

# Consumer Learning to Promote Behavioral Intention Toward IT Innovation: Is Word of Mouth Needed?

*Completed Research Paper*

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## ABSTRACT

Adoption of innovation is an on-going process involving persuasive communication and learning. However, the idea of marketing of IT innovation from consumer learning perspective has long been neglected. Based on consumer learning theory, we develop a model suggesting that word of mouth (WOM) stimulates individual consumers' learning and in turn affect their intention to adopt mobile payment. Data about users and potential users of mobile payment was collected from China through a questionnaire survey. The results indicate that consumers first sense the WOM and obtain relevant information from the surrounding environment. Their information searching will affect their perceived knowledge and self-efficacy about mobile payment. Then attitude about mobile payment is formed, which in turn, affects their behavioral intention toward mobile payment. Differences of model path coefficients between users and potential users of mobile payment are explored, and implications and limitations are also discussed.

## Keywords

Consumer learning, mobile payment, word of mouth, information search, behavioral intention.

## INTRODUCTION

Adoption of innovation is an on-going process involving persuasive communication and learning (Lee & Xia, 2011, P289). Any process that changes consumers' memory and behavior is defined as consumer learning (Arnould et al., 2001). Two main types of consumer learning are direct consumer learning, learning from usage experience, and indirect consumer learning, learning from outside sources (Li, et al., 2003). The contradiction between limited time and abundant IT innovation strengthens the importance of indirect learning. As a source of indirect learning, WOM has long been accepted as an important communication source between individual consumers (Derbaix and Vanhamme, 2003). With the rapid development of the Internet, WOM makes it easier for consumers to recommend new IT innovations for peers. Currently, there is a consensus by IS researchers that there is a lack of systematic investigation into what can be termed "other behavioral outcomes," for example, WOM (Kim & Son, 2009). However, WOM is not embodied in popular theories about technology adoption.

In this study, we adopt the idea of marketing of IT innovation, an idea said to have long been neglected in the business press and academic literature (Easingwood & Koustelos, 2000), and view adoption of innovation as a consumer learning process. WOM that consumers receive is proposed to initiate the consumer learning process, serving as a response to the call for exploring the role of WOM in stimulating the diffusion of IT innovation in individual user context in Venkatesh, et al. (2012). The research question is how WOM can stimulate consumer learning and in turn affect individual consumers' intention to adopt IT innovations.

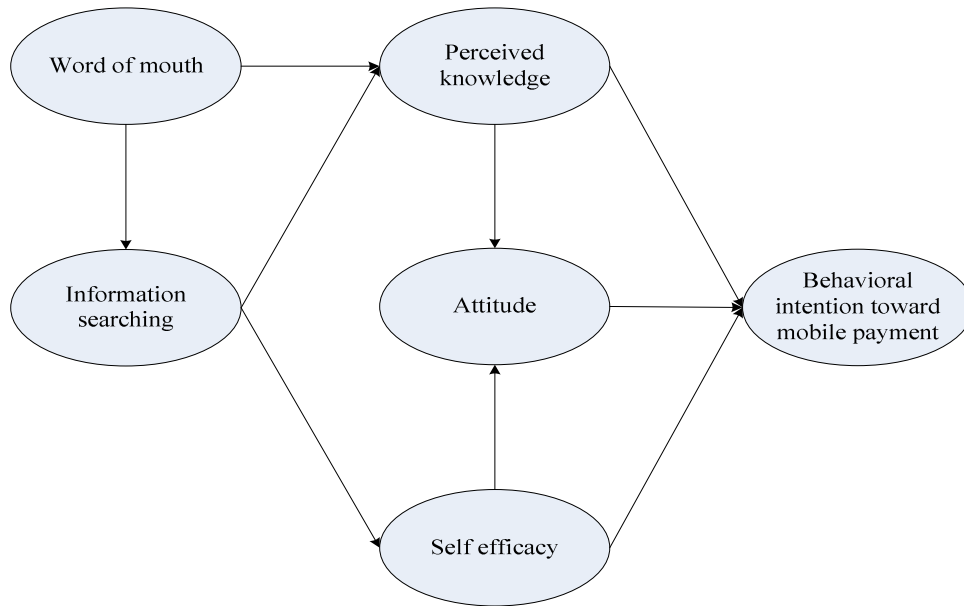
## THEORY

Attitude is a core variable to explain consumers' adoption behavior. Rosenberg and Hovland (1960) proposed the tripartite model of attitude, in which attitude is composed of affective, behavioral, and cognitive components. Affective component refers to a person's emotions towards the object; behavioral component refers to how a person tends to act towards the object; Cognitive component consists of thoughts and beliefs the person has about the object (Breckler, 1984).

Lavidge and Steiner (1961) first established consumer learning in an advertising context by adopting the tripartite model of attitude and proposed that advertising have three functions: cognitive component, affective component, and conative component. The cognitive component is intellectual, mental, or relational states; the affective component is emotional or feeling states; and the conative is the states relating to the tendency to treat objectives as positive or negative goals (Lavidge

and Steiner, 1961, p.60). Consumers first sense the stimuli and obtain relevant information from the surrounding environment, and then attitude is formed, which in turn, affect potential decisions. This model was labeled the hierarchy of effects model (Palda, 1966).

By adopting the tripartite attitude model and hierarchy of effects model, a new conceptual model was proposed to show the role of WOM in stimulating consumer learning and thus behavioral intention toward IT innovations (Figure 1). In this study, perceived knowledge pertains to cognitive dimension of attitude; self-efficacy and attitude about the IT innovation pertain to affective dimension; and behavioral intention toward mobile payment, which represents consumers’ intention to adopt or continue to use mobile payment) pertains to conative dimension. WOM and information search serve as the stimuli of the consumer learning process.



**Figure 1. Research Model of Consumer Learning**

**HYPOTHESES DEVELOPMENT**

WOM we received increases our awareness of new IT innovations. Rogers defined “information that an innovation exists” as awareness knowledge (Rogers, 2003, P.173). After consumers become aware of the IT innovation, they will increase communication with others or search independently to interpret the specific innovation and gain information about how the IT innovation functions (Rogers, 2003). Then, they can decide whether they should adopt the IT innovation. Rogers (2003) named this process the knowledge stage of the innovation-decision process. WOM serves as the starting point of the IT innovation diffusion process because WOM lets you become aware of the IT innovation and stimulates your information search behavior.

*H1: Positive word of mouth consumers received will have a positive relationship with their information searching about the IT innovation.*

Information search is a process in which a person seeks information about a problem, situation, or artifact independently (Browne, Pitts, &Wetherbe, 2007). Independent exploration behavior means searching for information independently, through which consumers can obtain information they are interested in. Independent exploration behavior can improve consumers’ knowledge about the IT innovation (Barki, et al., 2007). By searching for information, consumers become familiar with the IT innovation and become knowledgeable about the IT innovation. The more efforts they spend on information searching, the more product-related information they get, and then the more knowledgeable they feel.

*H2: Consumers’ information searching behavior will have a positive relationship with their perceived knowledge about the IT innovation.*

Direct experience is the most effective source of self-efficacy about IT innovations. Unfortunately, individuals cannot always experience IT innovations before they decide to use IT innovations. External sources of knowledge serve as supplements of

direct experience. Information search is individuals' proactive behavior of seeking help. Support for consumers of the IT innovation is believed to be positively associated with individual's self-efficacy (Compeau & Higgins, 1995). Individuals can obtain vivid examples about how to use the IT innovation from the Internet or hear of the experience from people whose opinion they value. Thus, information search effort will be positively associated with individuals' self-efficacy.

*H3: Consumers' information searching behavior will have a positive relationship with their self-efficacy of using the IT innovation.*

WOM plays an important role in knowledge diffusion (Sweeney, Soutar & Mazzarol, 2008). First, WOM makes us become aware of the existence of the IT innovation, and consumers' product knowledge depends on their awareness or understanding about the product (Lin and Zhen, 2005). Awareness of the IT innovation serves as initiation for the information searching process, which contributes to the accumulation of knowledge about IT innovation. Second, WOM is not only a form of communication between senders and receivers, but also an important source of knowledge. Senders form WOM based on their experience, thus WOM is rich in information and stimulates knowledge exchange between senders and receivers.

*H4: Positive WOM consumers received will have a positive relationship with their perceived knowledge about the IT innovation.*

Self-efficacy is the extent to which consumers of the IT innovation think they can use the IT innovation. Availability of related knowledge, resources, and supports directly affects peoples' perception of their capability of using IT innovations (Huang, Liu, & Chang, 2012). Level of self-efficacy will be changed when new information and experiences are acquired (Torkzadeh, Chang & Demirhan, 2006). Innovations about mobile payment are knowledge-centered innovations, and relevant knowledge is very important in consumers' capability of using the innovation while avoiding potential risks during the usage. The consumers will feel wise to use the IT innovation if they are capable of using the IT innovation.

*H5: Consumers' self-efficacy about the IT innovation will have a positive relationship with their attitude toward the IT innovation.*

Knowledge about the IT innovation will be used by consumers to evaluate the IT innovation and form their opinion and beliefs (Martin & Lueg, 2011). With knowledge about the IT innovation, consumers will develop belief about the IT innovation such as whether it is easy to use and useful. Individuals form an initial attitude toward technology based on their perceptions of the technological characteristics, such as perceived usefulness and perceived ease of use (Kang, Lim, Kim, & Yang, 2012). Moreover, perceived knowledge of consumers will decrease their anxiety of the IT innovations, which has a negative impact on attitudes toward IT innovations (Venkatesh, 2000).

*H6: Consumers' perceived knowledge about the IT innovation will have a positive relationship with their attitude toward the IT innovation.*

Product knowledge can affect consumers' purchase intention (Lin & Chen, 2006), and lack of knowledge has long been accepted as a barrier for consumers to adopt IT innovations such as personal computers (Venkatesh & Brown, 2001). When consumers are faced with new IT innovations, they are not familiar with the innovations and thus may perceive it risky to adopt the innovations. Knowledge about the IT innovation helps to reduce consumers' perceived risk and uncertainty. Thus, perceived knowledge will stimulate the adoption of IT innovations. The more knowledge consumers have, the more informed consumers feel. The more consumers become informed about IT innovations, the more likely consumers will adopt them (Gu, Park, & Konana, 2012).

*H7: Consumers' perceived knowledge about the IT innovation will have a positive relationship with their behavior intention toward the IT innovation.*

The theory of planned behavior has been applied to predict different kinds of behaviors such as adoption of advanced mobile services (Nicola's et al., 2008). According to the theory of planned behavior, consumers' self-efficacy and attitude about IT innovations are positively associated with their behavioral intention. The following four hypotheses are supported by the theory of planned behavior.

*H8: Consumers' attitude toward the IT innovation will have a positive relationship with their behavior intention toward the IT innovation.*

*H9: Consumers' self-efficacy about the IT innovation will have a positive relationship with their behavior intention toward the IT innovation.*

**METHOD**

**Data Collection**

Mobile payment refers to a payment for goods, services, and bills by using mobile devices (such as smartphones) through wireless and other communication technologies (Dahlberg, Mallat, Ondrus & Zmijewska, 2008). Mobile payment is used to test the proposed model. Students from an eastern Chinese university are used as the sample in this study. Questionnaires were sent out in several classrooms and students were invited to participate in the survey. 255 questionnaires were sent out and 235 responses were obtained with a response rate of 92%. Three invalid responses were deleted because of a high rate of same answers. There are 68 respondents who have used mobile payment and 164 respondents who have not used mobile payment. In order to maintain the balance of these two groups, 68 cases were selected randomly from those respondents who have not used mobile payment by using SPSS 20. Thus, there are two groups: user group and potential user group, both of which have 68 cases. Demographic information of the participants is summarized in Table 1.

Measure	Item	User group		Potential user group	
		#	%	#	%
Age	18	2	2.9	2	2.9
	19	14	20.6	17	25
	20	21	30.9	18	26.5
	21	14	20.6	15	22.1
	22	9	13.2	13	19.1
	23	3	4.4	1	1.5
	Missing	5	7.4	2	2.9
Gender	Male	13	19.1	20	29.4
	Female	55	80.9	48	70.6
Year of using mobile internet (Month)	No	1	1.5	1	1.5
	0-6	4	5.9	2	2.9
	7-12	4	5.9	6	8.8
	13-18	4	5.9	7	10.3
	19-24	5	7.4	5	7.4
	>24	50	73.5	47	69.1
Year of using mobile payment (Month)	No	0	0	68	100
	0-6	31	45.6	N/A	N/A
	7-12	12	17.6	N/A	N/A
	13-18	8	11.8	N/A	N/A
	19-24	3	4.4	N/A	N/A
	>24	13	19.1	N/A	N/A
	Missing	1	1.5	0	0

**Table 1. Demographic Information for User and Potential User Group**

**Measures**

We tried to adapt existing measures from prior studies to assess constructs in the model. Minor modifications were made to the adopted measures. A Chinese version of instrument was developed from original English items by following back-translation method (Brislin, 1970). All of the items were measured on a seven-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). Positive WOM was assessed with three items adapted from Lin & Sher (2005). Information search was measured with five measures adapted from Barki, Titah, and Boffo (2007). Measures of attitude about the innovation were adopted from Schierz, Schilke, and Wirtz (2010). Self-perceived knowledge was assessed by four items adapted from Suh and Lee (2005). Self-efficacy was assessed with using three items from Johnston and Warkentin (2010). Intention to adopt and intention to continued use of IT innovations were both included in the questionnaire to cover all possible respondents. Three items from Gu, Lee, and Suh (2009) were used to measure intention to adopt, and three items from Venkatesh et al. (2012) were used to measure intention to continued use. Personal innovativeness will be used as control variable in this study.

**Data Analysis**

The PLS algorithm was conducted to analyze the data by using SmartPLS 2.0. We run the model for both user and potential user group. We analyzed the data in three steps. First, we evaluated the measurement model; second, we evaluated the structural model; and third, we tested the significant path differences for the two groups by using parametric approach (Keil et al., 2000). Age, gender, and personal innovativeness do not have a significant impact on behavioral intention. Thus, results without these control variables were reported below.

### Measurement Model

A variety of statistics for user group and potential user group are shown in Table 2. Coefficient Alpha ranges from 0.74 to 0.89 for user group and from 0.72 to 0.90 for potential user group, which are all above the threshold 0.70 (Cronbach, 1971). Composite reliability ( $\rho_c$ ) scores are all above 0.8 for both groups, indicating internal consistency of the measures (Chin, 1998). All AVEs are larger than 0.5 (Fornell & Larcker, 1981). All these statistics indicate high reliability of the items. Additionally, all square roots of AVEs are larger than inter-correlations among the constructs in the model (Fornell & Larcker, 1981), indicating discriminant validity. Jointly, these findings suggest adequate convergent and discriminant validity. We also checked the variance inflation factors (VIFs) of all the independent variables. None of the VIFs exceed 3, suggesting that multicollinearity is not a concern (Petter et al. 2007).

User group										
	R2	CR	Cronbachs $\alpha$	AVE	pWOM	INS	PK	ATT	SEL	INT
Positive word of mouth (pWOM)	N/A	0.849	0.736	0.658	<b>0.811</b>					
Information search (INS)	0.162	0.897	0.855	0.636	0.402	<b>0.797</b>				
Perceived knowledge (PK)	0.600	0.862	0.788	0.611	0.465	0.754	<b>0.782</b>			
Attitude (ATT)	0.547	0.922	0.885	0.747	0.268	0.425	0.437	<b>0.864</b>		
Self-efficacy (SEL)	0.175	0.926	0.879	0.806	0.156	0.418	0.347	0.711	<b>0.898</b>	
Intention to continued use (INT)	0.664	0.931	0.889	0.819	0.359	0.538	0.511	0.615	0.772	<b>0.905</b>
Potential user group										
	R2	CR	Cronbachs $\alpha$	AVE	pWOM	INS	PK	ATT	SEL	INT
Positive word of mouth (pWOM)	N/A	0.893	0.824	0.737	<b>0.858</b>					
Information search (INS)	0.206	0.929	0.904	0.724	0.454	<b>0.851</b>				
Perceived knowledge (PK)	0.270	0.899	0.852	0.692	0.384	0.486	<b>0.832</b>			
Attitude (ATT)	0.378	0.918	0.880	0.738	0.324	0.233	0.401	<b>0.859</b>		
Self-efficacy (SEL)	0.073	0.843	0.718	0.645	0.360	0.270	0.279	0.559	<b>0.803</b>	
Intention to adopt (INT)	0.610	0.920	0.868	0.792	0.331	0.297	0.273	0.707	0.668	<b>0.890</b>

Table 2. Measurement Validity for User Group and Potential User Group

### Structural Model

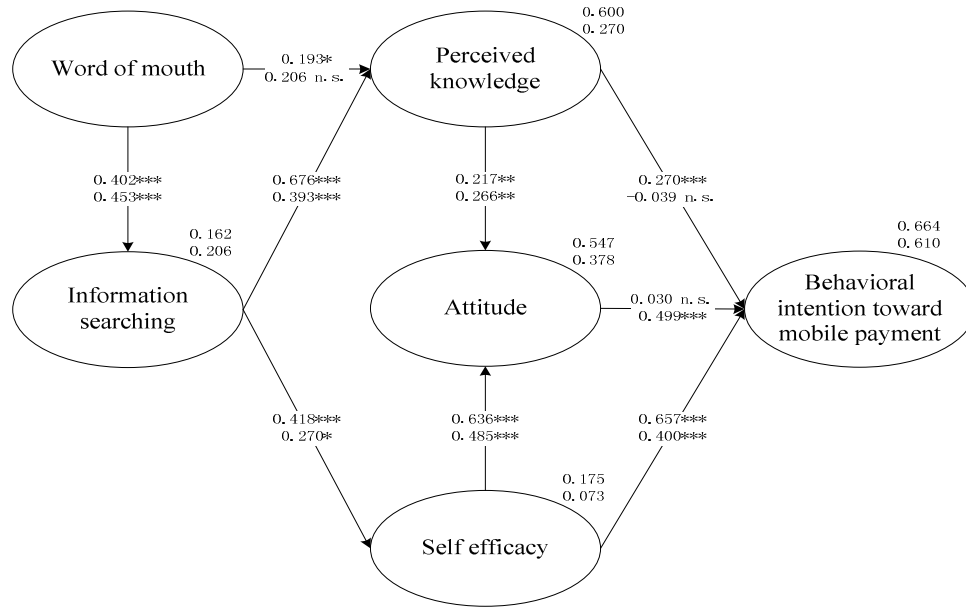
The path coefficients and explained variances of the structural model for both groups are shown in Figure 2. For the user group, the model explained 66.4% of the variance in adopters' intention to continued use. For the potential user group, the model explained 61% of the variance in non-adopters' intention to adopt.

For the user group, WOM has a positive impact on information searching behavior and their perceived knowledge, supporting H1 and H4. Information searching behavior has a positive impact on perceived knowledge and self-efficacy, supporting H2 and H3. Perceived knowledge and self-efficacy of users each has a significant impact on their attitude about IT innovations, supporting H5 and H6. Perceived knowledge of users has a significant impact on their intention to continued use, supporting H7. Users' attitude about the IT innovation doesn't have a significant impact on their intention to continued use. Thus, H8 is not supported. The results also indicate self-efficacy of users has a significant impact on their behavioral intention, thus, supporting H9.

For the potential user group, WOM has a positive impact on information searching behavior, but WOM doesn't have a significant impact on potential users' perceived knowledge. Thus H1 is supported but H4 is not. Information searching of potential users has a positive impact on their perceived knowledge and self-efficacy, supporting H2 and H3. Perceived knowledge and self-efficacy of potential users each has a significant impact on their attitude about IT innovations, supporting H5 and H6. Perceived knowledge of potential users does not have a significant impact on their intention to adopt. Hence, H7 is not supported. Potential users' attitude toward the IT innovation has a significant impact on their intention to adopt the IT

innovation. Thus, H8 is supported. The results also indicate self-efficacy of potential users has a significant impact on their behavioral intention, supporting H9. The results of the hypotheses testing are summarized in Table 3.

WOM does not have a significant impact on knowledge for potential user group. However, WOM has a positive impact on perceived knowledge if information search were excluded from the model ( $b=0.385$ ,  $P<0.001$ ). The result of a Sobel test shows that information searching fully mediates the relationship between WOM and perceived knowledge (Sobel test statistic= $2.441$ ,  $P<0.05$ ).



Note: \* $P<0.05$ ; \*\* $P<0.01$ , \*\*\* $P<0.001$ , and n.s.=not support; Variance explained shown above box; the upper coefficients are for user group, and the lower coefficients are for potential user group.

Figure 2. Structural Model for User Group and Potential User Group

Relationships	Support: user group	Support: potential user group
H1:WOM→Information search	Yes	Yes
H2:Information search→Knowledge	Yes	Yes
H3:Information search→Self-efficacy	Yes	Yes
H4:WOM→Knowledge	Yes	No
H5:Self-efficacy→Attitude	Yes	Yes
H6:Knowledge→Attitude	Yes	Yes
H7:Knowledge→Behavioral intention	Yes	No
H8:Attitude→ Behavioral intention	No	Yes
H9:Self-efficacy→ Behavioral intention	Yes	Yes

Table 3. Summary of Hypotheses Tests

Multi-group Analysis

In the structural model, the path coefficients vary for two groups. A multi-group analysis is conducted in order to test whether these differences are significant (Keil et al., 2000). The results are summarized in Table 4. According to the results, three path coefficients are significantly different, which are “Information Search -> Knowledge”, “Knowledge -> Behavioral Intention”, and “Attitude -> Behavioral Intention”.

DISCUSSION

Key Findings

For the user group, once users of the IT innovation heard something new about the IT innovation, they will search for more information about the IT innovation. Their information search behavior and the positive WOM they received will increase their knowledge about the IT innovation. Information search also increases their self-efficacy to continued use the IT innovation. Users' perceived knowledge and self-efficacy stimulate them to develop a positive attitude about the IT innovation and each has a positive impact on their intention to continued use. However, attitude of users does not affect their continued usage decision.

For the potential user group, the WOM potential users received does not increase their perceived knowledge about the IT innovation but stimulates them to search for information about the IT innovation. Their information searching behaviors increase their perceived knowledge and self-efficacy. Their self-efficacy and perceived knowledge about the innovation have positive impacts on their attitude about the innovation, which in turn stimulates their intention to adopt the innovation. At the same time, self-efficacy of potential users has a direct impact on their intention to adopt the innovation, while their perceived knowledge about the innovation does not affect their intention to adopt the innovation.

Path	b: not use	b: use	Equal variance P-two tail	Different Variance P-two tail
Attitude -> Behavioral intention	0.4992	0.0298	0.00154	0.00155
Information search -> Knowledge	0.3929	0.6764	0.0310	0.0317
Information search -> Self-Efficacy	0.2695	0.4184	0.367	0.367
Knowledge -> Attitude	0.2656	0.2165	0.694	0.694
Knowledge -> Behavioral intention	-0.039	0.2705	0.000899	0.000972
Self-Efficacy -> Attitude	0.4851	0.6361	0.248	0.248
Self-Efficacy -> Behavioral intention	0.4	0.6568	0.0947	0.0950
Word of mouth -> Information search	0.4535	0.4021	0.709	0.709
Word of mouth -> Knowledge	0.2061	0.1934	0.923	0.923

**Table 4. Result of Parametric Multi-group Analysis with PLS**

Three path coefficient differences between user group and potential user group can be distinguished. (1) Users' information search is more effective in increasing their perceived knowledge than potential users'. One possible reason is users learn by doing and have a systematic knowledge structure about mobile payment and thus users have more specific objectives of information searching than potential users. (2) Perceived knowledge about the IT innovation does not affect potential users' intention to adopt it but affects users' intention to continued use. Attitude about the innovation fully mediates the relationship between perceived knowledge and intention to adopt for potential user group. (3) Attitude has a positive impact on potential users' intention to adopt the IT innovation, but does not affect users' intention to continued use the IT innovation. A possible reason is the role of attitude in affecting users' decision about continued use can be substituted by other factors such as habit (Lankton, Wilson, and Mao, 2010).

## Implications and Limitation

### *Implication for Theory*

WOM plays an important role in stimulating the adoption of IT innovations. As the thriving of social media and social websites, WOM is becoming more important in the diffusion of IT innovations, especially for individual user-oriented innovations. Additionally, the role of consumer learning in diffusion of IT innovation should be embodied in the innovation adoption research. Consumer learning happens in both adoption and post adoption. Thus, one model integrating consumer learning can work well for both adoption and post adoption research. Moreover, the importance of attitude is debated for post adoption research. The attitude indeed plays an important role in stimulating intention to adopt the IT innovation, but does not play an important role in stimulating intention to continued use the IT innovation. Future research should explore alternative factors of attitude in post adoption research.

### *Implication for Practice*

IT companies should realize the behavior difference of users and potential users. They should provide different introduction or product brochures for different groups and adopt different strategies to attract users or potential users. For example, they can provide senior or expert users with more informational documents while providing junior users or potential users with less informational documents. Additionally, IT companies need to realize the importance of WOM in stimulating adoption of IT innovation. They can use stimulus to encourage satisfied users to generate more positive WOM especially with help of

social network sites while treating negative WOM seriously. Moreover, it is wise for IT companies to educate the market first since consumer learning contributes to the adoption of the IT innovation.

#### Limitation

(1) The data was collected by using a self-report survey. Hence there is a potential for common method biases (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). However, results of Harmon one-factor test showed that more than one factors were extracted and the first factor didn't explain a majority of variances. Thus, common method bias is not a significant problem in this study.

(2) Student sample is used in this study. The limited source and special characteristics of the sample restrict the generalization of the findings in this study. However, iResearch (2008) reported that 40.7% percent of all mobile internet users in the Chinese market are students. Thus, the student samples are representative to some extent.

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