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EXPLAINING INFORMATION SYSTEMS ADOPTION AND POST-ADOPTION: TOWARD AN INTEGRATIVE MODEL

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Abstract

This study develops and tests an integrated model that explains information systems usage at adoption and post-adoption stages. Integrating the theory of planned behavior with the IS continuance model, this research provides insights into the complementary nature of the two theories in explaining IS usage over time. In addition, the integrated model takes into consideration the "habit" construct in order to better explain the automatic nature of IS continuance. The integrated model is tested in a longitudinal setting. Results present strong support for the existing theoretical links of the theory of planned behavior and IS continuance model, as well as for those newly hypothesized in this study. Initial usage indicates significant affect IS continuance usage, and habit posits a significant moderating impact on the relationship between IS continuance intention and IS continuance usage. The dynamic interrelationship between acceptance and continuance decision and the variability of determinants of IS usage across different adoption stages are demonstrated. The implications are noteworthy for both researchers and practitioners.

Keywords: Expectation confirmation theory, habit, IS adoption, IS post-adoption, TPB

Introduction

Research on information systems usage behavior in the last two decades focused primarily on initial usage and adoption. Using models from social psychology, such as the theory of reasoned action (Fishbein and Ajzen 1975), and the theory of planned behavior (Ajzen 1991), IS researchers largely employed intention-based models to explore how users come to adopt a particular IS. However, IS adoption is just the first step toward overall IS success. Bhattacherjee (2001) and Limayem et al. (2003) have stressed the importance of continuance to assure a successful IS implementation.

Although numerous researchers have begun to study the subject in more detail (e.g., Karahanna et al. 1999, Venkatesh and Davis 2000, Venkatesh et al. 2002), these authors examined the IS post-adoption by extending the acceptance model in a longitudinal setting and employed the same set of acceptance variables to explain IS continuance. Recently, Bhattacherjee (2001) has developed an IS continuance model in line with the expectation confirmation theory and presented a new set of variables specific to the IS post adoption, arguing there are substantive differences between adoption and continuance behavior. However, his investigation stopped at intention, and he did not assessed IS continuance.

Moreover, regarding the application of intention-based models, prior research in IS adoption assumed that IS usage behavior is primarily determined by intention. Although this assumption has been validated in past IS research on IS adoption, it may not explain IS continuance usage equally well in the case of IS post-adoption. As Limayem et al. (2003) asserted recently, "While plausible in the case of IS adoption, this assumption may not be applicable to continued IS usage behavior as it ignores that

frequently performed behaviors tend to become habitual, and thus automatic, over time" (p. 2). Thus, there is a need to understand the impact of habit in the context of IS continuance usage.

As a step toward bridging the gap, this paper developed an integrated model of IS adoption and IS post-adoption that takes into consideration the habitual nature of IS continuance. This model then is tested in this setting. We expect this study will present important theoretical and practical contributions. On the theoretical side, we propose an integrated model explaining IS adoption and post-adoption. This research highlights the evolution of IS usage by integrating the theory of planned behavior model and Bhattacherjee's IS continuance model to explain IS usage at different stages. Moreover, we synthesize research on habit taken from other disciplines and extend the IS continuance model by proposing habit to moderate the relationship between intentions and continued IS usage behavior. On the practical side, this study identifies key drivers of IS usage at different stages and provides a set of tangible guidelines that help managers motivate the continuous usage of new systems.

This paper is structured as follows. We first provide the theoretical background of this study by reviewing the literature on intention-based models, IS continuance model, and habit. Building on this review, we introduce our theoretical model. We then describe the research methodology and discuss the statistical results. We conclude the paper by providing several managerial and research implications of this study. Finally, directions for future research are suggested.

Theoretical Background

Theory of Planned Behavior

IS researchers have employed intention-based models from social psychology as a theoretical foundation for research on the determinants of user behavior (Davis 1989). In the past two decades of IS adoption and usage research, there has been a predominant focus on cognitive behavioral models, including the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the technology acceptance model (TAM) and its variants. Applying this model to the study of IS adoption, IS usage behavior is predominantly explained by behavioral intention. Intention, in turn, is formed by attitudinal beliefs and social normative influences. Subsequent research has expended considerable efforts on extending the TRA model to explain other contextual and research concerns. With the various modifications and extensions of additional variables, the concept of perceived behavioral control, as proposed by Fishbein and Ajzen (1975) was widely recognized, and led to the development of the theory of planned behavior (TPB) (shown in Figure 1). According to Ajzen (1991), the more resources and opportunities individuals think they possess, the greater would be their perceived control over their behavior, and therefore, the greater the likelihood for these individuals to behave accordingly.

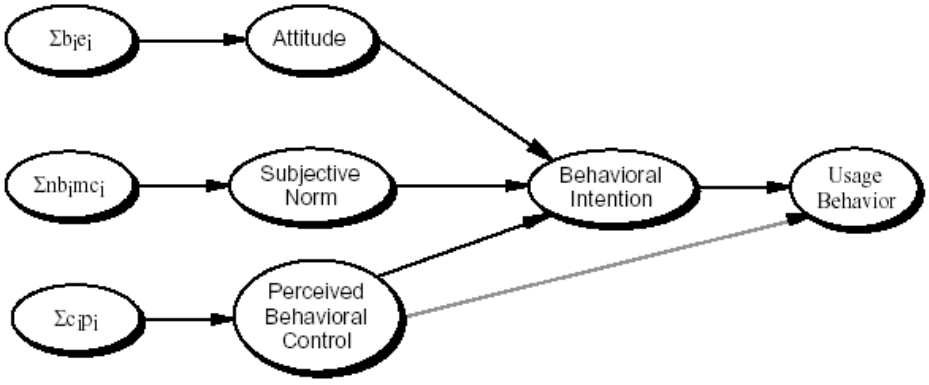

Figure 1. Theory of Planned Behavior Model

IS Continuance Model

Realizing the need to better understand continued IS usage behavior, several researchers have recently begun to study this subject (e.g., Karahanna et al. 1999, Venkatesh and Davis 2000, Venkatesh et al. 2002) by examining the intention-based models at both pre-adoption and post-adoption stages. However, it is important to note that IS continuance is not simply an extension of adoption

behavior. Bhattacherjee (2001) has empirically shown that antecedents of IS continuance usage differ considerably from those of initial adoption behavior. Based on expectation-confirmation theory, a theory widely used in the consumer behavior literature to study consumer satisfaction, post-purchase behavior and the like, Bhattacherjee's IS continuance model seeks to explain an IS user's *intention to continue* using an IS (see Figure 2). The model positively relates intentions to both satisfaction and perceived usefulness. Satisfaction and perceived usefulness are in turn positively related to the degree with which the user's expectations about the IS are confirmed.

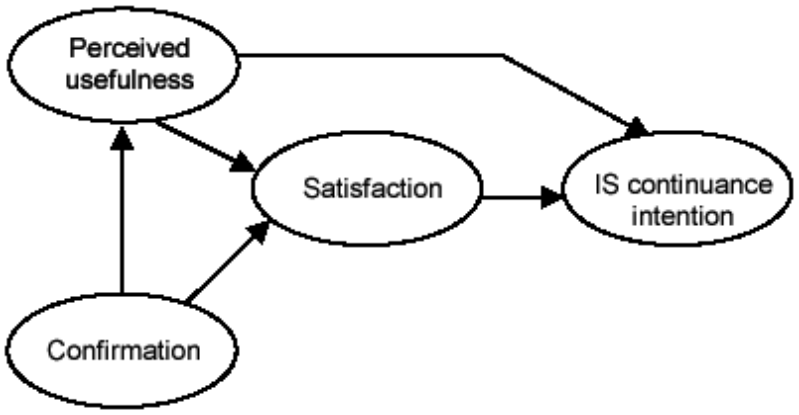

Figure 2. IS Continuance Model
(Used with permission, A. Bhattacherjee, "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly* (25:3), 2001, pp. 351-370. Copyright Regents of the University of Minnesota, MIS Quarterly, 321 19th Avenue South, Minneapolis, MN 55455)

Habit

Habit has been a core research topic of numerous studies from diverse theoretical perspectives. It has received a great deal of attention in the study of social psychology (Aarts and Dijksterhuis 2000; Bargh et al. 2001), health sciences (Lindbladh and Lyttkens 2002), food consumption (Saba et al. 2000), and consumer behavior (Guariglia and Rossi 2002). Across disciplines, habits are 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, p. 540). A review of prior literature revealed that the concept of habit has found only little attention in IS literature (Karahanna et al. 1999; Limayem and Hirt 2003; Limayem et al. 2003; Limayem et al. 2001), and there is no universally accepted scholarly definition of IS habit. Adapted from Limayem et al. (2003), IS habit is defined as "the extent to which using a particular IS has become automatic in response to certain situations." Aarts et al. (1998) suggested that when behavior becomes more habitual, the impact of intention on behavior decreases. Similarly, Verplanken et al. (1997) found that habit interacts with intention and guides to behavior. They concluded that non-habitual behavior is guided with more reasoning. In the context of IS usage, as individuals get into the habit of continuously using a system, the predictive power of intention is diluted. Therefore, the more usage is performed out of habit, the less cognitive planning is involved (i.e., the weaker the relationship between intention and actual behavior). In other words, habit plays the role of a moderating variable on the relationship between intentions and continuous usage.

Research Model

Integrating the theory of planned behavior (Ajzen 1991) with Bhattacherjee's (2001) IS continuance model, we propose a research model that attempts to explain IS usage behavior at different adoption stages. We agree with Bhattacherjee's argument on the substantive differences between IS adoption and continuance. Thus, we use the TPB model to explain IS initial usage in the adoption stage; likewise, we use the IS continuance model to elucidate IS continuance usage in the post-adoption stage.

As shown in Figure 3, our research model broadly examines IS usage over time, namely the adoption stage and the post-adoption stage. At the adoption stage, behavioral intention is jointly determined by attitude, subjective norm, and perceived behavioral control. Behavioral intention and perceived behavioral control, in turn, affect the initial use of IS. At the post-adoption stage,

drawing from Bhattacherjee, confirmation and perceived usefulness are postulated as the main determinants of satisfaction. Confirmation is positively associated with perceived usefulness. Both satisfaction and perceived usefulness are necessary for formation of IS continuance intention. IS continuance usage, in turn, is determined by IS continuance intention and IS initial usage. As explained earlier, habit is hypothesized to moderate the link between continuance intention and IS continuance.

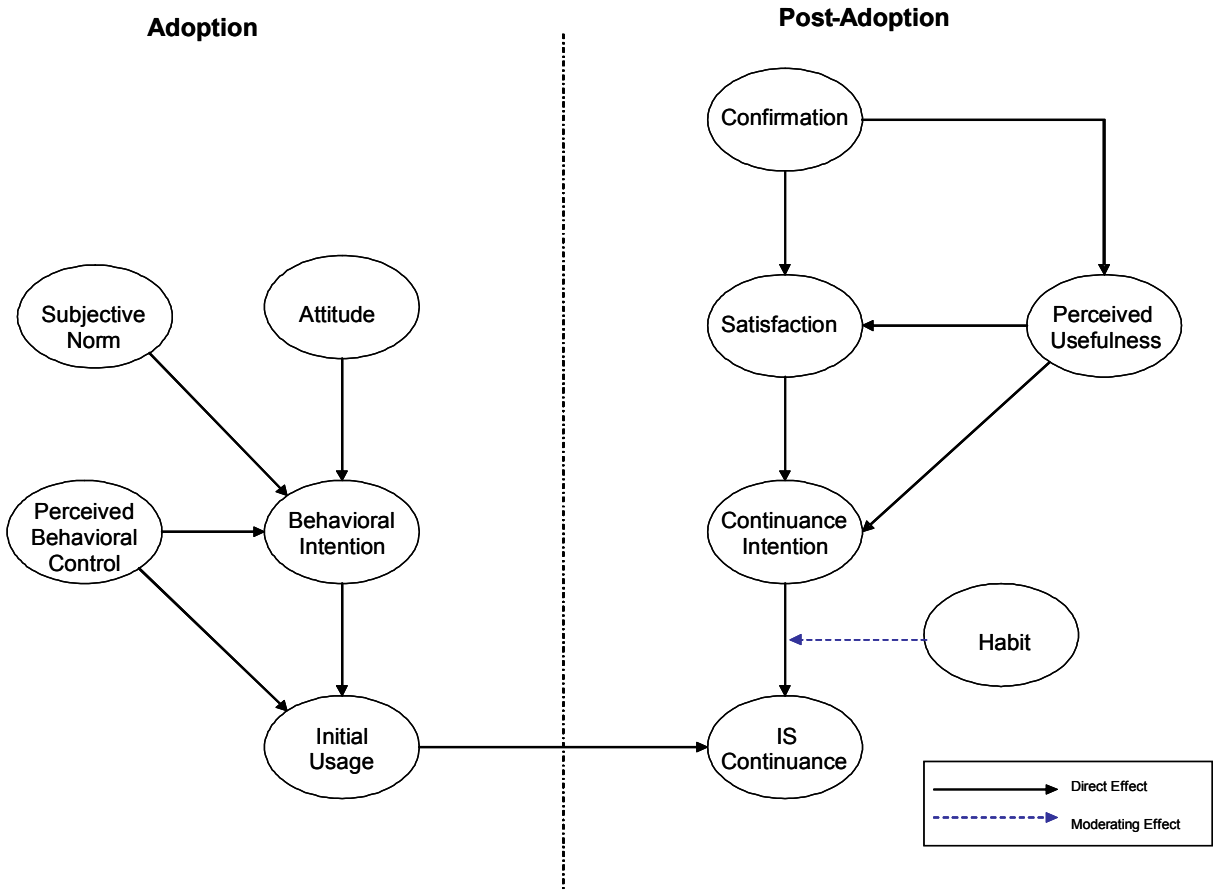

Figure 3. Research Model

Method

Our focus is on IS usage at the adoption and post-adoption stages. The system used in this study was Blackboard Learning System (**www.blackboard.com**). It is a Web-based server software platform that offers industry-leading course management, an open architecture for customization and interoperability, and a scalable design that allows for integration with student information systems and authentication protocols. Blackboard is adopted as a teaching platform for several courses provided by a local university. Students can log onto the system to download lecture notes, share documents with their project teammates, and communicate with their fellow students and course instructors.

First-year students were chosen as our research subjects, since they would have no prior knowledge of the system, making it relevant to study adoption as well as continuance. The usage of this system was entirely voluntary and students could use other means to download and upload materials and to communicate with their instructor and classmates. In other words, students were not penalized for not using this system. The sections below describe the details of data collection procedure, measurement, and data analysis.

Data Collection

As shown in Figure 4, training was provided to all students in Week 1 (t_0). The first set of variables was assessed in Week 2 (t_1), and the second set of variables was assessed in Week 6 (t_2). Finally, IS continuance was measured in Week 10 (t_3). The data was collected through an online survey. A total of 495 responses were collected at t_1, 371 replied to the questions at t_2, and 281 responses were collected at t_3.

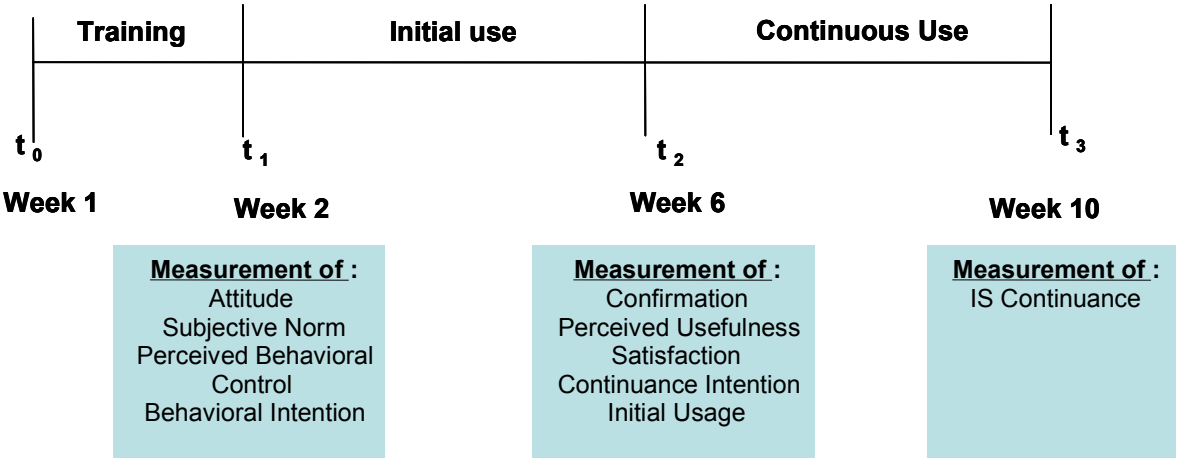

Figure 4. Research Design: Data Collection

Measurement

Table 1 lists the measures used in this research. We used items that had been validated by prior research, but modified the wording of the questionnaire in order to fit this particular context of Blackboard usage. The TPB scales of attitude, subjective norm, perceived behavioral control, and behavioral intention were measured using Taylor and Todd (1995). The scales of IS continuance model, including perceived usefulness, confirmation, satisfaction, and IS continuance intention, were adapted from Bhattacherjee (2001). Habit was assessed using the measures from Limayem et al. (2003). The initial usage and IS continuance were taken from Davis (1989) and Steinfield (1985).

Data Analysis

The analysis of the data was done in a holistic manner using partial least squares (PLS). The PLS procedure (Wold 1989) has been gaining interest and use among researchers in recent years because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes (Chin 1998; Chin and Gopal 1995; Compeau and Higgins 1995). It allows one to both specify the relationships among the conceptual factors of interest and the measures underlying each construct, resulting in a simultaneous analysis of (1) how well the measures relate to each construct and (2) whether the hypothesized relationships at the theoretical level are empirically true. This ability to include multiple measures for each construct also provides more accurate estimates of the paths among constructs which are typically biased downward by measurement error when using techniques such as multiple regression. Furthermore, due to the formative nature of some of the measures used and non-normality of the data, LISREL analysis was not appropriate (Chin and Gopal 1995). Thus, we chose PLS-Graph version 3.00 (Chin 1994) to perform the analysis.

Results

Following the two-step analytical procedures (Hair et al. 1998), we first examined the measurement model, then the structural model. The rationale of this two-step approach was to ensure that our conclusion on structural relationship was drawn from a set of measurement instruments with desirable psychometric properties.

Table 1. List of Measures

Constructs	Measures	Sources
Attitude		
ATT1	Using Blackboard is a (bad/good) idea.	Taylor and Todd (1995)
ATT2	Using Blackboard is a (foolish/wise) idea.	
ATT3	I (dislike/like) the idea of using Blackboard.	
ATT4	Using Blackboard would be (unpleasant/pleasant).	
Subjective Norm		
SN1	People who influence my behavior think that I should use Blackboard.	Taylor and Todd (1995)
SN2	People who are important to me think that I should use Blackboard.	
Perceived Behavioral Control		
PBC1	I would be able to use Blackboard.	Taylor and Todd (1995)
PBC2	Using Blackboard is currently within my control.	
PBC3	I have the resources and the knowledge and ability to make use of Blackboard.	
Behavioral Intention		
BI1	I will use Blackboard during the next four weeks.	Taylor and Todd (1995)
BI2	I intend to use Blackboard during the next four weeks.	
BI3	I intend to use Blackboard frequently during the next four weeks.	
BI4	All things considered, I expect to use Blackboard during the next four weeks.	
Perceived Usefulness		
PU1	Blackboard is of benefit to me.	Bhattacherjee (2001)
PU2	The advantages of Blackboard outweigh the disadvantages	
PU3	Overall, using Blackboard is advantageous.	
Confirmation		
CONFIRM1	My experience with using Blackboard was better than what I expected.	Bhattacherjee (2001)
CONFIRM2	The benefit provided by Blackboard was better than what I expected.	
CONFIRM3	Overall, most of my expectations from using Blackboard were confirmed.	
Satisfaction		
	How do you feel about your overall experience of Blackboard Use:	Bhattacherjee (2001)
SAT1	(Very dissatisfied/Very satisfied)	
SAT2	(Very displeased/Very pleased)	
SAT3	(Very frustrated/Very contented)	
SAT4	(Absolutely terrible/Absolutely delighted)	
Continuance Intention		
CI1	If I could, I would like to continue my use of Blackboard	Bhattacherjee (2001)
CI2	All things considered, I expect to continue using Blackboard during the next four weeks.	
CI3	All things considered, it is likely that I will continue to use Blackboard during the next four weeks.	
Habit		
HABIT1	I use Blackboard as a matter of habit.	Limayem et al. (2003)
HABIT2	Using Blackboard has become automatic to me.	
HABIT3	Using Blackboard is natural to me.	
HABIT4	When faced with a particular task, using Blackboard is an obvious choice for me.	
HABIT5	Using Blackboard has become a habit to me.	
HABIT6	It is a habit of mine to use Blackboard.	
Initial Usage/Continuance Usage		
	How often did you use Blackboard during the last 4 weeks?	
IU1/CU1	(Never/Always)	Steinfield (1985)
IU2/CU2	(Once a month/Once a day)	Davis (1989)

The Measurement Model

Convergent validity indicates the extent to which the items of a scale that are theoretically related should be related in reality. Table 2 presents information concerning the weights and loadings of the measures of our research model. All items have significant path loadings at the 0.01 level. Weights are relevant for the formative measures while loadings are relevant for the reflective ones. The four formative items in the model with weights from 0.39 to 0.69 demonstrated a substantive contribution to their corresponding construct. All our reflective measures fulfilled the recommended levels of the composite reliability and average variance extracted. As shown in Table 2, we noticed that all items of this study were higher than 0.50, as recommended by Fornell and Larcker (1987). All the values of composite reliability and average variance extracted were considered very satisfactory, with composite reliability at 0.92 or above and average variance extracted at 0.68 or above.

Table 2. Psychometric Properties of Measures

Construct	Item	Weight	Loading	St. Error	t-value
Attitude	ATT1		0.88	0.02	53.01
CR=0.92, AVE= 0.73	ATT2		0.89	0.03	31.69
	ATT3		0.88	0.02	37.66
	ATT4		0.77	0.04	17.68
Subjective Norm	SN1		0.88	0.01	83.31
CR=0.95, AVE= 0.74	SN2		0.84	0.02	39.86
Perceived Behavioral Control	PBC1		0.89	0.01	72.59
CR=0.93, AVE= 0.81	PBC2		0.93	0.01	107.18
	PBC3		0.88	0.02	57.59
Behavioral Intention	BI1		0.89	0.01	66.15
CR=0.95, AVE= 0.83	BI2		0.94	0.01	107.55
	BI3		0.90	0.01	88.09
	BI4		0.91	0.01	87.78
Perceived Usefulness	PU1		0.90	0.01	70.14
CR=0.93, AVE= 0.81	PU2		0.90	0.01	65.19
	PU3		0.90	0.02	52.11
Confirmation	CONFIRM1		0.91	0.01	81.72
CR=0.92, AVE= 0.80	CONFIRM2		0.90	0.01	72.74
	CONFIRM3		0.87	0.01	61.18
Satisfaction	SAT1		0.87	0.01	59.57
CR=0.93, AVE= 0.78	SAT2		0.91	0.01	79.87
	SAT3		0.89	0.02	47.06
	SAT4		0.86	0.02	43.74
IS Continuance Intention	CI1		0.85	0.02	38.64
CR=0.92, AVE= 0.79	CI2		0.91	0.01	118.12
	CI3		0.90	0.01	81.71
Habit	Habit 1		0.87	0.01	80.91
CR=0.93, AVE= 0.68	Habit 2		0.86	0.02	53.23
	Habit 3		0.78	0.03	26.35
	Habit 4		0.67	0.04	15.03
	Habit 5		0.87	0.02	35.03
	Habit 6		0.86	0.02	38.75
Initial Usage	IU1	0.69		0.06	10.74
	IU2	0.39		0.07	5.33
Continuance Usage	CU1	0.61		0.09	6.93
	CU2	0.44		0.09	4.69

Notes; CR=Composite Reliability, AVE= Average Variance Extracted

Testing for discriminant validity involves checking whether the items measure the construct in question or other (related) constructs. Discriminant validity was verified with the squared root of the average variance extracted for each construct higher than the correlations between it and all other constructs (Fornell and Larcker 1987). As shown in Table 3, each construct shares greater variance with its own block of measures than with the other constructs representing a different block of measures.

Table 3. Correlations between Constructs (Diagonal Elements are Square Roots of the Average Variance Extracted)

	ATT	SN	PBC	BI	PU	CONFIRM	SAT	CI	HABIT
Attitude (ATT)	**0.86**								
Subjective Norm (SN)	0.16	**0.86**							
Perceived Behavioral Control (PBC)	0.42	0.53	**0.90**						
Behavioral Intention (BI)	0.37	0.62	0.71	**0.91**					
Perceived Usefulness (PU)	0.45	0.22	0.32	0.31	**0.90**				
Confirmation (CONFIRM)	0.41	0.15	0.28	0.29	0.67	**0.89**			
Satisfaction (SAT)	0.51	0.18	0.37	0.34	0.61	0.57	**0.88**		
IS Continuance Intention (CI)	0.46	0.20	0.29	0.33	0.67	0.70	0.62	**0.89**	
Habit (HABIT)	0.38	0.13	0.27	0.30	0.49	0.58	0.49	0.62	**0.82**

Overall, these results provide strong empirical support for the reliability and convergent validity of the scales of our research model.

The Structural Model

Figure 5 presents the results of the longitudinal analysis with overall explanatory powers, estimated path coefficients (all significant paths are indicated with an asterisk), and associated t-value of the paths. Tests of significance of all paths were performed using the bootstrap resampling procedure. As shown in Figure 5, all hypothesized paths (except the link between perceived behavioral control and initial usage) in the research model are found statistically significant at 95 percent significance level.

As shown in Figure 5, at the adoption stage, all three determinants of behavioral intention (attitude, subjective norm, and perceived control) have significant effects on behavioral intention, with path coefficients of 0.12, 0.34, and 0.47 respectively. The three constructs explain 59 percent of the variance in behavioral intention. Regarding initial usage, only behavioral intention is found to be statistically significant ($\beta = 0.35$, $t = 4.64$), and explains 20 percent of the variance of initial usage. At the post-adoption stage, confirmation and perceived usefulness have significant impacts on satisfaction, with path coefficients of 0.30 and 0.41 respectively. The two constructs account for 42 percent of the variance in satisfaction. Confirmation also has a significant effect on perceived usefulness ($\beta = 0.67$, $t = 18.06$) with 45 percent variance explained. Regarding the antecedents of continuance intention, both satisfaction and perceived usefulness are significant with path coefficient of 0.34 and 0.46 respectively, accounting for 52 percent variance of continuance intention. In addition, continuance intention has a significant effect on IS continuance, with a path coefficient of 0.44. Moreover, IS initial usage has a significant impact on IS continuance. Finally, habit is also found to negatively moderate the impact on the link between continuance intention and IS continuance, with path coefficient of –0.59. Overall, the antecedent of IS continuance explain 44 percent of the variance.

In testing for interaction effects using PLS (as recommended by Chin et al. 1996), we follow the hierarchical process similar to multiple regression where we compare the results of two models (i.e., one with and one without the interaction construct). We then compare the R^2 for this interaction model with the R^2 for the "main effects" model, which excludes the interaction construct. We use the difference in R^2s to assess the overall effect size f^2 for the interaction where .02, 0.15, and 0.35 have been suggested as small, moderate, and large effects respectively (Cohen 1988). As indicated in Table 4, the model in which habit is proposed to moderate the link between intention and continued usage possesses a significantly higher explanatory power than the other three models, whereas the effect size for the interaction effect is 0.02 (small). It is important to understand that a small f^2 does not necessarily imply an unimportant effect.

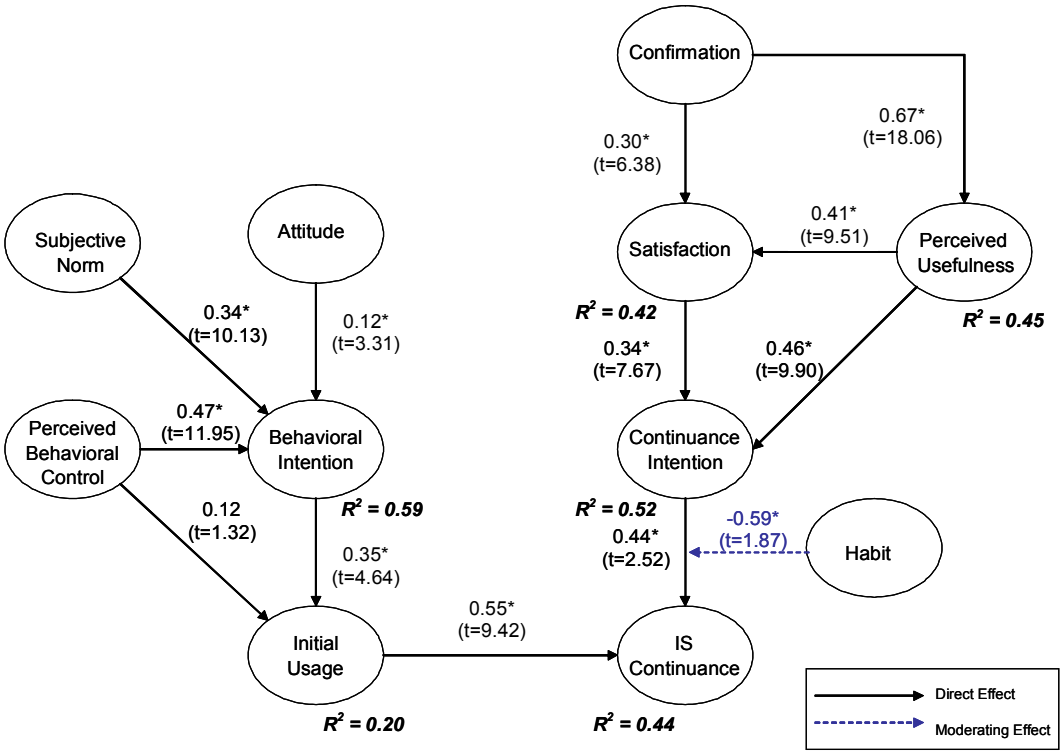

Figure 5. Results of PLS Analysis

Table 4. Hierarchical Test

	R^2s
Main Effect Model	0.429
Interaction Effect Model	0.440
f^2s[a]	0.02

[a] f^2s = [R^2(Interaction Effect Model) – R^2(Main Effect Model)]/[1 – R^2(Main Effect Model)]

Discussion and Conclusions

Motivated by the need to better understand IS usage over time, this study integrated the theory of planned behavior model with the IS continuance model to examine factors influencing IS usage at the IS adoption and post-adoption stages. Moreover, the suggested theoretical model takes into consideration the habitual nature of IS continuance. The findings present a strong support to the existing theoretical links of TPB and IS continuance model, as well as to the ones that were newly hypothesized in this study. Specifically, initial usage was found to significantly affect IS continuance. In addition, findings showed support for the moderating effect of habit on the link between IS continuance intention and continuance usage. These results have several implications for theory and practice.

Limitations of this Study

Before moving on to highlight the implications for research and practice, we would like to address the limitations in this study. First, the data was collected in the context of an Internet-based learning system. The replication of this study in organizational

contexts is necessary before the results can be generalized to other types of systems and settings. Second, prior research empirically demonstrated the difference between self-reported measures of IS usage versus computer-recorded measures (Straub et al. 1995). Some researchers even argue that self-reported measures are not accurate enough to reflect actual usage of the system (Trice and Treacy 1986). Therefore, future research should attempt to use computer-recorded measures to capture IS usage. Finally, the explained variance of IS continuance in this study was only 44 percent. This suggests that further refinement of this model by including other important variables that affect IS continuance is warranted.

Implications for Theory and Research

To the best of our knowledge, this study is one among very few that have attempted to investigate the drivers of IS usage at adoption and post-adoption stages. Most previous studies on IS usage either focused on the initial IS usage or studied IS continuance by using the same set of variables as in the adoption stage. Integrating the theory of planned behavior with the IS continuance model, and taking into consideration the habitual nature of IS continuance, we provide an integrative model explaining IS usage over time. The antecedents of adoption are different from the antecedents of continuance. We hope that the theoretical development constitutes a first step toward better understanding of the adoption and IS continuance. Moreover, findings confirmed the theoretical argument that the strength of intention to predict continuance is weakened by a high level of IS habit. This may explain why prior studies did not find a significant relationship between intention and behavior (e.g., Dishaw and Strong 1999).

Another key contribution of this study is that it provides important insights into the complex, dynamic nature of the relationship between IS adoption and post-adoption. Precisely, our findings imply that intentions can no longer be regarded as the only predictor of actual behavior. In our case, initial IS usage had the strongest impact on IS continuance. Researchers studying technology acceptance in general, and/or IS continuance in particular, should therefore not stop at intentions, but should include measurements for actual behavior and other important determinants (like habit and initial usage) in the study of IS post adoption. In addition, the determinants of IS usage vary across different adoption stages; therefore, researchers are encouraged to use a longitudinal approach to capture the change in the IS usage over time.

Implications for Practice

While this study leads to several interesting implications for theory and research, it is also relevant for practitioners. First, findings show the determinants of IS adoption are different from the antecedents of IS post-adoption; therefore, practitioners should focus on different antecedents of IS usage at different adoption stages. At the adoption stage, perceived behavioral control exhibited the strongest impact on behavioral intention, while intention in turn was found to be the only significant determinant of IS initial usage. This suggests that during the adoption stage managers should offer users adequate support, like IT expertise, technology support team, and all related resources. Similarly, they should enhance users' self-efficacy by offering training before implementing the system. At the post-adoption stage, intention is no longer the only determinant of IS continuance usage. As the behavior becomes habitual, users tend to use the system automatically without going through the cognitive planning process. Their initial usage becomes an important factor determining the level of IS continuance. This suggests that once the users adopt the system, they have a higher tendency for continuous use. Therefore, managers should carefully design an implementation plan that encourages usage in the adoption stage. Managers should realize that initial usage, to a very large extent, determines IS continuance. Therefore, a "bad start" in terms of initial usage could significantly hinder continuous use of that system.

Future Research

Integrating the theory of planned behavior with the IS continuance model is a first step toward better understanding IS usage over time. Future research should continue to explore the dynamic nature of IS usage in order to increase the variance explained in the model. In addition, this study has extended Bhattacherjee's (2001) IS continuance model by adding the habit construct. Another fruitful avenue of research may consist of adding other factors affecting IS continuance. Finally, this study is conducted at the individual level; future research might extend the current study by investigating IS adoption and post-adoption at the organizational level. Advances in business-to-business electronic commerce, we believe, would make an interesting examination of IS adoption and post-adoption in interorganizational systems such as electronic markets.

In conclusion, considering the many interesting questions that this study has raised, we hope that it promotes additional theorizing and empirical investigation aimed at better understanding IS usage behavior across different adoption stages.

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