Understanding Users' Continued Use of Online Games: An Application of UTAUT2 in Social Network Games

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Abstract—**Online gaming market is thriving but accompanied with fierce competitions. Players' continued use of online games is critical for the success of online game providers. This study applies UTAUT2 as the research framework to identify the key determinants of social network game (SNG) players' continued use intention, and to explore the moderating effects of individual characters (such as age, gender, and user experience) on the proposed hypotheses as well. The research model is examined by analyzing 3919 valid empirical data collected among SNG players in China. The results suggest that social influence is the most important determinant of continuance intention to use SNG, followed by habit, fantasy, enjoyment, achievement and price value. User experience and age are not moderators, whereas gender exerts moderating effects on the paths from social influence, perceived enjoyment and price value to continuance intention.**

Keywords- IS Continuance, UTAUT2, Social Network Games, Online Games

I.   INTRODUCTION

Online gaming is emerging as one of the fastest growing online entertainment industries with a continued increase in the number of participants [24]. Online gaming has become powerhouses of electronic-commerce and largely changed how the Internet users spend their leisure time [5]. However, the growing popularity and soaring revenue are accompanied with fierce competitions in online gaming industry. The features of Internet make it easy for online gaming players to access to and switch to alternative online games. Hence, how to retain the existing players and to prolong their playing duration in online games have attracted the attention of both practitioners and researchers [41].

Prior research on online games explored players' usage behavior (e.g., adoption, continued usage, and stickiness) in online games was mainly based on the dominant information systems (IS) theories, such as theory of reasoned action (TRA)[14], technology acceptance model (TAM) [11], and theory of planned behavior [2]. However, these theories were mainly developed in the work related settings to study employees' IT usage for utilitarian purposes. They might fall short in explaining individual usage of hedonic IS in home settings [42].

UTAUT2 was recently developed based on UTAUT which has been developed to explain users' technology

adoption behavior in organizational context [37]. UTAUT2 was selected since it can provide several advantages in the current research context. Venkatesh et al. [38] indicated that the objective of developing UTAUT2 was to focus on individual consumers' use context. Thus, comparing to theories build in the organizational setting for studying utilitarian oriented IS usage; UTAUT2 may provide more insights to investigate online gaming player's behavior in home settings. Further, UTAUT2 was developed based on a rigorous theoretical model UTAUT which has superior performances comparing to other eight IS models in explaining individual IS usage. Venkatesh et al. [38] argued that compared to UTAUT, UTAUT2 showed significant improvements in explaining the variance of consumers' technology use intention. Moreover, several constructs, such as hedonic motivation, price value, and user habit were added into UTAUT2. These constructs were repeatedly examined in prior studies as the important determinants of individual IS continuance usage in home settings, and have not been theoretically incorporated and examined in UTAUT.

In the work of Venkatesh et al., the importance to extend or adapt UTAUT2 to different research contexts is highlighted. Venkatesh et al. argued that "compare to general theories, theories that focus on a specific context are considered to be vital in providing a rich understanding of a focal phenomenon and to meaningfully extend theories" (pp. 158). Therefore, it is critical to examine how UTAUT2 can be generalized to different research contexts. In prior literatures, little research has attempted to apply UTAUT2 in the research context of online gaming, e.g., social network games (SNG) defined as "a type of browser game distributed through social networks fitting to multiplayer and asynchronous game playing "[27]. Thus, our theoretical choice of examining the extension of UTAUT2 in online gaming is further justified.

In addition, it is indicated that when applying UTAUT2 to different research contexts, modification or extension of UTAUT2 might be needed in order to understand a focal phenomenon better. Venkatesh et al. advocated the examination of other key constructs that were salient to different research contexts when applying UTAUT2 to build the models, since new constructs can result in important changes in theories in different context. Online gaming is different from mobile Internet technology investigated in

UTAUT2. Prior researchers have suggested that the explanatory power of a particular model or theory would depend on the characteristic of the technology [21]. Thus, in the current study, UTAUT2 is selected as the research framework, and some modification is done in order to understand the phenomenon of continuous play of SNG.

The rest of the paper is arranged as follows. Research background and research model are discussed in the next section, followed by the presentation of the research method in Section III. Subsequently, research results are illustrated in Section IV. Then, the paper goes on with discussions towards the research findings in Section V. Finally, we present the conclusion of this study, and discussion of limitations in Section VI.

II. RESEARCH BACKGROUND AND RESEARCH MODEL

A. Social Network Games

Nowadays, social networks services (SNS) (e.g., Facebook, MySpace) have become popular among the Internet users. People are using SNS for different purposes, such as for entertainment and communication. For example, Facebook, the most popular SNS, until June in 2013, it has 1.5 billion monthly active users with an increase of 21 per cent compared to last year [13]. Meanwhile, there are millions of apps run on SNS. And among these apps, SNGs have made great success on SNS by attracting an increasing number of players all over the world, and "have spawned a whole new subculture" [6]. In spite of the huge popularity and rapid growth of SNG, research on SNG is still in an infant stage [38].

SNGs usually have some features in common. SNG players mainly play social games with people in their existing social networks, such as friends, family, and co-workers instead of virtual players meet through the game [29]. Most SNGs are designed to be easy for players to play [27], and SNG players can interact with others without the constraints of time as SNGs are asynchronous [28]. SNGs combine multiple elements from both SNS and online gaming.

B. Research Model

In UTAUT2, seven constructs are identified as the main determinants of continuous intention, namely performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit. This study aims at investigating individual player's continued intention to use SNG. Thus, some modifications have been made in order to make the model fit better to explore the research context of SNG as discussed in Section I.

Venkatesh et al. [38] have suggested that hedonic motivation is one of the key factors determining IS users' behavioral intention in non-organizational contexts. In this study, perceived enjoyment and fantasy are employed as the two factors reflecting hedonic motivations in the SNG context. Li et al. [22] found that the hedonic gratification, such as perceived enjoyment and fantasy, determined individuals' continued intention to use SNG. Emotional response (such as enjoyment) and imaginary response (such as fantasy) have also been suggested to be important motivations for individual to conduct hedonic consumption [20].

Performance expectancy represents the utilitarian value of IS usage and emphasizes the benefits provided to consumers by using the technology [38]. The utilitarian benefit players expect to gain is the sense of achievement by engaging in kinds of activities in SNGs, such as gaining power or accumulating in-game symbols of wealth, competing with other players in the SNG, and achieving higher game levels [22][43]. Therefore, in the current study, achievement is used to reflect the utilitarian value driving individuals' continuance intention to use the SNG.

Effort expectancy is similar to perceived ease of use and means the degree of ease associated with consumers' use of technology. However, this construct has been argued to lose its influence on continuance intention when users accumulate experience during their continued use stage [18]. Moreover, a SNG is usually designed for players to obtain the game rules and skills easily. Thus, effort expectancy is not included in this study to explore continued use of SNG.

Facilitating conditions refer to consumers' perceptions of resources and support available to perform behavior. The purpose of the current study is to examine the players who have accumulated experience in SNG use. Venkatesh et al. [38] pointed out that the users with more experience depend less on external support. Furthermore, SNGs are featured as easy-learning curve, free-to-play pattern via no matter PC or mobile devices, and requiring less continuous time and effort [27],[28]. These features enable the SNG players to require little additional support for learning, device, location and time to continue playing a SNG. Hence, we assume the influence of facilitating condition can be marginal in the current research context and it is not included in our research model.

In this research, we also explore the moderating roles of individual characters (age, gender and user experience) on the relationships from independent variables to dependent variable as proposed in UTAUT2. The moderating effects exerted by age, gender and user experience have attracted attention in online gaming studies. Prior online gaming research claims different results. For example, Lin et al. [31] reported the moderating effect of gender on perceptions of online game loyalty, whereas, Ha et al. [17] claimed age was a more significant moderator on perceptions of online gaming loyalty, gender only exerted marginal moderating effect. Hence, the moderating effects of these individual characters should be examined in the current study.

Based on the above ground, six constructs are proposed to predict continuance intention, including achievement, social influence, perceived enjoyment, fantasy, price value, and habit. Since behavioral intention has been examined to be the dominant determinant of IS actual use in the prior IS research, in this study, we focus on exploring the determinants of continuance intention. The research model is presented in Figure1.
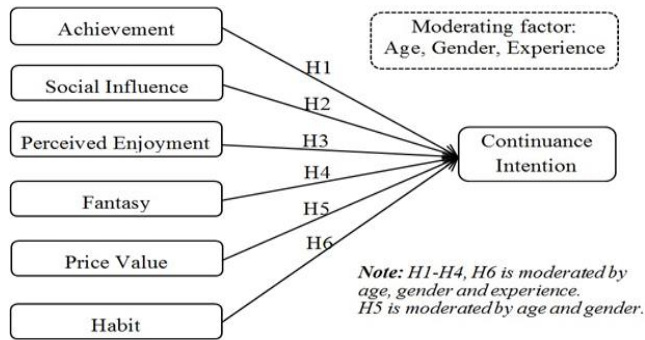
Figue 1. Research Model

C. Research Hypotheses

The achievement components refer to playing SNG to gain power, to progress rapidly, to accumulate in-game symbols of wealth or status, and to compete with others [7]. Suznjevic and Matijasevic [35] found that achievement was the most important motive for players to play the MMORPG. Prior research results towards online games have supported this argument and indicated that achievement positively predicts continuance intention to play online games [7], [22]. Thus, it is reasonable to expect that achievement will influence SNG continuance intention, and the following hypothesis is proposed:

H1. Achievement is associated with SNG continuance intention positively.

Social influence refers to the extent to which players perceive that important others believe they should continue playing a particular SNG [38]. Social influence is included as a major predictor of behavioral intention in UTAUT2. Lee [29] claimed that many players decided to play online games was just because their friends recommended them to do so. Similarly, Hsu and Lu [23] conducted an empirical study with 233 responses in the context of online games and supported the argument that social influence had significant impact on intention to play online games. Thus, it is reasonable to argue that SNG players are more likely to continue playing SNG if their friends encourage them to continue playing it. Hence, the following hypothesis is suggested:

H2. Social influence is associated with SNG continuance intention positively.

Perceived enjoyment in the current study refers to the extent to which the activity of playing the SNG is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated [12]. Perceived enjoyment is theorized to predict behavioral intention directly [19]. In online games settings, Ha et al. [17] indicated that "games must, of course, provide players with enjoyment, as part of their basic nature". Players are more willing to persist in playing online games in the future when their behavior is prompted by intrinsic motivation, such as perceived enjoyment [40]. Thus, it seems reasonable to argue that SNG players are more likely to continue playing SNG if they perceive there perceive more enjoyment during their game playing process, and the following hypothesis is proposed:

H3. Perceived enjoyment is associated with SNG continuance intention positively.

Hedonic consumption studies in marketing discipline suggest that seeking product-related fantasy and imagine is an important determinant for pleasure-oriented consumption behavior [20]. Prior research in the online gaming context also identified fantasy as a major motive for individuals to play online games [26], [32]. In the SNG settings, players can construct and realize their fantasy by trying different identities, fancy avatars and conducting activities, which are not possible for them to do in the real life. It seems that SNG players are more likely to continue playing the SNG if they perceive the SNG is with fantasy. Thus, it is proposed that:

H4. Fantasy is associated with SNG continuance intention positively.

In UTAUT2, price value is proposed as a direct key determinant of behavioral intention and is conceptualized as consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them [38]. SNGs are usually provided for free to register and basic play. However, players have to pay for fancy decorations and powerful equipment, or if they want to achieve higher game levels quickly. Hence, SNG players are also consumers and will be affected by price value. Therefore, we follow the trend of UTAUT2, and assume that:

H5. Price value is associated with SNG continuance intention positively.

Ajzen and Fisherbein [1] claimed that habit was a driver of continuance intention and explained the effect of habit on behavioral intention from the instant activation perspective (IAP). IAP suggests that the relationship from habit to behavioral intention is equivalent to and is an expedited form of conscious processing theory. The formed habit triggered by the attitude objects or environmental cues can activate the behavioral intention which is well-established and restored. Venkatesh et al. [38] supported this argument and verified the significant impact of users' habit on behavioral intention. Hence, it is postulated that:

H6. Habit is associated with SNG continuance intention positively.

In the research model, the postulations of moderating effects in UTAUT2 are followed and examined. The paths from social influence perceived enjoyment, fantasy, achievement and habit to behavioral intention are hypothesized to be moderated by age, gender and experience. The path from price value to continuance intention is postulated to be moderated by age and gender.

III. RESEARCH METHOD

A. Instrument Development

The study employed survey as the research method for gathering empirical data. Each construct in the research model was measured with multiple items adapted from extant literatures to improve the content validity [35]. Items were slightly modified according to the research context. Each item was measured with a five-point Likert scale, ranging from disagree (1) to agree (5).

The research model includes seven constructs. Items measuring social influence, price value and habit are adopted from Venkatesh et al. [38]. Continuance intention is measured by two items adopted from Lee [29]. The 4 items developed by Wu et al. [41] were employed to measure achievement. Fantasy (FA) was measured by three items adapted from the work of Sherry and Lucas [34]. Three items developed by Ghani and Deshpande [16] were used to measure perceived enjoyment.

The questionnaire was developed in English, and then translated to Chinese by one of the researchers in the research project, who is a native Chinese speaker. Then, the questionnaire was sent to 7 participants for pilot study. The participants were consisted of 3 IS researchers, a manager of the SNG provider and 3 current players of the SNG. Some phrases and words were revised according to the feedback from the respondents. The clarity and the overall quality of the questionnaire were improved.

B. Data Collection

Data was collected via a web-based survey from the current SNG players of one popular SNG in China. The SNG is offered by one of the biggest Chinese social network service providers which have multi-million users. Before the data collection, the SNG has been running for 6 months and is distributed via the social network sites.

With the help of the company, the questionnaire was distributed to registered players of the SNG. The survey aimed at studying individual SNG players' continued usage and switching behavior among SNGs respectively. This study attempted to explore the continued usage behavior among SNG players. This study identified the most potential continuous players by asking them whether they have been playing the SNG in the recent one month.

220,000 invitations for answering the questionnaire were sent out to a random sample from registered players of the SNG from Nov. 23rd to 27th, 2012. No rewards were offered to the respondents for answering the questionnaires. All respondents provided their respondents voluntarily. As a result, 7769 respondents were collected including continuous players, switching players and discontinuous players. 3919 valid responses were from continuous players. In the survey on Chinese online game players conducted by iResearch (2012), 67.8 per cent of online game players in China are male and 32.2 per cent are female. 37 per cent of players are below 18 years old, 63per cent of players are above 18 years old [25]. From the demographic information of the respondents presented in Table 1, it can be seen that the sample largely fits to the online game users in China.

TABLE 1. DEMOGRAPHIC INFORMATION OF RESPONDENTS

Measure	Items	Frequency	%
Gender	Male	2357	60.1
	Female	1562	39.9
Age	Adolescence	1083	27.6
	Adult (over 18 years old)	2836	72.4
Experience of playing the SNG	Less than 1 month	1860	47.5
	1-3months	1177	30.0
	3-6months	881	22.5

C. Data Analysis

A two-step approach suggested by Anderson and Gerbing [3] was adopted to analyze the empirical data. This study first analyzed the measurement model to examine the reliability and validity of the instruments, and then tested the structural model to investigate the research hypotheses.

Amos 20. was employed to conduct confirmatory factor analysis (CFA) to examine the measurement model including convergent validity and discriminant validity. Several common used model-fit indices were adopted to estimate the measurement model. All indices exceed the acceptance level (>0.9): GFI=0.956, AGFI=0.939, IFI= 0.981, NFI=0.990, CFI=0.981, TLI=0.977 and RMSEA=0.050 [9]. $\chi 2/df$ is not considered, because the value is very sensitive to sample size, and current study has a very large sample size.

Convergent validity and discriminant validity is presented in Table 2 and Table 3.

TABLE 2. RELIABITLITY AND CONVERGENT VALIDITY STATISTICS

Construct (no. of items)	α	Composite reliability	Minim. factor loading	AVE
SI(3)	0.97	0.97	0.93	0.91
AC(4)	0.94	0.94	0.81	0.81
PE (3)	0.93	0.93	0.88	0.82
FA(3)	0.85	0.86	0.73	0.67
PV(3)	0.93	0.93	0.86	0.82
HA(3)	0.94	0.94	0.88	0.84
CI (2)	0.95	0.95	0.95	0.91

TABLE 3. DISCRIMINANT VALIDITY

Construct	SI	AC	PE	FA	PV	HA	CI
SI	**0.95**						
AC	0.66	**0.90**					
PE	0.21	0.18	**0.91**				
FA	0.71	0.69	0.26	**0.82**			
PV	0.61	0.51	0.12	0.60	**0.91**		
HA	0.64	0.62	0.23	0.66	0.55	**0.92**	
CI	0.70	0.62	0.35	0.69	0.53	0.66	**0.95**

Convergent validity evaluates whether a particular item is developed to measure the construct which is supposed to be measured. Factor loading, average variance extracted (AVE) [9]; composite reliability (CR) and Cronbach's alpha values are usually used to examine convergent validity [9]. The values of the indices in our model are presented in Table 2. All of the values exceed the acceptance level: factor loadings are all over 0.7, composite reliability are over 0.7, AVE are over 0.5, and Cronbach's alpha are over 0.7. Discriminant validity reflects whether two constructs are statistically distinguished from each other. The results in Table 3 show that discriminant validity is achieved, since the square roots of AVE on the diagonal are higher than the correlations between constructs [9].

Two tests are conducted to examine common method bias. Harmon's one-factor test is performed to test common method bias. No factor is found to account for the majority of the covariance in the variables [33]. In addition, single factor model test is performed by modeling all items as

indicators of one factor representing common method bias impact. The single-factor model showed a poor fit (GFI = 0.476; AGFI = 0.371; NFI = 0.546; IFI = 0.547; TLI = 0.502; CFI = 0.547; RMSEA = 0.222). With results from two tests, common method bias is not likely to be a significant problem in this study.

IV. RESEARCH RESULTS

The analysis results on the structural model of multi-group model were presented in Figure 2. The model fit indices suggest a good model fit between the data and the research model in current study. The values of indices are presented as following: GFI=0.956, AGFI=0.939, IFI= 0.981, NFI=0.980, CFI=0.981, TLI=0.977 and RMSEA=0.050. Achievement (β = 0.101, $p < 0.001$), social influence (β = 0.306, $p < 0.001$), enjoyment (β = 0.164, $p < 0.001$), fantasy (β = 0.195, $p < 0.001$), price value (β =0.033, $p < 0.050$), habit (β =0.217, $p < 0.001$) are positively associated with continuance intention significantly. 62.8 per cent of variance of continuance intention is explained by the research model, which indicates a good explanatory power of

the research model [9]. According to the analysis results presented in Table 4, age and user experience are not significant moderators. Gender exerts significant moderating effect on the paths from social influence, perceived enjoyment and price value to continuance intention.
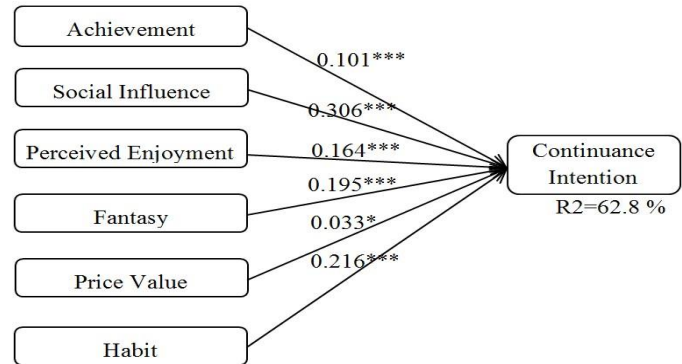
Note. * $p<0.05$, **$p<0.005$, ***$p<0.001$, n.s: not significant.
Figue 2. Structure Model Results of Multi-group Model

TABLE 4. STRUCTURE MODEL RESULTS OF MODERATORS

Hypothesis	Age (Basic model, χ2= 2105,122, df =336)		Gender (Basic model, χ2=2087.445, df =336)		Experience (Basic model, χ2=2318.762 , df = 504)		
	Adolescence	*Adult*	*Male*	*Female*	*Less than1 month*	*2-3months*	*3-6months*
AC→CI	β=0.128***	β =0.085***	β =0.085***	β = 0.114***	β =0.087***	β =0.099**	β =0.136***
	χ2= 2106.013, △χ2=0.891, n.s.		χ2=2088.028, △χ2=0.583, n.s.		χ2=2320.316, △χ2=1.554, n.s.		
SI→CI	β =0.347***	β =0.296***	β =0.363***	β =0.230***	β =0.318***	β =0.304***	β =0.288***
	χ2= 2106.957, △χ2=1.835, n.s.		χ2=2100.328, △χ2=12,883, **p<0. 01**		χ2=2319.729, △χ2=0.967, n.s.		
PE→CI	β =0.138***	β =0.178***	β =0.124***	β =0.232***	β =0.163***	β =0.174***	β =0.160***
	χ2= 2106.628, △χ2=1.506, n.s.		χ2=2108,563, △χ2=21.118,**p<0.01**		χ2=2319.134, △χ2=0.372, n.s.		
FA→CI	β =0.213***	β =0.210***	β =0.210***	β =0.171***	β =0.217***	β =0.193***	β =0.167***
	χ2= 2106.289, △χ2=1.167, n.s.		χ2=2088.051, △χ2=0.606, n.s		χ2=2320.432, △χ2=1.67, n.s.		
PV→CI	β =0.029, n.s.	β =0.039*	β =0.10,n.s.	β =0.069**			
	χ2= 2105.161, △χ2=0.039, n.s.		χ2=2091.225, △χ2=3.78, **p<0.05**				
HA→CI	β =0.159***	β =0.230***	β =0.204***	β =0.221***	β =0.187***	β =0.203***	β =0.229***
	χ2=2107.336, △χ2=2.214,n.s.		χ2=2087.490, △χ2=0.045, n.s.		χ2=2320.165, △χ2=1.403, n.s.		
R2(CI)	65.2	61.4	65.6	59.4	64.6	59.1	60.3

V. DISCUSSION

This study aims to test the explanatory power of a research model extended from UTAUT2 in predicting SNG player's continuance intention. As presented in Figure 2, all hypotheses in multi-group model are supported. Factors including achievement, social influence, perceived enjoyment, fantasy, price value, and habit all have significant and direct influences on continuance intention to play the SNG.

In this study, the effect of social influence is stronger than other factors in predicting continuance intention to play the SNG. Findings of prior studies have indicated that user's intention was significantly affected by other important referees' opinions when they made decisions of IS usage [4], [36], [37], [38]. In this study, players mainly play the SNG with real friends/families in their existing social networks. SNG players usually connect with these friends/families both

in real life and the virtual SNG world. Hence, the recommendations from important others exert a strong influence on player's continuance intention to play the SNG.

Fantasy (β=0.195) and perceived enjoyment (β=0.164) are found to exert strong influence on continuance intention in this study. The present studies indicate that fantasy affects the intention to continue playing SNGs, because players would like to try out new identities and to be absorbed in the virtual fantasy world [28]. In the current study, players can play the SNG to reflect their own imaginations when they manage and decorate the virtual spaces, avatars and various activities in the SNG. The study sheds light on the importance of fantasy in predicting continuance intention. It implies that players would like to engage in the SNG, if they can continually construct and realize their fantasies which cannot be performed in real life.

The finding of perceived enjoyment in this study concurs with the arguments that perceived enjoyment is an important determinant of behavioral intention in the context of hedonic settings [19], [37]. Since the players mainly play the SNG to

obtain the entertainment, this result suggests that the players are not likely to continue playing the SNG if they do not enjoy it [29].

One interesting result emerging from the findings is that habit is the second important driver of continuance intention. Prior studies reported that "habitual previous preferences to use a specific IS directly and strongly increase user intentions to continue using the same IS again" [15], [38]. The result implies that player's decisions on whether they should continue playing the SNG is based on both their perceptions of the desirable outcomes of playing the SNG and their habit of playing the SNG. Players are more intended to play the SNG when playing the SNG becomes habitual to them.

The result towards the influence of achievement is in accord with the findings from prior studies. Present studies report that achievement exerts significant influence on continuance intention in the context of online gaming [40], [42]. It can be inferred that players would like to continue playing the SNG if they can obtain the sense of achievement by participating various kinds of activities in the SNG, such as acquiring superior power, and defeating other players. In this study, achievement exerts a relatively less effect on continuance intention to play the SNG. It implies that getting the sense of achievement might not be the premier target for players to play the SNG. Instead, players might engage in the SNG for other reasons, such as for realizing the fantasy, and experiencing the enjoyment during the process.

The study provides interesting findings on how individual characteristics (e.g., age, gender and experience) moderate the effects of achievement, social influence, perceived enjoyment, fantasy, price value, and habit on continuance intention. User experience is not a significant moderator according to the test results presented in Table 4. Among the groups with different use experience, there is no significant difference on the effect of their perceptions (including achievement, social influence, perceived enjoyment, fantasy and habit) on continuance intention. In other words, the players who started playing the SNG earlier and the players who started playing the SNG later do not have different perceptions on continuance intention to play the SNG. Since a player with longer playing history does not necessarily suggest that the player is a heavy user who plays the SNG frequently.

In addition, no statistically significant differences between different age groups are found according to analysis results shown in Table 4. The result is consisted with the work of Lee [29] which reports that no paths are significantly moderated by age in online gaming. It seems that in the current study players with different ages, no matter they are adolescences or adults, do not have different perceptions towards the effects exerted by factors (including achievement, social influence, perceived enjoyment, fantasy, price value and habit) on continuance intention to play the SNG in the post-adoption stage.

Gender plays moderating role on the paths from social influence, perceived enjoyment and price value to continuance intention according to the analysis result presented in Table 4. The finding indicates that the path coefficient from social influence to the continuance intention for males was significantly larger than that for females. This finding suggested that the effect of social influence on the intention to play online games is stronger for males than females. It can be inferred that male players are more likely to be influenced by the most important people around them when they make decisions on continuing or not continuing using the SNG. It is probably because males are usually more interested in playing online games than females do. Hence, male players concern the information towards online games more than females do, including recommendations from important others.

Moreover, the effect of enjoyment of playing SNG on continuance intention is stronger for females than males. It can be inferred that female players concern more about the entertainment obtained in playing SNG compared to male players. It might be due to the design of less violent and less competitive features of the SNG. These features enable females to have pleasant experience from the process of playing. Finally, as we expected, female players concerns more about the price value compared to male players when they make decision on continuing playing SNG. The result is consistent with prior findings which suggest that women are likely to pay more attention to the prices of services and will be more cost conscious than man [38].

VI. IMPLICATIONS FOR THEORIES AND PRACTICES

The study provides some implications for both theories and practitioners.

From a theoretical perspective, in the prior literature, little research has explored continuance intention in the online game settings based on UTAUT2, especially SNG [6]. This study filled the gap by developing the research model based on UTAUT2 and identified the key determinants of continuance intention in SNG. Furthermore, this study contributes to a theoretical understanding of the explanatory power of the extended model based on UTAUT2. By explaining a relatively high proportion of variance in the continuance intention, this study suggests that the tailored UTAUT2 is suitable for investigating continuance intention in SNG.

Through the examination of the research model, this study highlights the important factors in influencing continuance intention to play the SNG, namely social influence, habit and hedonic motivations (e.g., fantasy and perceived enjoyment), followed by achievement and price value. The importance of fantasy and achievement in predicting SNG continuance intention offers new insights into explaining the utilitarian and hedonic motivations in hedonic IS research, especially in SNG games. The analysis results on the moderators of age, gender, and use experience reveals that individual characteristics of online game players can still be the moderators, and its moderating effect, such as age and user experience are diminishing in the online gaming context.

From a practical perspective, this study emphasizes the strong impact of social influence to continuance intention. Thus, SNG providers should try to use the networks of SNG

players to facilitate players' continuance behavior via different online communication channels, such as the popular social network sites, Renren, Sina Microblog, and QQ.

The importance of habit in predicting SNG continuance intention suggests that SNG providers should raise some strategies to help the development of SNG players' habit, such as offering players rewards for repeated and prolonged usage to foster the habit.

The finding on fantasy in predicting continuance intention suggests that SNG providers should offer more fancy themes, diverse imaginary identities and activities, and novel virtual worlds in their SNG design in order to retain their SNG players. Meanwhile, the SNG providers can strengthen player's sense of achievement by providing more opportunities for players to gain more in-game wealth, compete with other players, and achieve higher game levels.

Finally, the moderator test findings in age (a moderator) and gender (not a moderator) suggest that the SNG providers should try to balance the preferences of both male and female in their SNG design, but not the user age yet. The finding that user experience is not a moderator offers the SNG providers suggestion that they should focus more on the heavy SNG players who play the SNG quite often, but not those with long time use experience.

VII. CONCLUSION AND LIMITATION

The main purpose of this study was to investigate the determinants of a player's continuance intention in online gaming. By applying and tailoring UTAUT2 to study continuance intention in online gaming, we found UTAUT2 to be a useful theoretical model in our context. Thus, the explanatory power of UTAUT2 is expanded in the new research context, since all the constructs in the research model are statistically significant. Further, comparing to age and experience, gender exerts more significant moderating effects. These unexpected results also contribute to a better understanding of a player's continuance intention, and provide practical suggestions to online game service providers.

This study is subject to some limitations. Firstly, we conducted the research in China which has different culture from other countries. The examination of the results in other countries may provide richer insight in understanding continued use of SNG. Secondly, the research setting in current study is SNG as one form of online games. This study need to be replicated in other types of online games. Finally, we only examined the moderating role of age, gender and experience. Studies investigating other moderators (e.g., education level, income level, social status) may provide more understandings on continued usage in online games

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