

Predicting users' intention to continue mobile internet services usage : The integration of habit into the Expectation-Confirmation Model

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1. Introduction

While many existing studies (Noh and Kim, 2007; Chang and Kim, 2007; Woo et al., 2007; Kim, 2004; Davis, 1989) have focused on initial Information Systems (IS) usage or acceptance (Premkumar and Bhattacharjee, 2008), there is less attention paid to the post adoption environment where individuals decide between continuing and discontinuing of IS (Thong et al., 2006). The long-term viability and eventual success depend on continuous use rather than first time use of IS (Bhattacharjee, 2001a). Therefore, IS continuance at individual user level is

important for many B2C E-commerce/M-commerce firms such as Internet service providers, online retailers, online bankers, online brokerages, online travel agencies, and mobile Internet service providers. In order for wireless-based services to be effectively used in m-commerce environment, mobile service providers need to know the critical factors that affect the continued use of mobile service.

Existing studies attempted to develop and empirically tested continued IS usage behavior model, namely, expectation-confirmation model (ECM) (Premkumar and Bhattacharjee, 2008; Bhattacharjee, 2001a). A theoretical

model of ECM in IS domain was specifically developed by Bhattacharjee (2001a) for understanding users' continued IS usage behavior, and has been extended by some authors (Thong et al., 2006; Kang and Kim, 2006) incorporating additional user perceptions- perceived ease-of-use and perceived enjoyment into the original ECM. Although these studies suggest a novel approach to understanding how user's beliefs affect his or her intention to continue to use IS, they are limited in explaining user's behavior in the post-adoption stage since they fail to consider user's automatic behavior, 'habit', which may be generated from frequently using and learning IS. Habit in the context of IS use can be defined as the extent to which people tend to use IS automatically because of learning (Limayem et al., 2007).

Recently, some researchers (Limayem et al., 2007; Liao et al., 2006; Gefen, 2003; Kim et al., 2008) have attempted to incorporate the 'habit' construct into IS research, indicating it has great potential to explain continued IS use. For instance, Limayem et al. (2007) suggested that continued IS use is not only a consequence of continued usage intention, but also of habit, and Gefen (2003)

argued that online shoppers intentions to continue using a website depend not only on perceived usefulness and perceived ease of use, but also on habit. Kim et al. (2008) also revealed that habit in addition to computer self-efficacy is a major antecedent of users' intention to continue to use portal services provided by university to students. But dealing with the effect of habit on continued IS use, these studies were conducted in the context of online shopping, world wide web, or a portal service on campus. This fact shows that research is needed to examine the role of habit in other IS usage contexts such as the mobile internet services continuance context.

Our paper is one of the earliest research incorporating the 'habit' construct into the ECM in the context of using mobile internet services. In order to examine the factors which determine continued use of users using mobile internet services, we set up a research model that consists of perceived usefulness, perceived ease-of-use, habit, satisfaction, and continued IS use based on ECM. Given that cellular phones are most popular devices for using mobile services, this study will only focus on the use of mobile Internet services

through cellular phones.

II. Theoretical background

1. The expectation-confirmation model

The particular interest of this current study is the continuance of mobile internet services, and representation of a fundamental managerial challenge in M-commerce (mobile commerce) implication.

A review of prior studies suggests the theoretical foundation for the hypotheses formulation. Expectation-confirmation model (ECM) is derived from the expectation-confirmation theory (ECT) (Oliver, 1980) which is widely used in the consumer behavior literature to study consumer satisfaction, post-purchase behavior (e.g. repurchase, complaining) and service marketing in general (Anderson and Sullivan, 1993; Dabolkar et al., 2000; Oliver, 1980; Oliver, 1993).

ECT posits that consumers' repurchase decisions are derived from their level of satisfaction with products or services. In an ECT framework, firstly consumers form an ini-

tial or pre-purchase expectation of a specific product or service. Following a period of initial consumption, they form perceptions about its performance vis-à-vis their original expectation and determine the extent to which their expectation is confirmed (i.e. confirmation). Then they form satisfaction or affect based on their confirmation level and expectation on which confirmation was based. And finally, satisfied consumers form repurchase intention, while dissatisfied users discontinue its subsequent use (Oliver, 1980; Bhattacharjee, 2001a).

In this study, from ECT we took some variables including users' satisfaction with the IS, confirmation level of expectations, and post-adoption expectations such as perceived usefulness and perceived ease-of-use to investigate the effects of these variables on individual's intention to continue IS usage. Although ECM is adopted from the expectation-confirmation theory, it has some unique features: 1) It highlights the importance of post-adoption expectations rather than pre-adoption expectations. It is because users keep updating these expectations after gaining more experiences from using IS. Therefore, users' expectations towards using IS could be very differ-

ent from the initial expectations prior to use IS (Bhattacharjee, 2001a; Karahanna et al., 1999; Fazio and Zanna, 1981). LaTour and Peat (1987) concluded that expectations based on consumers' direct experiences are main predictors of their satisfaction. Therefore, ECM posits that post-adoption expectations are relevant determinants of users' satisfaction with IS. 2) In the ECM context, expectation may be defined as individuals' beliefs or sum of beliefs regarding the usage of IS. Since perceived usefulness (belief) is the most consistent determinant of users' intention to use IS reveals that it is a surrogate for post-adoption expectations (Karahanna et al., 1999; Davis et al., 1989; Venkatesh, 2000). 3) Performance is mediated by confirmation presuming that the influence of performance is already accounted for by the confirmation variable (Bhattacharjee, 2001a; Yi, 1990).

Bhattacharjee (2001a) developed and validated an expectation-confirmation model (ECM) in the utilitarian IS domain including perceived usefulness as a determinant post-adoption performance. Similarly, Thong et al. (2006) developed an extended expectation-confirmation model in the mobile internet service continuance do-

main, incorporating three post adoption beliefs such as perceived usefulness, perceived ease-of-use, and perceived enjoyment.

2. Habit in the IS context

While the concept of habit has been extensively studied in many literatures such as social psychology, health science, food consumption, and organizational behavior, only little attention has it been paid in the IS domain (Limayem et al., 2007).

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). In the IS context, habit is defined as the extent to which using a particular IS has become automatic in response to certain situations (Limayem et al., 2003). There are five characteristics of habit described in various literatures. 1) habits require learning (Verplanken et al., 1998); 2) habitual responses are automatic in the sense that they can be performed quickly in parallel with other activities and with allocation of minimal attention (Oulette and Wood, 1998); 3) habits are automatic re-

sponses to specific situations or stimuli, and are always limited in scope (Oulette and Wood, 1998); 4) habits reflect automatic behavior tendencies developed during the past history of the individual (Oulette and Wood, 1998); 5) habits emerge from response repetition (Oulette and Wood, 1998). According to Aarts et al. (1998), most habitual behaviors arise and proceed efficiently, effortlessly, and unconsciously. Bamberg et al. (2003) indicated that habit can predict ones' future behavior. When

behavior has been performed many times in the past, subsequent behavior increasingly becomes under the control of an automated cognitive process and likely to form favorable intentions about acts (Oulette and Wood, 1998; Aarts et al., 1998). Gefen (2003) stated that people rely much more on habit than they do on external information and on choice strategies.

Table 1 provides the research description of habit used in IS literature.

[Table 1] Summary of habit-related research

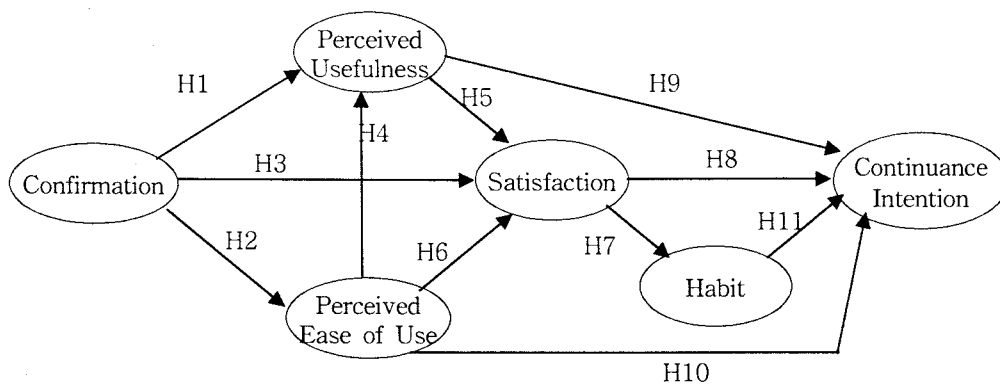
Authors	Study Area	Purpose of Study	Results
Gefen (2003)	Intention to continue using a website.	To validate the idea that one can improve the explanatory power of models such as TAM by including habit construct.	Habit exerts a direct effect on behavior.
Limayem et al. (2003)	IS usage in the educational environment.	To develop and test an integrated model of IS adoption and post-adoption.	Habit moderates the relationship between intention and behavior
Limayem and Hirt (2003)	IS usage in the educational environment.	To validate the idea that one can improve the explanatory power of models such as TPB by including habit construct.	habit exerts a direct effect on behavior.
Liao et al. (2006)	Continued B2C website use	To explore the role of habit to predict continued use of B2C website.	Habit exerts a direct effect on behavior.
Limayem et al. (2007)	Voluntary continued usage of WWW.	To explore the role of habit and its antecedents in the context of continued IS usage.	Habit moderates the relationship between intentions and behavior.
Kim et al. (2008)	Voluntary IS in a university	To examine the role of perceived habit on the affective attitude and intention to continue to use IT	Perceived habit directly influences affective attitude and continuance intention

As described on Table 1, habit can be an important construct in the context of continued IS usage. While some suggested that habit has a direct impact on behavior or plays a moderating role between intention and behavior, others (Kim et al., 2008) say that it directly influences affective attitude (similar to satisfaction) and intention to continue using IS. Meanwhile, Limayem et al. (2007) revealed the antecedents and outcomes of the construct habit, proving that satisfaction may be the most important preceding variable of habit.

III. Research model and hypotheses development

The expectation-confirmation theory has been known as a proper model which explains the post-adoption behavior of IS users. Some authors propose that habit also is a good construct which may explain users' use or intention to continually use IS. This study attempted to incorporate habit with the expectation-confirmation theory and make the role of habit explicit in the mobile internet service usage context. The research model of this study is proposed in

Figure 1.



[Fig. 1] Research model

According to Bhattacharjee (2001a), perceived usefulness of IS may be adjusted by confirmation experience, particularly when the users' initial perceived usefulness is not concrete due to the uncertainty over what to expect from the usage of IS. Bhattacharjee (2001a) empirically validated that perceived usefulness is influenced by users' confirmation level in B2C e-commerce service context. The positive correlation between confirmation and perceived usefulness has also validated in e-learning continuance environment (Roca et al., 2006) and in mobile Internet service continuance context (Thong et al., 2006). The level of confirmation is also expected to positively affect on perceived ease-of-use. It is because as a user gains confirmation experience, perceived ease-of-use related belief of the user will be updated and become more concrete. Recently, some (Thong et al., 2006; Roca et al., 2006; Kang and Kim, 2006) empirically validated this association in the study of mobile Internet service continuance, e-learning continuance, and weblog continuance, respectively. Hence, this leads the first hypothesis:

H1: Confirmation of expectation has a positive effect on perceived usefulness.

H2: Confirmation of expectation has a positive effect on perceived ease-of-use.

Based on expectation-confirmation theory (Oliver, 1980; Bhattacharjee, 2001a), the level of satisfaction is determined by that of confirmation between expectation and performance. The causal link between confirmation and satisfaction has been empirically established in a number of studies (Lin et al., 2005; Thong et al., 2006; Roca et al., 2006; Kang and Kim, 2006; Bhattacharjee, 2001a, 2001b). Thus, it is hypothesized that:

H3: Confirmation of expectations has a positive effect on satisfaction.

According to TAM based studies (Davis et al., 1989; Venkatesh and Davis, 2000), perceived ease-of-use is expected to have a direct effect on continued IS usage intention. Kang and Kim (2006) found perceived ease-of-use to be a positive determinant of perceived usefulness in the

context of hedonic IS usage. Thus, it is hypothesized that:

H4: Perceived ease-of-use has a positive effect on perceived usefulness.

In the context of continued IS usage, researchers argued that users' beliefs such as perceived usefulness and perceived ease-of-use are considered post-adoption expectation and as users obtain expected benefits through their usage experiences with the IS, they may have a positive feeling or satisfaction with IS. A number of studies (Roca et al., 2006; Thong et al., 2006; Kang and Kim, 2006; Bhattacharjee, 2001a, 2001b) are supportive of positive relationship between users' beliefs and satisfaction. For instance, while Bhattacharjee (2001a) and Bhattacharjee and Premkumar (2004) argued that perceived usefulness only affected satisfaction, others (Roca et al., 2006; Thong et al., 2006; Kang and Kim, 2006; Devaraj et al., 2002) found that both perceived usefulness and perceived ease-of-use were positively related to satisfaction in various contexts (e-learning service, mobile internet service, blog service, B2C e-commerce). Therefore, it leads the

following hypothesis:

H5: Perceived usefulness has a positive effect on satisfaction.

H6: Perceived ease-of-use has a positive effect on satisfaction.

Aarts et al. (1997) explained that 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. Reibstein (2002) illustrated that online shopping offers a good illustration of the close relationship between satisfaction and habit formation. Limayem et al. (2007) empirically validated the significant effect of satisfaction on habit in the study of voluntarily continued usage of WWW. Based on the above studies, the following hypotheses are developed:

H7: Satisfaction has a positive effect on habit.

Since Oliver (1980) theorized that satisfaction had a positive, direct correlation with future intention, many researchers have validated such relationships in the fields of marketing and management information systems. For examples, the marketing studies

showed that the major reason for consumers' repurchase or reuse intention about products or patronized service is the consumers' level of satisfaction (Patterson and Spreng, 1997; Bearden and Teel, 1983). On the other hand, IS researchers (Bhattacharjee, 2001a; Van Riel et al., 2001; Kang and Kim, 2006) have revealed the positive impacts of satisfaction on continued IS usage. Thus, it is hypothesized that:

H8 : Satisfaction has a positive effect on continuance intention

In the IS usage literature, while perceived usefulness has been constantly found as the most important determinant of users' usage intention (Taylor and Todd, 1995; and Davis et al., 1989; Bhattacharjee, 2001a; Karahanna et al., 1999), perceived ease-of-use is reported to have different results in the context of using hedonic IS such as web (movie website or weblog service). Van der Heijden (2004), for instance, revealed that perceived ease-of-use had more important impact on continued web usage than perceived usefulness. Recently, Thong et al. (2006) also found a positive relationship between perceived usefulness, perceived

ease-of-use, and continued usage in the mobile Internet service context. Thus, it is hypothesized that:

H9: Perceived usefulness has a positive effect on continuance intention.

H10: Perceived ease-of-use has a positive effect on continuance intention.

Bamberg et al. (2003) stated that habit can predict one's future behavior. When behavior has been performed frequently in the past, subsequent behavior increasingly becomes under the control of an automated cognitive process (Aarts et al., 1998; Ouellette and Wood, 1998). According to Gefen (2003), people rely much more on habit than they do on external information and on choice strategies. Once use of a specific service becomes routine, habit should become an additional force that increases the behavioral intention to continue using that service (Liao et al., 2006). Liao et al. (2006) and Kim et al. (2008) empirically tested and validated (perceived) habit-continuance intention association in the continued usage contexts of B2C websites and portal at a university, respectively. This leads the following

hypothesis:

H11: Habit will have a positive impact on continuance intention.

IV. Methodology

1. Variables measurements

Measurement items were developed based on prior literature. Items measuring intention to continued use of mobile Internet services, perceived usefulness, and perceived ease-of-use were adopted from prior works by Thong et al. (2006) and Bhattacharjee (2001a). Items related to satisfaction were adopted from prior work by Thong et al. (2006). Items measuring confirmation were adopted from prior work by Bhattacharjee (2001b). Items related to habit were taken from prior work done by Limayem et al. (2003).

All the items measuring the research variables were adopted with change in wording appropriate for current context, which was the continued usage of mobile internet services. Appendix A provides a listing of the scale items.

2. Data collection

Empirical data for this study was collected via a 15 day questionnaire survey of the undergraduate students of universities situated in J. province, S. Korea from September 3rd to September 18th, 2007. Samples of 250 universities students were recruited on campus, and research assistants briefed participants about the survey to ensure that each questionnaire was completed fully. Out of 250 questionnaires delivered, 237 were returned (94.8 percent response rate). 13 responses with incomplete or inadequate data due to samples of non-experience holders were eliminated and as a result, 237 responses were used in the data analysis.

Out of 237 respondents, there were 66.7 percent of male and 33.3 percent of female. In terms of age and education of the respondents, 65.82 percent were in the range of 20-25 years old, and 39.2 percent were of 3rd year undergraduate students. Most of respondents (69.6%) were paying 0-10000 Won per month for using the mobile Internet services. For time using mobile internet, 167 respondents (70.5%) were in the range of 0-60 minutes.

3. Instrument validation

The test of measurement instrument includes the examination of discriminant validity and estimation of reliability coefficients of the measures. Discriminant validity can be assessed using factor analysis for checking the uni-dimensionality of the items. Principal component factor analysis was used to assess the convergent and discriminant validity of the variables in the model. Factor

structure was suggested using the criteria of an eigen value greater than or equal to one. As shown in Table 2, except 1 items (sat1) among all 26 items loaded onto the expected factors as they were originally designed. Factor loading were all higher than 0.5 on its own factors, and therefore each items loaded higher on its associated construct than on any other construct, supporting the discriminant validity of the measurement.

[Table 2] Results of Instrument validation

Variable		Component					
		1	2	3	4	5	6
Confirmation	conf1	.844	.137	.083	.167	.138	.061
	conf6	.822	.196	.110	.249	.146	.137
	conf5	.814	.192	.004	.174	.158	.221
	conf2	.797	.131	.169	.131	.132	.185
	conf3	.774	.133	.124	.352	.157	.018
	conf4	.761	.151	.023	.334	.203	.110
Habit	hab3	.125	.885	-.033	.091	.073	.079
	hab2	.200	.859	.033	.149	.125	.037
	hab5	.147	.839	-.092	-.010	.020	.072
	hab1	.065	.775	-.042	.194	.060	.031
	hab4	.268	.670	.128	.189	.157	.401
	hab6	.169	.577	.116	.085	.127	.486
Perceived ease-of-use	peou3	.099	.024	.895	.086	.075	.080
	peou1	.045	-.116	.886	.095	.005	-.020
	peou4	.107	.035	.884	.108	.076	.056
	peou2	.097	.017	.882	.123	.119	.024
Perceived usefulness	pu3	.404	.227	.156	.737	.105	.160
	pu4	.352	.147	.241	.721	.120	.165
	pu1	.301	.113	.177	.716	.261	.127
	pu2	.420	.210	.072	.698	.140	.227
Satisfaction	sat4	.148	.120	.086	.062	.854	.110
	sat3	.217	.022	.104	.176	.770	.229
	sat2	.256	.189	.084	.200	.767	.064
Continuance intention	int2	.283	.224	.039	.305	.236	.733
	int1	.317	.212	.059	.338	.335	.658
Cronbach's α		0.939	0.902	0.924	0.898	0.824	0.876

Cronbach's α was used to assess the internal consistency reliability. As shown in Table 2, the reliability coefficients ranged from 0.824 to 0.939, which were significantly higher than the acceptable level of 0.7 for this kind of study. These results confirm that the scales used are both valid and reliable.

V. Results

Following a two-stage methodology recommended by Anderson and Gerbing (1988), we carried out data analysis using LISREL. First, we assessed reliability and construct validity by conducting a confirmatory factor analysis on the measurement

model. Second, we examined the structural model based on the cleansed measurement model.

1. Assessing the measurement model

The adequacy of the measurement model is determined by examining convergent and discriminant validities. To test convergent validity, we first need to check the unidimensionality of each construct. Following recommended methodological procedures (Anderson and Gerbing, 1988), we revised the measurement model by deleting, one at a time, items which shared a high degree of residual variance with other items. All items dropped and retained in Appendix A. After eliminating three questions (conf5, hab4, hab6), the measurement model had good fit. Various indices were used to evaluate the fit of the measurement model.

The overall model χ^2 is 272.50 with 194 degrees of freedom and the p-value associated with this result is 0.00. As this p-value is significant, the χ^2 goodness-of-fit statistic does not indicate that the observed covariance matrix matches the estimated covariance matrix within sam-

pling variance. However, χ^2 statistic is problematic in its use as a goodness-of-fit measure because of its inherent sensitivity to sample size (Hair et al., 2006). For this reason, the χ^2 value is difficult to use as the sole indicator of goodness-of-fit test and is necessary to examine other types of fit indices: Normed χ^2 , GIF, AGFI, NFI, CFI, SRMR, RMSEA.

Normed χ^2 (χ^2 to degree of freedom) was 1.40, which was good, being below the maximum desired cut-off of 3.0. Goodness-of-Fit index (GFI) was 0.89, which was a little lower than recommended threshold of 0.9, but the other fit indices were all satisfactory. The adjusted goodness-of-fit (AGFI), normalized fit index (NFI), and comparative fit index (CFI) were 0.86, 0.96 and 0.99, respectively, indicating good model fit. The observed values for standard root mean square residual (SRMR) and root mean square error of approximation (RMSEA) were 0.047 and 0.044, respectively, which were within the recommended cutoff values of 0.08 for SRMR and 0.08 for RMSEA (Hair et al., 2007). These results suggest that the structural model is suggested to fit the data well.

[Table 3] Results of Confirmatory Factor Analysis

Variable	Item	Loading	St. Error	t-value	AVE	CR
Confirmation (CONF)	conf1	0.84	0.29	15.00	0.72	0.93
	conf2	0.82	0.34	14.20		
	conf3	0.86	0.25	15.58		
	conf4	0.84	0.30	14.86		
	conf6	0.89	0.21	16.38		
Perceived usefulness (PU)	pu1	0.77	0.41	12.83	0.69	0.90
	pu2	0.86	0.26	15.28		
	pu3	0.88	0.22	15.94		
	pu4	0.81	0.34	14.08		
Perceived ease-of-use (PEOU)	peou1	0.84	0.29	14.82	0.75	0.92
	peou2	0.87	0.24	15.59		
	peou3	0.88	0.22	15.95		
	peou4	0.87	0.24	15.61		
Satisfaction (SAT)	sat2	0.84	0.36	12.87	0.62	0.83
	sat3	0.79	0.39	12.46		
	sat4	0.73	0.41	12.20		
Habit (HAB)	hab1	0.72	0.48	11.79	0.68	0.90
	hab2	0.88	0.22	15.78		
	hab3	0.89	0.21	15.93		
	hab5	0.80	0.35	13.71		
Continuance Intention (INT)	int1	0.91	0.16	16.07	0.77	0.87
	int2	0.84	0.29	14.26		

Note: AVE=Average Variance Extracted, CR=Composite Reliability

Convergent validity is assessed with three criteria, that is, factor loadings, composite reliability, and average variance extracted (AVE). First, the size of the factor loadings is one important consideration, and a generally accepted rule-of-thumb is to accept items with loadings of 0.5 or higher, and ideally 0.7 or higher. Second, the composite reliability for each construct must be larger than

0.7. Third, the average variance extracted (AVE), providing a measure of the variance shared between a construct and its indicators for each factor, should exceed 0.5 (Hair et al., 2006)

As shown in Table 3, the standardized path loadings were greater than 0.7 and all significant (t-value > 11.79). The composite reliability for all constructs exceeded 0.7. The

average variance extracted for each factor was greater than 0.5. Hence the questions in this study had convergent validity.

Discriminant validity assesses the extent to which a concept and its indicators differ from another concept and its indicators (Bagozzi et al., 1991). Discriminant validity was eval-

uated by comparing the correlation shared between the construct and other constructs with the squared root of the AVE on the diagonal (Fornell and Larcker, 1981). As shown in Table 4, the squared roots of the AVE were all greater than the inter-construct correlations, providing evidence of discriminant validity.

[Table 4] Correlations Between Constructs

Variable	CONF	PU	PEOU	HAB	SAT	INT
CONF	0.85					
PU	<u>0.77</u>	0.83				
PEOU	0.27	0.34	0.87			
HAB	0.40	0.43	0.01	0.83		
SAT	0.55	0.56	0.26	0.31	0.79	
INT	0.64	0.73	0.20	0.46	0.67	0.84

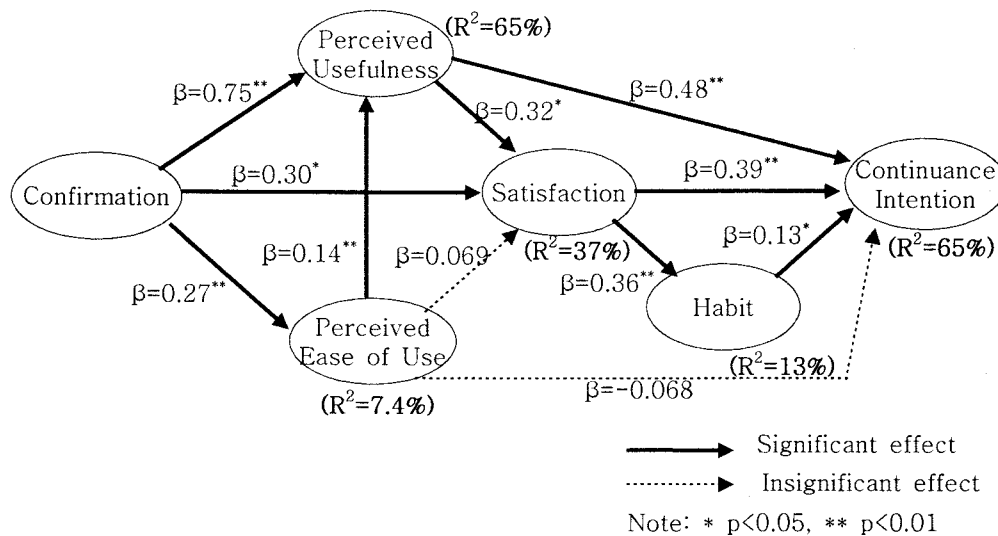
Note 1. Diagonal elements are square roots of the average variance extracted

2. Assessing the structural model

The estimation of the structural model was performed with MLE (Maximum Likelihood Estimation) method and covariance matrix. The structural model also showed an adequate fit (GFI=0.89, AGFI=0.85, NFI=0.96, CFI=0.99, SRMR=0.74,

RMSEA=0.049).

Assessment of the structural model involves estimating the path coefficients and the R^2 value. Path coefficients indicate the strengths of the relationships between the independent and dependant variables, whereas the R^2 value is a measure of the predictive power of a model for the dependent variables.



[Fig. 2] Results of our research model

The overall results of the analysis are shown in Figure 2. As hypothesized, continuance intention was significantly related with satisfaction ($\beta=0.39$, $t=4.74$), Perceived usefulness ($\beta=0.48$, $t=6.17$), and Habit ($\beta=0.13$, $t=2.20$), which together explained 65.0 percent of the dependent variable's variance and these three paths have effects in the direction hypothesized, and Hypotheses 8, 9, and 11 were, therefore supported. However, perceived ease-of-use ($\beta=-0.068$, $t=-1.18$) did not have significant impact on continued usage intention, and thus Hypothesis 10 is rejected.

Habit ($\beta=0.36$, $t=4.40$) was significantly affected by satisfaction,

which explained 13 percent of variance in habit and thus Hypothesis 7 was supported. Satisfaction was significantly associated with perceived usefulness ($\beta=0.32$, $t=2.44$) and confirmation ($\beta=0.30$, $t=2.45$), accounting for 37 percent of the variance of habit and providing support for Hypotheses 5 and 3. Contrary to expectations, perceived ease-of-use ($\beta=0.069$, $t=0.96$) did not significantly affect satisfaction. Thus, Hypothesis 6 is not supported.

Perceived usefulness was significantly affected by confirmation ($\beta=0.75$, $t=9.98$) and perceived ease-of-use ($\beta=0.14$, $t=2.60$), which totally accounted for 65 percent of

variance in perceived usefulness and accordingly Hypothesis 1 and 4 were supported.

Finally, confirmation ($\beta=0.27$, $t=3.69$) had a significant effect on perceived ease-of-use, which explained 7.4 percent of variance in perceived ease-of-use, and thus Hypothesis 2 was supported.

V. Conclusions

The objective of this paper was to develop more comprehensive version of expectation-confirmation model (ECM) that can explain individuals' behavioral intentions to continue mobile Internet services usage and to identify the role of habit to predict users' continuous usage intentions from the view of mobile Internet services usage. For this, we employed five constructs on the basis of prior studies, and traced the role of the constructs in our research model. We have included the post-adoption beliefs (perceived usefulness and perceived ease-of-use), satisfaction, and 'Habit', an automated cognitive process, in our research model since these variables have been strongly expected to affect users' behaviors in

the IS usage contexts (Thong et al., 2006; Liew et al., 2006; Limayem et al., 2003).

First of all, the results of this study are supportive of existing studies based on ECM with the links between perceived usefulness and continuance intention, satisfaction and continuance intention, confirmation and perceived usefulness, confirmation and satisfaction, and perceived usefulness and satisfaction being significant. These findings are consistent with the findings of existing studies (Bhattacharjee 2001a, 2001b; Thong et al., 2006; Kang and Kim, 2006). Perceived ease-of-use, however, has an insignificant effect on both satisfaction and continuance intention, the result which is different from what is expected. The insignificant effect of perceived ease-of-use can be explained as follows. Firstly, while perceived ease-of-use may initially influence pre-usage intention, this effect tends to wear off with time as users become familiar with the technology and learn how to use it, as indicated by Premkumar and Bhattacharjee (2008). Secondly, the reason for insignificant effect of perceived ease-of-use on satisfaction is not clear but one reason we can consider is that as most users were fa-

miliar and comfortable with using mobile internet services through their mobile phones, and the services that users experience are very simple and effortless, these factors may have brought the lack of effects of perceived ease-of-use construct in our study. However, as there exists an indirect effect of perceived ease-of-use on both satisfaction and continuance intention via perceived usefulness, further research on this matter need to be conducted.

The second focus of this study was the role of habit in the mobile Internet service usage context. A significant contribution of this research is that the consumers' habit was also verified to be a major predictor of continuance intention, this finding consistent with the study of Limayem et al. (2003), Liao et al. (2006), and Kim et al. (2008). The direct linkage of habit to continuance intention suggests that the past behavior of customer will have a large impact on their current assessment of whether to continue the behavior in the future.

The finding of our study also shows that satisfactory experience may be a key to IS habit development. This result is consistent with the result of Limayem et al.

(2007). The significant effect of satisfaction with using mobile Internet services on habit means that satisfied users tend to be quickly into the habit of using services.

For practitioners, our results emphasize the importance of perceived usefulness as predictor of mobile services usage continuance intention. Today, mobile applications are ubiquitous in all aspects of our life, and used as image enhancer or hedonic tools as well as utilitarian one. Therefore, the users are going to increasingly demand usefulness, particularly in the long-run, for the systems to be successfully used. Service providers must understand users' requirements while developing the systems and offer ongoing adaptive system maintenance to continually match systems features to the evolving needs of consumers. Furthermore, to enhance user satisfaction as a means of ensuring their continued use of mobile internet services, practitioners should consider various implementation strategies, such as user involvement in the design process, users education, and user training about the systems to ensure that users build realistic expectations of a system, confirm their initial expectations, and are satisfied with their

use.

Another contribution for practitioners is that our results emphasize the importance of habit as a predictor of continued usage intention. Service providers should understand users' habits of using mobile internet services when they faced with situations that call for the promotion of certain services-related behaviors (Limayem et al., 2007). It is because, in general, when people repeatedly interact with specific systems or services, their perception of risk of using them is diminished and there is no need to reassess (Gefen, 2003).

This study has some limitations. Firstly, our subjects are not be fully representative of the entire population, as the sample was drawn from the university students within a specific region, although university students are likely to be the first participant segment in mobile commerce (Yang, 2005). Secondly, our study used a cross sectional design rather than a longitudinal design which restricts such temporal comparisons. This study shows that satisfaction is positively related to habit, but there exists a reciprocal relationship between satisfaction and habit. A longitudinal study may reveal the effect of actual acts and habit on beliefs such as

perceived usefulness and perceived ease-of-use. Future research should incorporate this view into the research model.

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Appendix A

I. Confirmation

1. 모바일 인터넷 서비스의 이용으로부터 얻은 경험이 기대했던 것 보다 나왔다.
2. 모바일 인터넷 서비스의 수준이 기대했던 것 보다 나왔다.
3. 모바일 인터넷 서비스의 이용이 기대했던 것 보다 도움이 되었다.
4. 모바일 인터넷 서비스의 이용이 기대했던 것 보다 좋은 점이 많았다.
5. 모바일 인터넷 서비스의 이용이 기대했던 것 보다 만족스럽다(*).
6. 전반적으로 모바일 인터넷 서비스의 이용으로부터 얻은 경험이 기대했던 것 보다 나왔다.

2. Perceived usefulness

1. 나는 모바일 인터넷 서비스의 이용이 내 일상생활에서 유용하다는 것을 발견하였다.
2. 내게 있어 모바일 인터넷 서비스를 이용하는 것이 목적 달성하는데 보다 효과적이었다.
3. 내게 있어 모바일 인터넷 서비스를 이용하는 것이 많은 일들을 보다 편리하게 수행하는데 도움이 되었다.
4. 모바일 인터넷 서비스의 이용으로 필요한 목적을 달성하는데 시간/노력이 적게 들었다.

3. Perceived ease-of-use

1. 모바일 인터넷 서비스를 이용하는 방법을 배우는 것은 쉬웠다.
2. 모바일 인터넷 서비스를 이용하는 것은 매우 간편하고 쉬웠다.
3. 모바일 인터넷 서비스를 능숙하게 이용하는 것이 내게 쉬웠다.
4. 모바일 인터넷 서비스는 나에게 간편하고 배우기 쉬운 서비스이었다.

4. Habit

1. 나는 모바일 인터넷 서비스를 무의식적으로 나도 모르게 이용한다.
2. 어떤 일(학업/업무)을 수행할 때, 나는 습관적으로 모바일 인터넷 서비스를 이용한다.
3. 내가 모바일 인터넷 서비스를 이용하는 것은 습관이 되었기 때문이다.
4. 나는 모바일 인터넷 서비스를 이용하는 것이 자연스럽다(*).
5. 나는 모바일 인터넷 서비스의 이용에 중독되어 있다고 생각한다.
6. 나는 모바일 인터넷 서비스를 이용하기 앞서 주저하지 않는다(*).

5. Satisfaction

1. 매우 불만족스럽다 - 매우 만족스럽다 (*)
2. 매우 불쾌하다 - 매우 유쾌하다
3. 매우 좌절적이다 - 매우 흡족하다
4. 매우 끔찍하다 - 매우 즐겁다

6. continuance intention

1. 나는 내 일상생활에서 계속해서 모바일 인터넷 서비스를 이용할 것이다.
2. 나는 현재와 같이 규칙적으로 모바일 인터넷 서비스를 계속 이용할 것이다.

Note: (*) means deleted items in the final analysis

개요

모바일 인터넷 서비스 이용자의 지속적인 이용의도에 대한 영향요인 탐색 : 습관과 기대일치모형의 통합

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기대일치이론에 기초한 기대일치모형은 정보시스템 연구 분야에서 정보시스템의 지속적인 사용 혹은 사용의도를 설명하는 핵심 이론으로 언급되어 왔다. 이러한 기대일치모형과 더불어 최근에 정보시스템 분야에서 주목을 받고 있는 또 다른 개념은 자동화된 행동 경향을 의미하는 '습관'이다. 본 연구에서는 이러한 두 가지 개념들을 기초로 모바일 인터넷 서비스에 대한 지속적인 이용 상황에서 습관과 기대일치모형을 통합하는 시도를 하였다.

이에 일차, 지각된 유용성, 지각된 사용 용이성, 습관 등의 수용후 신념, 이용자 만족, 지속적 이용의도로 구성된 연구모형을 구성하고 이를 검증하였다. J도내 250명의 대학생들을 대상으로 설문자료를 수집하여 분석한 결과, 기대일치와 지각된 유용성이 모바일

인터넷 서비스의 이용자 만족에 대한 주요 요인으로서 나타났다. 또한 지각된 유용성, 이용자 만족, 습관은 모바일 인터넷 서비스에 대한 지속적 이용의도를 결정하는 주요 요인으로 나타났다. 반면에 지각된 이용 용이성은 이용자 만족과 지속적 이용의도 모두에 대하여 아무런 관련성이 없는 것으로 나타났다.

주제어 : 기대일치모형, 습관, 지각된 유용성, 지각된 이용 용이성, 만족, 지속적 이용의도

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