

How Will SNS Games Help Social Network Services Grow?

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ABSTRACT

By using Social Network Services (SNSs) as platforms, game developers have gathered a huge user base, and the entertainment these games provide has further enlarged the SNS user base. However, there are signs that this symbiotic growth is slowing down.

We developed a model and tested 14 hypotheses. Our main findings are: Although SNSs are “social,” “social norms” do not have much impact on the intention to use the games continually. Although users generally are not addicted to SNS games, the creation of addiction is an effective way to achieve continuance.

Keywords: Social Network Service, Social Games, IS Continuance

1. INTRODUCTION

Social network services (SNSs, aka social network sites) have become one of the most popular services on the Internet in recent years. Examples are Facebook, MySpace, Bebo, Twitter, Live Space, and Plurk. According to a recent report, Facebook has become the most popular website in the world as defined by number of visits. This number reached 3.1 billion in 2010, more than Google’s 2.6 billion [1].

Data show that the fast growth of Facebook can be attributed to its affiliated games. Facebook has developed a large amount of entertaining game software, which appeared after it launched its platform for third-party applications in 2007. These games have become very popular and in turn helped Facebook attract millions of users.

The growth of SNSs is partially derived from the growth of the SNS games, even though the number of very active SNS game users decreased 5% from April 2010 to May 2010. Thus, in our study we focused on the continuance intentionality and behavior of SNS game users. We begin in Section 2 with a literature review, through which we describe SNS games and the theories our study

was based on. In Section 3, we describe our study, including the research model, hypotheses, surveys, and data collection. Section 4 describes the data analyses, including pretests, reliability and validity tests, and hypothesis tests. Section 5 is the conclusion.

2. INTRODUCTION TO SNS GAMES AND LITERATURE REVIEW

2.1. SNS Games

The main difference between SNS games and other games is that the former use existing online social networks to enlarge the user base. This approach benefits SNSs because it enriches their content and makes them a new Internet platform. To keep their customer bases, SNSs and their game partners designed the following four mechanisms:

1. **Instantaneity:** Almost all the SNSs that host games designate “game zones” that provide game selections and show who is on which game.
2. **Invitation:** An example is “Restaurant City,” which provides gifts to those who send invitations. Once their friends receive these invitations and become players, the senders can receive free cooking ingredients for every visit by an invitee.
3. **Sharing:** “Restaurant City” allows players to notify other players about the events they are engaged in. This mechanism creates “ambient awareness” for participants and gives them a good sense of belonging.
4. **Recommendation:** Many SNS applications allow users to review and rate the applications. For example, Facebook has “like,” which allows users to express their preference for an application. All their friends are notified of this action, which creates a friend-recommended promotion.

However, there are two problems. First SNSs have only recently developed, and 5- or 10-year longitudinal data do not exist. Many domain experts

have noticed this trend. The BBC reported a decline in Facebook users in 2008 [2]. In a survey taken at the 2009 Gartner CRM Summit, both the audience and the analysts expected that in 10 years Facebook would have fewer than 250 million users. It had 500 million as of July 2010 [3].

Using its analytic tool called Social Technographics [4], Forrester Research found that the number of SNS users last year dropped in every category except “joiners” and “inactives” [5,6]. Social Technographics divides SNS users into 6 categories, ranging from “creators” to “inactives,” based on how active they are. The percentages of users claiming to belong to the 3 most active categories all dropped. Forrester analyst Jackie Rousseau-Anderson thus suggested that “The initial wave of consumers using social technologies in the US has halted. Companies will now need to devise strategies to extend social applications past the early adopters.” [7] A similar suggestion was made by one of Forrester’s European market analysts [8].

Experts’ worrying is not unique to Facebook. MySpace’s accelerated decline has also been noticed. Between January and February 2011, the number of unique visitors to MySpace declined worldwide by 14.4%, from 73 million to 63 million. Their current audience is only half of what it was a year ago [9].

Data also show that SNS games may be experiencing a similar decline. For example, in 2011 CityVille had 101 million active users (MAUs) in January 2011 but only 97 million in February; in April, the number dropped to 89 million. FarmVille shows a similar pattern. It had 58 million MAUs in December 2010, but only 52 million in February 2011 and 47 million in April [10,11].

Second, SNSs have started to request games that use their virtual money for trading and to charge commissions on the transactions and fees for their commercials. These actions may prevent developers from engaging in free viral marketing and force them to be more cautious in the use of marketing strategies. Thus, we believe that developers probably will need to become familiar with the factors that affect players’ intentions to continually use SNS games and thereby maximize SNS profits. So long as SNS games can continue, SNSs can sustain themselves.

Before demonstrating our model, we present a review of the relevant research literature.

2.2. Information Systems Continuance

Although acceptance of information systems (IS) is the first step toward realizing IS success, the long-term viability and success of an IS depend on its continued use [12]. To explain IS continuance, Bhattacharjee proposed a post-acceptance model based on Oliver’s Expectation-Confirmation Theory (ECT) [12,13].

Oliver believed that consumers’ decisions to repurchase are based on the confirmation of their expectations, which in turn is based on the perceived performance of the product or service after a period of initial consumption. The degree of confirmation determines consumer satisfaction, which is the referent for the repurchase intention. Bhattacharjee believed that IS continuance is similar to consumer repurchasing because both decisions (1) follow an initial (acceptance or purchase) decision, (2) are influenced by the initial use experience, and (3) can potentially lead to *ex post* reversal of the initial decision. It differs from ECT in the sense that “it focuses only on the post-acceptance variables. This is so because the effects of any pre-acceptance variables are already captured within the *ex post* confirmation and *ex post* satisfaction constructs.” Second, “ECT only examines the effect of pre-consumption (*ex ante*) expectation...”; however, continuance is determined by *ex post* expectation, and *ex post* expectation is represented by “perceived usefulness.” Studies have shown that perceived usefulness “is the only belief that is demonstrated to consistently influence user intention across temporal stages of IS use”. The extended IS continuance model is schematized in Figure 1.

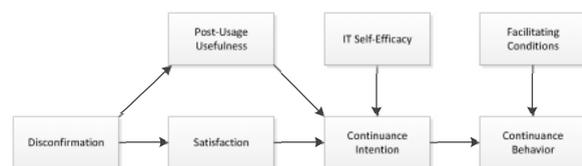


Figure 1 Extended IS Continuance Model [14]

3. RESEARCH MODELS AND PROCEDURES

In this section, we begin to describe how SNS games are constructed. We then present our hypotheses based on this description. Finally, we provide the survey data.

3.1. Constructs for SNS games

The extended IS Continuance Model is consistent with research on SNS continuance. First, “self-efficacy” and “facilitating conditions” come from Technology Acceptance Model (TAM) and

have proven to be appropriate constructs in various technology studies. Second, our research question is similar to the one that researchers have tried to solve using the IS Continuance Model.

Our model differs from the IS Continuance Model in some respects. First, we use the term “perceived enjoyment” instead of “perceived usefulness.” Not only extrinsic motivation, but also intrinsic motivation, can affect the use of technology in the workplace. Although usefulness is extrinsic, the enjoyment obtained from using IT is intrinsic. Both motives are important in the workplace, but users have no professional goals when playing games and thus usefulness may not be important in this context [15].

Second, we added “socialization” as an *ex ante* condition. Socialization is similar to “need to belong” [16]. It is the human need for other people to be concerned about one and for one to be accepted by society, or the motivation to establish and maintain long-term, positive, and important personal connections [16]. SNSs are social tools and SNS games can help users fulfill their social needs.

Studies have shown that online game players fall in two categories – power gamers and socializers. Power gamers hope to win, whereas socializers enjoy companionship with their online partners [17]. Most SNS games are designed for light players, and thus socializers may find them more appealing than power gamers.

Social presence is the sense of companionship that is facilitated by the media [18]. Users will find a website useful and enjoyable if they feel a good social presence there [19,20]. SNS games provide a social context in which players can become transfigured into “avatars” that interact with others on the site. Such social presence can lead to a high level of socialization and a better chance of continuance.

Third is the issue of social norms, which are judgments by members of the social group to which one belongs. One’s behavior can be affected by such judgements. It is also likely that social norms affect users’ continuance intentions and behavior.

Fourth, addiction has been reported as a side effect of online social activities [21,22]. Although light players may prefer games that do not require much commitment, addiction can still result in continual playing. Socialization can be another attribute of addiction [23].

Confirmation or disconfirmation is an essential

part of the IS Continuance Model. However, we do not believe it is a necessary part of ours. First, confirmation is similar to usefulness. As Bhattacharjee stated, “Though these items [of confirmation] are similar to the usefulness items, usefulness captures users’ expectations from IT usage, while disconfirmation examines the extent to which those expectations are met during actual usage.” [12]. Because the elements of the IS Continuance Model are all *ex post*, and *ex post* factors capture the *ex ante* effect [12], the *ex post* enjoyment factor in our model, which replaces usefulness, implies confirmation. Adding confirmation contributes nothing useful, but it could create multicollineality. The implications of confirmation for enjoyment can also be seen in the measures of enjoyment.

3.2. Hypotheses and the model

Our model, based on the above discussion, is shown in Figure 2.

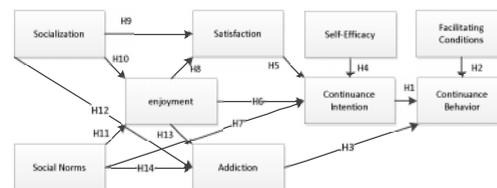


Figure 2 SNS Game Continuance Model

The arrows in Figure 2 refer to positive impact. For example, H10 means that the socialization of SNS game players has a positive impact on their enjoyment.

Hypotheses 1, 2, 4, and 5 follow from the extended IS Continuance Model [14]. Hypothesis 3 is based on Jean Morrissey’s observation that addiction can be viewed as continual involvement with a substance or activity. Although the addictive substance or activity is initially sought because it creates pleasure or enjoyment, in the longer term, involvement with it becomes necessary for one to feel normal [24]. Such automatic long-term behavior, which is referred to as a habit, is an antecedent of IS continuance [25].

H6 is based on the Technology Acceptance Model, but “perceived usefulness” is replaced by “perceived enjoyment.” H7 comes directly from TAM.

H8 and H9 are concerned with the factors affecting satisfaction. Research shows that post-acceptance enjoyment positively affects satisfaction [26]. Preece claimed that satisfaction is a determinant of sociability in online communities [20], and Phang proposes that interactivity can provide a way for individuals to

obtain benefits such as enjoyment and satisfaction from interactions in the community [27].

H10 and H11 refer to the antecedent of enjoyment proposed by Hassanein and Head and by Lu and Wang [19,28]. H12, H13, and H14, all of which involve addiction, are from Lu and Wang [28].

3.3. The survey

The design of the questionnaire and the preliminary selection of items was guided by our literature review. The scales are socialization, social norms, self-efficacy, facilitating conditions, enjoyment, satisfaction, addiction, continuance intention, and contunace behavior.

The questionnaire has three parts. 錯誤! 找不到參照來源。 lists the second part. The first part is a general survey on SNSs and the use of SNS games that we used to screen inappropriate respondents from the test sample. Those who did not play SNS games were excluded. Of the 454 respondents, 239 joined an SNS because of the games. This statistic shows that more than half of SNS users play SNS games. The third part of the questionnaire consists demographic items, the data from which were used for F-tests to check the effects of demographic differences.

4. PROCEDURE AND DATA ANALYSIS

We began the study with a pre-test to validate the questionnaire. We then conducted the main survey using the validated questionnaire. One-way ANOVAs were employed to check for significant interactions between the demographic and psychological variables. Then, the questionnaire was further validated and model fitness checked. Once all these issues were resolved, the hypothesis tests were conducted.

4.1. The pre-test

The first step of the pre-test was to invite seven scholars with domain knowledge and extensive experience with SNSs and SNS games to examine the above preliminary version of the questionnaire. Two MIS professors checked the internal validity of the questions, and two Ph.D. candidates helped them evaluate the questionnaire further. Five professionals were invited to check for ecological validity, i.e., whether the questions are really important for SNSs and SNS games. All nine judges agreed that the questionnaire "can measure what it is supposed to measure" and that "all dimensions are essential to the evaluation of SNS and SNS games." Thus, face validity and content validity were achieved.

We then put the questionnaire on Google Docs for

the pre-test. Through personal connections such as MSN, Skype, BBS, personal blogs, Facebook and so on, we recruited 147 respondents, 24 of whom were invalid. The reasons for disqualifying questionnaires were: (a) the SNS being used did not have games, (b) the games were not SNS games, (c) the same answer was given to each item; (d) at least one question and its reverse-worded counterpart had contradictory answers, (e) the respondent could not continue playing because of extraneous factors outside the respondent's control, and (f) the respondent submitted multiple questionnaires (inferred from the same IP address). The sampling started from May 15, 2010 to May 23, 2010.

1. Reliability

Cronbach's α was used to assess the reliability of the scales composing the questionnaire [19,28]. Guilford has suggested that an α value greater than 0.7 means that the reliability is adequate [29]. Because the reliability was found to be good for all the scales, all the items were retained in the final questionnaire.

2. Validity tests

We began by applying the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy to determine if the scales had adequate validity and were suitable for factor analysis [30]. A KMO score greater than 0.8 shows that the items in a scale have low partial correlations. All the KMO scores in fact exceeded 0.8, which confirms that the scales are factorable.

The factor analysis of the 9 scales yielded 8 factors. After adjustments, there were 9 factors matching the 9 scales.

We repeated the reliability and KMO tests for the new constructs. Both yielded good results (Cronbach's $\alpha = 0.738$ and KMO = 0.826).

4.2. Main survey

The revised survey was distributed to those respondents who had played SNS games. The survey was posted on Google Docs and remained there for 12 days, from May 26, 2010 to June 6, 2010. The link was provided on several popular Taiwanese websites, including PTT ([Telnet://ptt.cc](http://www.ptt.cc)), Gamebase (<http://gamebase.com.tw>), Gamer (<http://gamer.com.tw>), and Game DB (<http://www.gamedb.com.tw>). Lottery rewards were given and all respondents had an equal chance to win them. This procedure prevented survey bias because, had no reward been given, it is possible that participants who were currently playing SNS

games (i.e., did not discontinue playing) would be more motivated than other participants to answer the questions. The total number of questionnaires received was 516, but 64 were discarded due to invalid responses. The reasons for disqualifying questionnaires were the same as those in the pre-test.

4.3. Demographic variables

Because we suspected that demographic variables would interact with the psychological variables, we conducted a series of one-way ANOVAs to test for such relationships. The overall results show that the demographic factors did not affect the results.

4.4. Reliability, validity tests and model fitness

We follow the same procedure as in the pre-test to test the reliability. It shows that the reliability is good as all the Cronbach's values exceed 0.7. KMO value was 0.896, so we proceeded with the factor analysis, which yielded 9 factors

corresponding to the 9 psychological dimensions so construct validity is good.

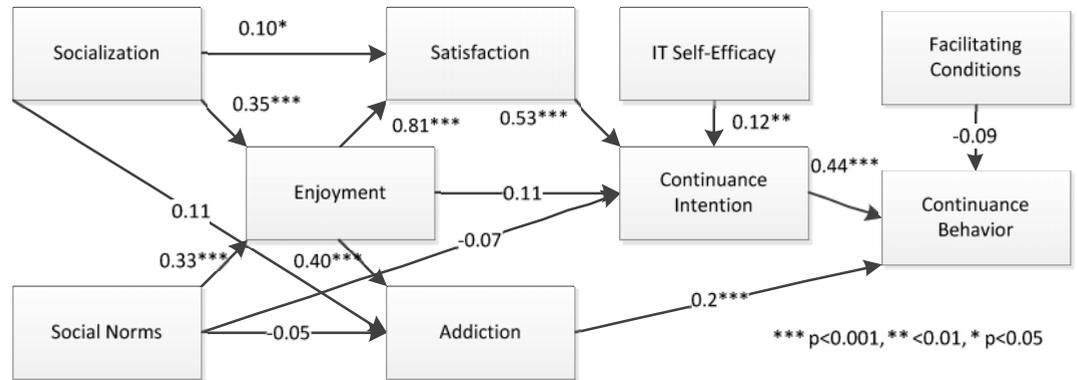
We then conducted convergent and discriminant validity tests. Both were achieved.

We next sought to determine whether our model is the best of the available choices – the question of model fit. The three kinds of model fit (absolute fit, incremental fit, and parsimonious fit) for our data are good.

4.5. Hypothesis testing

Finally, we used maximum likelihood estimation to test the hypotheses listed in Section 3.2. Figure 3 and 錯誤! 找不到參照來源。 show the structural equation model for the path analysis and the results of the hypothesis test.

Figure 3 Path analysis for the structural equation model



5. DISCUSSION AND CONCLUSIONS

We showed in Section 1 that the success of SNSs depends on the number of users, which can be increased by providing games. But how is this accomplished? To answer this question, we used a modified IS continuance model to test our hypotheses, with the intention that game developers will be able to draw on our finding to make decisions on strategies to attract more players. Before describing these application-related findings in Section 5.2, we discuss the results of the hypothesis tests in Section 5.1. In Section 5.3, we note the limitations of the study and offer suggestions for future research.

5.1. Discussion of the hypothesis test results

Our study confirms previous studies on the effect of continuance intention on continuance behavior and the effect of self-efficacy and satisfaction on continuance intention. However, facilitating conditions had no effect on continuance behavior. The respondents found it easy to obtain the necessary resources, but this did not increase their intention to keep playing, perhaps because most SNS game players are light players who do not need large resources to win. It is not a good strategy for a vendor to market SNS games to power players, because this type of players is likely to seek more intensive games in other platforms, such as PS3 games. Thus, we believe that game companies should keep their games as simple as possible, under the assumption that easy entry is a necessary, although not a sufficient, condition for people to play.



The fact that satisfaction was influenced by enjoyment and socialization shows that games are different from other programs. Because data have shown that many people use SNSs because of SNS games, the feelings of pleasure from playing SNS games can be an important driving force for the growth of SNSs.

Socialization has a positive impact on the enjoyment of many activities. Simmel believed that socialization brings enjoyment that results from being with others [31]. In real-life social settings, however, socialization can also be associated with pressure or other negative emotions. Because online environments avoid these pitfalls, it is not surprising that they bring enjoyment to game players.

Social norms also have a significant positive impact on enjoyment. Lu and Wang point out that enjoyment can be enhanced by playing with friends [19,28]. We can take this further with respect to SNS games. As noted by Granovetter, friends on an online social network include not only members of one's inner circle or people one has strong ties with, but also people with weak ties – friends of close friends or just people we see only once in a while offline [32]. Thus, the information sharing and interactions among friends on the Internet is more frequent and diversified than among friends in real life. These interactions can intensify the effect of social norms.

Enjoyment also has a strong effect in promoting addiction [19,28]. Addiction in turn results in continuance behavior, as illustrated by our confirmation of H3.

Several hypotheses were not supported in our study. First, we found that socialization and social norms had no significant effect on addiction, and enjoyment and social norms had no significant effect on continuance intention. Because SNSs do not require players to stay online long and their interactions do not have to occur simultaneously, players find the games convenient, but their commitment and social presence are reduced. Because it is likely that players of SNS games need to make a commitment to the games before they become addicted [33], the probability that the games will actually get players addicted is low.

For the same reason, players may demonstrate high levels of socialization in SNS games without becoming addicted. As SNSs themselves are social tools, SNS games are not the only way that SNS users can become socialized.

Neither enjoyment nor social norms were significantly associated with continuance intention in our study. When respondents answered the question about why they quit SNS games or spent less time on them, they said that playing the games was meaningless. A possible explanation is that even though they also said they enjoyed playing the games, most were light players and used SNSs to extend and maintain their social networks. Because there are so many other things both on and off the Internet that can bring them enjoyment, they don't require SNS games to meet this need.

Although previous studies have found social norms to affect the acceptance of technology, we did not confirm this finding with respect to SNS game continuance. Players' own feelings (e.g., satisfaction) have much greater impact on continuance intention than the opportunity to interact with friends. When we asked the questions about social norms, we were thinking of close friends, not casual friends. In online social networks, users have different levels of friends, and therefore close friends may not be as important as in other contexts; the players do not need to become engaged with others to the extent that is required in real-life social networks. In addition, there was no evidence in our study for asset specificity, which is defined as the extent to which the investments made to support a particular transaction have a higher value to that transaction than they would if they were redeployed for some other purpose. Perhaps this is because the cost of switching to other games is low. In other words, the friendship one forms in one SNS game does not involve a high level of commitment and thus can easily be replaced by a friendship developed in another game.

We found self-efficacy to be an important factor affecting continuance intention. For example, it is likely that language is a barrier to engagement with both SNSs and SNS games. Once this barrier is overcome, usage increases. In Taiwan, Facebook was introduced in 2006 but did not gain momentum until the Chinese interface was fully built in June 2009. Since then, the number of users has increased from 700 thousand to 2.8 million per month. According to the CheckFacebook report, a number of other countries, including Lithuania, Kuwait, Vietnam, have show similar growth [19,28].

5.2. Research contributions and business implications

Because the history of SNSs is short, research on

the subject is in its infancy. Likewise, there has not been as much research on webpage games (i.e., games demonstrated and played on webpages with no peripheral devices) as much as on other Internet activities or even video games. Nonetheless, there is evidence that SNS games are an important driver of SNS growth. We hope that our research will be valued as a pioneer in this emerging but important area.

1. According to *Businessweek*, gamification has become a priority for businesses such as Siemens, Hilton, Nissan, and Target [34]. Gamification is the use of game-playing mechanisms for non-game applications, particularly consumer-oriented web and mobile sites, with the aim of encouraging people to adopt the applications [35]. Our study falls in the gamification category. Because industry practitioners have started to notice the increased use of gamification, our research findings about which aspects of gamification are the most important should be of direct benefit to companies. The factors we found to be important, such as “enjoyment,” are the ones that companies may want to invest in more: It can be seen in Figure 3 that the most significant path in the model is from “enjoyment” through “satisfaction” to “continuance intention”. However, there was no significant relationship between “enjoyment” and “continuance intention.” Finding the game to be interesting is not sufficient grounds for players to continue playing SNS games; they need satisfaction. An important reason for this satisfaction is the inherent value of the games: more gain for less effort [36]. FarmVille is a good example. Players can get a good sense of achievement by watching their crops grow without spending much time on it.
2. Social norms had little impact on continuance compared with other factors. Even though respondents indicated that they were influenced by friends (see average scores for males and females in Table 7), and friends had little effect on how much they enjoyed the games, social norms had no direct impact on continuance intention. Thus, although Facebook has a larger user base than other game platforms, and players may have more friends playing with them, these factors did not necessarily lead to continual use of SNS games. Facebook might be able to form a monopoly due to network externality, but that does not mean it will necessarily be able to

monopolize SNS games. Other SNSs will still have a good chance to compete in the market by providing good-quality games.

3. One way to increase one's continual use of something is to become addicted to it. In our study, we found that the average “addiction” score was 2.58 (錯誤! 找不到參照來源。). This figure indicates that SNS games have not yet gotten players addicted. Although excessive addiction is morally reprehensible, what matters most is keeping a balanced perspective on any products that have a negative impact on us. Game companies can add more competition, challenge, and feedback to increase the likelihood that players will continue playing.
4. Although self-efficacy increased continuance intention in our study, other variables had a greater effect on it. The average self-efficacy score was above 4.0, which indicates that the respondents found SNS games easy to play. It is unlikely that simplifying the games further will increase the probability that players will keep playing.

We believe that the IS Continuance Model, which our study was based on, needs to be modified in two respects. First, “confirmation” needs to be removed from the model, at least when applied to SNS games, because it is subsumed under “perceived enjoyment”. Second, we used “perceived enjoyment” instead of “perceived usefulness,” because usefulness is not relevant to why people play SNS games; instead, enjoyment is the issue. Finally, we added “socialization” to the model, as well as other dimensions specific to SNSs, and we found that most had an impact on IS continuance.

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