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Habit Formation in Twitter

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Abstract

The concept of habit has been receiving a lot of attention among Information Systems (IS) researchers. In recent years, we have witnessed a considerable progress in the conceptualization and operationalization of IS habit. However, little theoretical and empirical attention has been given to the formation of IS habit. To fill this gap, this paper builds and tests a theoretical model investigating the factors affecting the formation of habit in the context of Twitter. An online survey was conducted and data from 167 respondents were analyzed using PLS. The results showed that satisfaction, frequency of past behaviour, and convenience were important in determining habitual use of Twitter. In addition, social presence had significant impact on user satisfaction with Twitter. This paper concludes with a discussion of theoretical and practical implications.

Keywords: Twitter, User Satisfaction, Habit, Convenience, Social Presence, Information Systems Continuance, Social Media

1 Introduction

The advancement and popularity of Internet technologies have encouraged users to widely adopt and use social technologies in their daily lives. Twitter, which was launched in 2006, is currently one of the most popular social technologies with more than 200 million users in 2010 (BBC, 2010). Micro-blog is a web-based platform which allows users to publish and exchange short elements of contents such as short sentences, individual images, or video links (Kaplan and Haenlein, 2011). It provides a new way for users to communicate and publish contents.

The topics of acceptance and continuance of social technologies (including Twitter) are generating increased interest among Information Systems (IS) researchers. Consistent with the observation of Ortiz de Guinea and Markus (2009), existing works on the continuance of social technologies tended to build on the theoretical tradition of planned behavior and reasoned action (Ajzen, 1991). Researchers assumed that the continued use of a particular social technology is fundamentally intentional behavior that is driven by conscious intentions, resulting from a rational decision making process. For example, Liu et al. (2010) built on the information systems (IS) continuance model (Bhattacharjee, 2001) and hypothesized that the decision to continue using Twitter is determined by a cognitive evaluation process. Users compare their initial expectations about the use of Twitter (e.g., content motivation, social motivation, process motivation, and technology motivation) with their actual usage experiences. The discrepancy between expectation and actual experience (disconfirmation) creates affective or emotional responses (satisfaction), and thus drives the intention to continue using Twitter.

Literature in psychology and social psychology posit that repetitive behaviors are automatically evoked. Repeated behavior requires less mental effort and conscious attention (Aarts et al., 1997). That is, when behaviors are repeated in consistent settings, decision makers activate an automatic response (a habit) and arrive at a choice. In recent years, we have witnessed a considerable progress in the conceptualization and operationalization of habit in the context of information systems (Kim, 2009; Limayem et al., 2007; Wu et al., 2008). Unfortunately, little theoretical and empirical attention has been given to the formation of IS habit. To fill this gap, this study attempts to step further on the basis of current research on Twitter, build and test a theoretical model investigating the factors affecting users in formatting habit in the context of Twitter. As users frequently using Twitter tend to become habitual and automatic over time, the purpose of this paper is to explore the antecedents of habit in the context of Twitter.

The rest of the paper is structured as follows. The next section addresses the theoretical background of the current study. The third section presents our research model and hypotheses. The fourth section describes an online survey study of Twitter to empirically test the research model. Data analysis is presented in the fifth section. The last section concludes with a discussion of the managerial and research implications.

2 Theoretical Background

This study attempts to investigate the factors that explain the formation of habit in the context of Twitter. In this section, we first provide a review of the literature on Twitter, we then discuss the literature of IS continuance and IS habit.

2.1 Prior Studies on Twitter

The history of Twitter is not long, however its explosive growth has successfully caught the eyes of researchers. Like other information systems (IS), the acceptance, usage, and continuance usage of Twitter have become an interesting research area among IS researchers. Zhao and Rosson (2009) conducted a study on Twitter usage. They identified five major motivations of Twitter usage (as shown in Table 1). Barnes and Böhringer (2009) conducted a study on continuance usage intention in Twitter. They indicated that user intention to continue using Twitter was determined by perceived usefulness, satisfaction and habit. Moreover, a significant number of studies used a quantitative approach to explore the usage pattern among Twitter users. Much of these studies crawled data from Twitter and used social network analysis or content analysis to explore how and why people use Twitter (Java et al., 2007; Huberman et al., 2008; Kwak et al., 2010). Table 1 summarizes some of the key studies of Twitter.

Author(s) and Year	Purpose	Findings
Zhao & Rosson (2009)	Motivations of Twitter usage	Keeping in touch with friends and colleagues Raising the visibility of interesting things to one's social networks Gathering useful information for one's profession or other personal interests Seeking help and opinions Releasing emotional stress
Barnes & Böhringer (2009)	Continuance usage intention in Twitter	Perceived usefulness Satisfaction Habit
Java et al. (2007)	Motivations of Twitter usage	Talking about daily activities Sharing information
Huberman et al. (2008)	Social interactions in Twitter	Twitter users have a very small number of friends compared to the number of followers and followings they declare
Kwak et al. (2010)	Follower-following topology analysis in Twitter	Reciprocity

Table 1: Summary of Prior Studies on Twitter

2.2 IS Continuance

In recent years, a lot of attention has been drawn to the importance of information systems (IS) continuance (Bhattacharjee, 2001; Davis & Venkatesh, 2004; Karahanna et al., 1999). Researchers argued that the success of an information system goes beyond initial adoption and it depends on whether users are willing to continue to use it. Most these existing studies built on the theoretical tradition of planned behavior and reasoned action, and examined the continuing use of an IS from a rational choice perspective. Bhattacharjee's IS continuance model (2001) is the most well-cited research framework

in the study of IS continuance. The IS continuance model is built on expectation-confirmation theory, and suggests that IS continuance intention is predominantly determined by satisfaction and perceived usefulness. The model also relates satisfaction and perceived usefulness to the degree with which the user expectations about an IS are confirmed. Expectation provides the baseline level against which confirmation is assessed by users to determine their evaluative responses or satisfaction. The better they are met, the more useful it appears to users and the more satisfied they are. Researchers from social psychology however argued that when behaviors are repeated in consistent settings, habits are automatically evoked and do not need much intentional effort (Aarts et al., 1997).

2.3 Habit

Habit is the results of automatic process (Ronis et al., 1989). Wood et al. (2002) found that once a habit is established, behaviour performance requires little of the individual's attention and minimal mental effort. Ouellette et al. (1998) also indicated that after the initial adoption individuals with repetitive behaviour are most likely involved in non-reflective cognitive processing. Routinized behaviour tends to become habit. The concept remains new in the field of IS. Limayem et al. (2007) defined habit as the extent to which using a particular IS has become automatic in response to certain situations. Most existing studies focused on how IS habit is conceptualized and measured, as well as its relationship with continuance intention and IS continuance use (Limayem et al., 2007; Limayem & Hirt, 2003). In general, IS researchers agree that if individuals are habitually performing a particular behavior (e.g., using an IS), the future behavior (the continued use) will be largely determined by habit rather than reasoned action. Given the importance of habit in the context of IS, we still do not fully understand how IS habit is formed.

3 Research Model and Hypotheses

Figure 1 depicts the research model of habit formation in Twitter. Definitions and interrelationships of the constructs in the research model are addressed in this section.

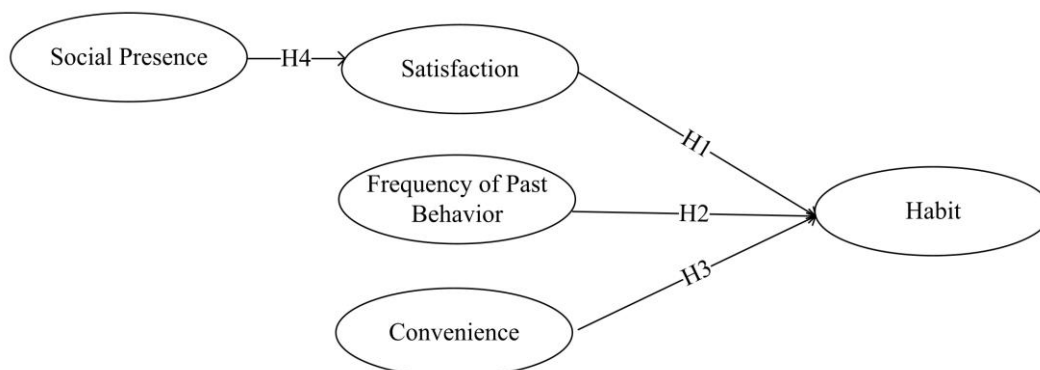


Figure 1: Research Model

3.1 Habit, Satisfaction, Frequency of Past Behavior

Building on Limayem et al.'s (2007) definition of IS habit, we define habit as the extent to which using Twitter has become automatic in response to certain situations. According to Limayem et al. (2007), satisfaction, frequency of past behaviour, and comprehensiveness of usage are the key antecedents of IS habit. Satisfaction refers to an individual's subjectively derived favourable evaluation of any outcome and/or experience (Westbrook, 1980). Frequency of past behaviour captures the intensity of usage, incorporating the duration of usage along with frequency of use (Venkatesh & Morris, 2000). Barnes and Böhringer (2009) confirmed that satisfaction and frequency of past behavior are determinants of habit in the context of Twitter. However they found that comprehensiveness of usage is not context significant factor in forming habit in the context of Twitter. Comprehensiveness of usage refers to the extent to which an individual uses various applications offered under the umbrella of a single IS system (Limayem et al., 2007). Since Twitter itself is an information system with simple application (reading, posting, and searching) rather an information system with various applications (e.g., Facebook), the concept of comprehensiveness of usage is not suitable for the context of Twitter use. Furthermore, Barnes and Böhringer (2009) suggested that one or two strong valuable applications could be enough to create habit in the Twitter context. Thus we do not include the antecedent variable comprehensiveness of usage in the current investigation of Twitter use. In this study, we explore how satisfaction and frequency of past behaviour affect the formation of habit in the context of Twitter. Here are our hypotheses:

H1: User satisfaction with initial Twitter use is positively associated with the formation of Twitter habit.

H2: The degree of frequency of past Twitter behaviour is positively associated with the formation of Twitter habit.

3.2 Habit and Convenience

In the area of information systems, convenience has long been identified as the most important factor in determining the use of mobile phones (Leung & Wei, 2000) and Internet technologies (Papacharissi & Rubin, 2000; Charney & Greenberg, 2002; Flanagan & Metzger, 2001). In consumer behaviour research, when consumers found the products convenience, they will need less time, physical and mental efforts to make the purchase decisions (Copeland, 1923). In other words, convenience reduces human cognitive efforts, and thus we believe that convenience will be one of the important antecedents of habit formation in the context of Twitter.

One important feature of Twitter is that it can be accessed anytime and anywhere through Twitter website, short message services, mobile phones, and various desktop applications. We believe that this technological convenience will further facilitate the formation of habit in the context of Twitter. Therefore, when users find Twitter convenience, they will have higher tendency to form habit.

H3: Convenience of Twitter service is positively associated with the formation of Twitter habit.

3.3 Satisfaction and Social Presence

Social presence is the extent to which people believe that the environment is personable and humanistic (Short et al., 1976). Higher levels of social presence increase user enjoyment that will carry over to user satisfaction (Hassanein & Head, 2007). Social presence theory (Short et al., 1976) showed that the communication media with more cues would lead to a higher degree of social presence. That means media that provide more communication cues are seemed as being warm, personal, sensitive, and sociable. It may be influenced by certain invariant fixed mechanical characteristics of the medium, such as feedback speed, the number of cues, the degree of personalization, and the language variety. Twitter is a real-time information network, high feedback speed allow users to involve in real-time interactions. Dunlap and Lowenthal (2009) indicated that Twitter provided a platform for free flowing real-time interactions and these interactions usually can enhance social presence. Meanwhile, they found that users with high perceived social presence tend to engage in more social interactions, as they are likely to feel connected with other people. These connections and interactions help increase user perceptions of influencing power and thus increase their satisfaction (Hackman & Oldham, 1976). Based on this argument, we believe that user perceived social presence affects their level of satisfaction with the use of Twitter. Therefore, we have the following hypothesis:

H4: Perceived social presence will positively influence user satisfaction with the use of Twitter.

4 Research Method

This section describes the research methodology employed to test the hypothesized model presented in Figure 1.

4.1 Data Collection

An online survey was conducted for this study. The target respondents of this study are current Twitter users. The URL to the online English questionnaire was posted in several groups on Facebook, and most of the groups are Twitter groups formed by Twitter users. The participation of this study is voluntary. In order to increase response rate, an incentive of US\$10 vouchers was offered as lucky draw prizes for participation of the survey. In addition, a screening question was used to ensure that the respondents were current active users of Twitter. A total of 167 usable questionnaires were obtained. Among those respondents, 53.93% are male and 46.07% are female. About 43.55% aged between 19-28, and 31.45% aged between 29-42. About 92.18% had university degrees or above. About 67.95% of users have more than half a year experience with Twitter. The usage behavior of respondent shows that about 46.32% of Twitter user stay in Twitter for 0-15 minutes and about 46.32% use Twitter more than once per day.

4.2 Measures

Scale measures of the constructs in this study were borrowed mainly from existing scales that prior literature has shown to be reliable and valid. All constructs were measured using multi-item perceptual scales, and the items were modified to fit the research context of Twitter. Three types of scales were used for the measurements of items. Satisfaction used seven-point differential semantic scales, while social presence,

convenience, and habit adopted seven-point Likert scales. Frequency of past behavior used the intensity of usage. The items of the constructs are listed in Table 2.

Construct	Items	Sources
Social Presence (SP)	SP1: There is a sense of human contact in Twitter. SP2: There is a sense of personalness in Twitter. SP3: There is a sense of sociability in Twitter. SP4: There is a sense of human warmth in Twitter. SP5: There is a sense of human sensitivity in Twitter.	Gefen & Straub (2003)
Habit (HABIT)	HABIT 1: I use Twitter as a matter of habit. HABIT 2: Using Twitter has become automatic to me. HABIT 3: Using Twitter is natural to me. HABIT 4: When faced with a particular task, using Twitter is an obvious choice for me.	Limayem et al. (2003)
Convenience (CON)	CON1: Twitter is convenient to use. CON2: Using Twitter I can get what I want for less effort. CON3: I can use Twitter anytime, anywhere. CON4: Twitter is easier to use.	Ko, Cho & Roberts (2005)
Satisfaction (SAT)	SAT1: Very dissatisfied/ Very satisfied. SAT2: Very displeased/ Very pleased. SAT3: Very frustrated/ Very contented. SAT4: Absolutely terrible/ Absolutely delighted.	Bhattacharjee (2001)
Frequency of Past Behavior	FREQ1: In the last 4 weeks, how often did you use Twitter? FREQ2: Approximately how many times did you use Twitter during the last 4 weeks?	Bergeron et al. (1995) Szajna (1996)

Table 2: Construct Measurement

5 Data Analysis

Partial Least Squares (PLS) was used in data analysis. PLS has been widely used in IS research as it enables researchers to analyse both the measurement model and the construct model simultaneously. In addition, there is no normal distribution requirement for data when using PLS. It can also be applied to small sample cases (Chin, 1998). Therefore, it is more appropriate to use PLS in the data analysis.

5.1 Measurement Model

Convergent validity shows the extent to which the items of a scale that are theoretically related to each other should be related in reality. Composite reliability (CR) and the average variance extracted (AVE) were examined for convergent validity of the items. A CR of 0.7 or above and an AVE of greater than 0.5 are acceptable (Fornell & Larcker, 1987). The CR and AVE values and the item loadings are all shown in Table 3. All the item loadings are greater than 0.7 and all the CR and AVE values exceed the recommended threshold.

Constructs	Item Loading	Composite Reliability	Average Variance Extracted
Social Presence SP1 SP2 SP3 SP4 SP5	0.902 0.852 0.894 0.873 0.838	0.941	0.760
Convenience CON1 CON2 CON3 CON4	0.821 0.843 0.864 0.895	0.918	0.737
Frequency of Past Behavior FREQ1 FREQ2	0.915 0.855	0.879	0.784
Habit HABIT1 HABIT2 HABIT3 HABIT4 HABIT5 HABIT6	0.851 0.873 0.832 0.918 0.945 0.913	0.958	0.790
Satisfaction SAT1 SAT2 SAT3 SAT4	0.926 0.945 0.897 0.946	0.962	0.863

Table 3: Convergent Validity

Discriminant validity is the extent to which the measurement is not a reflection of some other variable. It is indicated by low correlations between the measure of interest and the measure of other constructs (Fornell & Larcker, 1987). Discriminant validity can be verified when the square root of AVE value for each construct is greater than all the correlations between this construct and other constructs (Fornell & Larcker, 1987). As shown in Table 4, all the square roots of AVE values are greater than the correlations between constructs, which suggests that discriminant validity is verified.

	SP	CON	FREQ	HABIT	SAT
SP	0.872				
CON	0.282	0.856			
FREQ	0.301	0.098	0.885		
HABIT	0.582	0.296	0.435	0.889	
SAT	0.630	0.243	0.369	0.532	0.929

Table 4: Discriminant Validity.

(Diagonal elements are square roots of the average variance extracted)

In this study, we further diagnosed the multicollinearity problem by examining the variance inflation factors (VIF) scores. The problem of multicollinearity occurs if the VIFs are greater than 10 or tolerance values are less than 0.1 (Grewal et al., 2004; Mason & Perreault, 1991). In this study, the tolerance values are ranging from 0.438 to 0.925 and VIF scores ranging from 1.081 to 2.283. The problem of multicollinearity is not identified in the current study.

5.2 Structural Model

Figure 2 presents the PLS results of the assessment of the structural model, including the estimations of the path coefficients (significant paths are indicated with asterisks), the associated t-value of the paths and the overall explanatory power. The results indicate that satisfaction, frequency of past behavior and convenience have significant impacts on habit, with path coefficients of 0.388 (at 0.010 significant level), 0.275 (at 0.010 significant level), and 0.175 (at 0.050 significant level) respectively. Hypothesis H1, H2, and H3 are supported. In addition, social presence is also found to have a strong significant effect on user satisfaction with path coefficient 0.630 (at 0.010 significant level). Hypothesis H4 is supported. Overall, satisfaction, frequency of past behaviour, and convenience explain 37.8% of the variance in “habit”, and social presence explains 39.7% of the variance in “satisfaction”.

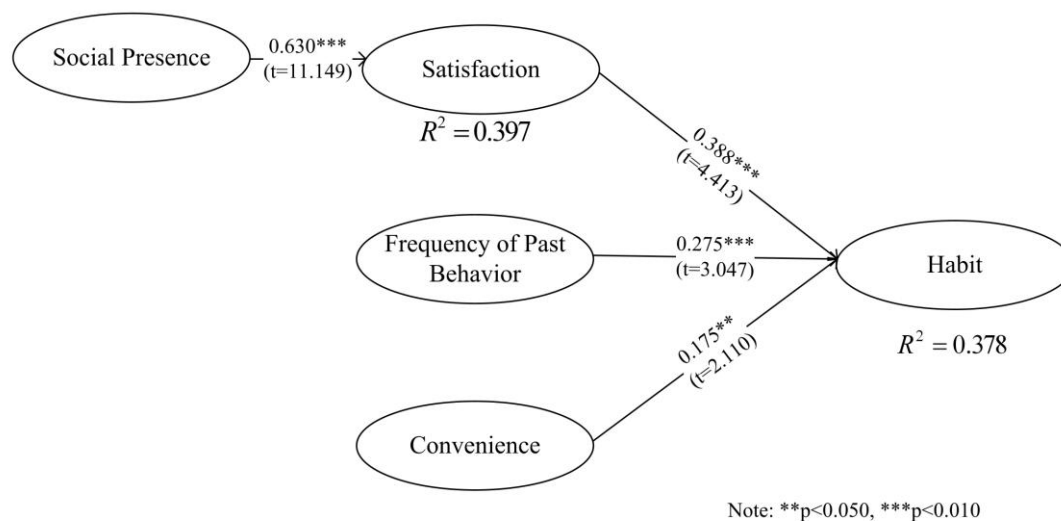


Figure 2: PLS Results of Research Model

6 Discussion and conclusion

This is one of the very first studies that identified the factors affecting the formation of habit in the context of Twitter. The results suggest that satisfaction, frequency of past usage, and convenience all have significant effects on the formation of habit in the context of Twitter. Furthermore, user satisfaction with the use of Twitter is influenced by social presence of Twitter service.

Before we discuss the theoretical and practical implications of the current study, researchers should pay attention to a few issues. First, the sample size is relatively small in the current study. Researchers have to be cautious about the generalizability of the

results. A larger sample size is recommended for future studies. Second, care should be taken before generalizing the results to other social technologies. Particularly, Twitter is an application that can be accessed anytime and anywhere, and thus convenience is found to be significant in explaining habit formation.

The results of this study provide important insights to both researchers and practitioners. In response to the call for a better conceptualization of habitual behaviour in the context of IS (Ortiz de Guinea & Markus, 2009), we explored the factors that lead to the formation of habit in the context of Twitter. Limayem et al. (2007) proposed three antecedents of IS habit, including satisfaction, frequency of past usage, and comprehensiveness of usage, and the current study provided empirical support to their study. Particularly, we found that both satisfaction and frequency of past usage (comprehensiveness of usage is not appropriate in the current investigation) have significant impacts on habit formation. Moreover, user satisfaction with Twitter use is found to exhibit the strongest impact on the formation of habit. We believe that when users have satisfactory experiences with Twitter use, they will increase their tendency to repeat the same courses of action again and again, and thus forming habitual usage of Twitter. In this study, we also add to the theories by introducing the concept of convenience in the research model of habit formation in Twitter. Compared with other information systems, Twitter is an application that can be accessed anytime and anywhere through Twitter website, short message services, mobile phones, and various desktop applications. This unique feature of Twitter further facilitates users to form habit in using Twitter.

The findings of this study also provide invaluable implications for practitioners. First, the results suggest that keeping users satisfied is a key in the post-adoption stage of an information technology/information system. Satisfied users tend to have a higher intention to continued using the technology, as well as higher chance to form habitual use of that particular technology. This suggests that Micro-blog designers should continue to monitor user satisfaction level. Second, convenience is found to have a significant impact on habit formation in the context of Twitter. It implies that users will be more likely to repeat using Twitter if they perceive that Twitter can be used anytime and anywhere, with very little effort. Thus, Micro-blog designers should make sure that Micro-blog application is available in all popular media (e.g., Micro-blog website, Facebook) and devices (e.g., iPhone, iPad, Galaxy tab). Finally, social presence is found to have an important impact on user satisfaction with Twitter, Micro-blog designers should continue to improve its interface, so as to enhance user satisfaction.

In summary, this is one of the very first studies that explores the antecedents of habit formation in Twitter. Future research should continue this line of research by investigating other types of social media and Web 2.0 applications.

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