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Soo Il Shin

Auburn University, szs0036@auburn.edu

Dianne Hall

Auburn University, halldia@auburn.edu

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Identifying Factors Affecting SNS Users as a Temporary or Persistent User: An Empirical Study

Soo Il Shin
Auburn University
szs0036@auburn.edu

Dianne J. Hall
Auburn University
halldia@auburn.edu

ABSTRACT

Since the emergence of the first Social Networking Site (SNS) as a new means of communicating with other people, much research has attempted to identify empirically and theoretically the characteristics, history, and impact on human relationships of both SNSs and their users. This study identifies SNS users as either persistent or temporary, based on their intention to continue using SNSs. To test these hypotheses, this study has amended the Expectation Confirmation Model of IS continuance (ECM-IS) by incorporating Perceived Characteristics of Innovation (PCI) from Diffusion of Innovation (DOI). A total of 158 participants were recruited for this study using Structural Equation Modeling (SEM). The study concludes that SNS user confirmation, PCI, and satisfaction are significant parameters of SNS users' intention to continue using SNSs. Research limitations and future research are also discussed.

Keywords

Social Networking Sites, diffusion of innovation, expectation confirmation theory, structural equation modeling

INTRODUCTION

Since the emergence of SixDegrees.com, the first social networking site (SNS) in 1997, hundreds of SNSs have become immensely popular as a new innovative mediums of communication. Boyd and Ellison (2007) defined SNSs as "Web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system." (p. 211)

While most early SNS services focused on providing tools like posting user profiles and simple messaging in the late 1990s and early 2000s, SNSs have now expanded their service criteria, offering photo sharing (Flickr.com), access to music (Last.FM), video sharing (YouTube.com), and more (Boyd and Ellison, 2007).

Many researchers from different academic disciplines acknowledge that SNSs have rapidly supplanted the roles of traditional communication media. From the Information System (IS) research perspective, SNSs have been paid more attention as a form of Computer Mediated Communication (CMC). Compared to face-to-face communication, CMC conveys social sharing and socio-emotional communication with others through non-verbal cues, gestures, or tone of voice in online communication. A body of research revealed that CMC may even be a preferable environment for people who desire more social interaction but have a hard time interacting in offline situations because of an introverted or shy personality (Baker and Oswald, 2010). Similarly, prior literature also revealed that SNS users' personal characteristics impacted different social interaction behavior (e.g., Lu and Hsiao, 2010). Therefore, in the context of IS, an SNS is regarded as a meaningful communication medium, even for those who struggle to interact socially.

Nevertheless, even though prior research has sparked increased interest in SNSs and their users, few studies have found evidence as to why SNS users persistently and frequently visit SNSs. Therefore, this study raises two questions that have been only minimally researched: 1) What factors enable SNS users to continue using SNSs?, and 2) How do SNS users' perceived characteristics of innovation affect them to be either persistent or temporary users? To fill in these gaps, this study employed two theoretical foundations: 1) the concept of Diffusion of Innovation (DOI) as a theoretical background providing concrete guidelines of characteristics of innovation adopters, and 2) the Expectation Confirmation Model of IS continuance (ECM-IS), which arises from Expectation Confirmation Theory (ECT), was used in an amended ECM-IS model.

LITERATURE REVIEW AND THEORETICAL BACKGROUND

Perceived Characteristics of Innovation (PCI)

Under Rogers's (1995) DOI theory, adopters of new technology can be categorized into five subgroups—innovator, early adopter, early majority, late majority, and laggard—based on the point in time when users first experience the new technology. Each category implies homogeneity of the adopter and non-adopter populations in its mathematical formulation (Tanny and Derzko, 1988).

However, in prior literature, some researchers have challenged this view by asserting the normality of adoption segments and the homogeneity of each segment group (Dekimpe, Parker, and Sarvary, 2000). Most frequently, prior literature claimed that the dichotomous categorization overlooked the heterogeneity among adopters and non-adopters. It suggested that the differences between adoptive behavior seen at the time of the first experience of new technology and such behavior seen at the time of complete adoption of new technology depended on motivational stages (Dekimpe et al., 2000; Lee, Kwon and Schumann, 2005). Lee et al. (2005) argued that non-adopters could be categorized into two groups: “those who will soon become adopters, prospective adopters; and those who are likely to remain non-adopters, persistent non-adopters” (p. 416). Consistent with this position, this study will argue that current SNS users are either persistent adopters who will continue to use SNSs or temporary adopters who will discontinue using SNS, depending on their motivational changes.

An individual's motivation for using new technology is characterized by the introduction of perceived characteristics of innovation (PCI) because each individual perceives the primary attribute of innovation differently (Moore and Benbasat, 1991). Moore and Benbasat (1991) claimed that the diffusion of innovation occurs when individual users cumulate enough decisions toward adoption of innovation under their perception of using the innovation rather than the perception of innovation itself.

After reviewing the prior characteristics of diffusion of innovation, this study adopts the following four dimensions of PCI in the context of SNS: *relative advantage*, *complexity*, *observability*, and *voluntariness*. The *relative advantage* construct in this study is the adopter's benefits from using an innovation rather than its precursors; consequently, the *perceived usefulness* in Technology Acceptance Model (TAM) is consistent as a surrogate for *relative advantage*. In the adoption of IT and its usage, prior literature evaluated the difficulties of IT usage in terms of the technology's perceived ease-of-use based on the TAM's framework (Thong, Hong and Tam, 2006). By aligning the definition with the *complexity*, perceived ease-of-use is employed as a surrogate for *complexity* (Moore and Benbasat, 1991). Citing the ambiguity of Rogers's (1995) measuring of *observability*, this research adopts an awareness of others' exposure to IT usage. The term can be used interchangeably with “others' use” (Compeau, Meuster, and Higgins, 2007). Lastly, this research directly incorporated *voluntariness* because most SNSs currently do not charge any fees to access or use their contents in most countries. However, *compatibility* is removed in this study because of its ambiguity concept in the context of SNSs (Compeau et al., 2007).

Expectation Confirmation Model of IS Continuance (ECM-IS)

Many researchers have employed theories such as Ajzen and Fishbein's (1975) Theory of Planned Behavior (TPB) and Davis, Bagozzi, and Warshaw's (1989) TAM to determine whether behavioral intention can be applied to the adoption (or non-adoption) of new technology by positing that behavioral determinants such as individual attitude, subjective norm, and ease-of-use account for behavioral intention. Nevertheless, it is reasonable to demonstrate an individual's behavioral intention from a psychological perspective (such as expectation or satisfaction) when using new technology. Consequently, this research highlights factors by employing Bhattacharjee's (2001) ECM-IS, which stemmed from Oliver's (1980) ECT, to examine the intention to continue to use SNSs.

In marketing disciplines, Oliver's (1980) ECT has been well represented as the ability to repurchase products or services by its explanation of the link between customer satisfaction and repeat purchases. According to ECT, customer satisfaction accounts for level of confirmation, which is the comparison between their pre-purchase expectation of the service or product and their post-purchase perception after using the service or product. A positive confirmation results from greater post-purchase performance than pre-purchase expectation. It is the fulfillment of a customer's perception because he or she continues purchasing, which indicates positive customer satisfaction (Liao, Chen, and Yen, 2007); otherwise, the dissatisfied customer would have changed the purchase channel or place.

Nevertheless, even though the construct of expectation plays an important role as an antecedent to determining the degree of confirmation, its importance has been subject to argument because of its potential for dispute, especially the validity of pre-expectation construct (Bhattacharjee, 2001). First, based on LaTour and Peat's (1979) findings that a consumer's direct experience determines the consumer's level of satisfaction, post-purchase expectation is regarded as a more relevant determinant of consumer satisfaction than pre-purchase expectation (which is constantly being updated by the mass media

and third-party opinion before the purchase). Therefore, Bhattacharjee's (2001) ECM-IS (an amended model of ECT) placed more significance on post-purchase expectation than pre-purchase expectation. In his model, the confirmation and satisfaction constructs covered pre-purchase expectation, so that confirmation implied a level of benefit acquired from a consumer's IS usage experience (Figure 1). Second, Bhattacharjee's (2001) ECM-IS employed perceived usefulness as a surrogate for post-purchase expectation because much of the literature about IS adoption and its usage believed that perceived usefulness was representative of a consumer's intention to use IS. Bhattacharjee (2001) assumed that confirmation has a positive relationship with perceived usefulness in that IT users adjusted the level of perceived usefulness downward when uncertainty was involved. In the context of SNSs, this research assumed pre-usage expectation and post-usage expectation as pre-purchase expectation and post-purchase expectation of performance, respectively.

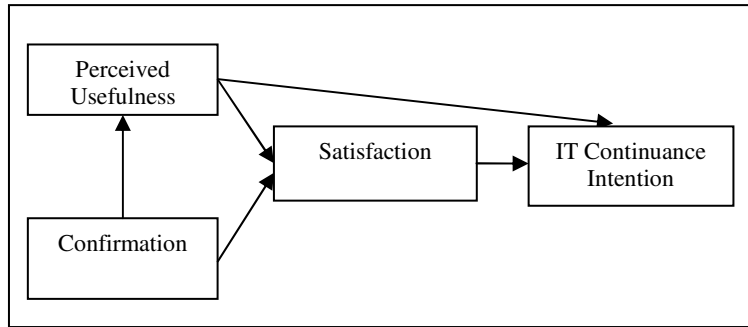


Figure 1. Expectation Confirmation Model of IS continuance (ECM-IS)

RESEARCH MODEL AND HYPOTHESES

Regardless of whether the ECM-IS clearly explained an IS-adopter's intention to continue using the new IS, this research aided the ECM-IS model's deficiency of explaining the relevance of an individual's adoption of IT-innovation and his or her conversion to continuous usage. Five hypotheses were suggested under an amended ECM-IS, which incorporated both PCI and his or her continued usage of IS (Figure 2).

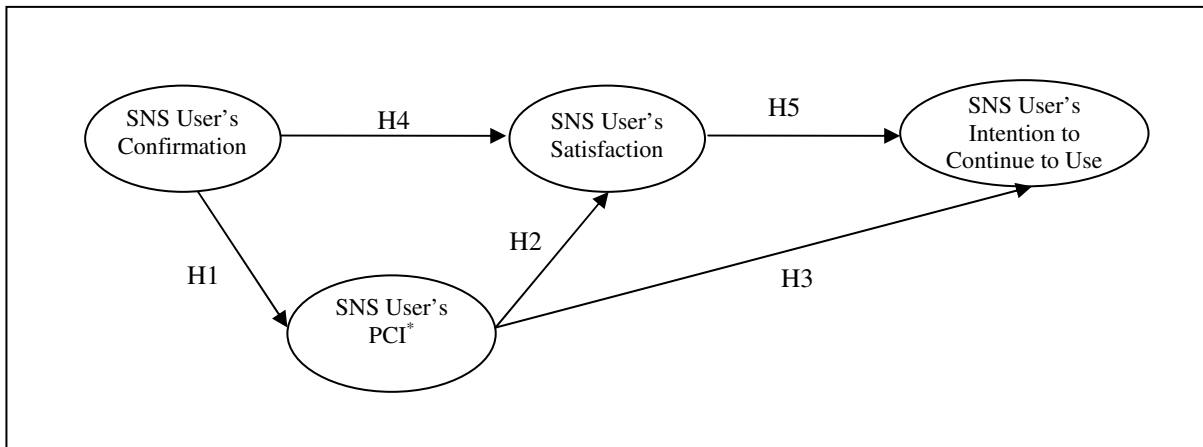


Figure 2. Research Model and Hypotheses

The cognitive dissonance theory supports a positive relationship between a user's confirmation of expectation and opinion of perceived usefulness in that it implies that rational users adjust their gaps of dissonance by altering their perception of usefulness to be consistent with reality (Bhattacharjee, 2001). According to Bhattacharjee's (2001) argument of confirmation, in the context of SNSs, SNS adopters might adjust their perceived usefulness positively if their post-perceived usefulness outweighs the pre-expected usefulness when initially they perceived SNS as not particularly useful. With similar reasoning behind the relationship between perceived usefulness and confirmation, perceived ease-of-use also positively adjusted if users had negative affects and attitudes toward adoption of SNSs as new technology (Davis, 1989). Additionally, the more SNS users are visible to non-users, the more non-users are likely join in SNS usage under the notion of an adoption of an innovation (Black, Lockett, Winklhofer, and Ennew, 2001). If SNS adopters benefit more from using SNSs than from traditional communication mediums, they will be more confident if they have a high level of awareness that others are using an SNS. Prior literature demonstrated that perceived voluntariness is a significant determinant of current IT usage (Agarwal

and Prasad, 1998). Therefore, positively confirmed SNS users tend to be more likely to choose an SNS as their medium for communicating with others by their own free will and relate to the adopters' current use of the SNS. Therefore, this hypothesizes as follows:

H1: An SNS user's confirmation will be positively associated with an SNS user's PCI.

Under the TAM perspective (Davis, 1989), perceived usefulness captures a user's perceived benefits by post-consumption expectation (post-perceived usefulness), which will have an effect on the user's subsequent IS continuance (Bhattacharjee, 2001; Eriksson and Nilsson, 2007). In the context of SNSs, SNS users will experience post-consumption expectation and determine the SNS's usefulness by perceiving that it either positively or negatively benefitted the adopter. Also, fewer difficulties in IS usage benefit the IS user's post-consumption expectation or post-perceived ease-of-use. Subsequently, the adopter's decision will affect post-acceptance, otherwise known as user satisfaction, and its future continuance (Bhattacharjee, 2001). Under others' use serving as the normative signal, SNS users will perceive that they are conforming to the SNS user group's desire so that they gain social status by failing to comply with the social norm (Compeau et al., 2007; Rogers, 1995). Lastly, voluntary adopters tend to have a compulsion to use an adopted innovation, which results in greater use of innovations (Moore and Benbasat, 1991). In the context of SNSs, voluntary adopters will use SNSs more than less-voluntary or non-adopters, and a high frequency of SNS use leads to a higher post-perceived performance, which means they feel more confident of an SNS's worth and positive evaluation which, in turn, leads to the future intention of repeated use. Therefore, this hypothesizes as follows:

H2: An SNS user's PCI will be positively associated with the SNS user's satisfaction.

H3: An SNS user's PCI will be positively associated with the SNS user's intention to continue using SNS.

Prior marketing literature reveals that higher levels of satisfaction are due to higher levels of expectation (Oliver and DeSarbo, 1988). ECT posits that post-perceived performance that is greater than pre-expectation forms a positive confirmation that leads to user satisfaction (Bhattacharjee, 2001). Furthermore, prior literature confirms that a consumer's level of satisfaction determines the intention to repurchase a product or continue a service (Szymanski and Henard, 2001). Therefore, in the context of SNS adoption, positively confirmed SNS adopters will perceive greater achievement in the expected benefits from use of an SNS, so satisfied SNS adopters will continue using SNSs. Therefore, this hypothesizes as follows:

H4: A SNS user's confirmation will be positively associated with that satisfaction in the SNS.

H5: A SNS user's satisfaction will be positively associated with the user's continuing use of SNS.

RESEARCH METHODOLOGY

Measurement Items and Analysis Method

For empirical testing, this research employed the Structural Equation Modeling (SEM) and utilized AMOS 18. Four latent constructs were measured by survey questions from prior literature that had been slightly modified. All survey items were assessed via a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Table 1).

Measure	Source	N of Items	Alpha (α)
• Demographics	N/A	3	N/A
• General SNS usage		5	
• SNS user's confirmation	Bhattacharjee (2001)	3	0.82
• SNS user's intention to continue to use		3	0.83
• SNS user's Perceived Characteristics of Innovation (PCI)			
▪ <i>Perceived usefulness</i>	Davis et al. (1989) and Thong et al. (2006)	3	0.90
▪ <i>Perceived ease of use</i>	Davis et al. (1989)	4	0.91
▪ <i>Others' use of SNS</i>	Compeau et al. (2007) and Moore and Benbasat (1991)	4	0.83
▪ <i>Voluntary use of SNS</i>		3	0.88
• SNS user's satisfaction	Spreng, McKenzie and Olshavasky (2006)	4	0.87
Item Total		32	

Table 1. Summary of Measures

Data Collection and Description

This research collected 158 participants' answers by employing a Web-based survey from students enrolled at Southeastern University in the United States. Cross-sectional data consisted of 63.3% male and 36.7% female participants. The majority of the participants' ages ranged from 18 to 30 years (94.3%, 149 out of 158), with a few being over 36 years. About 66.5% (105 out of 158) majored in business fields such as finance, accounting, and information systems, and 13.3% (21 out of 158) studied liberal arts such as political science and psychology. Thirteen participants (8.2%) studied architecture. Participants who studied forestry and wildlife science, and science and mathematics comprised 1.3% and 1.9%, respectively. Students with other majors and those with no response accounted for 3.2% and 2.5%, respectively.

DATA ANALYSIS AND RESEARCH RESULTS

Data Screening

Missing value analysis

The results of Little's Missing Completely at Random (MCAR) test indicated a statistically significant difference between the observed missing value pattern and the random pattern at a 1% significant level of confidence ($\chi^2(530.00)=641.19, p=0.01$). Therefore, this study conducted further missing value diagnosis manually item by item, and it qualified Missing at Random (MAR). The summary of missing data values also indicated that all missing values were less than 10% of items, suggesting that generally, they can be ignored (Hair, Black, Babin, Anderson, and Tatham, 2006). To remedy missing values, this study employed the EM algorithm method to increase better performance in Structural Equation Modeling (SEM) (Hair et al., 2006).

Tests for normality—skewness, kurtosis and Kolmogorov-Smirnov (KS) test

In the descriptive analysis of samples by each item, skewness and kurtosis of all items ranged between -2.36 and 1.87 and between -1.72 and 6.10, respectively. It appears that both skewness and kurtosis were qualified under the recommended criteria (less than |3| and |20|, respectively) (Kline, 2005). Additionally, each item qualifies Kolmogorov-Smirnov(KS) normality test to examine normality assumption ($p<0.000$) (Hair et al., 2006).

SNS User Description

The survey results indicated that 96.2% of participants (152) represented themselves as users of at least one SNS, and only 3.8% of participants (6) answered that they do not use SNSs because of privacy security issues (3) or because they find SNSs unnecessary to communicate with others (3). Among SNS users, the majority of participants used Facebook only or along with other SNSs. YouTube ranked second as users' sole SNS or along with other SNSs. A similar percentage of participants used Twitter and MySpace, and less than 10% reported themselves other SNS users (Table 2).

SNSs	Number of Users* (out of 152)	Percentage
Facebook	144	94.7%
Twitter	27	17.8%
MySpace	11	11.0%
Flickr	2	2.0%
YouTube	40	26.3%
Other (Cyworld, Mixi, LinkedIn, and Stickam)	6	3.9%

Note: *A user uses single or multiple SNSs (Summation of percentages all together is meaningless)

Table 2. Number of SNS Users

In a further analysis, 59.7% of users were active on a single SNS (Table 3). Compared to single SNS users, 29.6% used two SNSs, and 27.5% used Facebook with other SNSs. Other than Facebook users with different SNSs, YouTube with Twitter, MySpace, or Cyworld users were negligible (0.65% each, respectively). Lastly, around 10% of participants reported themselves to be users of three or four SNSs (8.5% and 2.0%).

SNS Types	Number of Users	Percentage
Facebook only	86	56.5%
YouTube only	3	1.9%
LinkedIn or Twitter only	1 each	1.3%
<i>Total number of single SNSs Users</i>	91	59.7%
<u>Facebook with</u>		
Twitter	14	9.2%
MySpace	3	1.9%
YouTube	21	13.8%
Flickr, Stickam, LinkedIn, Mixi	1 each	2.6%
<u>YouTube with</u>		
Twitter/MySpace/Cyworld	1 each	2.0%
<i>Total number of 2 SNS Users</i>	45	29.6%
<u>Facebook and Twitter with</u>		
MySpace	2	1.3%
YouTube	7	4.6%
<u>Twitter and MySpace with</u>		
YouTube	4	2.6%
<i>Total Number of 3 SNS Users</i>	13	8.5%
<u>Facebook, Twitter, and YouTube with</u>		
MySpace/Flickr/Cyworld	1 each	2.0%
<i>Total Number of 4 SNS Users</i>	3	2.0%
<i>Total Number of SNS Users</i>	152	100%

Table 3. Number of SNS Users

Regarding the frequency of SNS usage, the survey results demonstrated that a significant number of participants (52.0%, 79 out of 152) visit SNS(s) *more than once a day*, and 35.5% (54 out of 152) visit SNS(s) at least a couple of times per week. Regarding the periods of SNS usage, 89.5% (136 out of 152) have used SNS(s) for *more than two years*.

Measurement Model

Confirmatory Factor Analysis (CFA)

The researcher followed the two-step modeling process of the Measurement and Structural model. For the measurement, a Confirmatory Factor Analysis (CFA) was conducted by examining the fit of all constructs. As shown in Table 4, all goodness of fit indices qualified the recommended criteria, both for the measurement model and structural model.

Fit Indices	Recommended Value	Measurement Model	Structural Model
Chi-square (df)		272.01 (126)	293.35 (128)
Normed Chi-square	≤ 3.0	2.16	2.29
CFI	≥ 0.9	0.92	0.91
RMSEA	≤ 0.1**	0.09	0.09
SRMR	≤ 0.1**	0.06	0.07

Note: ** Henry and Stone (1994)

Table 4. Goodness of Fit Test

Convergent validity

For convergent validity, this study qualified four tests as indicators. First, all standardized factor loadings were above the minimum of 0.6, which is the recommended criteria for small sample size (Kline, 2005). Five items were removed in analysis (2 items from perceived usefulness, 1 item each from other's use, voluntariness, and intention to continue use). Additionally, one item (item *Useful 4*) was dropped because of high correlation with another (item *Useful 3*; $r = 0.81$, $p < 0.001$). Second, all construct reliability and coefficient alpha estimates were over 0.6, so they all qualified as suggested criteria between 0.6 and 0.7 and 0.6, respectively (Hair et al., 2006). Third, all constructs exhibited acceptable levels of average variance extracted (0.50), so results evidenced that all indicators qualified for convergent validity (Table 5).

Constructs	Construct Reliability	Cronbach's Alpha	AVE
SNS user's PCI	0.93	0.90	0.53
SNS user's confirmation	0.88	0.86	0.68
SNS user's satisfaction	0.91	0.88	0.66
SNS user's intention to continue to use	0.66	0.72	0.59

Table 5. Convergent Validity

Discriminant validity

In this study, discriminant validity was assessed by employing chi-square difference tests between unconstrained constructs, in which all constructs correlated freely with others, and constrained constructs, in which two of them set covariance equal to 1 between two constructs (Liao et al., 2007). As shown in Table 6, all chi-square differences were statistically significant at $p = 0.001$, so that all scales were distinct from each other.

Variable Constrained	Chi-Square (df)	Chi-Square Difference
None	298.68 (126)	-
Confirmation + Intention to continue use	445.70 (127)	147.02*
Confirmation + PCI	432.95 (127)	134.27*
Confirmation + Satisfaction	432.95 (127)	134.27*
Intention to continue use + PCI	294.46 (127)	4.22*
Intention to continue use + Satisfaction	310.18 (127)	11.5*
PCI + Satisfaction	569.97 (127)	271.29*

Note: * All chi-square differences were significant at $p = 0.001$.

Table 6. Discriminant Validity

Structural Model

Hypothesis tests

All hypotheses were supported except for the relationship between an SNS user's PCI and his or her satisfaction. The result indicated that an SNS user's satisfaction explained 66% of the variance in the SNS user's intention to continue to use jointly with the SNS user's PCI ($R^2 = 0.66$). The SNS user's confirmation also explained 32% of the variance in the SNS user's satisfaction ($R^2 = 0.32$). Similarly, the SNS user's confirmation explained 28% of the total variance in the SNS user's PCI ($R^2 = 0.28$) (Figure 3).

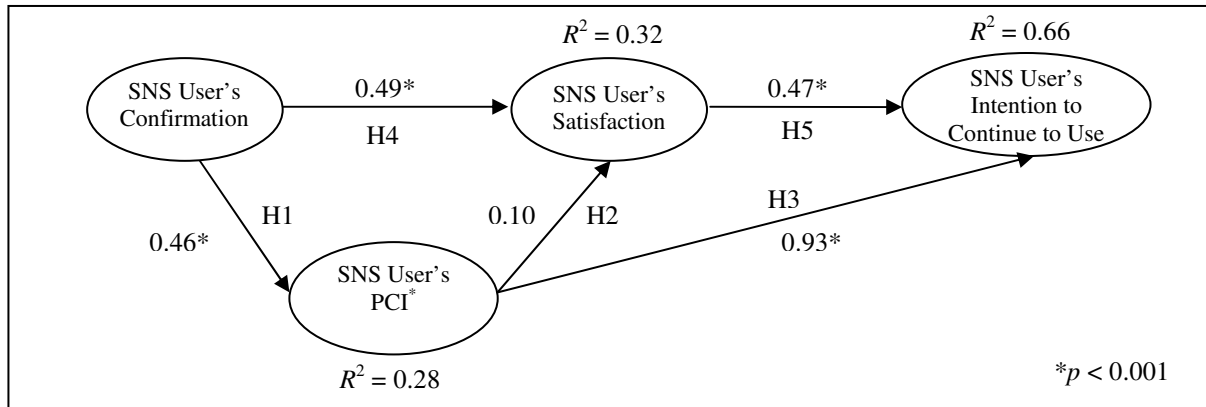


Figure 3. Structural Model

DISCUSSION

The focus of this study was to identify factors affecting an SNS user's intention to visit the SNS repeatedly by employing an amended ECM-IS model that substitutes the *perceived usefulness* construct for PCI to enable measuring the new technology adopter's characteristics of innovation.

The findings of this study conclude that the more positively confirmed SNS users perceive more satisfaction, which leads to more user intention to continue use of the SNS. Importantly, SNS user confirmation significantly predicted user satisfaction and user PCI. Also, intention to continue use of the SNS was predicted by both SNS user satisfaction and PCI. However, SNS users' perceived characteristics have not mediated the relationship between the SNS user's confirmation and satisfaction of SNS usage either directly and indirectly. Rather, an individual's perceived characteristics of new media affected the continuous usage to maintain the relationships. Compared to Bhattacharjee's (2001) study that confirmation and usefulness were both predictors of satisfaction, user confirmation is the only predictor of satisfaction in this research. PCI was not significantly associated with user satisfaction even when it included *perceived usefulness*. This result is similar to prior research in that *perceived usefulness* was not a significant predictor of satisfaction, but positively influenced the intention to continue use depending on the research context (e.g., Liao et al., 2007). To identify the degree of an SNS user's PCI effect with an SNS user's perceived usefulness only to an SNS user's intention to continue to use (research model vs. Bhattacharjee's (2001) ECM-IS model), authors conducted further analysis by substituting PCI to only *perceived usefulness* items (Figure 4). Noticeably, the further analysis showed that SNS users' satisfaction explained 22% more of the total variance in an SNS user's intention to continue to use jointly with an SNS user's perceived usefulness than suggested research model ($R^2 = 0.88$). Similarly, an SNS user's confirmation also explained 46% of the variance in an SNS user's PCI, which is 18% more explanation than the research model. The results evidenced that even though an individual's innovativeness toward SNSs had a significant effect on his or her intention to use them, usefulness still plays an important key role in deciding whether to use it or not. In the context of SNS, a plausible explanation of significant effect of perceived usefulness is that perceived usefulness is the representative dimension of post-adoption of new technology in terms of the most salient cognitive belief. Nevertheless, an SNS user's satisfaction was equivalent between further analysis and research model.

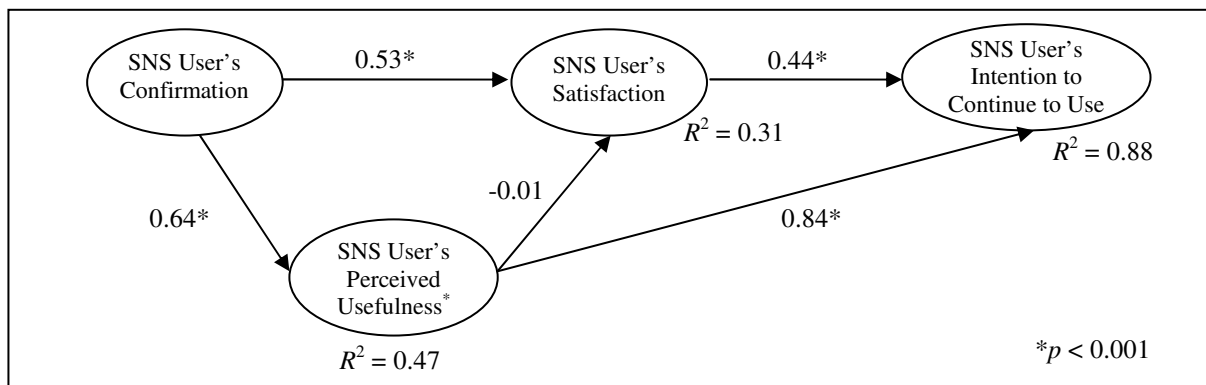


Figure 4. Bhattacharjee's (2001) ECM-IS model in the context of SNS

LIMITATIONS AND FUTURE RESEARCH

The respondents in this study were limited in age, which may potentially reduce generalizability. However, the age group represented is assumed to be that of the average SNS user. To test this, future research should recruit participants with a wide range of ages.

This study examined all types of SNSs as a research artifact. However, users of different types of SNSs may possibly exhibit different characteristics. Thus, future researchers may wish to study SNS user characteristics specific to the type of SNS.

A potential limitation of this study was the nature of cross-sectional study to measure SNS user intention to repeatedly visit the SNS. The survey participants reported that 89.5% of them had used SNSs for more than two years and 52% of survey participants visited SNSs more than once a day. Therefore, a future research direction may be a longitudinal research design with recruiting those SNS users to identify their continuance intention for the future.

CONCLUSION

Based on statistical analysis and findings, the SNS user's repeated SNS usage and persistence is determined by his or her level of confirmation, satisfaction, and perceived characteristics of new technology. In addition, an SNS user's perceived usefulness has a significant effect on the SNS user's continuance intention.

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