) was studied in Canada, the United States, Germany and Japan regarding user perceptions of a different (Samsung) localized website. In the earlier study, significant differences were found between Canada, the United States, and Germany with Japan. As in this study, the Japanese had the least favorable impression of website design.

Specific to disposition to trust, participants were asked to provide a rating indicating the degree to which people can generally be trusted. Along with low uncertainty avoidance countries (Canada, the United States, and India), Japan (the country highest on uncertainty avoidance) also scored similarly on this construct, although none of the countries scored higher than 5 out of 7. Japan also has the highest score for transaction security, but alternately the lowest for website trust. These findings for Japan are counter to expectations of a country high on uncertainty avoidance and hence risk adverse, and are also counter to Cyr et al. (2005) who found Japanese

to be least trusting over Canadians, Americans or Germans. Equally puzzling, overall Germany and China (both moderate for uncertainty avoidance) score lower than high uncertainty avoidance cultures such as Mexico or Chile. In alignment with Cyr et al., scores for Canada and the United States are similar. The results indicate that it is difficult for users to trust generally, and to trust the website more specifically. This is consistent with other research in which trusting intentions are affected by security, privacy, or perceived risk on the Internet (Jarvenpaa et al., 1999), now extended to eight countries.

A useful addition to the current research is the evaluation of country responses based on the GLOBE study. Based on the GLOBE clusters, results as predicted were obtained. That is, across all seven constructs, for the North America cluster there was only one significant difference and for the Latin American cluster of Mexico and Chile, there were no significant differences. These are remarkable findings given the number of cross-country comparisons involved. In the Confusion Asian cluster Japan and China are likewise very similar. In most cases, Germany stood alone. Finally, India (low uncertainty avoidance) tended to cluster with Mexico and Chile (both high uncertainty avoidance), which based on Hofstede's classifications would be unusual. It appears that the GLOBE clusters afford a useful conceptual classification system for use in future between country research.

A final interesting outcome is the complete commonality in the results between English Canada and French Canada. It appears that in a website context, commonality based on institutions, economics, and societal norms and practices (House et al., 2002) is a stronger predictor of user perceptions than culture.

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A Study of the Dynamic Nature of Trust from a Longitudinal Perspective

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ABSTRACT

Trust is dynamic in nature. It is a process rather than an outcome; it develops over time. Trust is an essential ingredient for successful business transactions in electronic commerce. Yet, there is little empirical research on the dynamic nature of trust in information systems and electronic commerce areas using a longitudinal (pre- and post-phase) approach. This paper proposes a model of dynamic trust from a longitudinal perspective. Furthermore, it provides empirical evidence of the dynamic nature of trust in the context of e-Channel and e-Vendor. The results of the study show that a consumer's trust changes over time due to variations in the level of trust in the pre-purchase phase and satisfaction with a previous transaction in the post-purchase phase. The results also reveal that satisfaction and post-trust are strong determinants of a consumer's future intention to reuse the e-Channel and to repurchase through the e-Vendor.

Keywords

Dynamic Trust Model, Pre-Trust, Satisfaction, Post-Trust, E-Channel Trust, E-Vendor Trust

INTRODUCTION

Trust is considered by many (Morgan and Hunt, 1994, Dwyer et al., 1987, Ganesan, 1994) to be a crux of relationships; trust plays a vital role in almost any commerce transaction involving monetary exchanges (Jarvenpaa et al., 2000, Ba et al., 1999, Hoffman et al., 1999, Noteberg et al., 1999). The issue of trust is even more critical in electronic commerce (e-commerce) since the degree of uncertainty of an e-commerce transaction is higher than in a traditional commerce transaction – i.e., a consumer's e-commerce transaction decision is made based upon his or her confidence in selling parties' processes that are not transparent (Urban et al., 2000). This is in stark contrast to the traditional brick-and-mortar business environment, where trust is based on personal relationships and face-to-face interactions between consumers and retailers.

Although research on trust in e-commerce transactions has well elucidated the essential role of trust and its

antecedents in building long-term relationships (Kim et al., 2008, Kim et al., 2005, Kim et al., 2004, Gefen et al., 2003, McKnight and Chervany, 2002, McKnight et al., 2002, Pavlou, 2003, Pavlou et al., 2007), one critical limitation of prior e-commerce trust studies is that the dynamic nature of trust (i.e., changing over multiple stages of interactions) is not considered from a longitudinal perspective. Recently, Gefen, Benbasat, and Pavlou (2008) present an agenda for the future research to extend the conceptual foundations of trust to improve the practice in online environments. They mention that trust is not only about one-time interactions. Since trust develops gradually over time, “future research could opt for longitudinal studies of trust in online environments to uncover the unexplored nature and effects of trust over time” (p. 277).

This is a crucial omission since consumers' post purchase process differs qualitatively from the pre purchase process; they already have prior experiences. A different theoretical insight is needed to understand the nature and effects of trust over time on long-term relationships in e-commerce transactions. Thus, there is clearly a need to study the dynamic nature of trust from a longitudinal (pre- and post-purchase) perspective. This paper attempts to fill this gap by studying the dynamic nature of trust in e-commerce transactions as a two-fold strategy (pre and post).

LITERATURE REVIEW

Meta-analytic studies on online trust are reviewed, since they cover literature from a comprehensive perspective and help to ensure that the next wave of primary research moves in the correct direction. There have been at least five meta-analytic studies to date that have reviewed and critically synthesized consumer trust and online consumer behavior in electronic commerce contexts. A meta-analysis study conducted by Chang, Cheung, and Lai (2005) reviews 45 empirical studies on the antecedents of online shopping and derived two reference models for online shopping adoption. According to the findings of their study on trust, most empirical studies have tested the direct effect of trust. Whether trust is mediated by other variables has not been explored.

Another meta-analysis conducted by Grabner-Krauter and Kaluscha (2003) provides an integrative review of the empirical literature on on-line trust in electronic commerce. One important argument addressed in their paper based on the findings of the analysis is that trusting intentions (e.g., willingness of to buy, intention to purchase) and their antecedents are examined more often, whereas trust-related behaviors (e.g., completion of purchase, actual use) are investigated in only a few studies (Kim and Prabhakar, 2004, Pavlou, 2003, Suh and Han, 2003). Since intentions do not automatically imply behaviors, trust-related actual behavior (i.e., completion of purchase) as a consequent of trust has to be measured (Grabner-Krauter and Kaluscha, 2003). Another noticeable finding of the analysis is that on-line trust is not static but a dynamic phenomenon. To take into account the dynamic nature of trust, longitudinal studies are required. However, the majority of the reviewed studies did not specify the phase of trust from a longitudinal perspective. A similar argument is made in another meta-analysis study conducted by Saeed, Hwang, and Yi (Saeed et al., 2003). In their study they point out that a major avenue for future research is to investigate, the relationships between website use, online purchase, and post-purchase satisfaction (Saeed et al., 2003).

A limitation of most prior e-commerce research found across several of the cited meta-analytic studies is that previous online consumer trust research in electronic commerce area has not examined the dynamic nature of consumer trust from a longitudinal viewpoint.

THEORY GROUNDING

According to consumer marketing literature (Blackwell et al., 2001, Kalakota and Whinston, 1997, Blackwell and Stephan, 2001), the consumer purchase process consists of three general phases: pre-purchase, purchase and post-purchase phases. These phases of consumer behavior occur in electronic commerce transactions as well as traditional transactions (Blackwell and Stephan, 2001). While the successful completion of the initial transaction is an important first step in e-commerce relationship, the long-term relationship depends not only on the factors that fostered the pre-purchase phase, but also on the outcomes of the pre-purchase decision (Oliver, 1993).

An important point from the *social exchange theory* perspective is that the trustor-trustee relationships terminate or continue based on two types of comparisons (Kelly and Thibaut, 1978, Thibaut and Kelley, 1959, Blau, 1964). The first type is the comparison of the relationships with other partners (i.e., the alternative relationship comparison). In other words, the trustor-trustee relationship may continue unless they find any better relationships with someone else. The second type is the comparison of the relationships with the current partner (i.e., the balance or give-and-take relationship comparison). In general, the trustors want to keep the

balance between giving and taking from the relationship with the trustee. When they perceive a smaller take/give ratio based on the prior interaction and experience of the relationships, they may terminate the relationship with trustees and try to find a better relationship elsewhere.

As an indicator of how well the trustees (e.g., vendors) provide services, *satisfaction* is critical because if trustors (e.g., customers) are satisfied with trustees' performance, both parties will build a mutual understanding and the relationships will be more likely to continue. Therefore, in an e-commerce context, as the customer's satisfaction increases with respect to the vendor's performance, their trust increases and the intention to continue the relationships with the existing vendors will also increase.

Drawing from the social exchange theory perspective, a *conceptual dynamic trust model* is proposed (see Figure 1). The underlining mechanism of the model describes as follows: Let a purchase transaction happen at time t . The dynamic trust model rests on the logic that both post-trust and satisfaction significantly affect relationship retention (e.g., willingness to reuse, intention to repurchase) in time $t+1$. The degree of post-trust is adjusted at time $t+1$, based on the level of pre-trust at time $t-1$ along with the level of satisfaction with the previous transaction experience at time t . Satisfaction also plays a mediating role in pre-trust. The pre-trust at time $t-1$ plays the role of an anchor for the adjusted level of trust (i.e., post-trust) at time $t+1$. Without negative encounters (e.g., bad experience, negative word-of-mouth, etc.), the level of post-trust is enhanced from pre-trust because of the service consistence of a vendor.

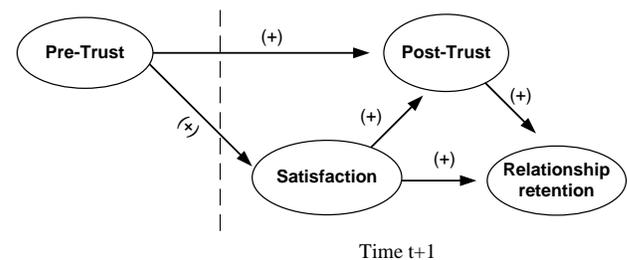


Figure 1. Dynamic Trust Model

E-CHANNEL TRUST VERSUS E-VENDOR TRUST: RESEARCH MODEL AND HYPOTHESES

In an e-commerce context, from a consumer's perspective there are at least two trustees: Internet as a shopping channel and an Internet selling party or Internet vendor as a business partner. Since an e-commerce transaction requires a consumer's sensitive personal and financial information (e.g., address, phone number, and credit card numbers), if the consumer does not have a certain level of trust in the selling party, he or she is also reluctant to make a transaction with the selling party. Further, e-commerce transactions involve trust not only between the consumer and the selling party, but also between the

consumer and the computer-mediated Internet channel through which the transactions are executed (Grabner-Krauter and Kaluscha, 2003). Thus, this study focuses on a consumer's trust in both trustees (i.e., e-channel and e-vendor) as trust-entities.

Trust and risk are closely related to each other. As an impersonal form of system trust (Grabner-Krauter and Kaluscha, 2003), the concept of *e-channel trust* is primarily related to a medium-specific transaction risk of using open technological infrastructures (i.e., the Internet) for monetary transactions (Chaudhury et al., 2001), while *e-vendor trust* as an interpersonal form of trust is associated with a partner-specific transaction risk that results from decisions of the partner, his ability, integrity, and willingness to perform. Grabner-Krauter and Kaluscha (2003) define system-dependent uncertainty (equivalent to system-specific transaction risk) as exogenous or environmental uncertainty that relates to "potential technological sources of errors and security gaps or to put it economically to technology-dependent risks that cannot be avoided by an agreement or a contract with another actor who is involved in the transaction" (p. 785). Transaction-specific uncertainty (correspondent to partner-specific transaction risk) is defined as "endogenous or market uncertainty that results from decisions of economic actors and is caused by information asymmetry between sellers and buyers" (p. 786).

Satisfaction is an indicator of how well the vendors provide services. This is critical because if customers are satisfied with vendor performance, both parties will build mutual understanding and the relationships will be more likely to continue. Therefore, as the customer's satisfaction increases with respect to the vendors' performance, his or her trust increases and the intention to continue the relationships with the existing vendors will also increase. For the e-channel case, when the customers use the Internet for the first time as a new channel of shopping, it is natural for them to have a lower degree of trust since e-channel involves a higher degree of uncertainty and risk compared with the conventional shopping channel. However, once they have a positive experience (i.e., satisfied experience) that contributes to building a new level of trust in e-channel, they do not hesitate to reuse the e-channel. Thus satisfaction, as a summary of the trustor's previous experience, will, in turn, affect post-trust that is a prerequisite for future behaviors (i.e., reuse, repurchase, etc).

In e-commerce context, a consumer has pre-trust in e-channel (an e-vendor) before they place their first Internet order through the Internet using the e-vendor's Website. The next level of trust (i.e., post-trust) is revised based on their satisfaction level of the previous transaction experience. Consequently, when they need to make another transaction, post-trust will play the role that the pre-trust did. Over time, the consumer develops stable and

mature trust in the trustees (i.e., e-channel and e-vendor) after they are consistently satisfied with the trustee's performance.

The degree of post-trust is associated with the degree of pre-trust. If a consumer has not experienced negative encounters during e-commerce transaction, the level of post-trust is consistent or improved from that of pre-trust. However, there are conflicting hypotheses have been proposed for the relationship between pre-trust and post-trust for negative experiences. Some studies (e.g., (Anderson and Sullivan, 1993)) argue that consumers who have a high degree of pre-trust are likely to be unperturbed by a single small negative experience. So, the level of post-trust is not much changed. Some other studies (e.g., (Bitner et al., 1990)) argue that negative experiences for those who have a high degree of pre-trust produce a contrast effect so that the negative effect is enhanced. Thus, I hypothesize the triangular relationships as:

Hypothesis 1a/b: *A consumer's pre-trust in e-Channel (e-Vendor) positively affects a consumer's post e-Channel (e-Vendor) trust.*

Hypothesis 2a/b: *A consumer's pre-trust in e-Channel (e-Vendor) positively affects a consumer's satisfaction of the transaction via the e-Channel (with the e-Vendor).*

Hypothesis 3a/b: *A consumer's e-Channel (e-Vendor) satisfaction positively affects a consumer's post e-Channel (e-Vendor) trust.*

The role of trust in e-commerce has been elevated by many studies (Gefen, 2002, McKnight and Chervany, 2002, Jarvenpaa et al., 2000, Li et al., 2006) because of the high degree of risk present in most e-commerce transactions. In the context of e-commerce, since most electronic transactions are not-instantaneous (i.e., payment may occur in advance before delivery is completed) across large geographical distances, consumers are very concerned with that e-vendors won't adhere to their transactional obligations. Thus, a consumer's belief (i.e., trust) concerning an e-channel (e-vendor) is a direct determinant of willingness to make a transaction (Kim et al., 2008). Trust enables one to engage in an online transaction despite the presence of risk. By the same token, in the re-purchase phase, post-trust, (the adjusted pre-trust by satisfaction) directly influences a consumer's future favorable intent to repurchase through the e-channel from the e-vendor. Thus, drawing from the arguments above, we propose the following research hypotheses:

Hypothesis 4a/b: *A consumer's post e-Channel (e-Vendor) trust positively affects a consumer intention to reuse the e-Channel (to repurchase through the e-Vendor).*

Hypothesis 5a/b: A consumer's e-Channel (e-Vendor) satisfaction positively affects a consumer's intention to reuse the e-Channel (to repurchase through the e-Vendor).

RESEARCH DESIGN AND DATA COLLECTION

This study used Web-based surveys in a longitudinal design. The instrument development was carried out following the three stages suggested by Moore and Benbasat (1991): i) item creation, ii) scale development, and iii) instrument testing. The data was collected in two phases which created a temporal separation by introducing a time lag between the measurements of independent and dependent variables (i.e., separation of measurements). The respondents were assured that there was no right or wrong answer, meaning that they should answer questions as honestly as possible. These procedures reduced their evaluation apprehension.

For the main field study, two rounds of surveys were distributed to a group of students enrolled in lower level¹ undergraduate courses at a large public university in the Northeastern United States. The participation was voluntary, and it took 15-20 minutes for students to complete each phase. Those who did not wish to take the survey were given the option of doing some other work of equal value. To increase the seriousness of participation to the participants, they were given 2% of extra course credits for each stage, and all participants were entered into random drawings for a chance to win four \$100 cash-prizes.

To test the research hypotheses of the study concerning two objects of trust by two phases: pre-purchase and post-purchase stages, this research requires a relatively complex data collection (i.e., data about e-Channel and e-Vendor from the same respondents at two separate time periods). Especially for collecting multi-stage data about consumers' pre-trust in e-Channel and e-Vendor, self-reported data are necessary in studies of this kind. By using students, we were better able to avoid attrition between data collection points, and thereby avoid a critical threat to validity. Therefore, student subjects for this study provide another major advantage. The surveys received a total of 767 responses for the first phase and 730 responses for the second phase. Due to the fact that students participated in the study voluntarily for extra credit, it would be possible for them to provide mock responses. After eliminating duplicate, invalid and/or incomplete responses, a total of 658 usable responses were collected.

¹ Since one part of this research model focuses on initial e-Channel trust, we collected data from lower level undergraduate students to increase the possibility of collecting data from first time e-Channel users.

After the respondents reported the URL of their very recent B2C transaction site at the first phase survey, they were asked to answer these two questions: "Was the electronic commerce transaction the very first of its kind in your life?" and "Was the transaction the very first with this e-vendor?" Since this study focuses on initial trust and post trust in e-Channel/e-Vendor, we classified the data based on these questions. As expected, only a small number (73) of respondents reported that the transaction was the very first in their life. Two-hundred forty-nine respondents reported that their transaction was the very first transaction with the e-vendor. The remaining respondents were the ones who had previous transaction experience with the e-vendor. In short, 73 and 249 samples were used for data analyses and e-Channel and e-Vendor trust model testing, respectively.

DATA ANALYSES AND RESULTS

The proposed hypotheses of the research model were tested using Partial Least Squares (PLS)-Graph e.0.1060, which is a structural modeling technique that is well suited for testing both the measurement model and highly complex predictive structural models at the same time (Chin, 1998b, Chin, 1998a).

Measurement Model Testing

To ensure the appropriateness of the measurement model, it was tested for the reliability of internal consistency, and convergent and discriminant validity (Bollen, 1989, Chin and Gopal, 1995).

Structural Model Testing

The assessment of the structural models includes estimating path coefficients and R-square. Both R-square and the path coefficients show how well the model is performing (i.e., model fit) (Hulland, 1999). The model fit is analyzed as a measure of the validity of the model, and statistical tests, (t-tests) of path coefficients are used to draw conclusions regarding the research hypotheses. The results of the model assessment are presented in Figure 2.

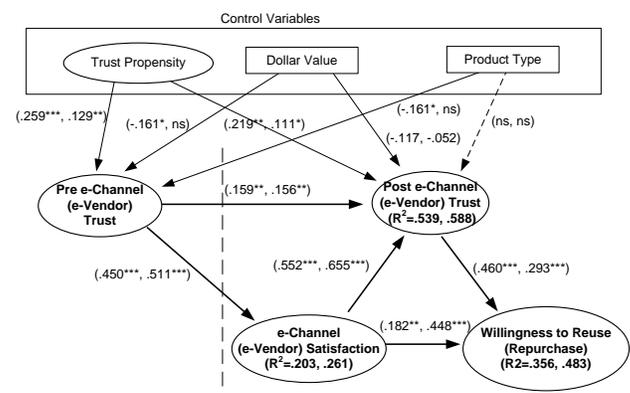


Figure 3. Structural Model Results

As shown in the results of the e-Channel trust model, a consumer pre e-Channel trust shows a strong positive effect on a consumer's post e-Channel trust (Beta = .159, $p < 0.01$). As expected, the pre e-Channel trust strongly affects a consumer's e-Channel satisfaction (Beta = .450, $p < .001$) and, in turn, e-Channel satisfaction strongly affects post e-Channel trust (Beta = .552, $p < .001$). Finally, a consumer's e-Channel reuse intention is significantly affected by e-Channel satisfaction (Beta = .182, $p < .01$) and post e-Channel trust (Beta = .460, $p < .001$).

Now turning to how the model fits, the R-square for post e-Channel trust, e-Channel satisfaction, and e-Channel reuse intention are .539, .203, and .356, respectively. The relatively high R-squares show that the model fits well with the data and provides a strong explanation of the variance in these variables. For example, the R-square of e-Channel reuse intention is .356, indicating that the model explains 36% of the variability in a consumer's e-Channel reuse intention.

For the e-Vendor trust model, a Consumer's pre e-Vendor trust has strong positive effect on both post e-Vendor trust and e-Vendor satisfaction. A consumer's post e-Vendor trust is strongly affected by e-Vendor satisfaction in the post-purchase phase. All hypothesized paths in the model are significant at the 0.01 level. A consumer's repurchase intention is strongly affected by e-Vendor satisfaction and post e-Vendor trust. The beta coefficients with the results of hypotheses are summarized in Table 3. The R-squares of post e-Vendor trust, e-Vendor satisfaction, and repurchase intention are .588, .261, and .483, respectively.

DISCUSSION AND CONCLUSION

This study has several key findings. First, the triangular relationships among pre trust, satisfaction, and post-trust in e-Channel and e-Vendor models were confirmed. Another important finding in this study is that a consumer's e-Channel (e-Vendor) satisfaction and post-e-Channel (e-Vendor) trust are strong determinants of a consumer's e-Channel reuse intention (repurchase intention) in post-purchase phase. The causal relationship between pre-trust and satisfaction can be justified by Festinger's cognitive consistency theory (Festinger, 1957).

Implications of the study

This present study proposes a dynamic trust model, which suggests that trust at time $t-1$ (i.e., pre-trust) influences trust at time $t+1$ (i.e., post-trust). The model has broken down the pre-trust \rightarrow post trust link into two paths. One is the *direct route* from pre-trust to post trust. The other is the *transient route* containing satisfaction as a mediator between pre-trust and post trust. This study also provides empirical evidence of the dynamic nature of trust in an e-commerce context though the e-Channel and e-Vendor trust model. The influence of pre-trust on post-adjusted

trust was found to be equal across the two trustees (i.e., e-Channel and e-Vendor).

This study also provides a theory which bridges two important constructs (i.e., consumer trust and satisfaction) based on the dynamic trust model over two phases (i.e., pre-purchase and post-purchase). To the best of our knowledge, this is one of the first studies that focus on the dynamic nature of trust from a longitudinal viewpoint in the context of both the e-channel and the e-vendor. The findings of the research also have important practical implications. Trust coupled with satisfaction is among the biggest factors that determine a long-term relationship, which is imperative to the success of a business. Importantly, post trust, the adjusted trust, plays exactly the same role as the pre-trust does in the earlier time frame. Thus, from a practical perspective, Internet business managers should consider trust not just as an output of one time process but as an iterative and evolving process itself.

Limitations of the study and suggestions for future research

In this study we focused on direct and indirect effects of pre-trust and satisfaction on post-trust. However, the argument of dynamic trust could also work if satisfaction is explicitly modeled as a moderator – post-trust is less than pre-trust if satisfaction is low, but greater than pre-trust if satisfaction is high. Thus, an interesting future study will compare alternative models of dynamic trust (i.e., direct, mediated, and moderated effect models).

In addition, there is an interesting intuitive relationship that exists between an e-Channel and e-Vendor trust. Unless the potential consumers of e-commerce have a certain level of pre trust in e-Channel, they are not willing to use this new shopping channel. However, once consumers have a positive experience with electronic commerce transactions, the e-Channel trust is not a serious barrier anymore. After this stage, e-Vendor trust plays a major role in electronic commerce transactions (e-transactions). Thus, a certain level of e-Channel trust is more important for the first time consumers and for the consumers who have had negative experiences. It seems that the pre e-Channel trust is a necessary but not a sufficient condition to adopt the e-Channel for the pre stage of e-Channel adoption, while e-Vendor trust is another condition to make a transaction with an e-Vendor. During a consumer's pre purchase stage via the e-Channel, a consumer's trust in a certain e-Vendor plays a major role which then affects a consumer's purchase decision from that e-Vendor. However, the consumer's e-Vendor trust may or may not be a necessary condition because some consumers make e-transactions even if they perceive a low level of e-Vendor trust. In this case, consumers' decisions are mainly affected by other factors such as perceived benefit, low cost, quality of service,

etcetera. Drawing from the discussion above we propose the following proposition for a future follow-up study.

Proposition: e-Channel trust is a necessary condition to adopt the e-channel as a new shopping medium but e-Vendor trust is not a necessary condition for some groups of consumers.

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Due to the space limitations, references are not included, but are available from the author upon request.

Participating in Open Source Software Projects: The Role of Empowerment

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ABSTRACT

As a community-based innovation, Open Source Software (OSS) development intrigues researchers and practitioners, especially on why OSS projects succeed with light coordination and control mechanisms. In the view that the viability and sustainability of an OSS project rely on individuals' contribution and engagement, we investigate how the psychological feelings of empowerment derived from the assessments of OSS tasks affect participants' participation outcomes. In particular, we posit that empowerment can lead directly to participants' task performance and satisfaction in OSS projects. In addition, empowerment's effect on task performance and satisfaction can also be mediated by task effort. The research model is supported by data collected from 233 OSS participants. Theoretical contributions and managerial implications of this study are discussed.

Keywords

Empowerment, Open Source Software, participation

INTRODUCTION

In recent years, there are studies investigating how the context of OSS communities and individual characteristics such as values, beliefs and motives affect individuals' participation in OSS projects (e.g., Bagozzi and Dholakia, 2006, Lakhani and Wolf, 2005, Shah, 2006, Roberts et al., 2006). As an open innovation, OSS involves tasks that are of unique characteristics. A task refers to a set of activities directed toward a purpose (Thomas and Velthouse, 1990b). According to the empowerment theory, the assessments of a task have an impact on an individual's feelings and thus motivate the individual to perform the task (Hackman and Oldham, 1980, Gagne et al., 1997, Spreitzer, 1995). Empowerment is defined as positively valued experiences that individuals derive directly from a task (Thomas and Velthouse, 1990b). That is, empowerment is aroused by task assessments that occur within the person and refer to the task itself, rather than to the context of the task or to rewards mediated by others (Spreitzer, 1995). Unfortunately, few studies examined the effect of empowerment in the OSS context though tasks in OSS communities are unique and may allow participants to derive sense of empowerment. Also, most of the OSS research has investigated motivations to participate in

OSS projects and ignored the outcomes of such participation. Investigating how an individual's sense of empowerment derived from tasks in OSS projects affects their participation outcomes can extend our understanding of the success of open innovation in general, and OSS communities in particular.

To bridge the gap in the extant literature, we develop the research model by drawing upon empowerment theory. Our research model is supported by data collected from OSS participants.

THEORETICAL UNDERPINNINGS AND RESEARCH HYPOTHESES

The drivers for participants to contribute to and remain engaged in OSS projects are of great interest to researchers and practitioners (Ke and Zhang, Forthcoming, Roberts et al., 2006, von Hippel and von Krogh, 2003, von Krogh and von Hippel, 2006). Prior research has mainly focused on effects of the context of OSS communities, the ideology of OSS movement and individual characteristics such as values, beliefs and motives (e.g., Shah, 2006, Roberts et al., 2006, Lakhani and Wolf, 2005, Bagozzi and Dholakia, 2006). For example, Stewart and Gosain (2006) investigate how ideology affects the effectiveness of OSS development performance. Stewart et al. (2006) assess the influence of license choice and organizational sponsorship on individuals' interest and participation in OSS projects. Roberts et al. (2006) and Shah (2006) study the effect of individual extrinsic and intrinsic motivation.

According to the empowerment theory, an individual's assessments of a task exert an influence on the individual's feelings and motivation to perform the specific task (Spreitzer, 1995, Gagne et al., 1997, Hackman and Oldham, 1980). Thus, we expect that the feeling of empowerment derived from task assessments in OSS may play a critical role in motivating an individual to make contributions and be committed to the OSS project. Empowerment refers to positively valued experiences that individuals derive directly from a task (Thomas and Velthouse 1990; Gagne et al. 1997). Specifically, it is defined as an individual's experience of motivation that is based on cognitions about him- or herself in relation to a specific task (Spreitzer, 1995,

Seibert et al., 2004). Stated alternatively, rather than referring to the context of the task, empowerment is aroused by task assessments that refer to the task itself (Spreitzer 1995).

It is established that empowerment should be conceptualized as a gestalt of four types of feelings, namely autonomy (or self-determination), competence, meaningfulness and impact (Spreitzer, 1995). Autonomy refers to a sense of freedom in making choices about how to perform the task and being personally responsible for the results; competence is defined as the belief in one's ability to perform the task successfully; meaningfulness is the perceived value of the task in relation to one's personal beliefs, attitudes and values; and impact refers to the belief that one is producing intended effects and has control over desired outcomes through one's task behavior (Spreitzer 1995; Thomas and Velthouse 1990).

Theoretically, it is proposed that the empowering design of task provides opportunities for, rather than constraints on, individual mind-set and behavior (Thomas and Tymon, 1994, Mowday and Sutton, 1993, Spreitzer, 1995). As such, it is recognized as means by which managers can effectively manage organizations. Indeed, the positive effect of empowerment on task performance and satisfaction has gained empirical support (e.g., Liden et al., 2000, Thomas and Tymon, 1994, Spreitzer, 1995). Task performance refers to the cognitive outcome of individuals' conducting the task (Tsai et al., 2005). In contrast, satisfaction is defined as the affective consequence of effortful engagement in the task (Cherrington, 1980). Following the empowerment theory, we expect that empowerment, the psychological feelings derived from the cognitive assessments of a task, can have positive effect on OSS participants' task performance and satisfaction. In OSS projects, tasks can provide individuals with the feelings of autonomy and competence (Roberts et al. 2006). In addition, participants may gain feelings of competence by distributing their creation, receiving feedbacks from peers and enhancing their capability by leveraging the resources in the communities (von Hippel and von Krogh 2003). Also, tasks in OSS communities can be meaningful to participants. It is touted that the continuous improvement of OSS and its free distribution create value for the individuals, organizations and society (Lado and Ke, 2008). With the feelings of empowerment derived from a task, an individual experiences meaningfulness of the task, responsibility for the outcomes of the task, and knowledge of the actual results of the task (Kirkman et al., 2004). It motivates the individual to take greater risk and try out novel ideas, which is required by the complex, knowledge-based task. Since the individual performs the task for self-generated intrinsic reasons and if performing well can create positive affect, he or she would reduce the forms of task withdrawal that slows their effort. Such

engagement helps to increase work quality and improve the acquisition of task-related skills (Kanfer, 1991). Thus, an individual with the sense of empowerment would achieve a higher level of task performance. In addition, the sense of empowerment derived from a task motivates an individual to execute discretionary behaviors which satisfies his or her higher-order individual needs. Aligning the behavior of participating in OSS projects with his or her individual values, the individual derives higher satisfaction from task accomplishment. Hence we have the following hypotheses:

Hypothesis 1 A participant's empowerment is positively related to his or her task performance in an OSS project.

Hypothesis 2 A participant's empowerment is positively related to his or her satisfaction with an OSS project.

As a motivational construct, empowerment is translated into accomplished work by means of task effort expended by an individual (Parsons 1968). Conceptually, task effort consists of three components: commitment (or duration), intensity (or force) and direction (Kanfer, 1991). Commitment is defined as "the determination to try for a goal and the persistence in pursuing it over time" (Hollenbeck et al., 1989). It has two aspects namely time commitment and task persistence. Time commitment is defined as the duration of time that the individual dedicates to the task, while task persistence refers to the individual's continued effort in overcoming difficulties when performing the task (Tsai et al., 2005, Yeo and Neal, 2004). Effort intensity refers to the amount of resources that are expended. That is, effort intensity refers to how hard a person tries to carry out a chosen behavior (Kanfer, 1991, Yeo and Neal, 2004). In contrast, task direction is a person's behavioral choice and is often measured as choice decisions between mutually exclusive courses of action (Kanfer, 1991). This study focuses on the first two dimensions of task effort, i.e., commitment and intensity, due to two reasons. First, we are interested in only individuals who participate in OSS projects (i.e., their effort direction is to work on OSS projects). Therefore, people who are not OSS community participants are not of relevance to the current research. Second, it is established that commitment and effort intensity constitute the essence of working hard (Brown and Leigh, 1996). Thus it is appropriate for the current study to focus on these two dimensions to investigate OSS participants' effort expended on the projects.

In OSS projects, individuals may be motivated by empowerment along the dimensions of autonomy and competence (Ryan and Deci, 2000) from their participating in OSS projects. Given that autonomy and competence are two social psychological needs (Deci and Ryan, 2000), these individuals will expend high levels of effort and remain engaged when working on OSS

projects. In addition, tasks in OSS communities not only provide a sense of enjoyment and fun. They also allow individuals to make a difference to the software, how the software is developed and how members interact with each other to work toward the common goal of continuously improving the software. Higher levels of meaningfulness and perceived impact are believed to result in commitment, involvement and concentration of energy (Kanter, 1968, Thomas and Velthouse, 1990a). As such, empowerment energizes and sustains an individual's performing OSS tasks (Kanter 1968; Thomas and Velthouse 1990).

Hypothesis 3 An individual's empowerment is positively related to his or her task effort expended on the OSS project.

Task effort should also play a mediating role between empowerment and behavior outcomes. That is, empowerment has an indirect effect on task performance and satisfaction through task effort. Parsons (1968) defined effort as the means by which motivation is translated into accomplished work. This definition suggests that effort plays a mediating role between motivation and behavior outcomes. Empowerment is an individual's psychological feelings. It may arouse an intention to act. But it may not be able to lead to behavior outcomes directly. Instead, it is the effort through which empowerment is translated into behavior outcomes such as task performance (Brown and Leigh, 1996, Klein et al., 1999). Alternatively, if there is no effort, empowerment may not have effect on behavior outcomes (Locke and Latham, 1990, Locke et al., 1981). Such mediating effect

Table 1. Internal Consistency and Discriminant Validity of Constructs

	Constructs	CR	AVE	1	2	3	4	5	6	7	8	9
1	EM_MEAN	.91	.76	.87								
2	EM_CMP	.91	.76	.34	.87							
3	EM_AUTO	.91	.77	.28	.44	.88						
4	EM_IMP	.94	.84	.45	.52	.38	.92					
5	TIME_CM	.89	.74	.47	.42	.10	.59	.86				
6	TASK_PST	.90	.75	.43	.41	.17	.57	.60	.87			
7	INTENSITY	.91	.66	.41	.41	.15	.45	.59	.73	.81		
8	TASK_PRF	.95	.86	.30	.51	.17	.67	.65	.49	.47	.93	
9	SAT	.83	.56	.53	.44	.31	.48	.54	.54	.57	.45	.75

of task effort is empirically supported in psychology and marketing disciplines (Brown and Peterson, 1994, Brown and Leigh, 1996, Christen et al., 2006). We expect that this notion can be extended to the OSS context. Together, we have the following hypotheses:

Hypothesis 4 Task effort influences task performance in OSS projects.

Hypothesis 5 Task effort influences satisfaction in OSS projects.

RESEARCH METHODOLOGY

The data to test our model is collected as part of a larger data collection using the survey method from OSS project participants. We randomly selected potential respondents from the discussion forums hosted by sourceforge.net and some other on-line forums, such as MySQL and OpenOffice. Then we sent out about 2000 invitations to these people and asked them to fill out a questionnaire posted on SurveyMonkey.com, an online survey service provider. One week later, we sent the first reminder to encourage participation in the survey. The second reminder was sent one week after the first reminder. A total of 233 responses were included to test our model in this paper. We tested the non-response bias by the method suggested by Armstrong and Overton (1977). That is, we compared the chi-squares of the responses from the first 25% of the respondents to that of the final 25%. The significant difference would indicate the presence of non-response bias. Our results showed that there was no non-response bias.

The measurement items in our questionnaire were adapted from existing validated and well-tested scales in the extant literature. These scales had been proved to have good validity and reliability. In the questionnaire, all items were measured with 5-point Likert scales, ranging from "strongly disagree" to "strongly agree." Also, we provided the choice of "not applicable". The instrument for empowerment was adapted from (Spreitzer, 1995). The measurement items for task effort were adapted from (Yeo and Neal, 2004) and Tsai et al. (2005). Task performance and satisfaction were measured by items adapted from Tsai et al. (2005) and Brown and Peterson (1994), respectively.

DATA ANALYSIS AND RESULTS

Table 1 shows the composite reliability (CR) of each reflective construct. It is recommended that CR should be .70 or higher, which is satisfied by all constructs. AVE measures the amount of variance that a construct captures from its indicators relative to the amount due to measurement error. It is recommended that it should exceed .50. As shown in Table 1, the AVEs of all constructs exceeded .50. Hence, all three conditions for convergent validity were met.

Discriminant validity between constructs was assessed using Fornell and Larcker's recommendation that the square root of the AVE for each construct should exceed the correlations between this construct and all the other constructs (Fornell, 1981, Chin, 1998). In Table 1, the shaded numbers on the diagonals are the square root of the AVEs. Off-diagonal elements are the correlations among constructs. All diagonal numbers are much greater than the corresponding off-diagonal ones, indicating satisfactory discriminant validity of all the constructs.

Structural Model and Hypotheses Testing

To test the research model, the second order constructs are treated as reflective constructs with the measures of the latent variable scores of the dimensions. That is, empowerment is measured by the latent scores of the four first-order constructs, and task effort is measured by the latent scores of the three first-order constructs. The R squares for Task Performance and Satisfaction are both 0.46. Also, all links are significant at the level of $p < .001$. Thus, all hypotheses are supported.

Hypotheses H3 and H5 imply the mediating effects of task effort on the relationships between empowerment and task performance and between empowerment and satisfaction. We followed the three-step procedure to test such mediating effects. When task effort is not in the model, empowerment has a .67 co-efficient on task performance. As indicated in Figure 2, the coefficient between empowerment and task performance decreased to .37 when task effort is introduced as a mediator. Similarly, empowerment has a coefficient of .60 on satisfaction when task effort is not in the model, and this coefficient is reduced to .35 when task effort is introduced as a mediator. Thus the implied mediating effects are supported. Task effort partially mediates empowerment's effect on task performance and satisfactory. Overall, empowerment has both direct and indirect effects on task performance and satisfaction. Furthermore, the variances explained for both Task Performance and Satisfaction were greatly increased in the model with task effort being controlled (0.46 vs. 0.37, and 0.46 vs. 0.36 for Task Performance and Satisfaction, respectively).

DISCUSSIONS AND CONCLUSION

Our interest in investigating how empowerment affects participation outcomes in OSS communities is triggered by the lack of research that examines the effects of individuals' psychological feelings derived from the assessments of tasks. In the view that the design of tasks in OSS communities are quite different from proprietary software development tasks, such research unveils the underlying influencing mechanism that lead participants to contribute to and remain engaged in OSS projects and thus extends our understanding of OSS success. Our data analysis results indicate that empowerment aroused by task assessments plays an important role in affecting participants' task performance and satisfaction in OSS projects. In particular, as a construct of a gestalt of four types of feelings (meaningfulness, autonomy, competence, and impact), empowerment satisfies individuals' psychological needs, makes them favor the opportunities to create value for themselves and communities and keep them remain committed to the goal of continuous improvements of software in OSS projects. Such a conceptualization allows us to gain a more complete view of the influencing process of task assessments on individuals' participation outcomes.

Our research further reveals that, in addition to directly affecting task performance and satisfaction, empowerment indirectly influences participation outcomes through task effort. As a process variable, task effort partially mediates the relationships between empowerment and task performance and satisfaction. Therefore, different from prior studies that only investigate empowerment's direct effect, this research finding shows that it is critical to have task effort controlled when investigating empowerment's effect. Stated alternatively, leaving out the variable of task effort from a research model on empowerment may lead to inaccurate findings and dubious results.

It is important to evaluate the current study's results and contributions in light of its limitations. First of all, there are other salient factors that can affect an individual's performance in and satisfaction with an OSS project, such as leadership styles and individual competence. While the focus of the current study is on empowerment and examining the effect of these other factors is beyond the scope of the current study, future research should formulate a more integrated model so that we can compare and contrast different drivers' effects. Second, we collected data during one period of time. All the major constructs were measured by respondents' perceptions, which are subjective. Future research should use some objective measures and across multiple time points. A longitudinal study may enrich research findings by offering additional information on the causal relationships between independent and dependent variables.

Our study makes two major theoretical contributions. First, this study unveils how empowerment is translated into outcomes in the OSS context, directly and indirectly through task effort. Examining the mediating role played by task effort extends our understanding of the underlying influencing process of empowerment in OSS communities. Second, this is one of the first studies that examine the effect of psychological feelings derived from task assessments. Different from previous studies that investigate the effect of personal motivations aroused by the environment and personal dispositions (e.g., Shah 2006; Roberts et al. 2006), we focus on the intrinsic motivation derived from the assessments of tasks in OSS projects. Such focus provides more insights into the design of tasks which can be managed by project leaders.

Our study also has practical implications for the management of OSS projects. In particular, empowerment has significant impacts on participation outcomes. OSS project leaders and other stakeholders thus should find ways to maximize participants' sense of empowerment. For example, designing tasks to fit participants' capability

(such as high modularity and fine granularity), allowing participants to self-assign tasks, articulating the rhetoric of the project, encouraging active participation and highlighting possible changes that can be made by individual participants are all possible ways to affect participants' task assessments and thus enhance sense of empowerment. In addition, knowing that task effort partially mediates the empowerment-participation outcome relationships, practitioners should realize that, in addition to task design, they can influence outcomes by directly affecting task effort expended. Specifically, project leaders can call upon participants to work hard on the chosen task and encourage and support participants when they face difficulties and barriers.

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Usability of “Trusted Shops”

An Empirical Analysis of eCommerce Shops

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Keywords

Usability, eCommerce shops, empirical analysis, seals of approval, trusted shops

The diffusion of the internet has great influence on the buying behaviour of people and produces a plurality of business models and opportunities especially for SMEs. But it is often difficult for users of an online shop to judge the quality of products properly. Often, the layout and usability of eCommerce websites influences the perception of good product quality. A user-friendly interface enables users to familiarize with a website immediately. Furthermore, it increases the willingness to buy and to visit the website again. In this research, we analyze the state-of-the-art of usability in online shops through an analysis of the usability of 140 “trusted shops”, a German insurance label for SME eCommerce shops. The aim is on the one hand to investigate the state-of-the-art and on the other hand to derive concrete design recommendations.

We decided to select an expert-based analysis approach as we wanted to analyze eCommerce shops in large numbers. For the collection of a comprehensive list of examination criteria, a two-step way was chosen. By taking into account both the existing literature in the domain as well as the actual requirements from practice the resulting criteria catalogue is grounded in established ways of website design research and does at the same time not miss out on features prevalent in practice. First, we decided to take an inductive, exploratory approach by arranging expert interviews in order to gain some insight into criteria that are necessary for good usability of eCommerce stores run by SMEs. An analysis of previous studies was the background for the arrangement of expert interviews with four shop operators and developers. Second, complimentary and additional criteria were derived from literature. A consolidation of both methods led to a list of 60 criteria for the analysis of eCommerce usability. Based on the criteria catalogue we empirically analyzed how far “trusted shops” put knowledge about usability into practice. “Trusted Shops” is by its own account a leading seal of approval in Europe with a money-back guarantee for consumers. The aim of seals of approval is the establishment of consumer trust towards relatively unknown e-commerce operators. The research criteria were divided into the four thematic areas shopping, searching, registering and buying. They were formulated in an easy understandable way. Researchers were able to answer most of the questions with a simple yes or no. Examination criteria addressed questions in the areas of the main page, navigation, search, product detail page, shopping cart and order process.

It turned out that most eCommerce offerings from SMEs have a variety of deficiencies. For example, the evaluation of the results concerning standardized hyperlinks turned out to be worse than expected. 75 % of all shop use wide variations from the standard, such as underlined links in blue und visited hyperlinks in purple. Nearly 20% of all analyzed shops use elements that look like an advertisement, even though they are areas of information. Furthermore, product detail descriptions are very short or incomplete at 28.6 % of the shops. It can be very helpful to add the product to the shopping cart and return to the product site without effort. But only 47.5% of shops allow an easy return with just one click.

In total we found that most of the shops have great room for improvement. However, we also found some consensus among eCommerce offerings. For example, there are approx. nine products presented on the home page. 85% of all websites place their logo on the upper left corner. As a first study in this research area, our study is limited to small to medium-sized eCommerce shops. A comparison between large shops and the analyzed ones would additionally be revealing. Furthermore, the study is limited to European shops (especially German shops).

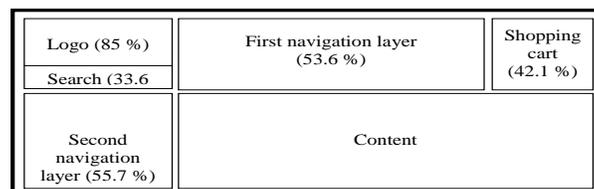


Fig 1: Scheme of the most commonly used layout for online shops

The Effect of Personalized Virtual Model and Voice Chat Support on Presence in Collaborative Online Shopping

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ABSTRACT

Collaborative online shopping refers to the activity in which a consumer shops at an online store concurrently with one or more remotely located shopping partners such as her friends or family. Although collaborative shopping is one of the popular ways of shopping in an offline context, many existing studies regarding online shopping have focused mainly on shopping by individuals; few studies have examined how to enhance the collaborative online shopping experience. This study examines two features that have the potential to enhance collaborative online shopping experiences in the context of a clothing store: a personalized virtual model and voice chat support between shopping partners. Drawing from theories of media richness and social presence, we will examine whether implementing these two features can increase telepresence and copresence.

Keywords

Collaborative shopping, telepresence, copresence, avatar, chat, online store.

Facilitating the Usage of Decision Strategies by Interactive Decision Aids: A Conceptual Analysis

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ABSTRACT

Internet shops like *amazon.com* or *activeshopper.com* enable customers to compare a large amount of products (e.g., digital camera) and product properties (e.g., price) in form of a comparison matrix. For choosing the preferred product from a comparison matrix, customers apply decision strategies. Riedl et al. (2008), for example, summarize and define thirteen important decision strategies (*Behavior Research Methods*, Vol. 40, No. 3, pp. 795-807). The application of most of these strategies can be facilitated by interactive decision aids like (i) sorting of products, (ii) a conditional drop function, or (iii) performing pairwise comparisons between products (see examples below). This research studies the relationship between decision strategies and the proper interactive decision aid(s). In particular, it addresses the following research question: Which type of interactive decision aid is necessary to support the application of specific decision strategies? The provision of decision aids is important, because they may reduce the effort to apply a particular strategy and/or increase decision accuracy. Based on our conceptual analysis, web designers can tailor systems that offer those decision aids that fit best to their customers' decision strategy, thereby facilitating decision processes.

Keywords

decision making, interactive decision aids, e-commerce, human-computer interaction, decision strategies

Examples for interactive decision aids (Source: *activeshopper.com*)

		
<p style="text-align: center;">SORT</p>	<p style="text-align: center;">CONDITIONAL DROP</p>	<p style="text-align: center;">PAIRWISE COMPARISON</p>

Comparison Of Users' Perceptions In The Pre- And Post-ERP Implementation Phases

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ABSTRACT

This study examines users' perceptions (Capability, Value, Timing, and Acceptance) of an ERP implementation at a major aircraft manufacturing company in the pre-Implementation phase (T1) and the immediate post-Implementation phase (T2), which is referred to in the literature as the Shakedown Phase. Our study is one of only a few that looks at users' perceptions over time, and that focuses on the Shakedown phase. We obtained 205 T1-T2 matched responses and 120 open ended comments at the post-implementation phase (T2). A comparison of the four key perceptions shows a statistically significant drop for all of the perceptions, except for User Acceptance. This is an interesting finding, implying that users continue to perceive the ERP system as important even though their perceptions regarding capability, value, and timing drop significantly from pre-implementation to post-implementation stage. We further explore the variations in these perceptions across tenure with the company and job profiles.

KEYWORDS: ERP, implementation, shakedown, users, perceptions.

The Effects of Portal Affiliations and Self-Proclaimed Assurance on Consumer Trust: Investigating Customers' Purpose of Visit as a Moderator

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ABSTRACT

Customers sometimes visit Internet stores just for fun, without strong intentions to purchase a product (hereafter "to browse"), and they sometimes visit with strong intentions to purchase a product (hereafter "to purchase").

Our research question is whether or not customers respond to the same interface features in a different manner depending on their purpose of visit (e.g., to browse or to purchase).

We believe that this is an important question for Internet stores. If Internet stores can predict different influence of a certain web interface feature on customers who have strong purchase intentions from the store, then they can design Web shopping sites to serve those customers more effectively. For example, assuming that those customers who visit to purchase usually conduct checkout processes, while those who visit to browse are less likely to conduct checkout processes, it would be effective to include the Web interface features that are especially effective for those who visit to purchase in the checkout screens.

This study will investigate whether or not customers' purpose of visit (e.g., to purchase or to browse) moderates the impact of portal affiliation and a store's self-proclaimed assurance on customer trust. A laboratory experiment is designed to investigate whether or not customers who have a different purpose of visit respond to portal affiliation and self-proclaimed assurance in a different manner.

Keywords

Trust, Portal Affiliation, Assurance, Purpose of Visit, Moderation.

Matching People And Groups: Recruitment And Selection In Online Games

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ABSTRACT

Massively multiplayer online games (MMOGs) have great potential as sites for research within the social and behavioral sciences and human-computer interaction. This is because “guilds” — semi-persistent groups in online games — are much like groups in real organizations. In this paper, we examine how groups and individuals find appropriate matches and whether appropriate matches lead newcomers to stay longer in their groups in an online game environment. Results from archival data, observation, and survey in the game World of Warcraft (WoW) indicate that different selection methods lead to person-group fit for social and task-oriented characteristics and good fit leads recruits to stay longer in their group. In particular, recruitment of new members to task-oriented guilds was most successful when brief interactions were used whereas recruitment to social-oriented guilds was most successful when probationary periods and referrals were used.

KEYWORDS: Fit, MMOGs, Guilds, Players, Selection, Retention.

Customization and/or Social Shopping: How do Digital Millennials Shop Online?

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ABSTRACT

This paper investigates how Social Shopping and Customization interplay to affect Digital Millennials' online shopping experience. We test whether the social richness of online shopping in pairs can overcome the leanness of the online shopping experience. Can the interactivity of Online Customization accomplish the same purpose? Is there a synergistic, interaction effect? Our 2x2 experimental design with 182 subjects examines this question with customizable versus packaged vacation travel. Analyses of Perceived Effectiveness, Perceived Ease of Use, Perceived Enjoyment and Intent to Purchase suggest that a user's Intention to Purchase is linked to the suitability of the site's user interface as well as the perceived social / technological richness of the website. The results shed light on Digital Millennials' online shopping preferences and provide guidance to web site designers incorporating Social Shopping or Customization into online shopping applications. Future research will extend the results to other populations, task domains and devices.

Keywords

social shopping, customization, digital millennials, online shopping, intent to purchase

A Study of the Organizational Critical Success Factors Affecting the Quality of IT Service

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ABSTRACT

Information systems have been a well researched topic based on their development, implementation, effectiveness, success and more recently Business-IT alignment. Of late, since the new model of IS function which includes a significant “service” component, there have been number of studies on “how to measure IT/IS service quality using the SERVQUAL instrument”. Our literature review, however, has revealed that there are few studies which provide a holistic view of which organizational factors affect the attributes of SERVQUAL and in what manner. In this paper, we first identify the individual organizational factors affecting the quality of IT service, and then develop a conceptual model to classify those factors and their relationships. The goal of our project is to study how those factors affect the quality of IT services and, with that understanding, to find ways to improve the quality of IT services. The proposed framework will facilitate organizations to judge the present state of their IT ecosystem and guide them to improve their IT service quality.

Keywords

IT Service Quality, Information Systems, IS Effectiveness, Critical Success Factors

User Behavior and Decision Making: The role of decisional Guidance in Decision Support

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ABSTRACT

The very nature of decision support systems (DSS) is to guide and support the user. Yet decisional guidance has surprisingly not dominated empirical DSS research. In this research we examine the role of decisional guidance in decision support. We postulate that the effect of decisional guidance on decision outcomes is mediated by the subjective experience of the user in interacting with the DSS. Furthermore we develop a theoretical and empirical analysis of the different role decisional guidance plays for users of different levels of domain expertise: novices and experienced (but not expert) practitioners. Using a purpose built experimental platform with 135 subjects we find the effects on decisional guidance on perceptions of the DSS and confidence in decision outcomes varies interactively between type of guidance (informative versus suggestive) and level of expertise

KEYWORDS: Decision support, human computer interaction, decisional guidance, expertise, confidence, perceived usefulness.

Understanding Conflict Escalations in Virtual Teams: A Social Network Approach

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ABSTRACT

One crucial aspect of conflict management in teams is to avoid conflict escalation. When escalation occurs the entire team will be consumed by arguments among disputants and cannot accomplish its task. While many studies have provided theoretic framework for the academic understanding of team conflicts, they did not suggest convenient measurement for the monitoring of the status of team conflicts. This project seeks to bridge this gap by studying four hundred virtual teams that were formed over past ten for complex tasks. We will apply social network analysis to identify the social network patterns associated with conflict escalations. We believe that the results from this research could contribute to the theoretic understanding of the conflicts in virtual teams. In addition, this study could provide managers and team leaders measurements to monitor the status of conflict. Finally, the research described may provide insight for the design of CMC systems.

Keywords

Social Network Analysis, Virtual Teams, Team Conflict.

An Empirical Analysis of Usability-Sociability Design for Sustaining Virtual Communities

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ABSTRACT

This study aims to explore how the usability and sociability design of virtual communities could encourage members' continuous participation in the communities. A theoretical model is proposed to explain the effects of usability and sociability design on continuous participation through members' perceived usefulness, enjoyment and sense of belonging. Data is collected from members of five popular leisure oriented virtual communities in China. The results show that both perceived usefulness and enjoyment have impacts on members' continuous participation intention. Among the usability and sociability design factors, we find that personalized service is the most critical mechanism that encourages members to continuously participate in virtual communities, while community infrastructure, friend connection and event organization also have positive effects on members' continuous participation intention through individual motivations. However, it is surprising to find out that leaders' involvement has no influence on members' continuous participation intention. Both theoretical and practical implications of this study are discussed.

KEYWORDS: Usability-sociability design, Virtual community, Continuous participation.

Computer Mediated Social Ties and Knowledge Sharing

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ABSTRACT

Understanding social interactions and knowledge sharing behavior in the organizational context is important as an organization's success is increasingly dependent on how efficiently and effectively knowledge workers share information with others. Knowledge workers are increasingly interacting via computer and communication technologies. In this research we integrate theories of computer mediated communication with theories and prior mixed findings about the strength of social ties and knowledge sharing to theorize about the effects of computer-mediated communication (CMC) on social ties and ultimately on knowledge sharing between individuals in firms. Specifically we theorize about the ability of CMC to a) support diverse social ties, and b) facilitate frequency-based strong social ties that hold strong trust – both supporting knowledge sharing. In a social network survey of 70% of employees in an innovation driven organization located in China, our analysis confirms our theorizing and offers contributions to IS and organizational researchers as well as practitioners.

Keywords

Social interactions, computer mediated communication, social ties, social networks, knowledge sharing.

Towards Understanding the Formation and Impact of E-service Failures

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ABSTRACT

E-service failure has been the bane of e-commerce by compelling consumers to abandon transactions entirely or to switch to brick-and-mortar establishments. Yet, despite the downsides of e-service failures, there has not been a study to-date that systematically investigates how perceptions of failure arise within online transactional environments and their impacts on consumer behavior. Departing from the multi-attribute utility approach prevalent in conventional consumer research, this study advances a typology of e-service failure from a goal-directed perspective. Assimilating Lee and Ariely's (2006) shopping goal theory with Van Osselaer et al.'s (2005) classification of consumer goals, it is the contention of this study that when transacting online, consumers are not only motivated to (1) purchase a product suited to their extrinsic requirements (i.e., consumption goals) and personal preferences (i.e., criterion goals) while enjoying the transactional experience (i.e., process goals), but they are also seeking ways to (2) translate what are often elusive intentions into tangible objectives (goal activation) and achieve those objectives in the most efficacious manner (i.e., goal implementation). Consequently, e-service failures can be delineated according to the type of consumer goal (i.e., consumption, criterion or process) they target and the transactional stage (i.e., activation or implementation) at which they occur. A research model of e-service failure is then constructed and testable hypotheses are derived.

To empirically validate the model, a 3x3 experimental design is proposed and elaborated. The experiment employs a 3 (Type of Failure: Activation Success + Implementation Failure; Activation Failure + Implementation Failure or Activation Failure + Implementation Success) x 3 (Type of Goal: Consumption; Criterion; or Process) between-subjects factorial design will be conducted. A totally separate control group without any form of e-service deficiency (Activation Success + Implementation Success) across the three goal categories will also be incorporated into the experimental design to contrast differences in consumers' perceptions, attitudes and behaviors arising from the distinction between the presence and absence of implementation failures given the successful activation of consumer goals. It is anticipated that the empirical findings from our experiment will serve to inform academics and practitioners on: (1) how consumer perceptions of different types of e-service failure manifest on e-commerce websites, and; (2) their impact on transactional attitudes and intentions.

Conceptually, our proposed experimental study is designed to not only verify the veracity of our research model, but to also challenge the premise underlying past research into consumer behavior. Theories like the EDT have contended that expectations constructed from previous transactional experiences form the baseline from which consumers assess future transactions. Yet, if we were to establish goal activation as a prerequisite for perceptions of implementation failure to arise, it will imply that while prior transactional experiences might be pertinent in affecting consumer behavior, goals—which are activated through immediate interactions with the e-commerce website—may be a more salient influence. Additionally, the experiment represents an opportunity to validate our typology of e-service failures by demonstrating how they might occur in reality and explaining why each e-service failure type might be more or less effective in affecting online consumer behavior. Pragmatically, empirical findings can offer cautionary advice to practitioners to be vigilant in web interface design so as to avoid activating unwanted goals, especially when the website is ill-equipped to fulfill them. Further, the typology of e-service failures can provide guidelines for practitioners to establish benchmarks for designing error-free e-commerce websites. Finally, this study acts as a pre-requisite to uncovering corresponding e-service recovery mechanisms that can be offered on e-commerce websites to alleviate consumers' disappointment and feelings of dissatisfaction in the event of e-service failures.

Keywords

E-Service Failure, Goal-Directed Perspective, Goal Activation, Goal Implementation, Consumption Goals, Criterion Goals, Process Goals.

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