CONTINUED USE OF TECHNOLOGY: COMBINING CONTROLLED AND AUTOMATIC PROCESSES

Research-in-Progress

Youngseek Kim
Syracuse University
221 Hinds Hall
Syracuse, NY 13244
ykim58@syr.edu

Ping Zhang
Syracuse University
328 Hinds Hall
Syracuse, NY 13244
pzhang@syr.edu

Abstract

This study investigates factors influencing individual users' continued use of technology, or technology continuance. Technology continuance is defined as individual user's continued employment of system. We consider mobile computing technology as a particular example for the investigation. In this paper, we first review the theoretical backgrounds based on the literature of post-adoption studies. Then we develop a research framework which considers both controlled and automatic processes. In particular, a person's technology continuance is determined by both continuance intention and habit. In the continued use of technology, intention can be influenced by satisfaction of previous experiences, which are affected by cognitive and affective beliefs; and beliefs and satisfaction are also influenced by confirmation of prior expectation. Habit, which is also influenced by satisfaction, can affect the continuance usage behavior. A research design was developed, and the research model will be empirically tested by a survey with mobile computing technology users.

Keywords: Mobile Computing Technology, Post-Adoption, Technology Continuance, IT/IS Continuance

Introduction

Early Information Systems (IS) research placed much emphasis on how people adopt technologies rather than how people use (or abandon) these technologies. The adoption studies recognize the initial acceptance as a critical step toward realizing IS success (Jasperson et al. 2005; Kim et al. 2007a; Saeed et al. 2008). However, IS success cannot be achieved or judged without continued use of technology, which is called technology continuance in this research. Drawing on the recent literature on the system usage (Burton-Jones et al. 2007; Burton-Jones et al. 2006), we define technology continuance as individual user's continued employment of system. Compared to technology adoption studies, little has been studied on how people continue to use or discontinue using technologies after adoption (Jasperson, et al., 2005; S. S. Kim, 2009; Limayem, Hirt, & Cheung, 2007). Usage behavior, commonly called post-adoption (Jasperson, et al., 2005), is at least equally important to attaining information technology implementation in an organization (Limayem, et al., 2007). Post-adoption is also important for individuals' technology continuance behavior in a non-organizational context.

Previous studies mainly approached the post-adoption behavior as a cognitive process, where people consciously examine their technologies during the usage stage. The majority of initial post-adoption studies employed the theories used in the adoption studies including Technology Acceptance Model (TAM) (Bhattacherjee 2001a; Hong et al. 2006; Venkatesh et al. 1996; Venkatesh et al. 2002), Theory of Planned Behavior (TPB) (Hong et al. 2008; Hsieh et al. 2008; Kim 2009; Venkatesh et al. 2001), and Theory of Reasoned Action (TRA) (Ahuja et al. 2005; Cenfetelli et al. 2008; Hartwick et al. 1994; Karahanna et al. 1999) for their theoretical background. These studies applied the cognitive adoption models in studying the usage behavior longitudinally. Recent post-adoption studies have used Expectation Confirmation Theory (ECT) (Bhattacherjee 2001b; Hsu et al. 2006; Roca et al. 2006; Spiller et al. 2007) and Social Cognition Theory (SCT) (Chan et al. 2004; Compeau et al. 1999; Gallivan et al. 2005; Ye et al. 2008) in order to address the changes in perceptions on technologies after people use them. These theories also rely on people's cognitive reasoning, in regards with their post-adoption decision making processes.

Even though the cognitive aspect is important for the post-adoption behavior, non-cognitive aspects are also critical components. Affective aspect and habit are two major non-cognitive aspects, which need to be considered in studying the post-adoption of technology. Kim and colleagues found that affective aspect is also important, along with cognitive aspect, in studying post-adoption behavior (Kim et al. 2007a). Previously, scholars have reported that affective aspect is important in understanding adoption behavior (Agarwal et al. 2000; Hsu et al. 2004; Venkatesh 2000). The post-adoption behavior cannot be explained by using only cognitive and affective approaches, since people may unconsciously continue to use the technologies, without any cognitive reasoning or affective feeling. The long-term continued use of technology becomes a habitual and automated process, with less cognitive processing (Kim 2009; Limayem et al. 2007; Wu et al. 2008). Ouellette and Wood (1998) also stressed the importance of habit, saying that with any repetitive behavior, reflective cognitive processing dissipates over time, leading to non-reflective, routinized behavior.

This study focuses on the post-adoption behavior of individuals' mobile computing usage. Although there are a good number of mobile service adoption studies (Chang 2008; Kim et al. 2008; Lu et al. 2005; Rao et al. 2007; Teo et al. 2003; Wang et al. 2006), few studies have researched on the post-adoption usage of mobile computing. In addition, these studies have limitations in terms of their research constructs, which do not address the mobility issues of mobile computing technologies. This research investigates the factors that influence the continued use of mobile computing technology. Mobile computing technologies represent the next generation of computing devices that have become popular today thanks to Smartphone, Mobile PC, and other emerging mobile computing devices (i.e. iPad and iPod Touch). Different from organizational IS usage, people use mobile computing devices not only for utilitarian purposes, but also for hedonic purposes. Therefore, the affective aspect of mobile computing is as important as the cognitive aspect in both adoption and post-adoption behaviors. This study also considers habit as an important antecedent of the continued usage of mobile computing technologies. Over time, mobile computing usage would become habitualized unless interventions occur to disrupt the formation of these deep, non-reflective mental scripts (Jasperson et al. 2005).

This research in progress paper is organized into four parts. First, a review of the literature of post-adoption studies sets the groundwork for its theoretical background. Second, the research framework, mobile computing technology continuance model, is developed by combining the adapted IS continuance model, and the habitual usage of technology model. Third, a cross-sectional research design is developed to empirically test the research model. It

employs a survey of mobile computing technology users. Fourth, the expected outcomes and their implications will be discussed in the conclusion.

Theoretical Background for Technology Continuance

This research considers three major theoretical backgrounds, namely Expectation Confirmation Theory (ECT), IS continuance model, and habit, as major theories and constructs in studying the post-adoption of technology. Researchers have attempted to develop and empirically test diverse IT/IS continued use models (Bhattacherjee 2001b; Bhattacherjee et al. 2004; Karahanna et al. 1999). This study builds on the IS continuance model by Bhattacherjee (2001a), which is based on ECT, and one of the main variables from TAM, perceived usefulness. Both perceived usefulness and perceived enjoyment are considered major constructs, representing cognitive and affective aspects of post-adoption of technology. This study also considers habit as a major construct in the development of its theoretical framework.

Expectation Confirmation Theory

ECT addresses the phenomena of increasing user experiences with IT/IS over a time period, which needs to be considered in studying the continued use of technology. The ECT originally developed by Oliver (1980), theorizes that consumer's post-purchase satisfaction is jointly determined by pre-purchase expectation, perceived performance, and expectancy confirmation. The ECT hypothesizes that a consumer's level of satisfaction with a product/service determines re-purchase intention. In turn, the consumer's level of satisfaction with the product/service is determined by their initial expectations (pre-purchase expectations) on a product/service, and congruity between expectations and product/service performance (confirmation) (Hsu et al. 2006). The ECT is well suited to the understanding of technology continuance because it highlights the importance of post-adoption expectations, rather than pre-adoption expectations. Venkatesh and colleagues also indicated that in the earliest stage of technology adoption, users are making acceptance decisions that are systematically different from the continuance decisions as user experiences increase (Venkatesh et al. 2000).

IS Continuance Model

Bhattacherjee proposed a theoretical model of IS continuance that takes into account the distinctions between acceptance and continuance behaviors (Bhattacherjee 2001a; Bhattacherjee 2001b). The model is based on the similarity between individuals' continuous IS usage decisions and consumers' repeated purchase decisions by using the ECT. He integrated perceived usefulness and confirmation, which influence the users' satisfaction with IS. The satisfaction then influences the IS continuous intention. Compared to the original ECT, Bhattacherjee's IS continuance model does not include the performance variable, as it presumes that the influence of performance is already accounted for by the confirmation variable (Bhattacherjee 2001b). The exclusion of performance from the original ECT, suggests that the influence of performance is mediated by confirmation (Yi 1990). This research uses Bhattacherjee's IS continuance model by incorporating one additional user perception variable, perceived enjoyment, in order to enhance understanding of technology continuance. Extending the original IS continuance model by incorporating additional user beliefs, would enable us to broaden the scope of user behavior in the post-adoption stage, and at the same time to improve the applicability of the ECT framework in different IT usage contexts (Thong et al. 2006). Perceived enjoyment has been studied as an important antecedent to help explain the adoption and usage of hedonic IT/IS, such as mobile computing devices.

Habit

This research considers habit as a major construct that influences the continued use of technology. Across disciplines, habit is commonly understood as "learned sequences of acts that become automatic responses to specific situations, which may be functional in obtaining certain goals or end states" (Verplanken et al. 1997). In the context of IT/IS usage, habit can be defined as the extent to which people tend to perform behaviors (use IT/IS) automatically because of learning (Limayem et al. 2007). During the initial adoption of technology, individuals are most likely involved in active cognitive processing in determining their intentions to adopt the technology; however, with any repetitive behavior after the adoption of technology, reflective cognitive processing attenuates over time,

leading to non-reflective, routinized behavior (Ouellette et al. 1998). Previous post-adoption studies have ignored that frequently performed behaviors tend to become habitual, and thus automatic over time (Limayem et al. 2007). Therefore, the post-adoption of technology research needs to consider not only the continuance intention but also habit.

Habit needs to be considered from two perspectives, as an antecedent of continued use, and the antecedents to habit in the post-adoption of technology research. Researchers have studied habit in the nature of the relationship between intention and actual behavior, from the perspective of an antecedent of continued use. Limayem and colleagues argued that the impact of habit is best captured by modeling its relationship to intention (Limayem et al. 2007). Wu and Kuo reported that both habitual usage and past usage (frequency) influence the IS continuance intention significantly (Wu et al. 2008). Kim found that habit mechanism has a distal effect on post-adoption phenomena, along with sequential updating (Kim 2009). Scholars have also studied diverse factors that intensify habit. Previous post-adoption studies in IS researched on habit with various determinants for it (Kim 2009; Limayem et al. 2007; Wu et al. 2008). They included a couple of antecedents of habit including frequent repetition of the behavior in question, and the comprehensiveness of usage, which refers to the extent to which an individual uses the various features of the IS system in question (Limayem et al. 2007).

A Research Model for the Mobile Computing Technology Continuance

Our research model for the mobile computing technology continuance employed the IS continuance model, which explains an IS user's continuance behavior as the result of his/her cognitive or controlled judgment process, by incorporating affective belief along with cognitive belief and habit which is non-cognitive or automated process in continued use of technology. We believe that technology continuance is determined by both controlled and automatic processes. Regarding controlled process, technology continuance can be driven by IS users' cognitive perception (perceived usefulness), their confirmation toward the original expectation of technology performance, satisfaction in using the technology, and intention to continue to use the technology. In the cognitive perspective, the intention can lead to the actual technology continuance behavior. Regarding automatic process, both affective perception (perceived enjoyment) and habit are incorporated into the controlled process of IS continued use. The affective belief can play a parallel role as cognitive belief by influencing satisfaction and being related to the confirmation. Habit also plays a critical role in continued use of technology. Habit would influence the actual technology continuance behavior. In order to address the context of mobile computing technology continuance, we also included perceived mobility as a moderating variable in the relationships between conformation and perceived usefulness and between conformation and perceived enjoyment. Figure 1 below shows the mobile computing technology continuance model, and we explained each construct and related hypotheses at the below.

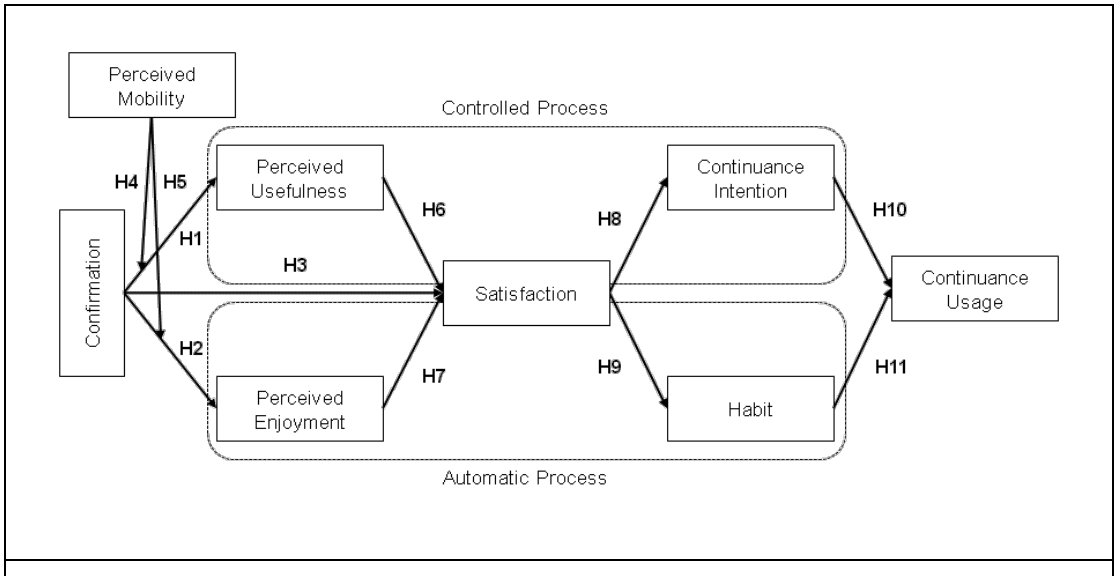

Figure 1. Mobile Computing Technology Continuance Model

Confirmation

Confirmation is the major component of IS continuance model based on ECT. From the perspective of IS usage, the ECT posits that the users' confirmation of expectations will have a positive effect on their perceived expectations of IS (i.e. perceived usefulness and perceived enjoyment) and their satisfaction in using IS. The IS continuance model builds on the assumption that users, after an initial adoption and a period of initial use, form an opinion of the extent to which their pre-adoption expectations are confirmed, and simultaneously, the users develop updated opinions about benefits (Larsen et al. 2009). After a period of use, a degree of confirmation and perceived benefits developed will influence the users' satisfaction with the technology. Previous post-adoption studies found that confirmation has positive relationships with perceived usefulness, perceived enjoyment, and satisfaction (Bhattacherjee 2001a; Bhattacherjee et al. 2004; Hong et al. 2006; Liao et al. 2007). Therefore, we hypothesize the following:

H1. Users' confirmation of expectations is positively related to their perceived usefulness with mobile computing technology.

H2. Users' confirmation of expectations is positively related to their perceived enjoyment with mobile computing technology.

H3. Users' confirmation of expectations is positively related to their satisfaction with mobile computing technology.

Perceived Mobility

Mobility allows people to access information anywhere they go. Compared to the wire-connected technologies, the mobile technologies provide us with the flexibility and convenience in terms of location and time. The improvement of mobile computing technologies also helps us to use the exactly same features of modern computers in our hands. Perceived mobility can be defined as the extent to which mobile computing technology is perceived as being able to provide pervasive and timely connections (Hong et al. 2008). Scholars found that perceived mobility influences perceived usefulness of mobile service (López-Nicolás et al. 2008), intention to continue usage of mobile services (Hong et al. 2008), or mobile computing usage (Mallat et al. 2009). In this research, we believe that perceived mobility would play a critical role in moderating how users develop their perceptions regarding usefulness and enjoyment from the confirmation of expectations. Therefore, we hypothesize the following:

H4. The association between confirmation and perceived usefulness is stronger in high perceived mobility than in low perceived mobility.

H5. The association between confirmation and perceived enjoyment is stronger in high perceived mobility than in low perceived mobility.

Perceived Usefulness and Perceived Enjoyment

This model considers both perceived usefulness and perceived enjoyment as the major components of both cognitive belief and affective belief. Perceived usefulness can be defined as the total value a user perceives from actually using a technology. In the TAM, perceived usefulness originally means "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989). However, since people use mobile computing technologies more than work purpose, perceived usefulness in this research means performance expectancy in accomplishing either works or personal tasks. Perceived usefulness is known extrinsic motivation as well as performance expectancy (Venkatesh 1999; Venkatesh et al. 2003). Extrinsic motivation refers to the performance of a goal-driven activity that leads to achievements or rewards (Thong et al. 2006). Therefore, the perceived usefulness in this research specifically means the post-adoption expectation in terms of utilitarian purpose and extrinsic motivations after people experience the technology. Numerous prior studies verify that perceived usefulness is an important indicator for technology acceptance and usage behavior (Davis 1989; Taylor et al. 1995; Venkatesh et al. 2000). Among the various beliefs in IT adoption research, perceived usefulness is the most consistent antecedent of user's intention to use IT (Davis 1989; Karahanna et al. 1999; Venkatesh et al. 2000), and a good number of post-adoption studies found that the perceived usefulness influences the satisfaction of using technologies, which logically influences the intention and actual behavior of continued use of technology (Bhattacherjee 2001b; Chea et al. 2008; Hsieh et al. 2007; Limayem et al. 2007). Therefore, perceived usefulness can be applied into users' satisfaction:

H6. Users' perceived usefulness of mobile computing technology based on their experience has a positive influence on their satisfaction with the technology.

Along with perceived usefulness, which is a cognitive belief, perceived enjoyment as an affective belief influence satisfaction. Individuals who experience pleasure or joy from using a technology, and perceive any activities involving the technology to be personally enjoyable in its own right aside from the instrumental value of the technology, are more likely to adopt the technology and use it more extensively than others (Davis et al. 1992). For this research, we expanded the IS continuance model by incorporating perceived enjoyment as additional post-adoption belief. Perceived enjoyment can be defined as "the extent to which the activity of using a certain technology is perceived as being enjoyable," which is considered to be an intrinsic source of motivation (Davis et al. 1992). Intrinsic motivation focuses on the pleasure and satisfaction of being involved in an activity (Deci 1971). This perceived enjoyment notion is in line with popular definitions of emotional value, which derive from feelings and affective states that IT artifacts generate (Kim et al. 2007b). Previous studies already confirmed the saliency of perceived enjoyment at the adoption stage of technologies (Igbaria et al. 1997; Venkatesh et al. 2001). A couple of post-adoption studies also confirmed the positive relationship of perceived enjoyment and satisfaction. Especially in the perspective of a hedonic IT, which emphasizes the fun aspects of using IT, perceived enjoyment has been found to be significant and even more important than perceived usefulness as a determinant of IT usage (Van der Heijden 2004). Therefore, we expect to see a significant impact of perceived enjoyment on the satisfaction:

H7. Users' perceived enjoyment of mobile computing technology based on their experience has a positive influence on their satisfaction with the technology.

Satisfaction

Satisfaction is an important factor which directly influences intention to continue to use mobile computing technology and habit. Satisfaction is believed to influence post-purchase attitude and consumers' intention to repurchase a product or reuse a service (Hsu et al. 2006). Most applications of the ECT model assume that satisfaction is the most immediate influence on future purchase intention (Hsu et al. 2006). In this research, we assume that users' satisfaction with technology has a positive effect on their intention to continue to use the technology. According to the similarity between re-purchasing products/services in a consumer context and the continued use of technology, the ECT posits an equivalent relationship in the continued technology usage context. In turn, users' satisfaction with technology is determined by the users' confirmation of expectations and both their perceived usefulness of technology and their perceived enjoyment of technology. Satisfaction has been studied in many previous studies, and they found the positive relationship between satisfaction and intention to continue to use technology (Bhattacherjee 2001a; Bhattacherjee 2001b; Hong et al. 2006; Limayem et al. 2007; Teo et al. 2008). Satisfaction is also found as a determinant of habit (Limayem, et al., 2007). Satisfactory experiences with a behavior are a key condition for habit development as they increase one's tendency to repeat the same course of action again and again (Aarts, Paulussen, & Schaalma, 1997). Therefore, we can hypothesize:

H8. Satisfaction has a positive effect on the intention to continue to use mobile computing technology.

H9. Satisfaction has a positive effect on the habit.

Continuance Intention

We believe that technology continuance can be determined by both individuals' cognitive intention to continue to use technology and habit which is non-cognitive and automated process toward technology continuance. Technology Continuance can be defined as the extent to which users take advantage of the major features of technology in terms of both depth and breadth. The depth of usage can be measured by the amount of time spent, and the breath of usage can be measured by the number of applications used with the technology. In the actual measurements, the depth of usage can be measured by the average weekly usage hours, and the breath of usage can be measured by the number of application categories which users spend with a minimum amount of time. We expect to see a positive relationship between the technology continuance intention and the actual continuance behavior with technology. Therefore, we can hypothesize:

H10. The intention to continue to use technology has a positive effect on the actual technology continuance behavior.

Habit

This research includes habit as a major construct. Habit in IS field is defined as the extent to which people tend to perform behaviors (use IS) automatically because of learning (Limayem et al. 2007). Defined this way, habit has relatively little conceptual overlap with intention (Limayem et al. 2007) and may thus provide additional explanatory power in explaining IS usage. Habit can play a significant role in affecting users' technology continuance. Habit would affect the actual continuance behavior with technology. Even though Limayem and colleagues found that habit has a moderation effect on the relationship between IS continuance intention and the actual continuance behavior (Limayem et al. 2007), recent studies reported that habit influences continuance behavior directly (Jasperson et al. 2005; Kim 2009; Ortiz de Guinea et al. 2009). We expect to see a significant impact of habit on the actual continuance behavior with technology. Therefore, we can hypothesize:

H11. Habit has a positive effect on the actual continuance behavior with mobile computing technology.

Research Design and Method

Survey Development

We will use a survey method to examine the constructs and hypothesized relationships of the mobile computing technology continuance model. The majority of survey items will be adopted from previous studies and modified for this research. The actual survey questionnaire will be created by adjusting the measures of the constructs for current mobile computing users. The questionnaire will help validate the new model and predict the technology continuance of mobile computing technologies. For the questionnaire, all the items from previous studies will be modified to make them relevant to the mobile computing context. Before the actual survey, we will validate the items through a pre-test procedure with 25 – 30 current mobile computing users to ensure content validity, completeness, readability, and understandability.

Sampling and Participants

The questionnaire data will be collected through an online survey. The population in this study focuses on mobile computing technology users in the U.S., and the sample population which we will collect is targeted towards 250 college students in the U.S. The number of 250 participants was introduced based on the effect size & power of previous studies, and the survey questionnaire and statistical analysis techniques which we are going to use. Since the college students are included in the majority of mobile computing users, we can generalize the results of this research to the population of general mobile computing users. Students enrolled in a mid-size university located in the north-eastern area of the U.S. will take the online survey from September to October of 2010. Participants will each be paid $5 for a valid response. The questionnaire will consist of research introduction and purpose, specific questions to measure the constructs, and respondents' demographic information.

Variables and Operationalization

The theoretical framework will be translated into the measurements of constructs. We can adapt the survey items which were mainly validated and tested by previous studies. Some of the measurements just focused on specific contexts, so we need to update them for individuals' mobile computing usage contexts. To measure the perceived usefulness and perceived enjoyment, we will take the construct items from Venkatesh & Davis (2000) and Davis, Bagozzi, & Warshaw (1992) for each. The items for perceived mobility will be adapted from Hong, Thong, Moon, & Tam (2008). The confirmation, satisfaction, and intention will be measured by using the items from IS continuance model by Bhattacherjee (2001b). We will measure habit by using the survey items from Limayen (2007). New items will be developed and adjusted in order to measure continuance intention and continued use of technology for this research by considering the number of applications and the time spent for each application.

Instrument, Reliability, and Validity

All the variables will be measured using Likert scales (1 – 7) which are ranging from 'strongly disagree' to 'strongly agree' and multiple-item scales. Respondents will be asked to mark the response which best describe their level of agreement in the statements. The instrument items have been developed and tested by many scholars. The well-developed items will ensure the reliability in terms of test-retest issue and internal consistency. Also, reliability assessment for each construct will be conducted to check internal consistency of variables. For construct validity, the items are adapted from the supportive literature. For content validity, a pilot study will be conducted to examine the questionnaire. The previous studies already ensured the internal validity issue. Also, our sampling process would improve external validity issue. The survey method will help validate the new model and predict individual users' mobile computing technology continuance.

Conclusion

Anticipated Findings

The purpose of this study is to understand the factors that influence individual users' mobile computing technology continuance. The previous post-adoption studies based on cognitive models cannot explain the individuals' continued use of technology. We believe that non-cognitive components including affective aspect and habit need to be considered in the post-adoption studies along with cognitive aspect. We expect that perceived usefulness and perceived enjoyment are the important antecedents of satisfaction, which leads to continuance intention. Based on ECT, confirmation of expectation would be positively related to perceived usefulness, perceived enjoyment, and satisfaction. Both continuance intention and habit would be affected by satisfaction. Habit would affect the actual continued use of technology. Also, the strength of the relationships between conformation and perceived usefulness/ perceived enjoyment would be moderated by perceived mobility. The analysis of the survey results will help us validate our research model and understand individual users' mobile computing continuance.

Strengths and Limitations of this Research

The current research design has some strengths and weaknesses. In regards to strength, first, the research model presented above has strong theoretical background, combining aspects of ECT, IS continuance model, and habit. Second, we use reliable constructs and measurements based on previous studies in order to support the reliability and validity of this research. Third, the mobile computing technology continuance model will show the complex nature of various factors that affect the continued use of technology. However, this research design has a few limitations. First, this research uses the college students as the major sample for mobile computing users. The future research may need to extend the sampling to general mobile computing users rather than college students. Second, this research does not address the features of mobile computing technology and their influences on post-adoption usage. The feature-centric view of technology in post-adoption studies will help what kinds of features of mobile computing technology are more continuously used for a long-term perspective. Third, this research employs a cross-sectional study method based on current mobile computing users. In order to address the time change issue, we can either consider longitudinal study method or compare the different groups based on their adoption stages. For future research, we will develop relevant research questions and address the major limitations of this research.

References

Aarts, H., Paulussen, T., and Schaalma, H. "Physical Exercise Habit: On the Conceptualization Formation of Habitual Health Behaviours," *Health Education Research* (12:3) 1997, pp 363-374.

Agarwal, R., and Karahanna, E. "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs about Information Technology Usage," *MIS Quarterly* (24:4) 2000, pp 665-694.

Ahuja, M.K., and Thatcher, J.B. "Moving Beyond Intentions and toward the Theory of Trying: Effects of Work Environment and Gender on Post-Adoption Information Technology Use," *MIS Quarterly* (29:3) 2005, pp 427-459.

Bhattacherjee, A. "An empirical analysis of the antecedents of electronic commerce service continuance," *Decision Support Systems* (32:2) 2001a, pp 201-214.

Bhattacherjee, A. "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly* (25:3) 2001b, pp 351-370.

Bhattacherjee, A., and Premkumar, G. "Understanding Changes in Belief and Attitude toward Information Technology Usage: A Theoretical Model and Longitudinal Test," *MIS Quarterly* (28:2) 2004, pp 229-254.

Burton-Jones, A., and Gallivan, M.J. "Toward a Deeper Understanding of System Usage in Organizations: A Multilevel Perspective," *MIS Quarterly* (31:4) 2007, pp 657-679.

Burton-Jones, A., and Straub, D.W. "Reconceptualizing System Usage: An Approach and Empirical Test," *Information Systems Research* (17:3) 2006, pp 228-246.

Cenfetelli, R.T., Benbasat, I., and Al-Natour, S. "Addressing the What and How of Online Services: Positioning Supporting-Services Functionality and Service Quality for Business-to-Consumer Success," *Information Systems Research* (19:2) 2008, pp 161-181.

Chan, S.-C., and Lu, M.-t. "Understanding Internet Banking Adoption and Use Behavior: A Hong Kong Perspective," *Journal of Global Information Management* (12:3) 2004, pp 21-43.

Chang, P.-C. "Drivers and Moderators of Consumer Behavior in the Multiple Use of Mobile Phone," 19th Australasian Conference on Information Systems, Christchurch, Australia, 2008.

Chea, S., and Luo, M.M. "Post-Adoption Behaviors of E-Service Customers: The Interplay of Cognition and Emotion," *International Journal of Electronic Commerce* (12:3), Spring2008 2008, pp 29-56.

Compeau, D., Higgins, C.A., and Huff, S. "Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study," *MIS Quarterly* (23:2) 1999, pp 145-158.

Davis, F.D. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance in Information Technology," *MIS Quarterly* (13:3) 1989, pp 319-340.

Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. "Extrinsic and Intrinsic Motivation to Use Computers in the Workplace," *Journal of Applied Social Psychology* (22) 1992, pp 1111-1132.

Deci, E. "Effects of externally mediated rewards on intrinsic motivation," *Journal of Personality and Social Psychology* (18:1) 1971, pp 105–115.

Gallivan, M.J., Spitler, V.K., and Koufaris, M. "Does Information Technology Training Really Matter? A Social Information Processing Analysis of Coworkers' Influence on IT Usage in the Workplace," *Journal of Management Information Systems* (22:1), Summer2005 2005, pp 153-192.

Hartwick, J., and Barki, H. "Explaining the Role of User Participation in Information System Use," *Management Science* (40:4) 1994, pp 440-465.

Hong, S.-J., Thong, J.Y.L., Moon, J.-Y., and Tam, K.-Y. "Understanding the behavior of mobile data services consumers," *Information Systems Frontiers* (10:4) 2008, pp 431-445.

Hong, S., Thong, J.Y.L., and Tam, K.Y. "Understanding continued information technology usage behavior: A comparison of three models in the context of mobile internet," *Decision Support Systems* (42:3) 2006, pp 1819-1834.

Hsieh, J.J.P.-A., Rai, A., and Keil, M. "Understanding Digital Inequality: Comparing Continued Use Behavioral Models of the Socio-Economically Advantaged and Disadvantaged," *MIS Quarterly* (32:1) 2008, pp 97-126.

Hsieh, J.J.P.-A., and Wang, W. "Explaining employees' Extended Use of complex information systems," *European Journal of Information Systems* (16) 2007, pp 216-227.

Hsu, M.-H., and Chiu, C.-M. "Predicting electronic service continuance with a decomposed theory of planned behaviour," *Behaviour & Information Technology* (23:5) 2004, pp 359 - 373.

Hsu, M.-H., Yen, C.-H., Chiu, C.-M., and Chang, C.-M. "A longitudinal investigation of continued online shopping behavior: An extension of the theory of planned behavior," *International Journal of Human-Computer Studies* (64:9) 2006, pp 889-904.

Igbaria, M., and Tan, M. "The consequences of information technology acceptance on subsequent individual performance," *Information & Management* (32:3) 1997, pp 113-121.

Jasperson, J., Carter, P.E., and Zmud, R.W. "A Comprehensive Conceptualization of Post-Adoptive Behaviors Associated With Information Technology Enabled Work Systems," *MIS Quarterly* (29:3) 2005, pp 525-557.

Karahanna, E., Straub, D.W., and Chervany, N.L. "Information Technology Adoption across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs," *MIS Quarterly* (23:2) 1999, pp 183-213.

Kim, H.-W., Chan, H.C., and Chan, Y.P. "A balanced thinking-feelings model of information systems continuance," *International Journal of Human-Computer Studies* (65:6) 2007a, pp 511-525.

Kim, H.-W., Chan, H.C., and Gupta, S. "Value-based Adoption of Mobile Internet: An empirical investigation," *Decision Support Systems* (43:1) 2007b, pp 111-126.

Kim, H., Lee, I., and Kim, J. "Maintaining Continuers vs. Converting Discontinuers: Relative Importance of Post-Adoption Factors for Mobile Data Services," *International Journal of Mobile Communications* (6:1) 2008, pp 108-132.

Kim, S.S. "The Integrative Framework of Technology Use: An Extension and Test," *MIS Quarterly* (33:3) 2009, pp 513-537.

Larsen, T.J., Sørebø, A.M., and Sørebø, Ø. "The role of task-technology fit as users' motivation to continue information system use," *Computers in Human Behavior* (25:3) 2009, pp 778-784.

Liao, C., Chen, J.-L., and Yen, D.C. "Theory of planning behavior (TPB) and customer satisfaction in the continued use of e-service: An integrated model," *Computers in Human Behavior* (23:6) 2007, pp 2804-2822.

Limayem, M., Hirt, S.G., and Cheung, C.M.K. "How Habit Limits the Predictive Power of Intention: The Case of Information Systems Continuance," *MIS Quarterly* (31:4) 2007, pp 705-737.

López-Nicolás, C., Molina-Castillo, F.J., and Bouwman, H. "An assessment of advanced mobile services acceptance: Contributions from TAM and diffusion theory models," *Information & Management* (45:6) 2008, pp 359-364.

Lu, J., Yao, J.E., and Yu, C.-S. "Personal Innovativeness, Social Influences and Adoption of Wireless Internet Services via Mobile Technology," *Journal of Strategic Information Systems* (14) 2005, pp 245-268.

Mallat, N., Rossi, M., Tuunainen, V.K., and Öörni, A. "The impact of use context on mobile services acceptance: The case of mobile ticketing," *Information & Management* (46:3) 2009, pp 190-195.

Ortiz de Guinea, A., and Markus, M.L. "Why Break the Habit of a Lifetime? Rethinking the Roles of Intention, Habit, and Emotion in Continuing Information Technology Use," *MIS Quarterly* (33:3) 2009, pp 433-444.

Ouellette, J.A., and Wood, W. "Habit and Intention in Everyday Life: The Multiple Processes by Which Past Behavior Predicts Future Behavior," *Psychological Bulletin* (124:1) 1998, pp 54-74.

Peijian, S., Wenbo, C., Cheng, Z., and Lihua, H. "Determinants of Information Technology Usage Habit," Pacific Asia Conference on Information Systems, 2007.

Rao, S., and Troshani, I. "A Conceptual Framework and Propositions for the Acceptance of Mobile Services," *Journal of Theoretical and Applied Electronic Commerce Research* (2:2) 2007, pp 61-73.

Roca, J.C., Chiu, C.-M., and Martínez, F.J. "Understanding e-learning continuance intention: An extension of the Technology Acceptance Model," *International Journal of Human-Computer Studies* (64:8) 2006, pp 683-696.

Ronis, D.L., Yates, J.F., and Kirscht, J.P. "Attitudes, Decisions, and Habits As Determinants of Repeated Behavior," in: *Attitude, Structure and Function*, A.R. Pratkanis, S.J. Breckler and A.G. Greenwald (eds.), Lawrence Erlbaum Associates, Hilldale, NJ, 1989.

Saeed, K.A., and Abdinnour-Helm, S. "Examining the effects of information system characteristics and perceived usefulness on post adoption usage of information systems," *Information & Management* (45:6) 2008, pp 376-386.

Spiller, J., Vlasic, A., and Yetton, P. "Post-adoption behavior of users of Internet Service Providers," *Information & Management* (44:6) 2007, pp 513-523.

Taylor, S., and Todd, P.A. "Understanding Information Technology Usage: A Test of Competing Models," *Information Systems Research* (6:2) 1995, pp 144-176.

Teo, T.S.H., and Pok, S.H. "Adoption of WAP-enabled Mobile Phones among Internet Users," *The International Journal of Management Science* (31) 2003, pp 483-498.

Teo, T.S.H., Srivastava, S.C., and Jiang, L.I. "Trust and Electronic Government Success: An Empirical Study," *Journal of Management Information Systems* (25:3), Winter2008 2008, pp 99-131.

Thong, J.Y.L., Hong, S.-J., and Tam, K.Y. "The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance," *International Journal of Human-Computer Studies* (64:9) 2006, pp 799-810.

Van der Heijden, H. "User Acceptance of Hedonic Information Systems," *MIS Quarterly* (28:4) 2004, pp 695-704.

Venkatesh, V. "Creation of Favorable User Perceptions: Exploring the Role of Intrinsic Motivation," *MIS Quarterly* (23:2) 1999, pp 239-260.

Venkatesh, V. "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model," *Information Systems Research* (11:4) 2000, p 342.

Venkatesh, V., and Brown, S.A. "A Longitudinal Investigation of Personal Computers in Homes: Adoption Determinants and Emerging Challenges," *MIS Quarterly* (25:1) 2001, pp 71-102.

Venkatesh, V., and Davis, F.D. "A Model of the Antecedents of Perceived Ease of Use: Development and Test*," *Decision Sciences* (27:3) 1996, pp 451-481.

Venkatesh, V., and Davis, F.D. "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science* (46:2) 2000, pp 186-204.

Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* (27:3) 2003, pp 425-478.

Venkatesh, V., Speier, C., and Morris, M.G. "User Acceptance Enablers in Individual Decision Making About Technology: Toward an Integrated Model," *Decision Sciences* (33:2) 2002, pp 297-316.

Verplanken, B., Aarts, H., and van Knippenberg, A. "Habit, Information Acquisition, and the Process of Making Travel Mode Choices," *European Journal of Social Psychology* (27:5) 1997, pp 539-560.

Wang, Y.-S., Lin, H.-H., and Luarn, P. "Predicting Consumer Intention to Use Mobile Service," *Information Systems Journal* (16) 2006, pp 157-179.

Wu, M.-C., and Kuo, F.-Y. "An Empirical Investigation of Habitual Usage and Past Usage on Technology Acceptance Evaluations and Continuance Intention," *The DATA BASE for Advances in Information Systems* (39:4) 2008, pp 48-73.

Ye, C., Seo, D., Desouza, K.C., Sangareddy, S.P., and Jha, S. "Influences of IT substitutes and user experience on post-adoption user switching: An empirical investigation," *Journal of the American Society for Information Science and Technology* (59:13) 2008, pp 2115-2132.

Yi, Y. "A critical review of consumer satisfaction," in: *Review of marketing*, V.A. Zeithaml (ed.), American Marketing Association, Chicago, IL, 1990.