

December 2004

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Recommended Citation

Kim, Hee-Woong; Chan, Hock; Chan, Yee; and Gupta, Sumeet, "Understanding the Balanced Effects of Belief and Feeling on Information Systems Continuance" (2004). *ICIS 2004 Proceedings*. 24.

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UNDERSTANDING THE BALANCED EFFECTS OF BELIEF AND FEELING ON INFORMATION SYSTEMS CONTINUANCE

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Abstract

There are innumerable studies on technology adoption as well as continuance of usage. A review of previous research shows that cognitive factors are considered prominently in information technology adoption and continuance while the affective feelings of users are not. Although attitude and user satisfaction are common factors considered in information systems research, these factors only involve partial aspects of feelings. Researchers in the marketing areas, as well as the psychology area, begin to note the importance of feelings in understanding and predicting human and customer behavior. In many modern applications, such as mobile Internet services, user feelings are expected to be important, since users are not just technology users but also service consumers. Drawing upon the support of consumer research, social psychology, and computer science, this study proposes a balanced belief–feeling model of IS continuance. In the process of developing this model, the concepts of attitude, belief, and feelings are further articulated, defined, and distinguished. The balanced model is tested in a survey of mobile Internet users. The results established the validity of the model. A comparison with the IS continuance model shows that the new model can explain significantly more variance in continuance intention, taking into account that the new model has more factors. We offer theoretical reasoning for the balanced effects of belief and feeling on IS continuance and discuss the theoretical and practical implications of this study.

Keywords: IS continuance, belief, feeling, attitude

Introduction

The last decade has seen an increasing body of information technology or information system adoption studies. The adoption studies recognize initial acceptance as a critical step toward realizing IS success. However, the eventual IS success depends on its continued usage rather than the initial adoption. The importance of IS continuance or post-adoption behavior is also evident from the fact that acquiring new customers is more costly than retaining existing customers (Parthasarathy and Bhattacharjee 1998).

Previous research (e.g., Karahanna et al. 1999; Parthasarathy and Bhattacharjee 1998) on IT post-adoption has mostly been based on cognition-oriented behavioral models such as the technology acceptance model (TAM) (Davis 1989, Davis et al. 1989). Bhattacharjee (2001) developed the IS continuance model by incorporating user satisfaction, which is based on the expectation-confirmation theory (Oliver 1980). Later, Limayem et al. (2003) developed an integrated model that explains IS adoption and post-adoption by combining the theory of planned behavior (TPB) and the continuance model. The expectation-confirmation paradigm is also a cognitive approach, comparing perceived performance and cognitive standards such as expectation. In addition, satisfaction, in these post-adoption studies, has been treated as an attitude-like construct evaluated on a hedonic continuum. This exposes satisfaction to conceptual and operational ambiguity as discussed later.

Most users adopting traditional technologies (e.g., word processor, spreadsheet, e-mail) are employees in an organizational setting. Traditional technologies have been typically used for work-related purpose; therefore, personal liking or the affective experience may not be as important as the utilitarian benefits. However, the emergence of the Internet generates new forms of information and communication technology (ICT), such as the mobile Internet, which are used for personal needs. Adopters or users of new ICT are individuals who potentially play dual roles of technology user and service consumer. Thus, it is important to examine both the cognitive and affective aspects of the consumption experience from the double role perspective. Indeed, in many consumption situations at the individual consumer level, both kinds of benefits—instrumental (economic view of consumption) and emotional (deriving from the hedonic side of the situation)—may affect choice (Derbaix and Pham 1991). Researchers have advocated for the extension of the traditional one-sided cognitive view by integrating the affective and utilitarian components of consumption experiences (Batra and Ray 1986; Holbrook and Hirschman 1982). Nevertheless, few IS-related studies have considered the role of feeling in IS-related behavior. For this reason, feeling or emotion has to be featured prominently together with belief in IS continuance studies. (Emotions and feelings are treated synonymously.)

This study aims to examine IS continuance at the individual level from a balanced belief and feeling perspective. Specifically, there are two research questions: (1) What are the prominent belief and feeling-related factors in determining IS continuance? (2) How do belief and feeling lead to IS continuance? This study is conducted in the context of mobile Internet described as the wireless access to Internet through handheld devices such as mobile phones, PDA, and PDA phones. From a theoretical perspective, this study extends our current knowledge on IS continuance by examining the balanced effects of belief and feeling. From a practical perspective, this study provides guidelines on how to retain mobile Internet users.

Theoretical Framework

Belief and Feeling in Human Behavior

Decision making refers to the entire process of choosing a course of action, which explains human behavior. The role of cognition and affect has been crucial for studying human behavior. However, cognition-based theories have dominated previous research on understanding human behavior: TPB (Psychology), mental accounting (Marketing), utility and prospect theory (Economics), and the technology acceptance model (Information Systems). This single viewpoint may result from the traditional economic view of products as objects for which the consumer desires to optimize utility from the utilitarian perspective. Contrary to the cognition-oriented theories, consumer research (Derbaix and Pham 1991) and social psychology (Zajonc 1980) studies propose that affect plays a more central role in the decision-making process. Zajonc (1980) argues that thinking and feeling are two independent evaluation systems. Pieters and van Raaij (1988) suggest that while cognitive activity is needed to make decisions leading to certain goals, affective states may be involved to control, to interpret, and to accompany the process. Even in the economics area, Romer (2000) mentioned the importance of affect in decision making. Furthermore, research on how users interact with computer systems has also increasingly focused on emotional issues (Cowie et al. 2001; Klein et al. 2002; Picard and Klein 2002). Research has even found that an interface personalized to the user's emotions can increase interaction speed (Kostov and Fukuda 2001). In summary, several areas of research have shown the importance of including emotions in studies of human behavior.

Based on the two different mechanisms of thinking and feeling in human behavior and decision making (Romer 2000; Zajonc 1980), this study proposes a framework (Figure 1) for belief and feeling based human behavior. As we are studying IS continuance

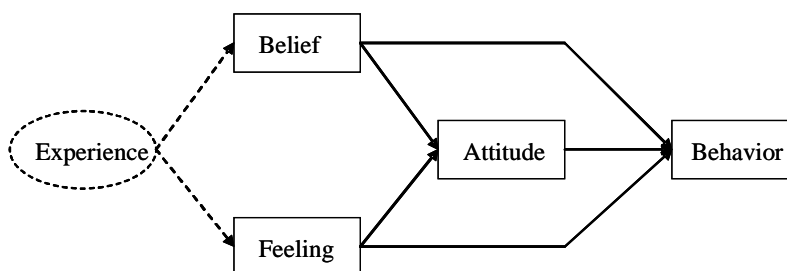


Figure 1. Theoretical Framework for Belief and Feeling Based Behavior

behavior, we assume that users have had direct experience with the IS. Since it has been previously suggested that the organization of cognition and affects in a system reflects the individual's total experience (Mischel and Shoda 2000), this paper follows the same idea. The cognition represented by belief is defined as the individual's subjective probability that performing the behavior will result in a specified outcome (Fishbein and Ajzen 1975). Affect represented by feeling is defined as a valenced affective reaction to perceptions of situations or experience (Richins 1997).

Distinction Between Feeling and Attitude

Earlier conceptualization of attitude was synonymous with affect (Davis et al. 1989; Fishbein and Ajzen 1975; Venkatesh et al. 2003). To avoid the conceptual and operational ambiguity resulting from treating attitude as an affect, Ajzen (2001) redefined attitude as a summary evaluation of a psychological object captured in both functional and hedonic dimensions. The current study adopts the idea of attitude toward performing the behavior in relation to the object instead, and reflects this idea in the subsequent research model. Many researchers agree that attitude contains both cognitive and affective elements (Batra and Ahtola 1990; Petty and Cacioppo 1985). In contrast, affect is reserved for a general mood, specific emotions as well as feeling states (Ajzen 2001). Thus, attitude is not a subtype of affect.

Feelings/emotions and moods are the different categories of affect. Moods may be elicited without the conscious awareness of the feeling state or its cause (Cohen and Areni 1991), while feelings are typically intentional (i.e., have a specific referent) (Bagozzi et al 1999). Since the current study focuses on the affective reaction toward the behavior which depends on the target object, feeling instead of mood is considered.

Attitude Formation from Belief and Feeling

The elaboration likelihood model (ELM) (Petty and Cacioppo 1985) posits that attitude guides decisions and other behaviors. Persuasion is the primary source for attitude formation. The model features two routes of persuasive influence: central and peripheral. The belief-attitude link can be explained via the central route, which involves the effortful cognitive activity where individuals draw upon knowledge to assess and elaborate the presented information. In contrast, the feeling-attitude link can be explained via the peripheral route.

As the amount of processing capacity available decreases, individuals are more likely to process less complex information such as simple peripheral cues. Feelings, mood, mere exposure effect and classical conditioning effect are affective cues leading to persuasion through peripheral route processing. The peripheral cue will spontaneously provoke a positive or a negative affective response and when the subjects are aware of the contingency between the peripheral cue and the target, the affect will transfer from the peripheral cue to the target. This subsequently influences the evaluative judgment. The *affect-as-information* model (Schwarz and Clore 1988) can also be used to explain the influence of feeling on attitude. According to the affect-as-information model, people rely on their actual feelings to form overall judgments because they perceive these feelings to contain valuable judgmental information. This is done by holding the target's representation in their minds and asking themselves, "How do I feel about it?" (Schwarz and Clore 1988). It also has been argued that the affect-as-information model explains that feelings help to form overall judgments through a controlled inferential process.

Direct Effects of Belief and Feeling on Behavior

The effect of belief on behavior has been supported by the technology acceptance model (TAM) (Davis 1989; Davis et al. 1989; Venkatesh et al. 2003). Bagozzi (1982) also supported the direct belief-intention link, by suggesting that this direct path from expectancy-value judgments to intention is hypothesized to work through stored imperatives in memory. According to the self-efficacy theory (Bandura 1982), behavior would be best predicted by considering both outcome judgments and self-efficacy judgments.

Romer (2000) classified human behavior forming mechanisms into thinking-based, feeling-based, and hybrid. Similar to the hybrid mechanism, the consummatory and instrumental motives in the consumption context are based on intrinsic rewards and extrinsic goals correspondingly. Unlike customers with instrumental motives, those with consummatory motives are particularly concerned about and regard their affective experience as very relevant by incorporating these feelings into their decision (Hirschman and Holbrook 1982). The theory of emotion and adaptation (Lazarus 1991) also identifies coping responses as impor-

Table 1. Background Theories for the Belief and Feeling Based Behavior

Relation	Background Theory	Related Research
Belief → Attitude	Elaboration likelihood model via central route	Petty and Cacioppo 1985
Feeling → Attitude	Elaboration likelihood model via peripheral route	Petty and Cacioppo 1985
	Affect-as-information model	Schwarz and Clore 1988
Belief → Behavior	Self-efficacy theory, technology acceptance model	Bandura 1982
Feeling → Behavior	Hybrid mechanisms: feeling-based and thought-based mechanisms	Romer 2000
	Theory of emotion and adaptation: coping responses to emotions	Bagozzi 1992; Lazarus 1991; Smith and Lazarus 1990
Attitude → Behavior	Theory of planned behavior	Ajzen 1991

tant mechanisms to infer action and goal attainment from feelings. Depending on the feelings generated, behavioral intentions emerge to activate plans for avoiding undesirable outcomes or increasing/maintaining the positive outcome (Bagozzi 1992). Bagozzi et al. (1999) suggested that action tendencies are automatic, “prewired” responses linked to emotions, thus supporting the relationship between emotion and behavior. Table 1 summarizes the theoretical background of each relationship in the framework and the relevant research.

Research Hypotheses

The concept of IS continuance has been examined variously as *routinization* (Cooper and Zmud 1990), *continued-sustained implementation* (Zaltman et al. 1973), and *confirmation* (Rogers 1995) as stated earlier. Despite the variations, all studies agree that continuance behavior considers institutionalizing IS use as a part of normal ongoing activity. Hence, IS continuance behavior is defined as the continued usage of IS by the adopters (Bhattacharjee 2001), where a continuance decision follows an initial acceptance decision and is influenced by the initial use experience.

Following Ajzen (2001), this study regards attitude as a summary evaluation of the use of mobile Internet, not as an affect. According to the prospect theory (Kahneman and Tversky 1979) and mental accounting (Thaler 1985), a customer’s overall assessment of a target object is conducted based on a comparison of perceived benefit and perceived sacrifice. This overall assessment will then determine the customer’s choice or behavior. In this sense, attitude is related to behavioral intention because people form intentions to perform behaviors toward which they have positive summary evaluation. Thus, there is a higher chance for a consumer with a positive evaluation toward the use of mobile Internet to continue using its services. Moreover, this attitude-intention relationship is also fundamental to other attitude-behavior theories such as TPB. Hence, we hypothesize:

H1: The attitude toward the use of mobile Internet is positively related to the continuance intention.

Several research projects have examined the content of affect, the dimensions underlying it, and the distinction between types of affect. Izard (1977) proposed the differential emotions scale by distinguishing the positive and negative emotions from a set of 10 discrete emotions. However, it has been noted that Izard’s framework includes cognitive processes, which undermines the degree to which these emotions can be considered basic (Oliver 1997). In contrast to the discrete approach, Russell (1980) proposed three basic emotional states known as *pleasure*, *arousal*, and *dominance* (PAD) as the circumplex model of affect. The PAD paradigm has received the greatest attention from consumer researchers for assessing emotions (Donovan and Rossiter 1982; Holbrook and Batra 1987). However, it has been suggested that *pleasure* and *arousal* are the two primary dimensions of affect because *dominance* requires a cognitive interpretation, which makes *dominance* unsuitable for representing pure affective responses (Kempf 1999; Mano and Oliver 1993; Russell 1980). Thus, this study identifies *pleasure* and *arousal* as the components of feeling.

The pleasure dimension refers to the degree to which a consumer feels good or happy with the target object, while arousal refers to the degree to which a consumer feels excited, stimulated, or active. In the context of mobile Internet, feelings play a major role.

In using mobile Internet services such as mobile gaming, the users feel pleasure from the fun and enjoyable games, as well as arousal from the excitement of playing those games. These feelings could influence attitude according to the affect-as-information model and ELM through the peripheral route processing via classical conditioning. Sanbonmatsu and Kardes (1988) proposed that if high arousal levels decrease the amount of processing capacity available for elaboration upon a persuasive message, peripheral cues may have a strong impact on attitude favorability. Emotions/feelings also play an important role in people's evaluation processes (Batra and Ray 1986; Schwarz and Clore 1988), where some (Allen and Madden 1985; Hirschman and Holbrook 1982) have shown that affect can influence the formation of attitude. Hence, we hypothesize:

H2(a,b): The user's feelings (pleasure, arousal) generated while using mobile Internet are positively related to the attitude toward the use of mobile Internet.

Although many studies have established that attitude does a good job of mediating the influence of product-feature knowledge or utilitarian beliefs, it is less known if the same can be said for the emotional experience. According to the theory of emotion and adaptation, feelings can indeed be represented as a unique and unmediated antecedent of behavior. Allen et al. (1992) found that emotion can have a direct influence on behavior that is not summed up by attitude judgments. However, according to Donovan and Rossiter (1982), arousal has been found to vary in its prediction behavior. In view of this, only pleasure is predicted to have a direct effect on IT user's behavior, IS continuance. Hence, we hypothesize:

H3: The user's feeling of pleasure generated while using mobile Internet is positively related to the continuance intention.

As the component of belief, this study identifies usefulness of mobile Internet. Usefulness means the degree to which a person believes that using a particular system would be advantageous in performing his or her task (Davis 1989; Davis et al. 1989). In this study, task means an objective or a function to be performed using the mobile Internet, such as checking e-mail, reserving concert tickets, or getting the latest lottery results. Since usefulness is part of perceived benefit, it may have a positive effect on attitude according to prospect theory and mental accounting. Indeed, Karahanna et al. (1999) found that usefulness exerts an influence on attitude substantively and consistently in the adoption and post adoption stage of IS use. Usefulness also has a direct effect on adoption intention and IS continuance intention according to TAM and the IS continuance model (Bhattacharjee 2001). Hence, we hypothesize:

H4: The usefulness of mobile Internet is positively related to the attitude toward the use of mobile Internet.

H5: The usefulness of mobile Internet is positively related to the continuance intention.

Research Methodology

This study adopts existing validated scales and established empirical procedures whenever possible. We adapt the IS continuance intention scales from Bhattacharjee (2001) by considering mobile Internet as a target IS. As for attitude, we adopt the items from Ajzen (2001). Also, we adopt the scale of usefulness from Davis et al. (1989) and Parthasarathy and Bhattacharjee (1998). To measure pleasure and arousal, we select the pleasure and arousal items that best suit the mobile Internet context from Cohen and Areni (1991). The questionnaires use the seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). Three IS researchers reviewed the instrument and checked its face validity. In addition, the questionnaire was discussed by a focus group of 10 experienced mobile Internet users to identify any factors not on the questionnaires. Feedback was obtained about the length of the instrument, the format of the scales, content, and question ambiguity. A pilot test was conducted with 72 samples. Subsequently some changes were made to the questionnaires and the list of items for each construct as finalized is shown in Appendix A.

Empirical data for this study was collected via an Internet survey. Messages advertising the survey were posted at two-week intervals on public forums. At the same time, e-mails were sent out via the University e-mail list to all undergraduate and graduate students. To improve the response rate, \$50 was offered to 20 respondents by lottery as an incentive. Potential respondents were reminded not to take the survey if they had no experience in using mobile Internet. The respondents were requested to enter their mobile phone number for accessing the mobile Internet, so that we could check if they had mobile Internet experience.

A total of 272 users participated in the survey. After removing the duplicate entries and incomplete responses, 218 (80.1%) usable responses were left. Table 2 shows the demographics of the respondents. The mobile Internet services can be categorized systema-

Table 2. Descriptive Statistics of the Respondents' Characteristics

Measure	Item	Frequency	Percentage
Gender	Male	162	74.3
	Female	56	25.7
Age	<20	8	3.6
	20-29	187	85.8
	30-39	22	10.1
	>40	1	0.5
Usage per Month	1-5	111	50.9
	6-10	42	19.3
	11-15	11	5.0
	16-20	18	8.3
	>21	36	16.5
Mobile Internet Service*	Communications	54	24.8
	Contents	77	35.3
	Commerce	87	39.9
Profession	High School	2	0.9
	Undergraduate	145	66.5
	Graduate	16	7.3
	Professional	50	22.9
	Self-Employed	1	0.5
	Others	4	1.9
Total		218	100.0

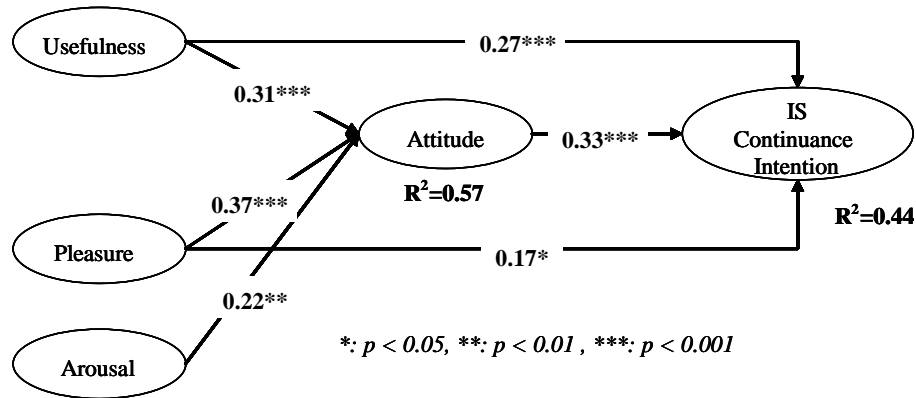
*Most frequently used

tically into three categories: commerce (i.e., shopping and ticketing), communication (i.e., mobile email) and contents (i.e., news and games). Comparing the usage patterns of the users, contents and commerce services emerge as the two most frequently used services. This is followed by communication services.

Data Analysis and Results

Atwo-stage methodology using LISREL (Anderson and Gerbing 1988) is used for data analysis. First, principal component analysis with VARIMAX rotation was conducted using SPSS 12.0 to assess the convergent and discriminant validity of the constructs. The scales show good reliabilities with all Cronbach's alphas greater than 0.80 (Appendix B). A total of five factors were identified: four factors having an eigenvalue greater than 1.0, and the last factor with 0.98. While the eigenvalue of the last factor is lower than 1.0, the scree test (Hair et al. 1998) indicates that five factors are appropriate. All items of the constructs are loaded on each distinct factor with factor loading greater than 0.5 and explain 81.3 percent of the total variance. When compared across factors, items were found to load highest on their own factors.

Confirmatory factor analysis was conducted by creating a path diagram using LISREL (Appendix B). Convergent validity was assessed using three criteria: individual item lambda coefficients greater than 0.70, a significant (0.05 level) t-statistic for each path, and each path loading greater than twice its standard error. The standardized loadings were all greater than 0.7 (Gefen et al 2000) except for UI4 (0.63). Each path loading was greater than twice its standard error (Anderson and Gerbing 1988). The composite factor reliabilities (CFR) were greater than 0.7. The average variance extracted for each factor was greater than 0.7. Thus, the convergent validity is established. The intercorrelations among the independent variables were below 0.6, thus establishing discriminant validity (Intercorrelations < 0.6) except for 0.62 between pleasure and arousal. Since pleasure and arousal had high intercorrelation (0.62), a chi-square constrained test was conducted between them. The chi-square difference



$\chi^2 = 288.30$, $df = 126$, $GFI = 0.87$, $AGFI = 0.83$, $CFI = 0.98$, $RMSEA = 0.077$,
Std. RMR = 0.053

Figure 2. Standardized LISREL Solution

was significant (p -value < 0.000) and showed that the original model represents a better fit. Discriminant validity can be also assessed based on the comparison between the correlations of the latent variables and the square roots of the AVEs. All correlations for a variable with other variables are lower than the square-root of the AVE for that variable. Thus, the discriminant validity among the constructs is established.

Figure 2 shows the standardized LISREL path coefficients and the overall fit indices. The model fit indices show good model fit. All three factors are found to be significantly related to attitude: *usefulness* ($\beta = 0.31$, $p < 0.001$), *pleasure* ($\beta = 0.37$, $p < 0.001$), and *arousal* ($\beta = 0.22$, $p < 0.01$). Thus, H2 (a,b) and H4 are supported. Three factors are also found to be significantly related to IS continuance intention: *usefulness* ($\beta = 0.27$, $p < 0.001$), *attitude* ($\beta = 0.33$, $p < 0.001$), and *pleasure* ($\beta = 0.17$, $p < 0.05$). Thus, hypotheses H1, H3, and H5 are supported.

Discussion and Implications

Discussion of Findings

This study found that both the cognitive and affective mechanisms work together to shape attitude and determine IS continuance. Van der Heijden (2002) mentioned that the presence of one forming process does not exclude the other in attitude formation. Thus, the traditional belief-attitude association does not rule out the possibility of a feeling-attitude relationship. However, we have to note the difference between this study and other technology adoption or continuance studies. Much of the research on technology adoption or continuance has been in organizational settings and the selected technologies were functional products, devoid of the hedonic dimension (Davis 1989; Davis et al. 1989; Karahanna et al. 1999; Venkatesh et al. 2003). In contrast, this study is set in an individual setting where the users are employing the IS services for personal needs. For this reason, not only the utilitarian dimension but also the hedonic dimension becomes important for overall evaluation and the continuance decision.

We can understand how usefulness and pleasure influence IS continuance behavior via the perspective of extrinsic and intrinsic motivation respectively. Extrinsic motivation refers to using the mobile Internet because it is perceived to be instrumental in achieving valued outcome (i.e., useful), which tends to heighten the interest in continuing the usage so as to reinforce the utilitarian benefits. In a way, users also try to rationalize their continuance behavior by looking for utilitarian benefits captured by usefulness to reinforce their past adoption decision (Karahanna et al. 1999). Intrinsic motivation refers to the extent to which the activity of using mobile Internet is perceived to be pleasurable in its own right, apart from any performance consequences that may be anticipated (Deci 1971). Although some researchers may refer to this sort of behavior as irrational (Pieters and van Raaij 1988), users who regard their emotional experience as very relevant in making decisions (Hirschman and Holbrook 1982) do exist, as in this case, pleasure has been shown to influence continuance intention.

The direct impact of feeling on behavior intention contradicts a previous study (Trandis 1971), which posited that attitude sums up the influence of all complex emotional experiences on behavioral intention. However, in the mobile Internet context, where mobile Internet customers use the technology and services for individual purposes, enhanced personal usage experiences will drive the customers to continue using the services. With that, we are dealing with a richer domain of emotional experience. It may be difficult for an individual to integrate such diverse feelings into a summary evaluation: attitude (Allen et al. 1992). Although attitude is shaped by hedonic and cognitive responses, it only represents a subset of the emotions/feelings (Holbrook and Hirschman 1982). Therefore, feeling could exist as a unique antecedent of behavior intention and subsequently behavior.

Regarding attitude, Venkatesh et al. (2003) argued against its role in explaining behavior. Most previous research (Ajzen 1991; Davis et al. 1989; Venkatesh et al. 2003) viewed attitude as an affective reaction. However, Spangenberg et al. (1997) proposed that attitude, which is evaluative in nature, contains cognitive as well as affective elements and it should be distinct from affect. Recently, Ajzen (2001) redefined attitude as a summary evaluation. When attitude is defined as an affective reaction, it plays the role of affect in predicting behavior. Affect predicts intention or behavior only when the behavior is habituated or mandatory (Allen et al. 1992). Before adopting technology, the usage behavior is neither habitual nor mandatory. For this reason, previous research (Davis et al. 1989; Venkatesh et al. 2003) had limitations in explaining technology adoption behavior in terms of attitude. However, this study shows the significant role and effect of attitude on IS continuance based on the new definition.

Comparison with the IS Continuance Model

The proposed belief and feeling based behavior model can be compared with the IS continuance model (Bhattacharjee 2001). This comparison aims to analyze the explanatory power of the predictors of continuance intention in each model. Although this study did not collect confirmation data, it did partially test the IS continuance model as shown in Figure 3, with the three satisfaction items adopted from Bhattacharjee (2001): *pleased*, *satisfied* and *contented*. While the belief and feeling-based post-adoption model could explain 44 percent of the variance in continuance intention, the continuance model (without the confirmation construct) could explain only 28 percent of the variance, Bhattacharjee reported 41 percent in his study. A computation of the F value based on the different R squares, $\frac{((R_{sq1} - R_{sq2}) / (df_1 - df_2))}{((1 - R_{sq1}) / (N - df_1 + 1))}$, gives a value of 61.71, with p value < 0.001. This means that all three predictors, namely usefulness, pleasure, and attitude, explain IS continuance better than usefulness and satisfaction alone.

In the IS continuance model, usage experience with the technology can influence satisfaction indirectly through a confirmation process (Oliver 1980). Based on the expectation-confirmation paradigm, satisfaction could imply an evaluation of a user's experience with the technology via the confirmation process. Thus, satisfaction in the continuance model is viewed as an attitude-like evaluation with the evaluative aspect of that judgment varying along the hedonic continuum. However, satisfaction is also captured as a feeling in the IS continuance model because Bhattacharjee adopted the idea that attitude is an affect. As we have discussed earlier, treating attitude as an affect results in some ambiguous status for both attitude and affect. In this sense, satis-

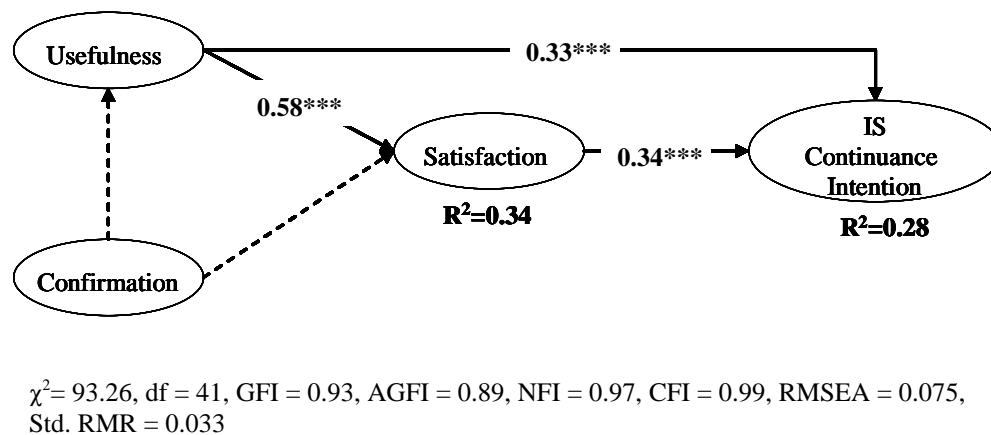


Figure 3. Testing Results of IS Continuance Model

faction is also subjected to operational ambiguity. If satisfaction is treated as an attitude-like evaluation, it would lack the overall judgment that considers both dimensions of cognition and affect as depicted in the proposed belief and feeling based behavior model. If satisfaction is treated as a feeling, it may not exist as a unique and fundamental feeling construct as satisfaction is often found to load together with positive emotions such as joy and happiness (Nyer 1997). Bagozzi et al. (1999) argued that satisfaction is more of the first emotion to receive scrutiny in post-purchase behavior research than to exist independently from many other positive emotions. Hirschman and Holbrook (1982) also argued that behavioral domains should be typified by richer emotive experience than just alone.

Moreover, the expectation-confirmation paradigm is a cognitive approach. In view of the belief and feeling based behavior in the current study, both the cognitive and affective approaches have to be considered. This is because the customers' evaluative judgment and subsequent behavior are based partly on cognition and partly on affective responses to a stimulus or experience (Oliver 1997).

Implications

From the theoretical perspective, this study develops a belief and feeling based theoretical framework for explaining human behavior, and responds to the call for including feelings/emotions in IS-related behavior. As discussed in the introduction, continued usage of new ICT for personal purposes, by users who have the dual role of service consumer and technology user, is better explained by the balanced model. This is because consumer choice and usage behavior is based on cognition and affective responses to a stimulus or experience (Oliver 1997). More aspects of emotions are taken into account and shown to be significant, compared to prior research on IT adoption (Davis et al. 1989; Venkatesh et al. 2003) and IS continuance (Bhattacharjee 2001). The balanced model was found to explain continuance significantly better with three determinants from the research model than the two in the IS continuance model.

This study finds that feelings have significant effects on attitude and IS continuance intention. Feelings represent the experiential view of a consumption experience (Holbrook and Hirschman 1982) and form the basis of the primary motivational system (Izard 1977). Thus, feelings can be rather helpful in explaining human behavior. Based on the assumption that users have relevant experience in dealing with IS in the IS continuance context, this study extends the current knowledge of the feeling-intention link by noting the potential effect of direct and regular experience on strengthening the link. Although affect itself may be transitory, it is still possible to recreate the conditions in our memory and react to the emotions so generated (Bagozzi et al. 1999; Pieters and van Raaij 1988). Thus, having relevant direct usage experience helps to leave the memory trace (Bower 1981) while regular experience retrieves the trace. The role played by feeling in the continuance context is further enhanced by regular experience because the consumers could reexperience the feelings every time they use mobile Internet services. As our model could potentially be applied to any experience-based context, perhaps the effect of regular versus irregular experience on the model could be explored further.

From a practical perspective, this research provides preliminary evidence concerning the criteria that adopters utilize to evaluate whether to continue IS usage. This is important in the ongoing improvements in the IS design and the associated follow-up services to ensure continued usage. Results show that users are responsive to the usefulness and to their own feelings toward the IS services. By keeping users in a loop of services that they perceive as useful, a habitual behavior (Limayem et al. 2003) in using the IS may be inculcated, which in turn leads users to employ the IS regularly and continuously. Other than improving instrumental consumption experience, service providers should also take care of the consumer's emotional experience. As feelings are significant in predicting attitude and continuance intention, service providers should offer services and interfaces that enhance feelings of pleasure and arousal.

Conclusion

This study discusses the need to include a richer consumption experience in explaining the continuance of mobile Internet as a new ICT by individuals who have double roles of technology users and service consumers. It is known that affect as well as cognition have important effects on service consumption and continuance (Allen et al. 1991; Holbrook and Hirschman 1982). This study developed a theoretical framework for explaining human behavior (IS continuance) from a balanced belief and feeling perspective. Although previous research has considered affect partially by considering *attitude* and *satisfaction* in IS adoption and IS continuance, attitude has been criticized for its confusing concept and its limitation in explaining human behavior (Davis et al. 1989; Venkatesh et al. 2003). Also, satisfaction has been criticized for its limitation in representing emotions (Allen et al.

1992). This study classifies belief as cognition and feeling as affect and shows their balanced effects on IS continuance in a mobile Internet context. The comparison between the balanced cognition and affect model and the IS continuance model (Bhattacharjee 2001) shows that satisfaction and perceived usefulness alone, in the IS continuance model, may not be able to explain as well as a combined impact of usefulness, attitude, and pleasure on the continuance intention. This offers important contributions toward articulating differences in the effects of cognition and affect in IS continuance.

However, we acknowledge several limitations in this study. One limitation of this study is to compare our model with a partial IS continuance model. By omitting the confirmation construct, a partial testing of the continuance model was done instead. Another limitation is that "emotional responses are not always recallable" (Donovan and Rossiter 1982). Thus, answering feeling-related questions using the questionnaire may not be always accurate. In addition, this study did not consider the correlation between independent variables, even though we know that there are two streams of study on the relationship between belief and feeling, i.e., primacy of affect (Zajonc 1980) and primacy of cognition (Lazarus 1991). These limitations may restrict the generalizability of the findings.

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Appendix A. Operationalization of the Model Variables

Variable	Item	Description	References
IS continuance intention	INT1	I intend to continue using mobile Internet in the next six months	Bhattacharjee 2001
	INT2	During the next six months, I plan to continue using mobile Internet	
	INT3	I expect to continue using mobile Internet in the next six months	
	INT4	If I could, I would like to discontinue my use of mobile Internet (reverse)	
Attitude	"How would you rate the use of mobile Internet?"		Ajzen 2001
	ATT1	Bad — Good	
	ATT2	Dislikeable — Likeable	
	ATT3	Harmful — Beneficial	
	ATT4	Worthless — Valuable	
Usefulness	USE1	Using mobile Internet enables me to accomplish tasks more quickly	Davis et al. 1989
	USE2	Using mobile Internet makes it easier to do my task	
	USE3	Using mobile Internet saves my time and effort in performing tasks	
	USE4	Mobile Internet is useful in performing my task	
Pleasure	"Using mobile Internet makes me feel..."		Cohen and Areni 1991
	PLE1	Unhappy — Happy	
	PLE2	Annoyed — Pleased	
	PLE3	Unsatisfied — Satisfied	
Arousal	"Using mobile Internet makes me feel..."		
	ARO1	Calm — Excited	
	ARO2	Relaxed — Stimulated	
	ARO3	Unaroused — Aroused	

Appendix B. Results of EFA and CFA

	Exploratory Factor Analysis using SPSS 12.0					SPSS Output			Confirmatory Factor Analysis using LISREL 8.54						
	1	2	3	4	5	Mean	Std. Deviation	Cronbach's alpha	Factor Loading	Std. Error	Std. Loading	Meas. Error	t-value	AVE	CFR
UI1	0.27	0.85	0.20	0.12	0.19	5.30	1.46	0.914	1.76		0.94	0.24		0.71	0.90
UI2	0.26	0.86	0.18	0.16	0.20	5.17	1.46		1.70	0.056	0.97	0.27	30.32		
UI3	0.22	0.87	0.21	0.14	0.15	5.17	1.43		1.36	0.052	0.93	0.36	26.24		
UI4	0.09	0.61	0.38	0.21	0.14	5.61	1.45		1.11	0.099	0.63	0.41	11.2		
ATT1	0.18	0.26	0.73	0.18	0.30	5.18	1.31	0.880	1.86		0.87	0.12		0.75	0.92
ATT2	0.19	0.25	0.77	0.13	0.28	5.16	1.29		4.16	0.260	0.86	0.06	16.15		
ATT3	0.20	0.18	0.76	0.21	0.18	5.48	1.17		3.24	0.220	0.80	0.13	14.48		
ATT4	0.38	0.23	0.70	0.18	0.09	5.25	1.27		3.21	0.240	0.77	0.60	13.48		
USE1	0.85	0.16	0.24	0.11	0.18	4.76	1.31	0.943	1.28	0.073	0.92	0.15	17.61	0.79	0.94
USE2	0.79	0.25	0.09	0.13	0.30	4.79	1.23		1.35	0.089	0.84	0.29	15.19		
USE3	0.82	0.22	0.27	0.13	0.18	4.87	1.32		1.62	0.093	0.91	0.17	17.33		
USE4	0.83	0.21	0.23	0.14	0.11	4.92	1.20		2.95	0.180	0.88	0.22	16.38		
PLE1	0.27	0.20	0.21	0.24	0.80	5.15	1.18	0.913	1.49	0.087	0.91	0.18	17.13	0.83	0.94
PLE2	0.24	0.20	0.26	0.23	0.82	4.97	1.41		5.18	0.280	0.95	0.11	18.41		
PLE3	0.23	0.22	0.31	0.27	0.74	4.98	1.32		2.83	0.170	0.88	0.23	16.24		
ARO1	0.18	0.15	0.23	0.83	0.22	4.87	1.44	0.906	4.21	0.250	0.91	0.17	17.07	0.82	0.93
ARO2	0.09	0.16	0.12	0.89	0.16	4.48	1.48		1.96	0.120	0.90	0.19	16.8		
ARO3	0.14	0.15	0.20	0.84	0.21	4.46	1.43		4.30	0.250	0.90	0.18	16.9		

