UNDERSTANDING ONLINE GAME PLAYERS' POST-ADOPTION BEHAVIOR: AN INVESTIGATION OF SOCIAL NETWORK GAMES IN CHINA

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ABSTRACT

Retaining players and re-attracting switching players has long been a central topic for SNG providers with regard to the post-adoption stage of playing an online game. However, there has not been much research which has explored players' post-adoption behavior by incorporating the continuance intention and the switching intention. In addition, traditional IS continuance theories were mainly developed to investigate users' continued use of utilitarian IS, and thus they may fall short when trying to explain the continued use of hedonic IS. Furthermore, compared to the richer literature on IS continuance, far too little attention has been paid to IS switching, leading to a dearth of knowledge on the subject, despite the increased incidence of the switching phenomenon in the IS field.

By addressing the limitations of prior literature, this study seeks to examine the determinants of SNG players' two different post-adoption behaviors, including the continuance intention and the switching intention. This study takes a positivist approach and uses survey research method to test five proposed research models based on Unified Theory of Acceptance and Use of Technology 2; Use and Gratification Theory; Push-Pull-Mooring model; Cognitive Dissonance Theory; and a self-developed model respectively with empirical data collected from the SNG players of one of the biggest SNG providers in China. A total of 3919 valid responses and 541 valid responses were used to examine the continuance intention and the switching intention, respectively. SEM is utilized as the data analysis method.

The proposed research models are supported by the empirical data. The continuance intention is determined by enjoyment, fantasy, escapism, social interaction, social presence, social influence, achievement and habit. The switching intention is determined by enjoyment, satisfaction, subjective norms, descriptive norms, alternative attractiveness, the need for variety, change experience, and adaptation cost.

This study contributes to IS theories in three important ways. Firstly, it shows IS switching should be included in IS post-adoption research together with IS continuance. Secondly, a modern IS is usually multi-functional and SNG players have multiple reasons for using a SNG, thus a player's beliefs about the hedonic, social and utilitarian perceptions of their continued use of the SNG exert significant effects on the continuance intention. Thirdly, the determinants of the switch-

ing intention mainly exert push, pull, and mooring effects. Players' beliefs about their current SNG and the available alternatives, as well as their individual characteristics are all significant determinants of the switching intention. SNG players combine these effects in order to formulate the switching intention. Finally, this study presents limitations and suggestions for future research.

TIIVISTELMÄ

Tutkimuksessa tarkastellaan erityisesti pelaamisen aloittamisen jälkeisiä vaiheita, koska sekä pelaajien pitäminen että takaisin pelaajiksi houkutteleminen ovat sosiaalisessa mediassa toimivien pelintarjoajien keskeisiä pulmia. Omaksumisen jälkeistä käyttäytymistä on tutkittu niukasti, eikä tutkimuksissa useinkaan ole tutkittu verkkopelaajien jatkamis- tai vaihtoaikeita. Perinteiset tietojärjestelmien käytön jatkuvuuden tutkimiseen soveltuvat teoriat ja mallit on kehitetty ensisijaisesti välineellisiin, hyötyrationaalisin perustein käytettäviin järjestelmiin, ja niiden soveltuvuus hedonististen eli mielihyvää ja jännitystä tuottavien verkkopelien tutkimiseen on epävarmaa. Verrattuna tietojärjestelmien käytön jatkuvuuden tutkimiseen, tietojärjestelmästä toiseen vaihtamisen tutkimus on niinikään vähäistä, vaikka tietojärjestelmästä toiseen vaihtaminen on yleistynyt.

Väitöskirjassa tunnistetaan aiemman tutkimuksen puutteita ja johdetaan verkkopelaamistutkimusten havaintojen perusteella verkkopelaamisen jatkamiseen tai toiseen peliin vaihtamiseen vaikuttavia tekijöitä. Tutkimus on positivistinen kyselytutkimus. Suuren kiinalaisen sosiaalisen median verkkopelaamispalvelulta kerätyllä empiirisellä aineistolla testataan viisi tutkimusten perusteella esitettyä mallia, jotka perustuvat UTAUT2 -malliin (Unified Theory of Acceptance and Use of Technology 2), käyttötarkoitusteoriaan (Uses and gratifications -teoriaan), vetovoimatekijäin teoriaan (eli Push-Pull-Mooring -malliin), kognitiivisten dissonanssien teoriaan ja itse kehitettyyn malliin pelaajien aikeista. Aineistossa oli käytettävissä kaikkiaan 3919 vastausta jatkuvuuden tutkimiseen sekä vaihtamisaikeiden tutkimiseen oli yhteensä 541 vastausta. Aineisto analysoitiin rakenneyhtälömallien avulla.

Analyysin löydökset tukevat esitettyjä malleja. Aikeisiin pysytellä nykyisissä verkkopeleissä vaikuttavat tilastollisesti merkitsevästi nautinnollisuus, mielikuvituksellisuus, todellisuuspakoisuus, sosiaalinen vuorovaikutus, sosiaalinen läsnäolo, saavutukset pelissä sekä tavat ja tottumukset. Vaihtoaikeita lisäävät puolestaan nautittavuuden vähäisyys, tyytymättömyys, henkilökohtaiset ja deskriptiiviset normit, vaihtoehtojen houkuttelevuus, vaihtelunhalu, helppo vaihtaminen ja matalat vaihtamis- ja uudelleenopettelukustannukset.

Tutkimus täydentää tietojärjestelmätutkimusta osoittamalla ensinnäkin, että vaihtamiskäyttäytyminen kuuluu tietojärjestelmien käytön aikaiseen tutkimukseen yhdessä käytön jatkamisen arvioinnin rinnalle. Toiseksi, nykyiset tietojär-

jestelmät ja käyttöympäristöt ovat monimuotoisia ja verkkopelaamiselle on moninaisia syitä. Pelaajien hedonisilla, sosiaalisilla ja hyötyrationaalisilla käsityksillä ja havainnoilla on merkittävä vaikutus jatkamis- tai vaihtamisaikeisiin. Kolmanneksi, vaihtamiseen vaikuttavat tekijät ovat vetovoimatekijäteorian mukaisia siten, että jotkut tekijöistä vetävät, toiset hylkivät ja kolmannet pidättelevät vaihtamisaikeita. Myös käsitykset nykyisestä sosiaalisen median verkkopelistä suhteessa saatavilla oleviin vaihtoehtoihin, kuten myös esimerkiksi verkkopelaajien ikä ja sukupuoli ovat merkitseviä vaihtamisaikeiden erojen selittäjiä. Verkkopelaajilla vaihtamisaikeet muotoutuvat siten edellä mainittujen merkitsevien tekijöiden yhdistelmänä. Lopuksi väitöskirja esittelee tutkimuksen rajoitukset ja suosituksia jatkotutkimuksille.

Avainsanat: Tietojärjestelmän omaksumisen jälkeiset vaiheet, Tietojärjestelmän käytön jatkaminen, Tietojärjestelmän vaihtamiskäyttäytyminen, Verkkopelaaminen, Verkkopeli sosiaalisessa mediassa

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1   INTRODUCTION

The purpose of this chapter is to provide a guide through this thesis for its readers. Firstly, the phenomenon of interest is presented. Next, the motivations and research objectives are illustrated, elaborating on the desirability and research purpose of this study. It continues by presenting the research questions and research strategies. Finally, the outline of the structure of the study and its synopsis are given.

1.1   Phenomenon of Interest

Online games are becoming an important driving force of electronic-commerce development, even during the global economic downturn (Hsu & Lu 2007). The attractiveness of online games is undeniable due to the thriving market for them, the number of participants and the amount of time players spend playing games (Boyle et al. 2012). According to the forecast released by DFC Intelligence, the estimated worldwide revenue produced by online games will have steady growth and reach 35 billion US dollars by 2018 (DFC Intelligence 2013). A great number of players have actively participated in online gaming worldwide. For example, China Internet Network Information Center has produced a report and indicated that 338 million Chinese Internet users are online game players, which suggests that 54.7 percent of Internet users in China had played online games by the end of 2013 (CNNIC 2014). Online games provide enjoyable activities that have exerted a far-reaching influence on how Internet users fill their spare time (Boyle et al. 2012). Roughly, 46 percent of the online game players have played online games for more than five years, and 41.3 percent of the players have played online games for one to five years in China, while more than 60 percent of the players state that they will increase or maintain the amount of time they spend on online gaming in the future (CNNIC 2014).

Online games can be categorized into different game genres and run on different platforms. Different features are designed to target different user groups. This study aims to investigate social network games (SNGs), which are becoming more and more popular and profitable, but which have not received adequate at-

tention from academic researchers (Chang 2013; Lee & Wohn 2012; Park & Ryoo 2013).

SNGs are usually associated with social network sites (SNSs) where players develop social connections with their peers, friends and families (Park et al. 2014; Järvinen 2009). The popularity of SNGs has expanded and they "have spawned a whole new subculture" in modern society (Chang 2013). By the end of January 2014, SNGs were continually at the top of the leaderboard according to Appdata's estimates of the monthly active users of Facebook applications (Appdata 2014). The top ten Facebook games each had over 15 million active users per month (Appdata 2014). Furthermore, DFC Intelligence (2011) has claimed that the SNG market still has major growth opportunities, and that the global revenue for the free-to-play games on browsers and social networks will reach $7.5 billion in 2016. Thus, the continued growth of SNGs provides a promising market for SNG providers from the business point of view.

However, for SNG providers, the rapid proliferation and thriving market provide both opportunities and challenges. SNG providers are competing for audience share and have an increasing need to retain players. With the rapid development of Internet technologies, SNG players can access rival SNG services and compare different alternatives effortlessly. Such a competitive environment enables SNG players to switch to an alternative very easily (Wu et al. 2010). For example, Playnomics (2012) produced a report on their social game players in the US for the third quarter (Q3) of 2012, which indicates that 95 per cent of the players who were active on the first day of Q3 were not active by the last day of Q3. Hence, in order to exert revenue and achieve lasting success, it is crucial for SNG providers to understand the SNG players' behavior after the initial adoption of a game (Hsieh et al. 2012). It is an interesting topic for both practitioners and IS researchers as it explores how to keep SNG players who would otherwise stop playing the game and/or move to a new game and also how to re-attract SNG players who switched to another game in the post-adoption stage (Wu et al. 2010).

1.2 Motivation and Research Objective

Prior IS studies have repeatedly argued that, mere user acceptance is not able to realize the full potential of an IS (Bhattacherjee 2001; Kim & Son 2009). Thus, it is beneficial to an organization to understand the post-adoption usage of an IS in order to yield a higher profit and develop a longer customer relationship (Bhattacherjee 2001). Accordingly, this study seeks to explore the post-adoption behavior of SNG players.

In earlier studies, Rodger (1995) suggested that post-adoption behavior included a series of behaviors after the initial adoption. In the post-adoption stage, individual users can continue using a specific service, or switch to an alternative service. Both IS continuance and IS switching behavior are the continued usage of a general IS. By embracing the definition given by Bhattacherjee (2001), IS continuance refers to users' decisions to continue using a specific IS service over a long period after their initial acceptance of an IS service (Li et al. 2013). IS switching refers to an IS user's termination of an IS service, or a significant reduction in the usage of one specific IS service, while replacing it completely or largely with an alternative substitute that satisfies similar needs (Bhattacherjee et al. 2012; Ye et al., 2006; Li et al. 2013). IS discontinuance suggests that a user stops using a general IS completely (Keaveney & Parthasarathy 2001). The current study attempts to investigate IS post-adoption behavior by examining continuance and switching in online gaming.

Though there are different forms of post-adoption behaviors (e.g. adaptation, assimilation, continuance, infusion, recommendation, routinization, and complaints), prior IS studies mainly focus on investigating IS continuance (Chea & Luo 2008; Cooper & Zmud 1990; Karahanna et al. 1999; Rodger 1995). Limayem et al. (2007) pointed out that IS continuance was the most studied term in IS research when referring to post-adoption behavior. In prior studies focusing on IS continuance, there are two research streams exploring IS continuance from two theoretical perspectives. The first stream has attempted to explain how user beliefs and attitudes influence behavioral intention. Theories such as the Theory of Reasoned Action (TRA) (Ajzen 1991), Technology Acceptance Model (TAM) (Davis 1989), and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003) have been developed accordingly. The second stream has revealed that satisfaction plays a central role in determining the continuance intention. Thus, the IS continuance model (Bhattacherjee 2001) was widely applied in several research contexts (Hong et al. 2006; Limayem et al. 2007; Thong et al. 2006).

However, in the last few years, IS researchers have argued that the treatment of viewing continuance as a synonym of post-adoption suggests an implicit assumption (Ye et al. 2006). This assumption implies that a user's decision to continue using a general IS (e.g. online gaming) and the decision to continue using a specific IS service (e.g. Farmville) can be studied as the same phenomenon (Ye et al., 2006). In other words, the specific IS service is the only representative of a general IS and no alternatives are available (Ye et al., 2006). This is a reasonable assumption under the organizational settings in which most of the traditional IS theories were developed and in which most studies on IS post-adoption behavior were conducted (Venkatesh et al. 2003).

Bhattacherjee et al. (2012) indicate that there are usually plenty of IS services which are replaceable with one another and provide similar functions to users (e.g. Happyfarm and Farmville). After the initial adoption or continued use of an IS service (e.g. Happyfarm), a user can easily switch to a substitute (e.g. Farmville). Thus, in the post-adoption stage, a user can choose to continue using a certain IS or switch to a substitute (Bansal et al. 2005; Bhattacherjee et al. 2012; Hou et al. 2011; Hsieh et al. 2012; Xu et al. 2013; Ye et al. 2006). However, the investigation of IS post-adoption behavior, including both IS continuance and IS switching behavior, is still in in its early stages. Figure 1 illustrates the research area of this study.
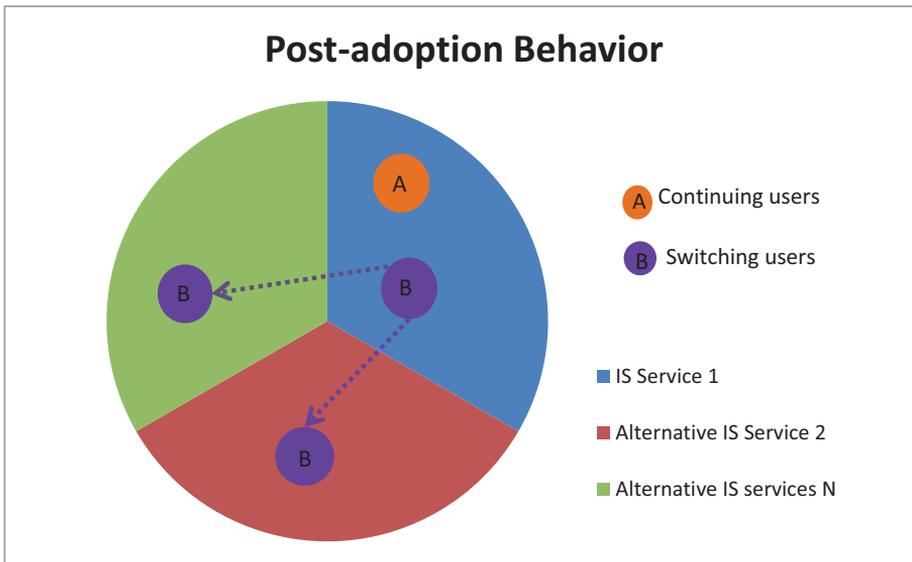
Figure 1 Research position of the study

As shown in Figure 1, in the IS post-adoption stage, individual users A can choose to continue using IS service 1, such as SNG 1. Individual users B can decide to switch from IS Service 1 to an alternative, such as IS Service 2 (e.g. SNG 2), or IS Service N (e.g. SNG N), after the adoption. Thus, in addressing the first research gap identified, the main purpose of the current study is to explore IS post-adoption behavior in SNGs by investigating the behavior of individual users A as continuing users and the behavior of individual users B as switching users in SNGs.

Studies on online gaming have been used as the benchmark for studying SNGs, which is one type of online gaming. In recent years, a growing body of IS literature has investigated online gaming (Chang 2013; Hsiao & Chiou 2012b; Huang & Hsieh 2011; Tseng & Wang 2013). Different research methods, such as surveys, quasi-experiments and qualitative studies, have been used to explore the

design, motives, outcomes, and many other aspects of online gaming (Boyle et al. 2012; Connolly et al. 2012).

A significant amount of the literature has explored the behaviors of players in online gaming from the perspective of individuals level (Boyle et al. 2012). Also, many studies have attempted to examine the motivations behind online gaming usage (Chou & Tsai 2007; Colwell 2007; Ryan et al. 2006; Sherry & Lucas 2006; Yee 2006a). However, an investigation on online gaming usage does not provide a sufficient interpretation of the post-adoption behavior of players, such as the decision on whether to continue playing a certain online game. Online gaming requires a lot of user involvement. Players are motivated to engage in a certain game due to the pleasant experiences created in the playing process as well as the social interaction experienced during the playing of the game. The effects of these factors may not influence the initial adoption, but only impact on continued use. Therefore, in order to examine a player's continuance and its determinants, this study seeks to investigate the phenomenon by proposing research models based on relevant theories. However, the limitations of traditional IS theories make them less desirable in this research context, which is elaborated below.

In prior literature, a number of studies have investigated IS continuance, however, there are still several limitations which deserve discussion. One stream of prior studies has mainly employed traditional IS theories such as TPB, TAM and its extensions, and UTAUT to investigate the phenomenon (Hsu & Lu 2007; Lee & Tsai 2010; Shin 2010). However, these theories were originally developed to study the individual use of utilitarian IS, especially for work related purposes. These studies fail to consider the usage of hedonic IS. In the work of Xu et al. (2012), it has been argued that the IS theories mentioned above do not provide adequate explanations of IS acceptance or the sustained usage of a hedonic IS, such as online gaming.

Another stream of studies was mainly built on the IS continuance model, which uses satisfaction as the prime predictor of the continuance intention. However, it also has flaws as it cannot properly explain a satisfied customer's decision to switch to an alternative. Several studies have revealed that – due to curiosity, the desire to seek novelty (Fiske & Maddi 1961), or after becoming bored with a game (Herrnstein & Prelec 1992) – satisfied customers may formulate a decision to switch to an alternative (Steenkamp & Baumgartner 1992). Moreover, in studies that apply the IS continuance model, it is assumed that dissatisfied customers are more likely to discontinue using a specific IS service. However, this understanding is challenged, since dissatisfied customers may still continue using a service due to the switching cost or because they are locked in (Carter et al. 2012). To sum up, these traditional theories may not provide sufficient knowledge for us to understand IS continuance in online gaming.

In order to select appropriate theories for examining IS continuance in online gaming, a comprehensive understanding of the characteristics of online gaming is needed. Holsapple and Wu (2007) indicate that many of the new IS integrated into our daily lives are multi-purpose, so that they can satisfy users' multiple needs. Online gaming players are often understood as engaging in a game to satisfy their multiple needs, rather than solely for entertainment (e.g. realizing fantasies, experiencing enjoyment, and escaping from daily life) (Huang & Hsieh 2011; Shin & Shin 2011; Wu et al. 2010). Meanwhile, socialization is also realized during social interaction and cooperation in the gaming process. Online gaming can be utilized as a new tool for players to satisfy social needs (Lee & Tsai 2010; Luca & Sherry 2004). Furthermore, utilitarian needs can be satisfied during online gaming as well. For instance, a sense of achievement can be obtained by accumulating virtual wealth or competing with others. The desire for self-presentation can be satisfied by decorating and exhibiting 3D avatars and virtual spaces to peers (Wan & Chiou 2006; Yee 2006b). To sum up, a player's needs can be satisfied constantly when a player continues engaging in the gaming world. Hence, it has been argued that IS research on continued use in online gaming should take the approach of incorporating different perspectives, such as technological, social and experiential viewpoints, when studying the hedonic, social and utilitarian functions served in online gaming (Hsu & Lu 2007; Huang & Hsieh 2011; Lee & Tsai 2010; Shin 2010).

Regarding the second research gap identified above, this study attempts to propose research models based on relevant theories which fit into the current research context instead of work-related settings. Moreover, it is preferable that the theories selected can provide an approach to posit constructs that reflect a player's beliefs regarding their perception of the hedonic, social and utilitarian usage of online gaming. In addition, studies that attempt to apply and extend theories and incorporate constructs which influence IS continuance rather than IS adoption may provide further understanding of the phenomenon. Finally, this study employs the uses and gratifications theory (U&G) and united theory of acceptance and use of technology 2 (UTAUT2) to conduct its investigation into IS post-adoption in SNGs (Katz et al. 1973; Venkatesh et al. 2012).

The third research gap is about IS switching behavior in online gaming. At present, the existing research on IS switching behavior is sparse, in contrast to the considerable number of studies on IS adoption and continuance. Bhattacherjee et al. (2012, pp. 327) argue that "despite the increased incidence and the relevance of such switching phenomenon, our understanding of it has remained scant". The dominant streams in IS post-adoption studies have widely used IS adoption theories to interpret the phenomenon. These theories aim at investigating a user's perceptions about the current IS service they use. However, not enough attention has been paid to a user's perceptions of the alternatives,

which are key concepts in switching behavior. Hence, based on relevant theoretical models, this study seeks to explore the effects, as seen from the players' perceptions, on both current SNGs and their alternatives, together with other factors when switching decisions are being formulated. Moreover, this study attempts to investigate the relationships between these constructs, which can offer a better understanding of the IS switching intention in online gaming. In addition, due to a lack of research into IS switching behavior there is a lack of knowledge about it and there are only a few options available, regarding theoretical frameworks for studying the phenomenon (Bhattacherjee et al. 2012), consequently, this study aims at proposing a self-developed model for investigating IS switching behavior.

1.3   Research Questions

The objective of this study is to investigate the IS post-adoption intention in SNG. The main research question is:

RQ: *What are the determinants of a SNG player's post-adoption intention?*

To fill the research gaps identified in section 1.2, the following two research sub-questions are introduced:

SRQ1: *What are the determinants of a SNG player's continuance intention?*
SRQ2: *What are the determinants of a SNG player's switching intention?*

In order to answer SRQ1, the factors determining a SNG player's continuance intention are examined. U&G and UTAUT2 were adopted as the basic theoretical frameworks. Both of these two theories follow the most widely employed beliefs-attitude-intention linkage of prior studies. The effects of beliefs and other factors (e.g. habit) on the continuance intention are investigated. The proposed models were empirically examined with the data collected from SNG players who were likely to continue playing the game in question. The constructs that are statistically significant are incorporated into the overall conceptual framework, to represent the key determinants of the continuance intention.

SRQ2 investigates the players' switching intentions in SNGs. Three research models were proposed in order to explore the key determinants of the switching intention. Using empirical data collected from SNG players who stated that they might potentially switch to another SNG, this study examined two research models by applying the push-pull-mooring model (PPM) and the cognitive dissonance theory (CDT) respectively, as well as a self-developed model based on important factors (e.g. beliefs and attitude) identified in prior studies. Individual beliefs about current service and alternatives, attitude, and the individual characteristics of a user were investigated as the determinants of the switching intention.

The constructs which are statistically significant are incorporated into the overall conceptual framework to illustrate the key determinants of the switching intention.

This study suggests an overall conceptual model for illustrating the determinants of the post-adoption behavioral intention (e.g. continuance intention and switching intention) of users playing SNGs. The key constructs are the individual's beliefs, attitude, individual characteristics and behavioral intention. The relationships between these constructs are conceptually and empirically supported by prior theories and studies, such as TAM, UTAUT, the IS continuance model, and cognitive dissonance theory (Bhattacherjee 2001; Davis 1989; Festinger 1957; Venkatesh et al. 2003). This study has been conducted in the context of SNGs. Thus, the conceptual model seeks to contribute to research on hedonic IS post-adoption. Moreover, the overall framework proposed in this study attempts to provide knowledge about post-adoption behavior in the IS field in a broad sense.

Finally, the empirical data were gathered from actual SNG players, instead of student samples. The findings aim to reflect the real situation of the phenomenon. The knowledge gained from the empirical findings provides practical information for SNG designers, developers and managers. For example, the explorations of the determinants of the continuance of players in certain SNGs will contribute to understanding how to retain the interest of players and keep them playing. This knowledge will help practitioners develop SNGs that cater to the preferences of SNG players. Additionally, the study will aid the understanding of the factors influencing individual switching intentions regarding a SNG, and practitioners will be able to make managerial strategies to re-attract switching players, while simultaneously improving a SNG's service so as to attract players from competitors.

This study also contributes to the society's knowledge about the post-adoption behavior of players, including their decisions to continue to play a certain game or to switch to alternatives. Furthermore, acknowledging differences between players with different individual characteristics will also add to the understanding of IS post-adoption behavior.

1.4 Research Strategy

The research process adopted in this study is as follows: a literature review; the proposal of research models; questionnaire development; a pilot study; conducting a survey; the examination of research models; and a discussion and on the findings and their implications. Following the process, five research articles were produced to contribute to the answers of the research questions. The research timeline and process are illustrated in Figure 2.
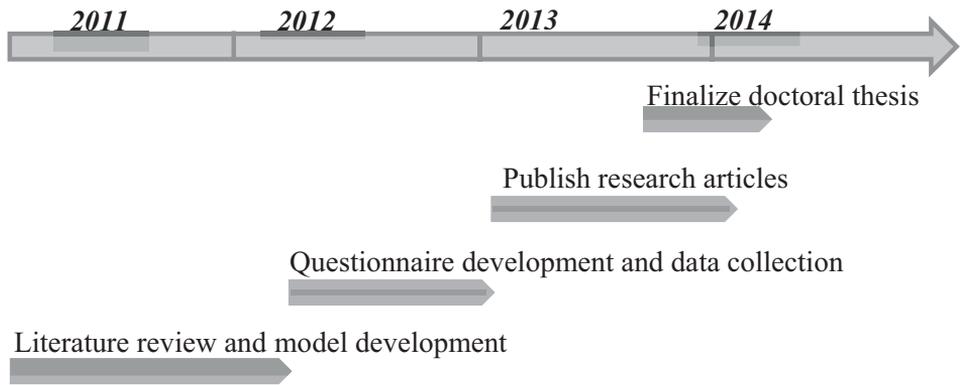
Figure 2 Research process and timeline

In order to obtain a general understanding of the research background, the literature review was conducted by focusing on three areas: IS post-adoption behavior, online gaming and social network games. The purpose of the literature review was to gain an understanding of those three important aspects. Firstly, the literature review provided a general understanding of the dominant IS theories used in studying IS usage, including IS continuance and switching behavior. Secondly, knowledge was obtained regarding the use of theoretical tools to examine online gaming. Since the examination of SNGs has been relatively scant, studies on online gaming were used as a benchmark for this study. Thirdly, in order to understand how the theoretical frameworks have been applied to the context of SNGs in prior studies, SNG studies were scrutinized. Based upon the understanding gained from the literature, the potential variables and relationships, and research models were proposed in 2011-2012.

Positivism is employed for this research. The research question was used to guide the selection of research method. The central questions in this study are typical "what" and "how much" questions. The main purpose of this study is to examine the hypotheses in the well-defined research models based on prior literature, and to identify the significant relationships between relevant constructs. Thus, a survey research method is employed for this study.

In order to gather quantitative empirical data, information about the beliefs of players regarding their usage of SNGs was collected. In 2012, questionnaires were developed to investigate potentially continuing players and switching players. After the pilot study, empirical data was collected from one of the largest social network game providers in China from November 23 to November 27, 2012. A total of 3919 valid responses were used to study the continuance intention of players in a SNG, while 541 responses were used to study the switching intention of SNG players.

The data analysis was performed after the data collection. The research models proposed were tested by using structural equation model (SEM) tools. AMOS 20 was selected because of its ability to handle a large amount of data. Articles 1, 3 and 4 were published in 2013; Article 2 was published in 2014. Article 5 was submitted to the Information Systems Frontiers in 2013. It is still under review during the finalizing of the thesis. The process of finalizing the thesis started in the last quarter of 2013 and was completed in 2014.

Article 1, "Please stay with me! An empirical investigation on hedonic IS continuance model for social network games," produced an answer to research sub-question 1. This article aimed to explore the underlying motivations of a player's continued use of SNGs by applying U&G as the research framework. This article examined the gratifications obtained during the playing process. These gratifications reflect an individual player's beliefs regarding their continuance intention to use the SNG in question. In this study, three categories of gratifications were identified, namely social gratification, hedonic gratification and utilitarian gratification.

The purpose of Article 2 was to answer research sub-question 1. It is titled "Understanding Users' Continued Use of Online Games: An Application of UTAUT2 in Social Network Games". The beliefs of individuals about a SNG and other factors such as habit and price value were examined. This article supplements current understanding of hedonic IS continuance by extending the explanatory power of the modified UTAUT2 with regard to SNGs.

Article 3, "Understanding Individuals' Switching of eService: An Empirical Study of Social Network Game Switching Intentions in China," answered research sub-question 2. In order to examine the player's switching intention in online gaming, this article employed the push-pull-mooring model (PPM). This article mapped potential variables into the PPM framework to provide an integrated understanding of the push, pull and mooring effects on the switching intention.

Article 4 answered research sub-question 2. It was titled "Exploring Individuals' Switching Behavior: An Empirical Investigation in Social Network Game in China". The paper proposes a self-developed model for examining potential relationships between the players' beliefs and the switching intention in SNGs. Since there are only a few studies on IS switching, and because researchers lack theoretical options, this study took the approach of proposing a self-developed model with which to study the IS switching intention in relation to SNGs.

Article 5, "A Cognitive Dissonance Framework for Modeling IT Switching Behavior," answers research sub-question 2. The article has been submitted to and is currently under review by the Information Systems Journal. By utilizing cognitive dissonance theory (CST) from social psychology studies, this article identified the determinants (e.g. beliefs and attitude) of the switching intention.

Furthermore, it attempts to explain how a player's perceptions of an attractive alternative can affect and revise beliefs about their current SNG, thus affecting the formulation of the switching decision. This article seeks to provide an in-depth understanding that supplements current knowledge about IS switching behavior.

1.5   The Structure of the Study

The thesis consists of two parts: a summary of the thesis and the original research articles.

The summary of the dissertation consists of 5 chapters. Chapter one presents the phenomenon of interest, the motivations behind the research, the research objective, research questions, research strategy, and the structure of the study.

Chapter two elaborates on the research background in which online gaming and SNGs, and IS post-adoption behavior, including IS continuance in online gaming and IS switching behavior are discussed. The overall conceptual model was presented in this chapter as well.

Chapter three describes the methodological considerations of this study, including its methodological and philosophical underpinnings, research methods, research design, data collection, and the method of data analysis.

Chapter four summarizes the research results included in this thesis. The findings and conclusions are also presented.

Chapter five presents a discussion of the theoretical and practical implications of the study as well as its limitations and possible avenues for future studies.

2 RESEARCH BACKGROUND

The major purpose of this chapter is to present the research background. Firstly, the research context, including online gaming and social network games, is discussed. Then, the literature review of IS post-adoption behavior in online gaming, including IS continuance and IS switching behavior in online gaming, is presented. Finally, the overall conceptual framework is illustrated.

2.1 Research Context

2.1.1 Online Gaming

Juul (2003) states that digital platforms, such as computers and the Internet, are the latest game mediums to emerge. In recent decades, we have seen the rapid development of information technology as well as a decrease in the cost of access to the Internet. These driving forces have significantly boosted the evolution of computer games, taking them from offline computer games to online games, which have sophisticated features and can be played with tens of millions of players worldwide.

Researchers discriminate between offline computer games and online games based on the number of digital devices (e.g. personal computers, mobile devices, PSP) involved in the gaming process simultaneously (Lo 2008). Computer games refer to digital games which can be simultaneously played by one or multiple players on one gaming device (e.g. a personal computer) (Kim & Kim 2010; Lo 2008; Wu et al. 2010; Wu & Liu 2007). Online games can be played by many players simultaneously by logging into the game server or by using a web browser as a portal on the Internet (Lo 2008; Tseng & Wang 2013; Wu & Liu 2007).

Based on the basic feature of online games, researchers have provided a variety of explicit definitions and implicit descriptions of online games. Some of the definitions of online games in academic articles are presented in Table 1.

Table 1 Definitions of an online game

Author(s)	Description / Definition of an online game
Kim, et al. (2002)	Online games are computer games where players can participate simultaneously through online communication networks.
Choi and Kim (2004)	An online game is a game added to the network system, allowing many players to meet each other in a virtual space.
Lo et al. (2005)	Online games are information technology applications featuring anonymity, media richness, real-time interaction, and a lack of boundaries.
Wu and Liu (2007)	Online games enable a large number of players worldwide to play together on a game server through the Internet.
Lo (2008)	Online games require users to interact with the virtual roles selected when logging onto a server.
Frostling-Henningsson (2009)	An online game is defined as a media in which players can cooperate and communicate with each other.
Wu et al. (2010)	Online games are multimedia applications that are played in networked virtual environments, such as the Internet or LANs, without geographic restriction.
Westwood and Griffiths (2010)	Online gaming is a popular computer-mediated social activity in cyberspace.
Tseng and Wang (2013)	Online games are virtual games where players can interact and compete with each other on the Internet from their own computers.

Table 1 shows that researchers have provided a variety of definitions of online gaming, but lack agreement on a definitive definition of online gaming. Warburton (2009) argues that the diversity of the definitions reflects the fact that online games are continually developing and evolving. In this study, online gaming refers to a multimedia game in which players can participant simultaneously over the Internet from their own gaming devices (Kim et al. 2002; Tseng & Wang 2013).

The gaming industry has been evolving in the last decades and online games have many complex and diverse forms. In order to further clarify the content and the position and the scope of this study, a general classification of online games is provided based on the game genres and the purposes of the games as identified by Connolly et al. (2012).

Connolly et al. (2012) carried out a systematic literature review of 129 research papers with empirical evidence in order to investigate the influence and outcome of computer games. Connolly et al. (2012) suggests that it is useful to categorize games based on their primary function. There are games mainly designed for entertainment purpose, games mainly designed for educational purposes, such as game-based learning, and serious games (Sward et al. 2008). This

study focuses on investigating online games designed mainly for entertainment purposes.

Furthermore, the game genres are mainly used to classify entertainment oriented online games (Connolly et al. 2012). The game industry uses an established classification called game genres to identify commonalities and differences between online games for entertainment purposes, although the classification is evolving because of the fast development of information technology and the market. Herz (1997) suggests game genres include action games, such as shooting games; adventure games, solving logical puzzles to progress; fighting games; puzzle games; role-playing games; simulations; sports games; and strategy games. In a later piece of research, Kirriemuir and McFarlane (2004) advocated Herz's system of classifications in their work.

2.1.2 Social Network Games (SNGs) and Research on SNGs

Researchers have attempted to suggest a definition for SNGs in prior studies. SNGs have been conceptualized by their platform (SNSs) rather than their content or game genres (Wohn & Lee 2013) because a SNG is usually a collection of many different online game genres (Lee & Wohn 2012).

Järvinen (2009) define a SNG as a type of browser game that is distributed primarily through social networks, and typically features multiplayer and asynchronous gameplay mechanics. Park et al. (2014, pp.3) conceptualize SNGs as "online games that are distributed via SNSs or linked with SNSs". Wohn and Lee (2013, pp.171) indicate that "SNGs are defined as digital games applications that use network data from social network sites such as Facebook". Omori and Felinto (2012, pp.2) maintain that "SNGs are applications which use the SNS infrastructure and resources and demonstrate asynchronous gameplay and mechanisms for multiple players". Embracing the conception put forward by Park et al. (2013), SNGs are defined in this study as online games that are distributed via SNSs or linked with SNSs.

These statements on the definitions of SNGs show they share many functional commonalities (Wohn & Lee 2013). Firstly, SNGs are essentially online games created to be embedded within or to be linked to existing social networking websites. Secondly, instead of playing alone, SNGs are multi-player platforms. SNGs are designed to share the gaming experience with peers through existing social networks (Lee & Wohn 2012; Shin & Shin 2011). In an SNG, friends can be used as resource to achieve higher scores, facilitate player interaction and create more social entertainment. Thirdly, most SNGs are considered casual games and are characterized by easy learning curves and less continuous time (Juul 2010), which are features that have attracted large audiences (Lee et al. 2012). Fourthly,

many SNGs are asynchronous, enabling interaction between players without the constraints of time.

An SNG was selected as the research context because the features of SNGs are said to reflect the trends and direction of online game development in the future (Wohn & Lee 2013). Firstly, compared to graphic and action intensive games, the popularity and distribution of casual games is growing at an increasing rate (Wohn & Lee 2013). According to industry practitioners, SNGs are usually casual games which are inexpensive, easy to access, easy to play, and can be played for short periods of time during a day (Järvinen 2009; Lee & Wohn 2012).

Secondly, online games are becoming the place where people transfer their social interaction and social phenomena into the virtual world (Williams 2006). Social elements can facilitate a player's stickiness to a game (CNNIC 2014). It is the trend of the gaming industry to design online games which have social features and enable a mass of playing participants. Networked games such as SNGs, which are applications running in or linked to SNSs, represent the prevailing trend within game development (Chang 2013; Omori & Felinto 2012; Park et al. 2013;Wohn & Lee 2013).

In order to gain an understanding of academic research on SNGs, a literature review was conducted that follows the structured approach suggested by Webster and Watson (2002) in order to determine the articles for the review. The same process was followed for the literature review of IS continuance in online gaming and IS switching behavior in the following sections. The review started by scanning Senior Scholar's Basket of Journals by Association for Information Systems to find the major contributions from the leading IS journals. These journals are the European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems, MIS Quarterly. The reviewing of these leading IS journals produced little knowledge about the research topic. Then, search terms such as "social games" or "social network games" were used to search several databases, such as ABI/INFORM COMPLETE (ProQuest), EBSCO (Business Source Complete), and ScienceDirect from 2003 to the present. Webster and Watson (2002) have argued that IS is an interdisciplinary field straddling other disciplines, thus suggesting that research articles in other disciplines should be reviewed. Hence, the searching process was extended to multiple fields, such as information systems, marketing and social psychology. By reading the abstracts of articles found by the search process, relevant articles were identified. Finally, this study went through the reference lists of the articles found, in order to ascertain the most important citations in the articles, thus identifying other key articles. Examples of the articles included in the review are presented in Table 2.

Table 2 Research on SNGs

Research area	Author(s)	Research method(s)	Research focus
SNG adoption and usage	Chen and Chang (2010)	Quantitative	Acceptance framework of SNG
	Wohn et al. (2010)	Quantitative	Motivation for playing an SNG
	Hou and Ma (2011)	Quantitative (conceptual Model)	Post-adoption of SNG
	Lim and Seng (2011)	Quantitative	Factors driving purchase of in-game items in SNG
	Shin and Shin (2011)	Quantitative	SNG acceptance model
	Wohn et al. (2011)	Qualitative	The effect of game playing on the relationship between initiation and development
	Lee et al. (2012)	Quantitative	Motivation behind playing SNGs and behavioral outcomes
	Lee and Wohn (2012)	Quantitative	Cultural orientations affect the usage patterns of individuals playing social network games
	Chang (2013)	Quantitative	Continuous intention regarding an SNG
	Park et al. (2013)	Quantitative	Acceptance model for mobile SNGs
	Wohn and Lee (2013)	Quantitative	The relationships between motivations, types of play and individual characteristics
SNG design	Järvinen (2009)	Qualitative (case study)	Design principles of SNGs
	Kirman (2010)	Qualitative (case study)	Design of SNGs
Education	Lee et al. (2011)	Qualitative (Case study)	General pattern behind developing social games for learning purposes

The studies included in the review suggest that the continual development of SNGs have started to attract the attention of IS researchers in very recent years. As shown in Table 2, one influential article on SNGs was written by Järvinen (2009) and was first published in 2009; most articles on SNGs have been published in the last 5 years.

Different areas have been explored, such as the usage of SNGs (Chang 2013; Park et al. 2013; Shin & Shin 2011). The factors affecting purchasing behavior have also been examined (Lim & Seng 2011). In addition, the potential of using

SNGs for learning purposes has been discussed (Lee et al. 2011). The design principles of SNGs have also been explored (Järvinen 2009; Kirman 2010).

Prior studies have attempted to apply different research methods to the study of the phenomenon and to provide insights into different areas relevant to SNGs. For example, research examining SNG adoption and usage has employed both quantitative methods (Chang 2013; Park et al. 2013; Shin & Shin 2011) and qualitative methods (Wohn et al. 2011). The research on SNG design and its potential for educational purposes has mainly applied qualitative studies, mostly case studies (Järvinen 2009; Kirman 2010; Lee et al. 2011). However, very few of these areas have been established enough to offer a clear guidance for further study. Thus, although SNGs are becoming part of the mainstream of Internet services and are emerging as a top application of SNSs (Chen & Chang 2010; Shin & Shin 2011), studies on SNGs are still in their infancy.

Researchers have appealed for more studies on SNGs, especially empirical studies and studies from different perspectives, to explore how and why SNG players are using SNGs (Lee & Wohn 2012; Park et al. 2013; Shin & Shin 2011; Wohn et al., 2010). Accordingly, as shown in Table 2, a major body of literature has focused on investigating SNG usage. Previous studies have examined beliefs, attitudes, and the perceived value of playing a SNG as the determinants of SNG acceptance and post-adoption behavior (Chang 2013), while traditional theories, such as TAM and the theory of flow, have been employed as the theoretical frameworks (Chang 2013; Park et al. 2013; Shin & Shin 2011). After scrutinizing the available literature, it appears that studies on post-adoption behavior in SNGs are rare (Chang 2013). Therefore, the motivation for investigating post-adoption behavior in SNGs is further justified.

2.2   IS Post-adoption Research

As discussed in Chapter 1, this study focuses on exploring IS post-adoption behavior by examining IS continuance and switching behavior in online gaming.

2.2.1   IS Continuance Research

One of the main objectives of this study is to investigate the determinants of an individual's continuance intention in a SNG. The present IS theories used to explore an individual's IS continuance serve as a basis for the theoretical choices in this study. Many studies in the IS field have attempted to investigate IS adoption and usage on the individual level. A considerable amount of literature has been

published, and a rich diversity of theories, models and theoretical constructs from multiple disciplines has been investigated (Venkatesh & Bala 2008). This research interest has merged to become one of the major streams in IS research. Two schools represent the major body of the available literature.

The first school mainly applies theories which focus on exploring individual beliefs and attitudes as key determinants of behavioral intention and usage, such as Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975), TPB (Ajzen 1991) and its extensions (Taylor & Todd 1995), TAM (Davis 1989) and its extensions (Venkatesh & Bala 2008; Venkatesh & Davis 2000), UTAUT (Venkatesh et al. 2003) and its extensions (Venkatesh et al. 2012). These theories were mainly developed in organizational settings to explore an individual's IS usage for utilitarian purposes.

Firstly, these theories mainly assume that behavioral intention is determined by individual beliefs. Individual beliefs are thus categorized in order to capture different attributes of the beliefs. For instance, normative beliefs representing social pressure to perform a usage behavior are proposed as a core component that affects the IS usage intention, such as social influence in UTAUT (Venkatesh et al. 2003) and subjective norms in TRA (Fishbein & Ajzen 1975). Beliefs about the behavior of using technology were also suggested as prominent determinants of behavioral intention, such as perceived usefulness in TAM (Davis 1989) and effort expectancy in UTAUT (Venkatesh et al. 2003). Prior studies also indicate that control beliefs reflecting the perceived difficulties of performing the behavior were important factors affecting the behavioral intention, such as perceived behavioral control in TPB (Ajzen 1991) and facilitating conditions in UTAUT (Venkatesh et al. 2012).

Secondly, prior studies have suggested that an individual's attitude toward a behavior is a prominent predictor of behavioral intention in TRA and TPB. Ajzen (2005) indicates that people intended to perform a behavior when they evaluated it positively. Attitude can directly influence behavioral intention. And beliefs can influence behavioral intention indirectly through attitude (Davis 1989; Fishbein & Ajzen 1975).

Thirdly, this research also attempts to explore other issues that might provide a better understanding of IS usage behavior, such as perceived value and habit in UTAUT2 (Venkatesh et al. 2012). In addition, moderators were examined in order to explore how individuals with different characteristics perceive the determinants of IS usage in different ways, examples include age, gender and user experience in UTAUT and its extensions. In brief, these theories provide fundamental theoretical frameworks and exert a significant influence on studies that examine IS usage (Venkatesh et al. 2003).

The second school of research generally adopts the IS continuance model as its theoretical basis. The IS continuance model suggests that individual beliefs

regarding the use of an IS and a user's satisfaction with it are the most prominent and direct determinants of the IS continuance intention. The IS continuance model posits that confirmation (or disconfirmation) will be formed when individuals evaluate whether their expectations of using the IS are consistent with the actual usage after the initial adoption. The confirmation serves as the basis of satisfaction and opinions and beliefs about the benefits of using an IS (e.g. perceived usefulness) in the future.

The IS continuance model has received considerable attention in studies on IS continuance in various research contexts (Bhattacherjee 2001; Liao et al. 2009; Limayem et al. 2007; Thong et al. 2006). However, there are some flaws in the IS continuance model, for example, IS researchers have noticed that user satisfaction does not always predict continued use (Li et al. 2006). Researchers in marketing also have reported that satisfied customers may still decide to switch to a competitor due to a need for variety or the availability of attractive alternatives (Steenkamp & Baumgartner 1992).

To sum up, these IS theories and their extensions have been largely used to explore the adoption of an IS and the continuance intention to use an IS. The basic assumption is that an individual's beliefs can directly and indirectly (through attitudes such as satisfaction) influence the behavioral intention. The empirical evidence supporting the prediction of the behavioral intention on actual behavior can be found in the application of these theories in several research contexts (Bansal & Taylor 1999). Thus, this study mainly focuses on exploring how the continuance intention is determined by various beliefs, attitudes, and other factors in online gaming. In order to examine previous research on the study of IS continuance in online gaming and select appropriate theoretical frameworks for this study, a literature review of the prior research on this topic is presented in the next section.

2.2.1.1 IS Continuance Research in Online Gaming

In order to understand and assess prior contributions to IS continuance research in online gaming, a review of relevant literature was carried out by scanning the Senior Scholar's Basket of Journals by the Association for Information Systems. Only a few pieces of research were found. The review then used several databases and drew on several disciplines. Search terms adopted from Boyle et al. (2012), such as "MMOG" OR "MMORPG" OR "online games" OR "SNG" OR "social games," were used and modified. More than 100 potential studies were found, but the review list was narrowed down to those studies that focus on an individual's IS post-adoption behavior in online gaming. Finally, 17 studies were selected for review; they are presented in Table 3.

Table 3 IS continuance research on online gaming

Author(s)	Research focus	Theory	Sample	Construct	Key finding
Choi and Kim (2004)	Customer loyalty	Exploratory approach	1993 respondents	Personal interaction, social interaction, flow, optimal experience	Customer loyalty is positively affected by optimal experience
Hsu and Lu (2007)	Customer loyalty	TRA, TAM	356 respondents	Perceived cohesion, perceived ease of use, perceived enjoyment, social norms, customer preference	Customer loyalty is directly determined by perceived enjoyment, social norms and preference, and indirectly determined by perceived cohesion.
Lu and Wang (2008)	Online game loyalty	Exploratory approach	1186 respondents	Descriptive norms, perceived playfulness, PBC, satisfaction, online game addiction	Gaming loyalty is significantly determined by satisfaction and online game addiction.
Yang et al. (2009)	Game service satisfaction and loyalty	Experience value, TRC, SERVQUAL	877 online game players in Taiwan	Experiential value, transaction cost, service quality	Satisfaction mediates the effects of experiential value, transaction cost and service quality to online loyalty
Lee (2010)	Online game loyalty	Exploratory approach	245 online and video game players	Motives, game design, business operation	Player loyalty is significantly affected by business operations, the game's design and the motives behind a player's participation.
Lee and Tsai (2010)	Continuance intention in online games	TAM, TPB	415 respondent	Perceived ease of use, attitudes, subjective norms, interaction with the computer, social interaction, perceived behavioral control, flow experience,	Continuance intention is determined by attitudes, subjective norms, perceived behavioral control, flow experience, and perceived enjoyment

				and perceived enjoyment	
Wu et al. (2010)	Online game continuance motivation and proactive stickiness	Use and Gratification theory	337 online game players	Gratifications, presence and service mechanism	Individual's continued motivation to play an online game is significantly determined by gratifications and service mechanisms
Teng (2010)	Online game loyalty	Exploratory approach	865 online gamers	Customization, immersion satisfaction	Customization exerts influences on loyalty directly and indirectly through immersion satisfaction
Shin (2010)	Players loyalty in MMORPG	TRA, TAM	312 respondents	Perceived enjoyment, perceived security, attitude, flow, subjective norms, intention	Loyalty is mainly determined by subjective norms and flow
Huang and Hsieh (2011)	Online game loyalty	Use and Gratification theory, flow theory	251 survey respondents and 126 interviews	Gratifications and online experience	Online gaming loyalty is determined by an individual's sense of control, perceived entertainment, and the challenge of the game.
Park and Chung (2011)	Online game community commitment	Social identity theory and Self-presentation theory	340 respondents MMORPG players	Online game design quality, interactivity, personal innovativeness, self-presentation desire of online identity, online game trust	The desire for the self-presentation of an online identity and trust in an online game positively affect MMORPG game community commitment
Hsiao and Chiou (2012a)	Continuance intention in MMOG	Social capital theory	347 respondents	Network centrality, non-guild interaction, access to within guild resources, perceived enjoyment, attitude	Continuance intention is significantly determined by an individual's attitude, which is affected by a player's access to resources and perceived

					game enjoyment.
Hsiao and Chiou (2012b)	Continuance intention in MMOG	Social capital theory	340 respondents	Social capital, game knowledge, community size, community trust, social value	Continuance intention is significantly influenced by community trust and perceived social value
Teng et al. (2012)	Online game loyalty	Interdependence theory, Bilateral deterrence theory	994 online gamers	Challenge, interdependence	Loyalty is positively associated with interdependence and gaming challenge.
Chang (2013)	Continuance intention to use a SNG	Exploratory approach	358 students	Interaction, user value, satisfaction and flow experience	Continuance intention to use an SNG is determined by satisfaction and flow experience
Deng et al. (2013)	Continued participation in online entertainment communities	Exploratory approach	longitudinal dataset of 2,302 users	Entertainment-based mechanism, community-based mechanism	Continued usage is determined by two mechanisms, namely the entertainment-based mechanism and community-based mechanism.
Tseng and Wang (2013)	Reuse behavior in online games	Exploratory approach	490 online gamers	Perceived friendship, consumer satisfaction, involvement, perceived attractiveness	A lower level of customer involvement affects the sensitivity of the relationship between consumer satisfaction and reuse behavior.

The review reveals three important points. Firstly, there is not much research focusing on IS post-adoption behavior in online gaming. Secondly, while a variety of theoretical perspectives were adopted by previous studies; the subject still lacks a theoretical underpinning. Prior studies have utilized and extended IS theories such as TRA, TAM and TPB (Hsu & Lu 2007; Lee & Tsai 2010; Shin 2010). These theories have been criticized, since they were developed to study the individual adoption of utilitarian IS, which may have limitations when interpreting hedonic IS usage (Xu et al. 2012). Some researchers have attempted to

utilize other theories to explain the phenomenon, such as social identity theory (Park & Chung 2011) and social capital theory (Hsiao & Chiou 2012b). However, few of them have developed to become an approach that can lead research on IS continuance in online gaming.

Interestingly, researchers were influenced by U&G, and utilized it to explore the determinants of continued play in online gaming (Huang & Hsieh 2011b; Wu et al. 2010). Boyle et al. (2012) suggest that U&G provides a framework to study the "more specific and media-related motives" of playing games. Moreover, Huang & Hsieh (2011b) indicate that U&G provides an avenue for exploring the non-technological aspects and offers a multi-disciplinary approach to studying how individuals use online games. However, in prior literature, it seems that only a few studies have taken the approach of mapping and categorizing the gratifications obtained during the playing process, such an approach may provide a framework for further studies.

In addition, several studies utilized the exploratory approach to investigate online game loyalty and the reuse behavior of online gamers (Deng et al. 2013; Lee 2010; Teng 2010). However, this approach has been criticized, since these studies may lack rigorous theoretical foundations (Choi & Kim 2004). Hence, there is still a need to investigate the research models and explore theoretical frameworks relating to IS continuance in online gaming.

Finally, the influence of moderators, such as age, gender and experience, has been addressed in prior studies of online gaming (Ha et al. 2007; Lee 2009; Luca & Sherry 2004; Venkatesh et al. 2012). Prior studies have suggested that players with different individual characteristics may perceive IS usage in different ways (Ha et al. 2007; Lee 2009; Luca & Sherry 2004). The focus of prior studies has rarely been about exploring the effects of moderators on the IS continuance intention in online gaming. Thus, although it is not the primary target to explore the moderating effects in this study, an investigation of moderators may provide some insights.

2.2.1.2 Unified Theory of Acceptance and Use of Technology 2

For this study, in order to explain continued use in online gaming, UTAUT2 (Venkatesh et al. 2012) was utilized and modified to study a SNG player's continuance intention. UTAUT2 is an extension of a rigorous theoretical framework called UTAUT (Venkatesh et al. 2003). Venketesh et al. (2012) proposed UTAUT2 based on their empirical study of mobile Internet consumers in Hong Kong. Four constructs from UTAUT were preserved in UTAUT2, and three more factors were added to UTAUT2: hedonic motivation; price value and habit. Altogether, seven constructs were identified as the main determinants of continu-

ous intention: performance expectancy; effort expectancy; social influence; facilitating conditions; hedonic motivation; price value and habit. The moderating effects of age, gender and experience were examined in UTAUT2 as well. The original UTAUT2 model (Venkatesh et al. 2012) is presented in Figure 3, and the definitions of the constructs are presented in Table 4.
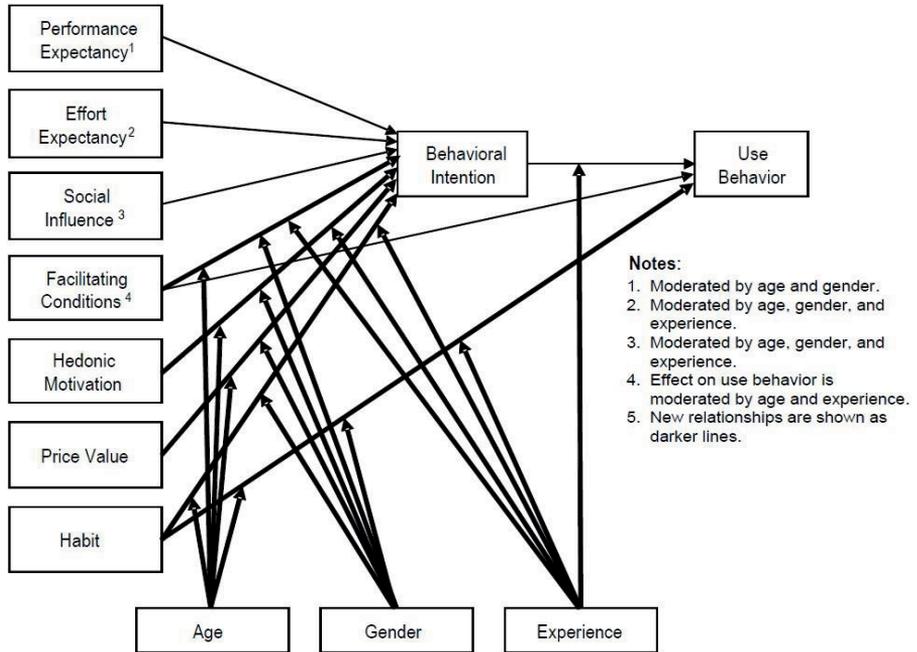
Figure 3 UTAUT2

Table 4 Constructs and definitions in UTAUT2

Constructs	Definition
Performance expectancy	The degree to which using a technology will provide benefits to consumers performing certain activities (Venkatesh et al. 2012, pp.159).
Effort expectancy	The degree of ease associated with consumers' use of technology (Venkatesh et al. 2012, pp.159).
social influence	The extent to which consumers perceive that important others (e.g. family and friends) believe they should use a particular technology (Venkatesh et al. 2012, pp.159).
Facilitating conditions	Consumers' perceptions of the resources and support available to perform a behavior (Venkatesh et al. 2012, pp.159).
Hedonic motivation	The fun or pleasure derived from using a technology (Venkatesh et al. 2012, pp.161)
Price value	Consumers' cognitive tradeoff between the perceived benefits of the applications and the monetary cost of using them (Dodds et al. 1991; Venkatesh et al. 2012, pp.161).
Habit	The extent to which people tend to perform behaviors automatically as a result of learning (Limayem et al. 2007, pp.705).

UTAUT2 is different to prior IS theories which were developed to study an individual's use of utilitarian IS in organizational contexts. The objective of UTAUT2 is to explore an individual consumer's IS usage (Venkatesh et al. 2012). The three constructs incorporated into UTAUT2 – price, hedonic motivation and habit – reflect the characteristics of continued usage in SNGs. SNGs are usually free to register at the initial adoption stage, but players have to pay for virtual goods in the post-adoption stage – if they wish to achieve an advanced level within the game in the post-adoption stage. Thus, SNG players are consumers. And as a type of online game, the main function of an SNG is to provide hedonic value and entertainment to players during the gaming process. The exploration of the hedonic motivation is crucial when studying SNG usage. The habit of playing a certain SNG is also formed in the post-adoption stage. In brief, UTAUT2 provides a useful framework for capturing and mapping the key constructs in this study.

In addition, Venkatesh et al. (2012, pp.158) have argued that "compared to general theories, theories that focus on a specific context are considered to be important to broaden scientific knowledge towards a focal phenomenon and to meaningfully extend the relevant theories". Thus, the use of UTAUT2 in other research contexts has been suggested. Furthermore, it has been suggested that when applying a theory to different research contexts, the modification or extension of the theory contributes to a better understanding of the focal phenomenon (Alvesson & Kärreman 2007). New constructs can be examined, which may pro-

duce important changes to theories in different contexts. According to the research, UTAUT2 has not been much examined in the context of online gaming, especially within SNGs. Other constructs important to SNGs were also lacking from UTAUT2 as well. Thus, adding them to UTAUT2 further justified the theoretical choice in this study, since the study was able to examine the explanatory power of UTAUT2 in the context of SNGs, and explore key elements of the focal context.

2.2.1.3 Uses and Gratifications Theory

Uses and gratifications theory is widely used in communication studies to explore individual media exposure (Larose et al. 2001), such as an individual's media selection and consumption behavior (Palmgreen et al. 1985). A fundamental assumption of U&G is that media users are active audiences and are aware of their needs. U&G theory suggests that media users are motivated to select a media that best fulfills their needs amongst the available alternatives (Katz et al. 1973).

U&G offers a theoretical framework for exploring and mapping an individual's gratifications, rather than suggesting fixed constructs. Prior researchers have widely applied U&G in order to study an individual's motivations with reference to media consumption in various contexts, such as the traditional media, for example, newspaper and television (Babrow 1987; Elliott & Rosenberg 1987). In recent years, U&G has also been used to study an individual's motivations for using modern media and information systems, such as the Internet (Stafford et al. 2004), mobile services (Leung & Wei 2000), social network sites (Xu et al. 2012), video games (Chou & Tsai 2007; Colwell 2007) and online games (Wu et al. 2010). Additionally, a variety of gratifications determining media usage have been identified, such as process gratification and content gratification (Katz et al. 1973) as well as social gratification (Stafford et al. 2004).

Stafford et al. (2004) have indicated that the U&G approach can be used to explain the continued use of a media that has already been chosen. Gratifications are related to an individual's actual media use experiences, which will impact on their future motivations of media usage, such as continuance motivation (Weibull 1985). The argument suggests that the gratifications obtained through prior media usage reflect an individual user's beliefs about a service based on their overall assessment of their usage (Larose et al. 2001; Levy & Windahl 1984). Hence, if a user's needs have been gratified by prior media usage, they are likely to continue using them in the future (Huang & Hsieh 2011).

This study applied U&G as the theoretical framework for investigating the IS continuance intention in online gaming. Compared to traditional IS theories, i.e.

those developed for studying work-related IS, U&G fits into the research context, which is a hedonic-oriented IS for voluntary use. Moreover, U&G focuses on the perspectives of individual customers, which also fits into the research scope of exploring the individual level in this study. Last but not the least, U&G has been widely used to explain the user motivations behind the selection of one service over others, thus the theory is appropriate for the online gaming market, where there are many alternatives. In addition, U&G can also be used to explain the continued playing of that game – based on the gratifications obtained in the gaming process.

In the context of online games, Huang & Hsieh (2011) suggest that the adoption of U&G broadens the conceptual definition of the motives that explain continued usage in online gaming. However, studies applying U&G have rarely focused on categorizing the gratifications obtained in online gaming in prior studies. Thus, this study attempts to utilize U&G to investigate the IS continuance intention in online gaming by identifying the key gratifications players obtain in the gaming experience, which may provide a better understanding of the phenomenon.

2.2.2 IS Switching Research

With the rapid growth of IS technologies, the competition among the service providers is becoming fiercer. There are always multiple products or different brands serving similar functions in meeting user needs. IS users can switch among these products or brands easily, since making a choice to switch to an alternative is as easy as downloading or a registration online (Bhattacherjee et al. 2012). Researchers have indicated that switching behavior and a user's discontinuance are different from each other. IS switching behavior suggests that a customer continues to use the general IS service, i.e. online gaming, but switches from a specific IS service to another similar IS service, such as switching from Farmville to Happy Farm. User discontinuance refers to the behavior of ending the use of a general IS service, such as stopping playing any online games (Keaveney & Parthasarathy 2001). Bhattacherjee et al. (2012) argue that IS switching behavior involves a complete or a large degree of replacement of a current IS service with a substitute that satisfies identical needs.

In the IS field, Bhattacherjee et al. (2012) claim that little attention has been given to understanding IS switching behavior, although the incidence of switching behavior is increasing. The focus on IS switching behavior has been "sparse, fragmented, and non-cumulative" (Bhattacherjee et al. 2012, pp.328), although there is a long history of studying customer switching behavior in marketing literature.

By examining the literature on relationship marketing, researchers have suggested that prior studies on customer switching behavior can be categorized into three main schools (Lopez et al. 2006; Zhang et al. 2012). The first school studies the process models of switching decisions, such as the work of Roos (1999). The second school examines the different characteristics of continuing users and switching users (Keaveney & Parthasarathy 2001). And the third school has focused on factors that influence switching decisions, see the work of Antón et al. (2007) and Kim et al. (2006). Researchers have shown an increased interest in the third school, and indicated that it has the potential to provide theoretical implications and managerial advice to practitioners (Lopez et al. 2006; Zhang et al. 2012).

In recent years, more and more IS researchers have highlighted the need to examine the determinants of IS switching behavior as well (Bansal 2005; Bhattacherjee & Premkumar 2004; Chuang 2011; Hou et al. 2011; Ye et al. 2006; Zhang et al. 2012). However, Bhattacherjee et al. (2012) point out that IS researchers still lack the theoretical models that can guide the research and examine the relationships between the constructs. Hence, in order to explore the determinants of the switching intention and select the proper theories for interpreting the phenomenon, there is a need to have an overall understanding of prior literature.

A literature review was performed by searching in several databases using search terms such as "switching" or "migration" (abstract, title or key words). Only 11 research papers met the search criteria of switching behavior in IS on the level of the individual. In fact, only one paper focusing on switching behavior in online gaming was found (Hou et al. 2011). The collection of the research articles is listed in Table 5.

Table 5 Research on IS switching behavior

Author(s)	Research Context	Theory	Sample	Key finding
Bansal (2005)	Auto repair and hair styling services	PPM	680 respondents	Push, pull, and mooring effects have significant and direct influences on the switching intention.
Hou et al. (2011)	Online games （MMORPG）	PPM	654 online gamers	Compared to pull effects, mooring effects exert a stronger influence on the switching intention, while push effects exert a marginal influence on the switching intention.
Hsieh et al. (2012)	Online services (blogs or SNS)	PPM	319 Facebook users	Switching intention is significantly affected by push, pull and mooring effects. Furthermore, mooring effects exert a moderating effect on the paths from push effects to the switching intention.
Zhang et al. (2012)	Blog	PPM	229 bloggers	Switching intention is significantly affected by satisfaction, attractive alternatives, and sunk costs.
Kim et al. (2006)	Email Service	Exploratory approach	1408 email users	Customer satisfaction, continuity cost and attractive alternatives significantly affect the switching intention. The attractiveness of alternatives exerts moderating effects on the path from satisfaction to the switching intention
Bhattacherjee et al. (2012)	Information technology (Web browser)	Exploratory approach	97 respondents	The IT switching intention is significantly associated with relative advantage and satisfaction, while IT switching behavior is significantly influenced by habit and the switching intention.
Lin et al. (2012)	online auction	Exploratory approach	292 valid responses	Switching intention is significantly and negatively associated with procedural, financial, and relational switching costs, as well as site design quality and interaction quality.
Liang et al. (2013)	Mobile Service	Customer switching behavior model	341 mobile service users	There are seven key factors determining customer switching behavior; core service failure, high price, and ethical problems are listed as the top three factors.

		pro-posed by Keaven-ey (1995)		
Park and Ryoo (2013)	Cloud computing	Two factor theory	188 stu-dents	Switching intention is positively associated with expected switching benefits, social influences and personal innovativeness, and negatively associated with expected switching costs.
Chuang (2011)	Mobile phone sub-scribers service	Pull-and-Suck effects	695 re-spond-ents	Suck effects significantly and negatively affect the switching intention, while pull effects are significantly and positively associated with the switching intention.
Zhang et al. (2009)	Blog	Social Role theory	316 bloggers	Switching intention is significantly determined by satisfaction, sunk costs, and attractive alternatives. Gender exerts moderating effects on the paths from satisfaction and attractive alternatives to the switching intention.

As shown in Table 5, researchers have adopted different theoretical frameworks and approaches in order to study the switching intention in IS. Most of these studies are empirical studies that use a quantitative approach. Researchers have employed different theoretical models, such as two factor theory (Park & Ryoo 2013), Pull-and-Suck effects (Chuang 2011), and social role theory (Zhang et al. 2009) to investigate the determinants of the switching intention in a variety of research contexts, such as blogs, mobile phone subscriber services, and cloud computing. Factors influencing the switching intention were examined, such as satisfaction, switching costs, and the attractiveness of alternatives (alternative attractiveness) (Bansal 2005; Hou et al. 2011; Hsieh et al. 2012; Zhang et al. 2012).

The Push-Pull-Mooring (PPM) model from human migration studies has been used as the dominant theoretical framework with which to study the switching intention (Bansal 2005; Hou et al. 2011; Hsieh et al. 2012; Zhang et al. 2009). Hsieh et al. (2012) indicate that PPM serves as a general guideline for researchers developing and examining a set of hypotheses. It has been successfully applied to investigate the determinants of an individual's switching intention in a variety of IS services, such as blogging and online gaming (Hsieh et al. 2012).

Thus, by following this trend, PPM is a potential theoretical paradigm for this study.

In addition, in prior studies on IS switching intention, a user's perceptions about the attractiveness of a substitute have been shown to be a crucial factor in influencing an IS switching decision. However, few studies have attempted to explore the phenomenon from the perspective of the dynamics of competition in the market. In other words, the influence of alternatives on the individual's perceptions of their current IS service are not well understood. Hence, the current study attempts to apply cognitive dissonance theory (CST) to explain the phenomenon. SCT may provide further understanding of the desire of individuals to switch to an alternative, even if they are familiar with their current IS service.

Bhattacherjee et al. (2012, pp.332) claim that IS switching behavior provides "a fertile and potentially insightful area" for IS researchers. However, this topic is still unexplored, because researchers lack theoretical choices. Hence, several studies have adopted exploratory approaches to the investigation of the switching intention (Bhattacherjee et al. 2012; Kim et al. 2006; Lin et al. 2012). For instance, in order to set a starting point for studying IT switching behavior, Bhattacherjee et al. (2012) explored several constructs extracted from IDT and ECT (e.g. relative advantage and satisfaction), and further investigated the influence of these constructs on the switching intention and switching behavior. Following their example, and in order to investigate the switching intention in online gaming, an approach that proposed a self-developed model and aimed to explore other relevant theories was adopted for this study.

2.2.2.1 Push-Pull-Mooring Model

In migration literature, the PPM framework is a dominant paradigm for exploring human immigration. Migration refers to "the movement of a person (a migrant) between two places for a certain period of time" (Boyle et al. 1998, pp.34). Relying on the PPM model, migration studies suggest that the migration decision is affected by push, pull, and mooring effects (Moon 1995). Push effects represent the negative factors, such as natural disasters or lack of job opportunities, that push migrants away from their original place of residence (Moon 1995). Pull effects capture the positive factors that pull migrants into the new location, such as higher income or better education (Stimson & Minnery 1998). Due to the complex nature of migration decisions, mooring effects – which represent personal, social and situational variables – were incorporated into the PPM model to supplement the push and pull effects (Moon 1995).

In IS studies, researchers have suggested that the human geological immigration and IS users' switching behaviors have a clear similarity (Hou et al. 2011;

Hsieh et al. 2012). Hence, the PPM model has attracted increasing interest from IS researchers investigating IS switching behavior (Bansal 2005; Hou et al. 2011; Zhang et al. 2012). IS researchers have attempted to interpret the switching intention by identifying the factors capturing the push, pull, and mooring effects. Push effects are negative factors, such as a low level of enjoyment and satisfaction, driving users away from their current IS service. Pull effects are positive factors, such as more entertainment, lower prices and better service, that attract IS users to alternatives. Mooring effects are personal, social, and situational factors, which can either hinder or facilitate a switching decision.

Prior studies indicate that PPM is a useful and comprehensive research framework for mapping a IS user's switching intention (Hou et al. 2011). However, research attempting to investigate the switching intention in the context of online gaming by using PPM, especially in SNGs, is scant. By using the PPM model, this study attempts to explore the determinants of the switching intention and organize the constructs within a well-designed framework.

2.2.2.2 Cognitive Dissonance Theory

As a widely used social psychological theory, Cognitive Dissonance Theory (CDT) was developed by Festinger (1957), in order to illustrate how the dissonance of one's cognitions can change a person's beliefs, attitude and behaviors. Prior researchers have relied on this theory to explain a variety of phenomena such as attitudes towards smoking, condom usage, and energy conservation in economics, law, political science, and so on (Aronson 1997; Metin & Camgoz 2011).

The theory posits that individuals have the tendency to seek cognitive consistency such as in their beliefs, opinions. An individual will experience psychological discomfort, when cognitive inconsistency exists. Thus, the individuals are motivated to eliminate the inconsistency by, for example, changing their attitude to accommodate a behavior. Dissonances usually occur when an individual has to choose between two incompatible cognitions (Festinger 1957). In the IS field, Bhattacherjee and Premkumar (2004) applied CDT to explain how the IS users revise their cognitions during the use of an IS. For example, IS users' cognitions before the actual usage are mainly formulated on second-hand information obtained from vendors or interpersonal channels via multiple media. After the actual usage of the IS, a user will have accumulated their own experience and created a new cognition based on that experience. If there is a dissonance between these two cognitions, then, the individuals revise their cognition to seek consistency. Due to this revision, an individuals' behavioral intention may change. EDT,

which was further developed as IS continuance model, is an extension of CDT (Bhattacherjee 2001).

Similarly, in this research, an IS user may have a positive cognition and attitude towards the current IS service. However, dissonance may occur when they perceive the attractiveness of an alternative. Established beliefs and attitudes towards the current service may conflict with the attractiveness of the alternative. Thus, the individual revises their cognitions in order to delineate the dissonance occurring between the two cognitions. The individual may change their prior positive cognition of their current service to a negative one, for example, if it seems outdated and inadequate, in order to be consistent with the cognition of the alternatives (the alternative has better performance, thus making it reasonable to switch to the substitute). A change in attitude and beliefs may lead to a change in the behavioral intention. Thus, the continuance intention to use their current SNG is changed and becomes a switching intention. In this study, CDT provides an avenue for explaining changes in the behavior of IS users, such as when they become switching users due to the perceived attractiveness of an alternative, changing their prior cognition of a current service. It also makes this study one of the first to utilize CDT to explain the IS switching intention.

2.3 The Overall Conceptual Framework

This study aims to explore IS post-adoption behavior in online gaming. Figure 4 presents the overall conceptual framework of this study. The arrows show the relationships between the main components in Figure 4. The model is conceptually supported by a large amount of IS theories which posit that beliefs may have effects on the behavioral intention in two ways. Firstly, beliefs have direct impacts on behavioral intention. Secondly, beliefs can exert an effect on behavioral intention through attitude (e.g. satisfaction) indirectly. Moreover, perceived value and individual characteristics have an impact on behavioral intention. To sum up, the components were divided into five categories in this framework: beliefs; attitude; behavioral intention; individual characteristics and perceived value.
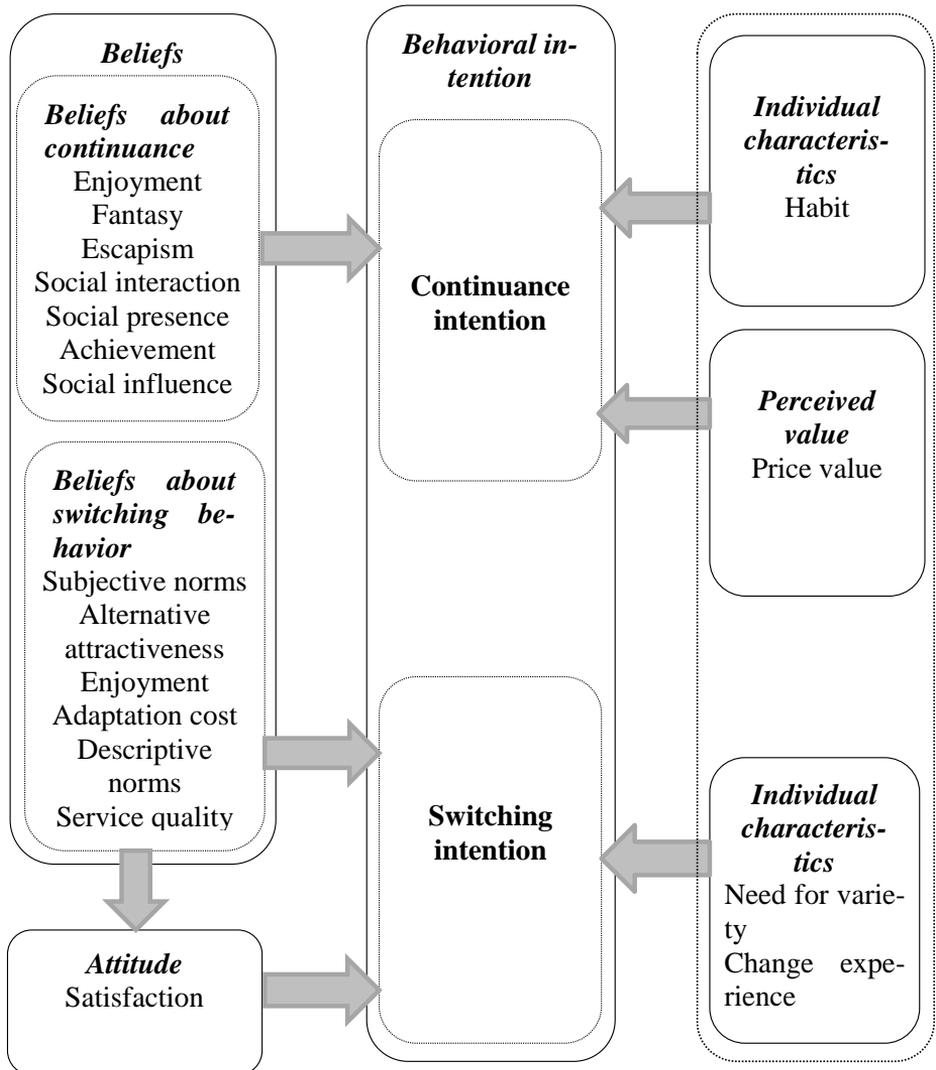
Figure 4 Overall conceptual framework

In this study, continuance intention is affected by players' beliefs about the continued use of an SNG, individual characteristics (e.g. habit) and perceived value (e.g. value for money). Users' beliefs can be categorized into four groups in this study. As a hedonic IS, the users' beliefs about the hedonic perceptions of continued play in the SNG are captured by enjoyment, fantasy, and escapism. Hedonic theories have indicated that the hedonic factors contain both imaginary responses represented by fantasy and escapism, and emotional responses representing by enjoyment (Hirschman & Holbrook 1982). Moreover, technologies today are usually multi-functional, serving both hedonic and utilitarian purposes (Holsapple & Wu 2007). Hence, players' belief about the utilitarian perception of

continued play in an SNG is represented by achievement. In addition, social motivations were repeatedly identified as important factors influencing IS usage (Venkatesh & Brown 2001). Social interaction and social presence were used to represent the players' beliefs about the social perception of continued play in the SNG in this study. Finally, social influence was identified as normative beliefs in several prior studies (Venkatesh et al. 2012; Venkatesh et al. 2003).

The switching intention is affected by players' beliefs about switching behavior between SNGs, satisfaction conceptualized as attitude, and individual characteristics such as the need for variety and change experience. Players' beliefs about service quality and the attractiveness of alternatives can affect user-satisfaction which directly influences the switching intention. Players' beliefs about the switching behavior can be divided into several groups as well. For example, subjective norms and descriptive norms have usually been identified as normative beliefs in prior research (Ajzen 1991). Prior studies view service quality as a belief related to an overall perception of IS performances (Wixom & Todd 2005). Adaptation cost representing switching cost – is regarded as a control belief according to TPB (Hong et al. 2008). TPB hypothesizes that control beliefs are related to individual beliefs about the difficulties of performing a behavior (Ajzen 1991). Thus, perceptions of factors, such as switching costs facilitating or inhibiting the performance of a behavior can be conceptualized as control beliefs (Hong et al. 2008; Shin et al. 2001). In addition, satisfaction is usually viewed as an attitude which reflects the effect and evaluation of the prior usage of a certain IS by users (Bhattacherjee 2001; Hong et al. 2008).

3 RESEARCH METHODOLOGY

The purpose of this chapter is to present the methodological discussion in this research. Firstly, the two main research paradigms in IS are discussed. Subsequently, the survey research method used to conduct this study and collect empirical data is addressed. Following that, the data collection procedures are illustrated. Thereafter, a discussion of instrument validity is presented. This chapter concludes by reporting the data analysis method employed in this study.

3.1 IS Research Paradigm

Hirschheim and Klein (1989, pp.1199) define research paradigm as "the most fundamental set of assumptions adopted by a professional community that allows its members to share similar perceptions and engage in commonly shared practices". While critical realism has been advocated as one popular research paradigm for IS studies (Mingers 2004), IS researchers mainly view positivism and interpretivism as the two primary paradigms. Although positivism is the dominant paradigm in IS studies, according to a number of research papers published in IS major journals (Chen & Hirschheim 2004), the discussions and arguments surrounding these two paradigms have lasted for decades (Alavi & Carlson 1992; Chen & Hirschheim 2004; Mingers 2001; Orlikowski & Baroudi 1991; Webber 2004). The differences between these two paradigms have been scrutinized with ontological, epistemological and methodological assumptions (Chen & Hirschheim 2004).

Developing from the domain of the natural sciences, positivism applies natural science methods to investigate social phenomenon (Hirschheim & Klein 1989). Ontologically, positivism holds the philosophical foundations of subjective-objective dualism. Thus, positivism sees reality as having an objective existence that is independent from human experience (Burrell & Morgan 1979). In contrast to positivists, interpretivists claim that reality is inevitably constructed and developed through human interaction and social practices within the social world, meaning that reality cannot be isolated from human activities (Burrell & Morgan 1979).

Epistemologically, positivists believe that the physical and social world can be observed by researchers objectively (Kim 2003). Hence, positivists examine theories by using a hypothetic-deductive approach. Such an approach provides re-

searchers with opportunities to verify or falsify theories and make proposed causal relationships based on the observable empirical data. This approach is able to provide scientific explanations and allows researchers to seek and make generalizations (Chen & Hirschheim 2004; Orlikowski & Baroudi 1991). In contrast to positivists, interpretivists argue that scientific knowledge cannot be captured by the hypothetical-deductive approach. Instead, the participants' perspectives and subjective meanings in the social settings should be taken as primary sources in the gathering and generating of scientific knowledge when interpreting phenomena in the social world (Orlikowski & Baroudi 1991). The investigation of a phenomenon is related to the researchers' interpretations. Generalization from results is usually not the primary aim of interpretivists. Instead, a thorough understanding of the deep structure of a phenomenon is considered able to provide useful information and produce useful knowledge for other settings (Chen & Hirschheim 2004).

Methodologically, since positivists believe that researchers should adopt a value-free position and exert no influence during research, they attempt to utilize objective constructs derived from and measured through the research evidence of prior studies (Chen & Hirschheim 2004, pp.201). Hence, positivists tend to adopt quantitative methods such as laboratory experiments, field experiments and surveys. A large amount of empirical data and statistical analysis methods are preferred for discovering universal regularities (Webber 2004). In contrast, interpretivists argue that regularities are related to human participation and social interaction. Hence, regularities cannot be derived without interpretations, perceptions, and conceptualizations from the perspective of the participants (Orlikowski & Baroudi 1991). Thus, research methods which allow researchers to engage within social settings are preferred by interpretivists, such as field studies (Chen & Hirschheim 2004).

Mingers (2004) has proposed critical realism as a way forward for IS researchers and criticized the limitations of positivism and interpretivism. Mingers (2004) claims that critical realism can bridge positivism and interpretivism and has the potential to provide philosophical underpinnings for IS research. Furthermore, Mingers (2004) suggests that critical realism does not advocate a single form of research method. Thus, different research methods should be applied because of the complexity and variety of the research objects.

While discussions of different paradigms have lasted for years, many researchers have suggested that paradigms are not necessarily separate and exclusive domains; they share more similarities than deep differences (Mingers 2001). Each of them has merits and shortcomings, and both provide substantial value in understanding a phenomenon (Kim 2003; Webber 2004). The real differences lie more on the research method level rather than on the methodological level (Mingers 2001). In the work of Mingers (2001), it has been further proposed that

research methods could be detached from research paradigms. That is because it is essential to consider research questions and research objectives as the central elements guiding the selection of research methods. And it is important to use research methods properly and critically according to the research questions (Mingers 2001; Webber 2004).

This study focuses on examining the determinants of the IS post-adoption behavioral intention in SNG, which leads to the postulation of the research question: *What are the determinants of SNG players' post-adoption behavioral intention?* Using the hypothetic-deductive approach, the primary goal in this study is to test hypotheses in the research models developed from theories with observable data. And this study seeks to derive generalizations beyond the contextualization.

In other words, literature reviews were conducted at the beginning of the research process. The theories which have the potential to explain the phenomenon and a variety of possible variables, which can be measured by standard scales, were selected from the literature review. Subsequently, the processes of the formulation of hypotheses, models and causal relationships among the constructs were completed. Then, empirical data was collected from the structured questionnaires. A quantitative method using a statistical package was used to test the hypotheses and theories applied. Finally, the explanatory power of the theories was examined, allowing the research results to be generalized.

Chen and Hirschheim (2004) make a brief summary of the characteristics of positivist research as: (1) hypotheses and causal relationships formulated in research models which are developed based on theories; (2) quantitative methods are widely adopted, in order to examine theories and proposed hypotheses; (3) researchers take a value-free and objective position during the investigation. Hence, according to the discussion above, the research approach adopted in this thesis should be classified as a positivist approach applying a survey research method.

3.2   Survey Research Method

The survey research method has played an important role in IS studies. IS researchers have widely used the survey research method for a variety of research purposes on the individual level, such as to develop or test theories and hypotheses (Davis 1989; Venkatesh et al. 2003; Venkatesh et al. 2012). In order to use the survey research method properly, there is a need to first distinguish the differences between the survey and the survey research method. Tanur (1982) indicated that a survey can be used to collect information about the description of an object, or the opinions of a number of people which represent a certain popula-

tion. Hence, a marketing survey and political survey can be called a survey, which are preceded by a large amount of data collection and analysis. Pinsonneault and Kraemer (1993) stress that only surveys conducted to seek scientific knowledge can be referred to as survey research.

Furthermore, Pinsonneault and Kraemer (1993) summarize three distinct characteristics of the survey research method. Firstly, the survey research method is a quantitative method which requires standard information about target subjects which can be individuals, organizations, and systems. The purpose of conducting a survey research is to obtain quantitative descriptions on some aspects of the research population of interest.

Secondly, the survey research method usually employs structured and predefined questions to ask for opinions. The responses to these questions are used as data to be analyzed. Thirdly, survey research usually collects data from a sample which is only a portion of the target population. The information collected from the sample should be large enough to conduct statistical analysis and for generalizing the findings to the larger population.

Survey research is applied when investigating a phenomenon in its natural settings. Moreover, Pinsonneault and Kraemer (1993) argue that the survey research method is an especially suitable option for investigating key research questions about how much and how many, rather than the proving of the commonly and generally understood how and why of a phenomenon.

The survey research method can be a useful method when the control of the variables of interest is impossible or undesirable. It is also a suitable method for studying the phenomena of interest in its natural setting, and can be employed to investigate the focal phenomenon as it occurs or as it has occurred recently.

In this study, the central questions are typical "what" and "how much" questions. This study seeks to explore the determinants of the SNG players' post-adoption behavioral intention and how much effect the determinants exert on the behavioral intention. Since the selection of the research method should be decided according to the research objects and research questions, the survey research method seems an appropriate method for conducting this research. The SNG players' behaviors are studied in their natural setting, and real players registered in one of the largest SNS companies were selected as the representative sample. Questionnaires with predefined and structured questions measured by standard scales have been used to collect numerical data for statistical analysis, in order to test the research models and verify the theories.

Pinsonneault & Kraemer (1993) further indicate that the survey research method can be applied to three research purposes: exploration, description and explanation. The aim of conducting a survey research for exploration purposes is to obtain more knowledge about the topic, to examine preliminary concepts, and

to explore new possibilities related to the target population. The overall purpose of the exploration study is to elicit a variety of viewpoints for further design.

Descriptive survey research seeks to describe a distribution or make a comparison between the distribution of the occurrences of situations, events and attitudes. The purpose of descriptive survey research is mainly to provide information rather than to test theories.

Explanatory survey research is employed to test theory and proposed causal relationships between constructs. The causal relationships are usually developed based on theories which elaborate the reasons, directions and effects of relationships. Therefore, the explanatory survey research seeks answers on the significance of the hypothesized causal relationships and whether the relationships exist for the reasons postulated.

According to the classification suggested by Pinsonneault & Kraemer (1993), this study has applied the survey research method for explanatory, exploratory, and descriptive purposes. Firstly, this study is mainly an explanatory survey research, since the primary purpose of this thesis is to examine the research models and hypotheses proposed in IS theories and prior literature. The relationships between the constructs were examined using the statistical method.

Secondly, survey research also has a descriptive purpose in this research. The distribution of a variety of individual demographic information, such as a user's age and gender, and experience of online gaming are presented in the statistical results of this study, helping to further understand the background to the research. Finally, this thesis can also be exploratory survey research, since it examines both IS switching behavior and IS continuance as IS post-adoption behavior, which has been seldom researched. Especially, the research on IS switching behavior is still in its infancy.

Prior research indicates three key elements for conducting a survey research, and suggests researchers use them to evaluate the quality of the survey research (Dillman 1978; Fowler 1984; Pinsonneault & Kraemer 1993). These three elements are research design, data collection method and sampling procedures.

Survey research can take the cross-sectional approach or be a longitudinal design, depending on whether the researchers have an explicit intention to include the influence of a time dimension in the research (Pinsonneault & Kraemer 1993).

The cross-sectional survey is used to collect data from the research sample at one point in time. No information on the sequence of events and phenomenon is obtained; hence, a cross-sectional survey is a "snapshot" for generalizing the findings of the sample to the wider population. Cross-sectional survey design is thus criticized because it limits the ability to make casual inferences.

Classic longitudinal design collects data at multiple time points. A longitudinal survey is mainly used to examine whether an intervening phenomenon affects

the development of the phenomenon. The data on the phenomenon are usually collected multiple times before and after the events of the intervening phenomena. Hence, a longitudinal survey allows more certainty when making casual inferences, since the temporal priority can be more easily constructed.

Since this study aims to investigate relationships between constructs, rather than the effects of the temporal changes of certain events, the longitudinal design does not provide obvious advantages for the research target. Moreover, the constructs in this thesis reflect the accumulation of the previous experiences of players, which seeks to provide temporal patterns of causal relationships. Hence, it provides justification for the cross-section design.

Pinsonneault and Kraemer (1993) have advocated that the unit of analysis is another key element in survey research design. The point is that the unit can be anything the researchers select, such as an individual, organization or system, and project. The key point is that the unit is appropriate for the research questions and proposed hypotheses. This thesis aims at examining the determinants of individual players' post-adoption behavioral intention. Thus, actual SNG players were selected as the unit of analysis, because they fit with the theories employed, the hypotheses proposed and the research questions of this study.

The criteria of a sampling procedure is to draw a research sample which can permit the generalization of certain phenomenon to an overall population (Pinsonneault & Kraemer 1993). The central issue is to select a sample frame – representative of both a subgroup of the population of interest and the unit of analysis. A random selection of samples from the sample frame is also required.

In this study, individual SNG players registered in a company in China were selected as the research sample. The company is one of the biggest SNG providers in China, has been operating for decades and provides multiple electronic services, such as SNS and online games. It markets SNGs as a major service and has millions of users in China. Recently, it has witnessed the success of its SNGs. Hence, its large user base and successful SNG services make it a good sample frame for research samples. Another reason for selecting the company is because the author could obtain empirical data by conducting a cross-sectional survey. The company allowed the questionnaire to be spread amongst its registered players, offering a chance to obtain adequate empirical data from actual players and gain diverse demographic information.

Regarding the data collection method, the web-survey approach was preferred to a postal paper questionnaire, phone interview or face-to-face interview. The advantages of online questionnaires are summarized below (Ilieva et al. 2002).

Firstly, it is an effective way to collect data from a wide audience, without being restricted to a geographic location. It is considered a very appropriate option for cross-section studies – it is especially good for the research sample of SNG players in this study as they are distributed without geographic limitations. Sec-

ondly, it is inexpensive compared to paper questionnaires, and provides an easy way to present the questionnaire to potential respondents. Thirdly, the speed of data collection is an important advantage in a web-survey approach. It allowed the researcher to obtain a large amount of respondents whose answers were automatically recorded in a short space of time. Moreover, since a player's personal information, such as a postal address or a telephone number, is usually not required in order to register and play in a SNG, it makes other forms of data collection methods less desirable.

3.3 Data Collection

The SNG is the most popular online game in China (iResearch 2012), and the SNG players mainly play the SNG with friends from the SNS. Thus, this study has been conducted within the realm of a popular SNG provided by one of the biggest and the most popular SNS companies in China. This company has hundreds of millions of SNS users all over the world. Currently, the company is developing to become one of the big SNG companies in China as well. For reasons of confidentiality, the name of the SNG and the name of the company are not publicized in this study, thus "The Company" and "The SNG" are used hereafter.

The SNG has been marketed mainly through its SNS services by The Company. The SNG provides a virtual gaming environment where the players can conduct a variety of activities, such as select their 3D avatars, hold virtual activities by inviting friends, manage virtual spaces, visit the virtual spaces of friends, interact and compete with other players. Before the data collection, The SNG had been running for around 6 months and it was selected because of the popularity of the game and the scale of the company.

Based on the features of The SNG, questionnaires were designed. The research models for answering SQR1 and SQR2 were empirically examined using the data collected from continuing players and switching players. The survey designed for continuing players is presented in 3.3.1, and survey designed for switching players is presented in 3.3.2.

In the survey, the questionnaires have three parts, including motivation letter, questions regarding the background information (e.g. age, gender, and experience) and the measurement of the constructs in the research models. The motivation letter explained the purpose of the study and encouraged the players to answer the questionnaire. In the second part, the respondents were asked to answer the questions, providing background information such as demographic information.

Subsequently, the respondents were asked to answer the question of whether they have played the SNG in the last month. The players who had played the

SNG in the last month were automatically linked to the questionnaires examining the continuance intention.

The SNG's manager stated that, according to their experience of The SNG and other SNGs, if a player stops playing The SNG for one month, it is highly unlikely that they will return to it, so they can be categorized as potential switching players. Furthermore, a survey report released by Playnomic (2012) about their SNG players in Quarter 3 (July-September), 2012, which is close to our data collection date, indicated that 95 percent of their players prefer to discontinue playing an SNG, even after the third day and did not return for the rest of Quarter 3. Thus, The SNG manager's suggestion seems reasonable criteria for identifying switching users. Hence, the respondents who answered that they have not played The SNG were led to the self-identified question: "Have you switched to playing other SNGs?" Respondents who answered that they have switched to other SNGs were led to the questionnaire designed to examine the switching intention. The rest of them were identified as discontinued users.

The instruments used to measure the constructs were scaled on a 5-point Likert-scale, ranging from disagree to agree. The items were adopted from prior literature. The approach of using validated measurements in prior studies has been widely adopted by IS researchers and encouraged in IS studies for both theoretical and particle reasons (Boudreau et al. 2001). The strategy assures comparability between studies aiming to accumulate knowledge in this field, and enables researchers to collect timely data. In this study, the measurements were slightly revised in order to fit in the research context (Boudreau et al. 2001).

The questionnaires were first written in English. Then, the questionnaires were translated into Chinese by one of the researchers in the research group. The researcher is a native Chinese speaker. The language was double checked by another two senior IS researchers who are also native Chinese speakers. Then, a pilot study was conducted to evaluate the quality of the questionnaires. Seven respondents participated in the pilot study. Three of them were IS researchers, one of them was The SNG's manager, and three of them were registered SNG players. Some minor adjustments, such as format and wording were made in order to refine the instruments. Finally, the respondents thought that the clarity of the questionnaires was good and that there were no difficulties in understanding the questions. The questionnaires are presented in the appendices.

With the help of the company, 220,000 electronic questionnaires were distributed to randomly selected samples amongst the registered players of The SNG from Nov. 23rd to 27th, 2012. A pop-up tool was used to invite the players to answer the online survey. The pop-up appeared when SNG players logged into their accounts on the SNS provided by The Company. If they clicked the pop-up, they were automatically led to the webpage containing the online survey questionnaire. No time limitation was set for the respondents to answer the question-

naire. The respondents could freely withdraw from the survey process. Except for the questions listed in the questionnaire about demographic information (e.g. age, gender) and user experience (e.g. how long you have been playing the online game), no identifiable individual information was collected. The respondents provided the answers to the questionnaires voluntarily and no rewards were provided for the responses.

Finally, of the 7974 responses we received, four segments were identified, including (i) registered users who claimed have never played The SNG before (2128); (ii) discontinued players who claimed that they had discontinued playing SNGs (1181); (iii) continuing players (4123) of The SNG; and (iv) switching players (542) of The SNG. The distribution of the respondents is presented in Table 6. The proportion of the missing data in the total number of responses is less than 2.5%. To ensure the quality of the empirical data only completed data was included when conducting the further analysis and only data from continuing players and switching players were analyzed. Altogether, 541 responses from the switching players were used to test the research models for investigating the switching intention, and 3919 responses from the continuing players were used to test the research models for examining the continuance intention.

Table 6 Distribution of the overall respondents

Type	Total cases	Invalid cases	Valid cases	Included in this study
Non-players	2128	0	2128	NO
Discontinued players	1181	0	1181	NO
Continued players	4123	204 (missing data)	3919	YES
Switching players	542	1 (missing data)	541	YES
Total	7974	205	7769	

The response rate is low in this study. However, two points might provide explanations for that. Firstly, the SNG manager has indicated that, according to their prior experience of distributing questionnaires to SNG players, this is a very common response rate. Furthermore, according to The Company's policy, no rewards were provided for answering the questionnaires because giving sloppy answers to questionnaires to obtain a reward is not desired.

According to the report released by iResearch (2012) about Chinese online gaming players, 37 percent of the players are under 18 years old, 24.4 percent of the players are aged from 18 to 24 years old, 11.5 percent of the players are aged from 25 to 30 years old, 8.6 percent of the players are aged from 31 to 35 years

old, 18.5 percent of the players are over 35 years. Furthermore, 32.2% of the players are female and 67.8% players are male. The distribution of the demographic information in this study (see Table 7) almost fits with the distribution of the online gaming players identified in iResearch (2012).

The distribution of the research sample is also similar to other research studies on SNGs. For example, the proportion of younger players and female players in SNGs is usually higher in SNGs than that for general online games (Park et al. 2013). Thus, the sample is largely representative of SNG players in China.

Table 7 Demographic information of the respondents

Measure	Items	Frequency	Percentage
Gender	Male	2634	59.1
	Female	1826	40.9
Age	Under 15	717	16.1
	16-18	780	17.5
	19-24	1390	31.2
	25-30	1062	23
	31-35	342	7.7
	Over 36	205	4.6

3.3.1 Survey on Continuing Players in The SNG

After the pilot study, the questionnaire was distributed to collect quantitative data from those SNG players who had played The SNG in the past month. The items used to measure the constructs were mainly adopted from the relevant literature. The constructs and the references are illustrated in Table 8.

Table 8 Constructs for investigating the continuance intention

Construct	Description	Reference
Escapism	The players were asked whether they have played The SNG to escape from everyday frustration, bad experience, anger and real problems.	Colwell (2007)
Fantasy	The players were asked whether they have played The SNG to experience things they cannot experience in everyday life, such as being someone else and immersion in a dream world.	Sherry and Lucas (2006)
Enjoyment	The players were asked to evaluate their overall enjoyment, e.g. the interesting, exciting and fun experiences they have had in The SNG.	Ghani and Deshpande (1994)
Self presentation	The players were asked whether they have played The SNG to show people that they are social, likeable and competent.	Papacharissi (2002); Lee et al.(2012)
Social Presence	The players were asked whether they have played The SNG to feel connected to others when playing The SNG.	Wu et al. (2010)
Social Interaction	The players were asked whether they have played The SNG to have social interaction with their real and virtual friends.	
Achievement	The players were asked whether they have played The SNG to obtain a sense of achievement, such as to possess virtual wealth and power, and to achieve a higher game level.	
Continuance Intention	The players were asked whether they had the intention to keep playing The SNG in the future.	Lee (2009)
Price value	The players were asked whether they thought the price they paid for playing and purchasing in The SNG were reasonable and of good value.	Venkatesh et al. (2012)
Social Influence	The players were asked whether they thought their peers would prefer them to continue playing The SNG.	
Habit	The players were asked whether playing The SNG was a habit, or a natural and automatic response.	

After the responses of the questionnaires were collected, the distribution of the demographic information in the valid responses (3919) is shown in Table 9.

Table 9 Demographic information of the continuing players

Measure	Items	Frequency	Percentage
Gender	Male	2357	60.1
	Female	1562	39.9
Age	Under 15	481	12.3
	16-18	602	15.4
	19-24	1298	33.1
	25-30	1009	25.7
	31-35	326	8.3
	Over 36	203	5.2
Time period playing this game	One Month	1860	47.5
	Two Months	673	17.2
	Three Months	505	12.9
	Four Months	205	5.2
	Five Months	162	4.1
	Six Months	514	13.1
Frequency in play-ing this game	Several times a day	1321	33.7
	Once a day	774	19.7
	Several times a week	793	20.2
	Once a week	432	11.0
	Less than once a week	354	9.0
	Less than once a month	245	6.3
Time duration in each session when playing this game	0-15mins	626	16.0
	16-30mins	974	24.9
	0.5-1 hour	722	18.4
	1-1.5hours	425	10.8
	1.5-2 hours	317	8.1
	2-3 hours	285	7.3
	More than 3 hours	570	14.5
Online game playing experi-ence	Less than 1 year	1166	29.8
	1-3 years	1016	25.9
	3-5 years	670	17.1
	5-7 years	393	10.0
	More than 7 years	674	17.2

3.3.2 Survey on Switching Players in The SNG

After the pilot study, the questionnaire was distributed to collect quantitative data from those SNG players who identified themselves as switching players. The items used to measure the constructs were mainly adopted from relevant literature. The constructs and the references are listed in Table 10.

Table 10 Constructs for measuring the switching intention

Construct	Description	Reference
Service Quality	The players were asked to indicate their overall evaluation of the service quality of The SNG.	Taylor and Baker (1994)
Enjoyment	The players were asked to evaluate their overall enjoyment, such as the interesting, exciting and fun experiences they have had in The SNG.	Ghani and Deshpande (1994)
Change Experience	The players were asked whether they have previously switched between SNGs.	Bansal (2005)
Alternative Attractiveness	The players were asked whether they felt the alternatives were attractive, such as the service, reputation and entertainment.	
Need for Variety	The players were asked whether they have a tendency to search for variety, to try something new or different	
Satisfaction	The players were asked to indicate their overall satisfaction with The SNG.	Oliver and Swan (1989)
Switch Intention	The players were asked whether they intended to switch to other SNGs.	Hsieh et al. (2012)
Subjective Norms	The players were asked whether they thought that important others around them would prefer them to switch to another SNG.	Liao et al. (2007)
Descriptive Norms	The players were asked whether they thought that important others around them have switched to playing other SNGs.	Park et al. (2012)
Sunk Cost	The players were asked whether they perceived financial, performance-related, social and psychological costs regarding The SNG being studied, when switching to other SNGs	Jones et al. (2002); Hsieh et al. (2012)
Adaptation Cost	The players were asked whether they perceived the adaptation to a new SNG as incurring costs, such as search cost and learning cost.	Kim et al. (2004)

After the responses of the questionnaires were collected, the distribution of the demographic information of the valid responses (541) was presented in Table 11.

Table 11 Demographic information of the switching players

Measure	Items	Frequency	%
Gender	Male	277	51.2
	Female	264	48.8
Age	Under 15	236	43.6
	16-18	178	32.9
	19-24	92	17
	25-30	17	3.1
	31-35	16	3
	Over 36	2	0.4

3.4 Data Analysis Methods

3.4.1 Structural Equation Modeling

As an important data analysis method, structural equation modeling (SEM) has received considerable attention from researchers conducting empirical research in multiple disciplines, such as marketing, psychology and education (Finney & DiStefano 2006). In the field of IS research (Straub 1990), SEM is also a very popular technique for high quality statistical analysis. Since the first articles utilizing SEM were accepted in the major IS journals, there has been a large body of research papers applying SEM in IS journals (Gefen et al. 2000).

The goal of SEM is to analyze causal models including the latent constructs measured by multiple items in multivariate data sets (Hair et al. 1992). Moreover, SEM has been suggested as a rigorous method with which to examine the reliability and validity of the instruments and the significance of relationships between constructs, and provide a set of indices for evaluating the model fit (Tabachnick & Fidell 2007). Furthermore, SEM is best suited to data analysis in confirmatory research (Gefen et al. 2000; Tabachnick & Fidell 2007). Hence, in order to examine the theory-based research models and hypotheses, SEM has been employed as the data analysis method in the five research articles included in this thesis.

In addition, SEM is a second generation regression tool, which is different to the first generation regression models (e.g. linear regression, MANOVA, and ANOVA). SEM can integrate the analysis of the measurement model and the structural model in the same analysis. In other words, SEM can conduct factor analysis and hypotheses testing in one operation (Gefen et al. 2000; Jöreskog & Sörbom 1982; Tabachnick & Fidell 2007).

In general, two approaches are used to conduct SEM, namely the covariance-based and the variance-based (component-based) approach (Chin 1998). Using model fitting techniques, covariance-based SEMs, such as AMOS, LISEREL and SEPATH, compare the covariance structure fit of the proposed research model with the best fit covariance structure. In order to estimate how the empirical data collected from a sample fits the proposed model rather than the best-fitting co-variance structure, covariance-based SEM provides indices and residuals as esti-mation references (Gefen et al. 2000). Especially when the research is proposed based on a theoretical basis, the covariance-based approaches are mainly used to test theories (Gefen et al. 2000). Covariance-based approaches, such as maxi-mum likelihood (ML), were even considered equivalent to SEM by many re-searchers (Jöreskog & Sörbom 1982). Component-based approaches, like PLS, are becoming popular as well, since they are suitable for estimating a small sam-ple size and non-normal data for theory development. PLS is thought to have a superior performance when there are formative measures in the research models (Reinartz et al. 2009).

In the current study, maximum likelihood (ML) was employed as the method of estimation for analyzing research models because ML is suitable for analyzing a large sample size (Anderson & Gerbing 1988). Moreover, ML has been proven to be robust, even when assumptions of indicator distribution are severely violat-ed. Even in extreme cases of skewness and kurtosis, ML still behaves robustly (Bollen 1998; Hu et al. 1992; Reinartz et al. 2009).

For this study, AMOS 21 software using ML, which follows the covariance based approach, was used to analyze the research models and hypotheses. AMOS 21 is appropriate for the current study, because the sample size is relatively large (> 200), and all the measures in our research models are reflective measures.

In this study, a two-step approach was followed, which is recommended by Anderson and Gerbing (1988) for proceeding with the data analysis. Confirmato-ry factor analysis (CFA) was used to estimate the measurement model. By using this technique, the reliability and validity of the measurements were examined. Then, the path coefficients and the statistical significances were examined by testing the structural model.

3.4.2 Instrument Validation and Model Fit Indices

In IS research, latent constructs which are not directly observable are represented by a set of measurement instruments. In order to examine the rigorousness of a research design, researchers need to estimate the degree of a latent construct's accuracy as captured by the instruments based on the data gathered (Straub et al. 2004). Thus, a proper data validation provides researchers with a higher confi-

dence about their methodological choice, which justifies the positivist method as a proper option for acquiring scientific knowledge in IS research. In other words, instrument validation is a prior and crucial process for conducting valid empirical IS research (Straub et al. 2004; Straub 1989). Therefore, researchers have suggested validation principles for instrument validation (Straub et al. 2004; Straub 1989).

Content validity refers to the degree of certainty that the instruments of the constructs capture the essence of a construct (Boudreau et al. 2001; Cronbach 1971). Straub et al. (2004) have highly recommended content validity as a valuable tool for verifying the instruments used in IS research. Usually, the empirical investigation of content validity is not mandatory; instead a literature review and expert judges or panels can be a useful way of achieving content validity (Boudreau et al. 2001; Straub 1989). In this study, literature reviews were conducted in the IS discipline. The constructs of the instruments were drawn from the most relevant IS studies, including online gaming, IS continuance and IS switching behavior. The literature review process provided a useful theoretical base for selecting the instruments. Moreover, as suggested by prior researchers, a pilot test of the instrument was conducted. Various experts including senior IS researchers and SNG marketing managers as well as actual SNG players were consulted. The successful conducting of those two steps suggests that the content validity of the instruments used in this study is good.

Construct validity refers to the extent to which the instruments fit together to measure the construct that is supposed to be measured (Straub 1989). In other words, construct validity is used to examine whether the instruments selected to measure a construct actually do so and if they fit together as an intellectual whole (Boudreau et al. 2001). In IS studies, in order to achieve construct validity, IS researchers usually examine both convergent validity and discriminant validity (Straub et al. 2004).

Convergent validity refers to the items used to capture a construct which are significantly and highly correlated (Straub et al. 2004). Researchers usually examine convergent validity by evaluating the factor loadings of each item reflecting the same construct. The criteria are that the factor loadings should be significant and exceed 0.7. Furthermore, the acceptance level of the composite reliability (CR) of each construct is 0.80. Finally, the average variance extract (AVE) of each construct should be larger than 0.50 (Fornell & Larcke 1981). Moreover, large Cronbach alphas ($\alpha > 0.8$) usually suggest a reliable measurement (Fornell & Larcke 1981).

In this study, the results of the assessments of convergent validity including the factor loadings, CRs, Cronbach alphas and AVE for all the constructs are presented in each article. The results show that all the requirements for these indices are met according to the recommendations made by Fornell and Larcker (1981).

Hence, the results show that the survey instruments exhibit good convergent validity.

Discriminant validity is used to indicate that the items measure the constructs they are theoretically associated with and supposed to be measured. This ensures that they do not measure other constructs (Gefen & Straub 2005). In order to ensure discriminant validity, the value of square root of the AVE for each construct should be greater than the correlations between the construct and other constructs (Fornell & Larcker 1981). There is a rather higher correlation between two constructs, however, previous research suggests that it is still a common correlation range from 0.7 to 0.8, and that the two constructs can be distinguished from each other (Grewal et al. 2004). Furthermore, in this study, the square root of AVE strictly exceeded the correlations between the constructs. The results of convergent and discriminant validity are presented in the individual research papers included in this thesis.

When conducting the measurement model analysis, both convergent validity and discriminant validity were established. Then the structural models were assessed according to a set of goodness of fit indices provided by AMOS. Table 12 presents the indices used in this study.

Table 12 Model fit indices

Index	Recommended cutoff value	References
GFI	≥ 0.90	Gefen et al. (2000)
AGFI	≥ 0.80	Gefen et al. (2000)
NFI	≥ 0.90	Gefen et al. (2000)
CFI	≥ 0.90	Anderson & Gerbing (1988)
TLI	≥ 0.95	Hu & Bentler (1999)
RMSEA	<0.06	Hu & Bentler (1999)

As presented in each article included in this thesis, the model fit indices were achieved, which implies a good model fit. Moreover, Since a Cmin/DF value is very sensitive to sample size. A large sample size tends to significantly increase the Cmin/DF value. Thus, although the non-significant chi-square value (Cmin/DF) has been used to evaluate the model fit, it was not adopted for Article 1 and Article 2 that used a sample population of 3919 individuals.

4   EMPIRICAL FINDINGS

The purpose of this chapter is to summarize the key findings of this thesis. In order to provide answers to the research questions in this study, the empirical results on continuance intention and switching intention are listed and discussed.

4.1   Empirical Results for the IS Continuance Intention

In order to investigate the determinants of the continuance intention, two research models based on U&G (in Article 1) and UTAUT2 (in Article 2) were proposed and tested. The amount of variance of continuance intention explained by the research models was 61.1% in research article 1, and 62.8% in research article 2. As shown in Figure 5, enjoyment, fantasy, and escapism, social interaction and social presence, achievement and self-presentation, social influence, price value, and habit are found to be determinants of the continuance intention.
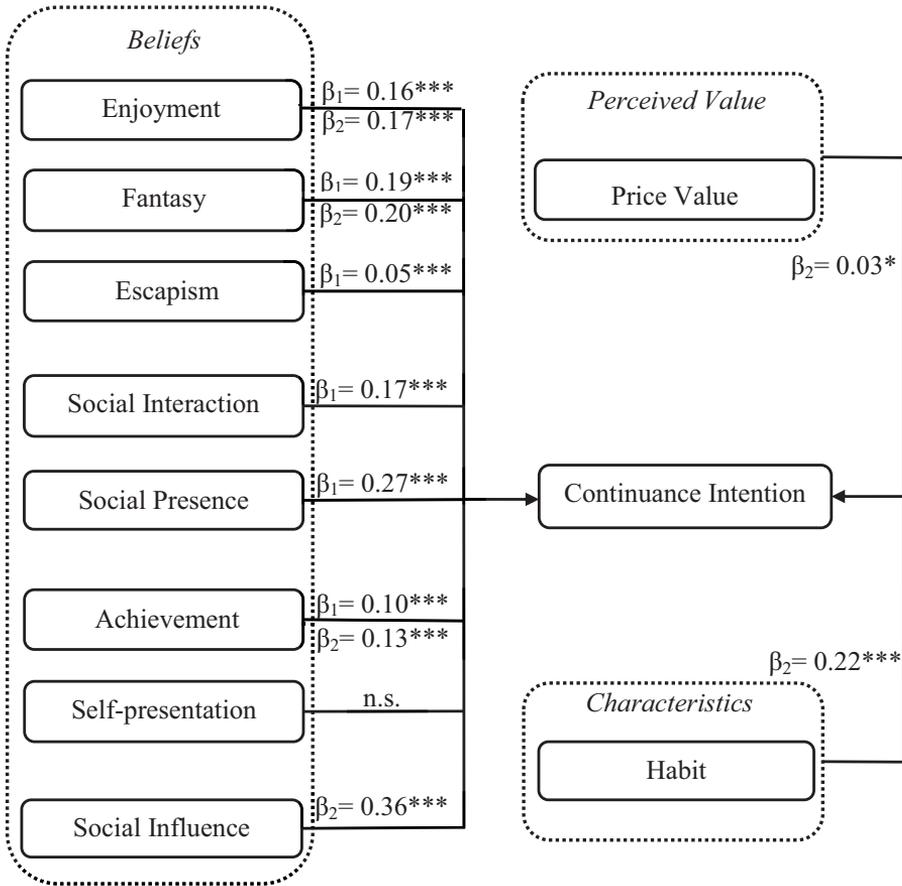
Note: *: p<0.05;***: p < 0.001; n.s. : not significant

Figure 5 Determinants of the continuance intention

Clearly, an individual's beliefs about their continued use of The SNG, perceived value, and individual characteristics are the main determinants of the continuance intention to play The SNG.

Enjoyment, fantasy, and escapism are beliefs reflecting individual players' hedonic perceptions regarding playing The SNG. Enjoyment (β_1= 0.16, β_2= 0.17, p<0.001)[1], fantasy (β_1= 0.19, β_2= 0.20, p<0.001), and escapism (β_1= 0.05, p<0.001) are all found to positively influence the continuance intention[1]. Among them, enjoyment and fantasy exert stronger effects on the continuance intention, while escapism only has marginal effect on it. The significance of enjoyment is aligned with prior studies, which indicate that enjoyment represents the basic

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[1] β_1 refers to the path coefficient in article 1; β_2 refers to the path coefficient in article 2.

function of online gaming (Boyle et al. 2012; Van der Heijden 2004). In this study, The SNG is investigated as one type of online game as it has the basic features and functions of such games. In this study, fantasy was found to be the most significant factor for capturing the hedonic motivation to continue playing The SNG. The finding suggests that the players would like to keep playing The SNG, to realize their fantasies in The SNG, such as trying new identities and conducting activities that are different to their everyday life, and being immersed in the imaginary virtual world (Lee et al. 2012).

Beliefs reflecting the social motivations to continue playing The SNG were found to be other important factors determining the continuance intention. In the current study, the social motivations were captured by social interaction (β_1= 0.17, p<0.001) and social presence (β_1= 0.27, p<0.001). Prior studies have pointed out that social presence is a prominent factor in determining the behavioral intention to use IS in several research contexts, including online shopping (Gefen & Straub 2003), virtual worlds (Schwarz et al. 2011), and even the most important factor determining the usage of social networks, such as Facebook (Cheung et al. 2011). In the current study, social presence is one of the most prominent factors determining the continuance intention to play The SNG. The features of The SNG, such as the 3D avatars, the instant and asynchronous interaction model, and the mechanism for playing with real social network friends, enable the players to have a "psychological sense of physically interacting and establishing a personal connection with others" (Biocca et al. 2003), further encouraging them to continue playing. Hence, this study confirms the findings of previous research, and suggests social presence is a key element in influencing the continuance intention to play a SNG. In addition, the finding on social interaction in this study is consistent with findings from the work of Huang and Hsieh (2011) who argue that online gaming is widely recognized as an avenue for interacting socially with friends from real life and the virtual world.

In this study, achievement and self-presentation are categorized as beliefs reflecting individual players' utilitarian perceptions of playing a SNG. Prior studies argue that self-presentation reflects a utilitarian motivation to use a personal homepage (Papacharissi 2002) and social network sites (Mehdizadeh 2010). However, a significant correlation between self-presentation and the continuance intention is not found in this study. The results suggest that, compared to self-presentation, SNG players think achievement is a more important utilitarian motivation to continue playing a SNG. The result of the influence of achievement (β_1= 0.10, β_2= 0.13, p<0.001) on the continuance intention is consistent with the finding in the work of Magni et al. (2010). Moreover, with the continued play of the SNG, the effects of utilitarian factors on continuance intention increase (Magni et al. 2010). The SNG players can discover more game features to reflect

their utilitarian motivations, such as obtaining the sense of achievement through accumulating virtual wealth or compete with other players.

Individual beliefs about social influence are usually conceptualized as normative beliefs in prior studies (Ajzen 1985; Venkatesh et al. 2003). In this study, the result suggests that social influence (β_2= 0.36, p<0.001) is the most significant determinant of the continuance intention. Prior studies in IS have indicated that, players prefer to make decisions about IS usage according to the opinions of other important referents (Bagozzi & Lee 2002; Suznjevic & Matijasevic 2010; Venkatesh et al. 2012; Venkatesh et al. 2003). Furthermore, researchers argue that online gaming is another channel for reflecting the effect of interpersonal relationships in the real world (Lu & Wang 2008; Wan & Chiou 2006). Thus the positive attitudes, opinions or behavior of peers regarding the playing of a game can greatly influence a SNG player's intention to continue playing a game.

Habit (β_2= 0.22, p<0.001) was found to be a key determinant of the continuance intention to play a SNG. Prior studies have argued that the habitual usage of certain IS can directly and strongly determine an individual's intention to keep using an IS (Gefen 2004; Venkatesh et al. 2012). Thus, the finding of the current study is accordance with the empirical findings of previous research, which indicates that habit can be treated as stored intention and can directly and significantly affect behavioral intention (Ajzen 2002).

Price value (β_2= 0.03, p<0.05) is found to exert a significant but marginal effect on continuance intention. This finding is in accordance with the work of Venkatesh et al. (2012). In their study, they found that, the importance of an individual's perceived benefits (e.g. hedonic, social, and utilitarian) is more powerful than the perceived monetary sacrifice (e.g. price value).

IS continuance model based on ECT has a far-reaching influence on prior studies on IS continuance (Bhattacherjee 2001). Studies applying the IS continuance model have indicated that satisfaction is one of the most prominent factors in determining the continuance intention to use an IS (Bhattacherjee 2001; Deng & Turner 2010). Thus, a post hoc analysis integrating satisfaction into the research model was conducted in Article 1. Satisfaction (β_1=0.130, p<0.001) was found to be a significant, but not a dominant determinant of the continuance intention. Thus, compared to individual beliefs which exert stronger influence on the continuance intention to play a SNG, satisfaction is not the primary determinant in this study.

The purpose of this study is to explore the determinants of the continuance intention to play SNGs. The results reveal that an individual's continuance intention to use a SNG are determined by their social motivations as captured by social interaction and social presence; hedonic motivations as represented by enjoyment, fantasy and escapism; utilitarian motivations as captured by achieve-

ment; normative beliefs as represented by social influence; the perception of price value; and habit.

4.2 Empirical Results for the IS Switching Intention

In order to investigate the switching intention, three research models were proposed by applying the PPM framework (Article 3); a self-developed approach (Article 4); and the cognitive dissonance theory approach (Article 5). The amount of variance of the switching intention explained by the research model is 62% in Article 3; 58.7% in Article 4; and 62.7% in Article 5. The determinants of the switching intention are the enjoyment of and satisfaction with the current IS service; the sunk cost and adaptation cost; subjective norms and descriptive norms regarding the switching behavior; change experience; and need for variety. The results are summarized in Figure 6.
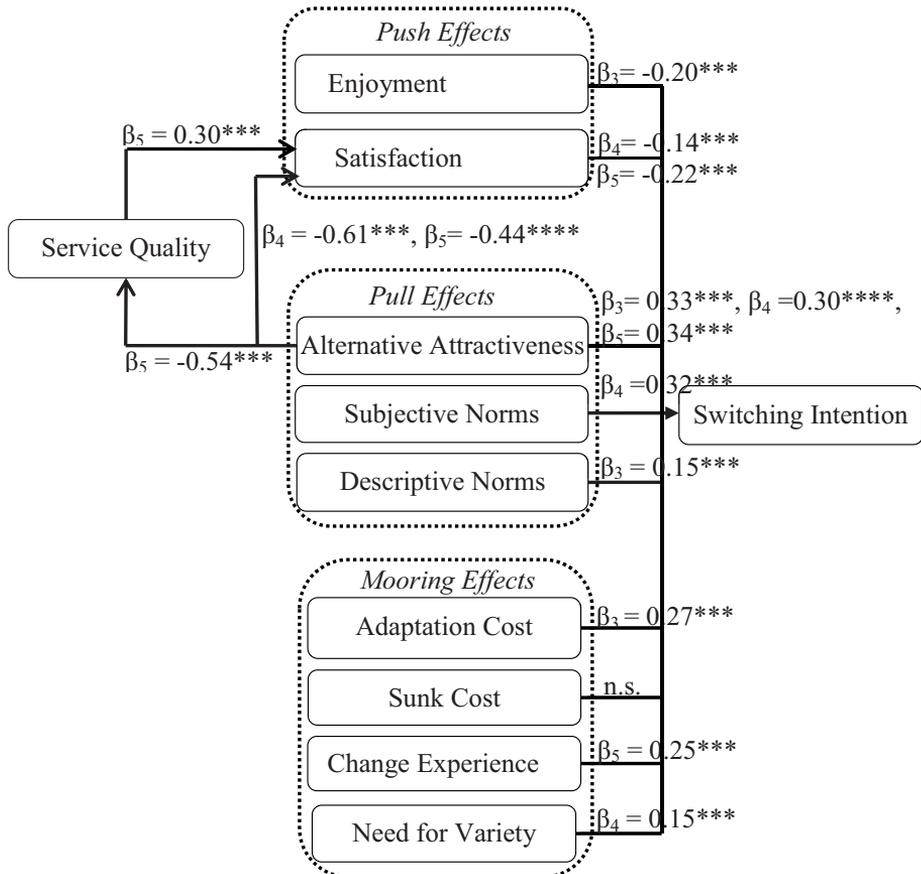
Note: ***:p<0.001, n.s.: not significant

Figure 6 Determinants of the switching intention

As shown in Figure 6, the determinants influencing the switching intention are mainly the push, pull, and mooring effects. Enjoyment (β_3= -0.20, p<0.001)[2] and satisfaction (β_4= -0.14, β_5= -0.22, p<0.001) regarding The SNG capture the push effects, referring to the negative factors driving players away from it. Hou et al. (2011) suggest that when players experience a low-level enjoyment of playing their current game, they may choose to switch to an alternative game to obtain a higher level of enjoyment. The finding in this study supports the results of prior studies.

Prior studies have indicated that satisfaction has a very strong push effect and a negative impact on the switching intention (Hsieh et al. 2012). There is a higher chance of dissatisfied IS users being pushed away from the present service (Bansal et al. 2005). The finding of satisfaction in the current study also accords with prior research.

Consistent with prior studies on IS switching in different contexts, such as online games (Hou et al. 2011), blog services (Zhang et al. 2012), e-mail services (Kim et al. 2006), and e-services for hair styling (Bansal et al. 2005), the pull effect is captured by alternative attractiveness in this study. Moreover, positive social norms including subjective norms and descriptive norms regarding switching behavior were also mapped as pull effects.

Alternative attractiveness (β_3= 0.33, β_4 = 0.30, β_5= 0.34, p<0.001) is found to be a prominent determinant of the switching intention in this study (Hsieh et al. 2012; Kim et al. 2006; Zhang et al. 2012). Prior studies have shown that the switching intention of IS users is directly and positively influenced by their perceptions about alternatives (Bansal et al. 2005). In this study, the significance of alternative attractiveness is in line with the results of previous research.

In addition, alternative attractiveness has strong negative effects on satisfaction (β_4 = -0.61, β_5= -0.44, p<0.001) as well as service quality (β_5 = -0.54, p<0.001). According to cognitive dissonance theory, the perception of an alternative substitute as superior can deteriorate a SNG player's previous positive perception of service quality and their overall satisfaction with a SNG (Inman et al., 1997).

In this study, compared to the effect of satisfaction on the switching intention, alternative attractiveness has a much stronger influence on it. A large body of prior research has suggested that satisfaction is the key determinant of customer loyalty and is a crucial factor in preventing user switching. However, the present findings seem to be more consistent with the research results of Bhattacherjee et al. (2012), who found that the relative advantage of alternatives exerted a much

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[2] β_3 refers to the path coefficient in article 3; β_4 refers to the path coefficient in article 4; β_5 refers to the path coefficient in article 5

stronger effect than satisfaction with a prior service did on the switching intention. Hence, alternative attractiveness has a direct and dominant impact on the switching intention, and has a strong influence on the switching intention indirectly through satisfaction and service quality.

In prior research, subjective norms ($\beta_4 = 0.32$, p<0.001) and descriptive norms ($\beta_3 = 0.15$, p<0.001) are conceptualized as normative beliefs, which have been repeatedly argued to have distinct influences on individual technology usage (Ajzen 1991; Lu & Wang 2008; Rivis & Sheeran 2003). A SNG is designed to be played with friends in existing social networks. A positive attitude towards switching behavior and the actual switching behavior of significant others can be the direct pull effect to attract players to switch to a substitute. Bansal (2005) indicates that subjective norms were a significant predictor of the switching intention, and that the inclusion of normative beliefs in studying service switching was limited. In the current study, both variables were found to be significantly and positively associated with the switching intention. Subjective norms were found to be one of the most prominent factors influencing the switching intention. To sum up, the findings of this study suggest that, the pull effect – represented by alternative attractiveness and social norms – has a strong impact on the switching intention.

Mooring effects refer to personal, social, and situational factors which can either facilitate or hinder the switching decision (Bansal et al. 2005). As shown in Figure 6, the mooring effect in the current study is captured by the sunk cost and the adaptation cost, change experience and the need for variety. Prior literature on switching from IS and marketing suggests that these variables fit the conceptualization of the mooring effects (Bansal et al. 2005).

The switching cost represented by sunk cost and adaptation cost was found to be a significant and strong factor influencing the switching intention. Prior studies examining IS switching behavior have usually studied switching cost as a single factor and found it to be one of the most important factors predicting the switching intention (Bansal 2005; Hou et al. 2011; Kim et al. 2006; Zhang et al. 2012). This study examined the effects of sunk cost (n.s.) and adaptation cost ($\beta_3 = 0.27$, p<0.001) as two decomposed concepts of the switching cost on the switching intention. Adaptation cost is found to exert significant impact on the switching intention, while the effect of sunk cost is not significant. The results suggest that individual belief about the difficulties, resources and opportunities for familiarizing oneself with an alternative SNG is the strong element hindering the switching intention. Mooring effects were also captured by the need for variety ($\beta_4 = 0.15$, p<0.001) and changing experience ($\beta_5 = 0.25$, p<0.001). These two factors were found to be important predictors of the individual characteristic in the current study. The significant effect of the need for variety supports the claim made in the work of Steenkamp and Baumgartner (1992). Their study suggests

that a satisfied customer may perform a switching behavior due to the desire to try something novel or different (Steenkamp & Baumgartner 1992). The result of the changing experience is supported by prior studies which indicate that people with a successful switching experience were more likely to switch to another online game (Hou et al. 2011). This study further investigated the effect of change experience on alternative attractiveness. The result suggests that IS users with a richer change experience perceive alternatives as more attractive.

This study aims to investigate the determinants of the switching intention. This study shows that the determinants exert different effects on the switching intention, namely push effects represented by enjoyment and satisfaction, pull effects captured by alternative attractiveness, subjective norms, and descriptive norms, and mooring effects represented by adaptation cost, the need for variety, and change experience.

4.3   Empirical Results for the Moderating Effect

Prior studies suggest that individual characteristics have moderating effects on an individual's usage of IS. Age, gender, and experience were investigated as the moderators that influence the continuance intention. Age and gender were studied as moderators in influencing the switching intention. Change experience, which was found to affect the switching intention directly, was further examined as a moderator. Although it was not the primary purpose to investigate the moderating effects in the current study, this study attempted to provide more understanding about SNG players' post-adoption behavior, and offer some hints for future studies.

In studies on continuance intention, the examination of age and gender was conducted in two research models presented in Article 1 and Article 2. In Article 2, age, gender and experience were examined as moderators. The sample was divided into two sub-groups, adolescence (below 18 years old) and adults (above 18 years old), in order to investigate the moderating effect of age. The purpose was to see whether adolescents and adults have different perceptions regarding the continuance intention in SNGs. The results showed that age and experience were not significant moderators. Only gender has a moderating effect on the paths from social influence, perceived enjoyment, and price value to the continuance intention. The statistical results can be found in Article 2 of this dissertation.

For a further investigation of the moderating effects of age, samples were divided into 7 sub-groups for Article 1 (below 15 years old, 15-18 years old, 19-24 years old, 25-30 years old, 31-35 years old, and above 35). The results show that age is a strong moderator in the study and that gender also exerts moderating effects on the paths from perceived enjoyment and social interaction to the contin-

uance intention. The statistical results can be found in Article 1, which is included in this dissertation.

In the study on switching intention, three moderators were examined, including age, gender, and change experience. Age was divided into two sub-groups (adolescence and adults); gender was split into two sub-groups (male and female); changing experience was divided into two sub-groups (low and high). The results show that age has a moderating role on the paths from enjoyment, adaptation cost, and alternative attractiveness to the switching intention. Gender has a moderating role on the path from adaptation cost to the switching intention. Change experience has a moderating effect on alternative attractiveness and service quality. The statistical results can be found in Article 3 and Article 5.

Finally, a summary of the moderating effects of age, gender and experience is presented in Table 13.

Table 13 Summary of the moderating effect in this study

Moderator	*Study on continuance intention*	*Study on switching intention*
Age	Age exerts significant moderating effects on the paths from *enjoyment, social interaction, social presence, self-presentation, fantasy, escapism, and achievement* to the continuance intention (1).	Age exerts significant moderating effects on the paths from *enjoyment, adaptation and alternative influence* to the switching intention (3).
Gender	Gender has significant moderating effects on the paths from *enjoyment (1, 2), social interaction (1), social influence (2),* and *price value (2)* to the continuance intention.	Gender has significant moderating effects on the paths from *adaptation cost* to the switching intention (3).
Experience	Experience has no significant moderating effect in this study (2).	
Change experience		Change experience exerts a significant effect on the path from *alternative attractiveness* to *service quality* (5).
Note	1: results from article 1 2: results from article 2	3: results from article 3 5: results from article 5

As presented in Table 13, gender is not found to be a strong moderator in this study. In prior investigations, boys usually matched the stereotype image of game players (Lee & Wohn 2012), suggesting they were more likely to play games. Earlier studies have repeatedly claimed that female players and male players

have very different perceptions towards playing games (Chou & Tsai 2007; Joe & Chiu 2008; Lee 2009; Lin et al. 2008). However, the results of moderating effects on gender provide interesting findings as gender is a comparatively weak moderator (see Table 13).

In addition, compared to adolescents, the enjoyment of an adult player is a stronger predictor of the switching intention. The results related to the continuance intention also indicate that enjoyment was a stronger determinant of the continuance intention for adult players. Thus, the results suggest that, compared to adolescent players, enjoyment is a more important determinant of post-adoption intention for adult players. The fulfillment of enjoyment can influence an adult player's intention to continue to play or to switch to alternatives.

5 IMPLICATIONS AND LIMITATIONS

This chapter is the last chapter of this dissertation. Firstly, answers to the research questions are provided. It then continues by presenting implications for theory and practice. Finally, the limitations of this study and suggestions for future studies are discussed.

5.1 Summary of the Answers to the Research Questions

The main research question is:

What are the determinants of SNG post-adoption intention?

Based on the discussion above, the answers to the main research question are:

In the post-adoption stage, SNG players can choose to continue playing a SNG or switch to a substitute. A variety of determinants have direct and significant influences on behavioral intention, such as individual beliefs, attitude, and individual characteristics.

Furthermore, the determinants of the continuance intention and the switching intention are presented in the following way:

The determinants of the continuance intention are: normative beliefs, beliefs about the hedonic, social and utilitarian motivation of continuance, perceived value, and individual characteristics.

Individual beliefs, attitude and individual characteristics exert different effects on the switching intention, including push, pull, and mooring effects.

5.2 Implications for Theory

From a theoretical point of view, this study seeks to make contributions to the research area of IS post-adoption behavior. It addresses the limitations of the prior research on IS post-adoption behavior which has mainly considered continued use to be a synonym for post-adoption, focusing on the determinants of a user's continued use (Bhattacherjee 2001; Venkatesh et al. 2012; Venkatesh et al. 2003; Wu et al. 2009). Currently, for a general IS, there are usually multiple IS services serving similar functions, which can be replaced by each other and are therefore

competitive (Ye et al. 2006). After the initial acceptance of a certain service, IS users can easily switch between these competitive products in the post-adoption phase. However, only a little research has been conducted to explore IS switching behavior. Bhattacherjee et al. (2012) has indicated that, from the theoretical perspective, there is "clearly a need" to develop research models to investigate IS switching. Thus, this study incorporates both continued usage and switching behavior as post-adoption behaviors, in order to add more knowledge to IS post-adoption.

The links between "beliefs and intention" and "beliefs, attitude and intention" are theoretically and empirically supported by a large body of literature in IS. In prior studies, the IS post-adoption intention has mainly been determined by individual beliefs about their current use of an IS. In this study, the research results confirm prior findings, and also suggest some new and interesting findings. This study suggests that the decision to switch instead of continuing is affected by a user's beliefs about the present service, as well as their beliefs about the alternatives. Thus, in the post-adoption stage, the effects of a user's beliefs are multidimensional. User beliefs about the present service they are using and their beliefs about the substitutes both have a significant influence on the formulation of the post-adoption behavioral intention. The decision to continue or switch is a function of the attractiveness of the present service versus the attractiveness of alternatives – as Rusbult and Farrell (1983) argue.

The nature of a hedonic IS is usually considered to be that of providing entertainment, fun and enjoyment (Ha et al. 2007). A user's beliefs about the hedonic perceptions of using hedonic IS have been largely investigated and identified as the key determinant of the use intention in the prior literature (Choi & Kim 2004; Huang & Hsieh 2011; Lee 2009). In this study, in addition to hedonic motivations, social and utilitarian motivations are found to be significant determinants as well. Thus, user beliefs can be mainly categorized into beliefs about the hedonic, social and utilitarian motivations driving the continued usage of an IS. Individual beliefs about the hedonic motivations of using the IS, such as obtaining enjoyment, realizing fantasies, and escaping from the real world, have been shown to have a significant impact on the continuance intention. Social motivations, such as having social interaction and requiring social presence, suggest that using IS to fulfill social needs has become a prominent determinant of the continuance intention. The significant influences derived from utilitarian motivations – referring to the capability of an IS to satisfy the utilitarian needs of individuals – retains its importance for determining the continuance intention. Thus, this study indicates that IS users are usually use IS to satisfy multiple needs.

The determinants of the switching intention are comparably more complex. Firstly, a user's beliefs exert significant effects on their switching intention. However, user beliefs should be divided into beliefs about the current service and

beliefs about the alternatives – as discussed above. Moreover, together with personal characteristics, the individual beliefs exert three effects, namely push, pull, and mooring effects on the switching intention. The push factors drive users away from the present service, the pull factors attract users to the alternatives, and the mooring factors facilitating or hindering switching behaviors are indispensable elements for formulating the switching intention. Thus, users need to coordinate push, pull, and mooring effects in order to formulate their switching intention.

In addition, this study offers a further explanation of IS switching intention by utilizing cognitive dissonance theory (SCT). This study suggests that the alternative attractiveness of competing products can directly predict the switching intention. It can also affect the switching intention indirectly, by exerting an influence on the user's original beliefs about the service quality of the present service they use, and the original attitude they held with regard to its service quality. This study confirms the value of SCT in this context and suggests that when users perceive an alternative with superior performances, the perception can conflict with their established positive perceptions of their present service. Thus, users may change their prior positive perceptions of the current service (service quality and satisfaction in the current study) to reduce the cognitive dissonance. Hence, their perceptions of the present service can be lower than their perception of the advantages offered by alternatives, leading to the formation of the switching intention. This study is one of the first to explain the switching intention by examining the relationships between a user's perceptions of alternatives and their perceptions of the service they currently use. This study suggests that the formulation of the switching intention is a rather complicated process which depends on the balance of influences between multiple elements.

Previous IS research, such as studies applying ECT, have consistently showed that satisfaction classified as attitude is the dominant element in assuring customer loyalty and preventing switching. However, in this study, satisfaction was not found to be a dominant predictor for either the continuance intention or the switching intention. This study suggests that individual beliefs and personal characteristics, rather than satisfaction, are the prominent determinants of behavioral intention in the post-adoption stage. Specifically, individuals are more likely to continue using an IS in the future if their beliefs about using the IS are positive, and if they have formed the habit of using the IS even though their overall satisfaction level with it is not high. Individuals are more likely to switch to alternatives – even when their satisfaction with their current IS is not low, if they perceive the alternatives as more attractive, if their normative beliefs about switching behavior are positive, the switching cost is low, and they have a high tendency to switch.

This study also suggests normative beliefs are one of the most prominent elements in determining the post-adoption intention in SNGs. Prior studies on IS continuance – when comparing path coefficients with other factors – have suggested that normative beliefs were important, but not the most prominent determinant of IS adoption and usage intention (Lee & Tsai 2010; Lee 2009; Park & Ryoo 2013; Venkatesh et al. 2012). In their study of IS switching behavior, Bansal et al. (2005) suggest that the inclusion of normative beliefs for examining the switching intention is very limited. They further indicate that "the defection of a single customer can trigger the defection of many other customers" because of the influence of subjective norms (Bansal et al. 2005, pp.108). That finding is supported by this study which finds that IS users think that important other's opinions of their intended behavior have a significant impact on their behavioral intention. In general, and in The SNG – as an application that is tightly linked to individual social networks – users are largely driven by social influences gained from others in their post-adoption stage.

5.3 Implications for Practice

The results of this study have some implications for SNGs service providers because they highlight the hedonic, social and utilitarian value of playing SNGs. In other words, a SNG player continues playing a SNG for multiple reasons. Consequently, providers should develop SNGs that have enough features and functions to satisfy players' multiple needs. For instance, the function of SNGs should be to provide hedonic value, such as promote an enjoyable playing experience, and create more themes and activities for realizing players' fantasies. Moreover, a SNG should not only be hedonic-oriented since the players are also desirous of the social interaction and social presence they experience. Thus, SNG providers should promote multiple channels with which to assist players in sharing the gaming experience with their existing network members or amongst their virtual friends. The study reveals that social presence is important. Thus, more attention should be placed on increasing players perception of "being there" in the virtual world.

The study shows that social influences from important others are very important in shaping behavioral intention. However, the managerial strategies relating to social influence are double-edged: they can be utilized to maintain players and to attract players from other SNGs. The results suggests that recommendations from important others should be utilized as an important marketing strategy. SNG providers should facilitate interaction between players in a SNG, for example by improving the SNG's features, developing a communication forum. And since a SNG is embedded or tightly linked to social networks, providers should

try to use the networks of players to facilitate their post-adoption behavior via different online communication channels, such as the popular social network sites Renren, Microblogs, and QQ.

This study reveals that alternative attractiveness exerts a prominent influence on the switching intention, and that current satisfaction and a positive perception of service quality cannot sufficiently prevent players from switching. Thus, it is crucial for SNGs providers to update their service and features to a superior level and keep up with their competitors. When players switch to other competitors, SNG providers should be aware that the service quality of their products may not be the major reason cause for the defection of customers. Keeping a SNG competitive is the key point in preventing players from switching.

In this study, the SNG players' perception of adaptation cost exerted significant influences on the switching intention. SNG providers can try to decrease the adaptation cost to attract players and help them switch from other games. For example, a guide or manual for new players and a 24 hour service center should be available in order to help players conquer the adaptation barrier.

Individual characteristics, including habit and need for variety, are important factors in this study. Accordingly, in order to maintain players, SNG providers must create strategies to foster the development of SNG players' habitual playing, such as offering players rewards for repeated and prolonged usage. Meanwhile, to prevent players from switching, providers should provide more new features, novel themes, different skills and gaming activities to prevent potential boredom after playing a SNG for some time.

5.4 Limitations and Future Research

Although this study provides interesting findings, it should be acknowledged that it has limitations.

Firstly, cross-sectional surveys can capture a snapshot of a moment. Thus, this study relies on a cross-sectional survey to explain the behavioral intention of individual users at a certain time point. In future studies, a longitudinal study can be adopted as players' beliefs and behavior may change during the playing process. The features of SNGs are also often updated, which may affect player choices. In this study, it has been found that the players' perceptions of The SNG changed due to competitors in the market. Thus, a longitudinal study can be employed to further explain the changes in the players' perceptions of a SNG, and the subsequent consequences of that change on behavior.

Secondly, this study stops after examining the behavioral intention in the post-adoption phase, but does not examine the actual behaviors. Since, there are other factors can intervene and influence actual behavior, the predictive power of be-

havioral intention on actual use can be weakened. Thus, future studies could pay more attention to examining the determinants of actual behavior in the post-adoption phase.

Thirdly, in the current study, a large amount of research samples were drawn randomly to generalize the results to other SNG players in China. It should be noted that this study has been carried out in a single game setting and in a particular culture. Prior studies have indicated that people with a different cultural background may have different perceptions of game playing (Lee & Wohn 2012). Thus, future studies may examine how different cultural backgrounds influence individual players' perceptions, and investigate whether the results of the current study are replicable in other cultures. Moreover, though SNGs share the basic features and functions of an online game, future studies are needed to investigate whether the results can be generalized to other game settings.

In addition, although switching incidences are commonplace, present research on IS switching behavior is still in its infancy (Bhattacherjee et al. 2012). Thus, the author urges future studies to pay more attention to switching behavior, including exploring theoretical frameworks and other factor for studying IS switching behavior. This study would like to propose several potential research avenues. For instance, since this study attempted to explore social norms, future studies could investigate the influence of broader cultural norms in determining the switching intention (Bansal 2005). Moreover, future studies could also examine the influence of beliefs on social and utilitarian motivations and the switching intention, and the influence of alternative attractiveness on other factors.

Last but not least, in the current study, moderators were found to exert significant effects on the relationships. Thus, this study suggests the examination of moderators in order to try different combinations of the samples and better explore the features of different user segments.

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APPENDICES

Appendix 1 the Survey Questionnaire (in English)

Thank you for spending 10 minutes completing this survey. The purpose of the survey is to investigate users' post-adoption behavior in social network gaming. Your responses will only be used for research, and no individual responses will be tracked. (For reasons of confidentiality, the name of the SNG that appeared in the original questionnaire is called "the SNG" in the questionnaire presented in this thesis. By the time of the data collection, the SNG had been running for six months).

1. What is your gender?
    ☐Male   ☐Female

2. What is your age?
    ☐ Under 15 years old   ☐16-18 years old
    ☐19-24 years old   ☐25-30 years old
    ☐31-35 years old   ☐ Ove 36 years old

3. Have you played this game before?
    ☐Yes   ☐No
 (The questionnaire was automatically ended when the respondents who selected "No" in Question 3)

4. Have you played this game in the last month?
    ☐Yes   ☐No
(In Question 4, the respondents who selected "Yes" continued the questionnaire with Part 1 "Questionnaire for Investigating Continuance Intention"; the respondents who selected "No" continued the questionnaire with Part 2 "Questionnaire for Investigating Switching Intention".)

Part 1 Questionnaire for Investigating Continuance Intention

5. How long have you been playing this game?
   ☐1 month   ☐2 months
   ☐3 months   ☐4 months
   ☐5 months   ☐6 months

6. On average, how often do you play this game?
   ☐Several times a day   ☐Once a day
   ☐Several times a week   ☐Once a week
   ☐Less than once a week   ☐Less than once a month

7. On average, how long do you play this game during each session?
   ☐0-15 minutes   ☐16-30 minutes
   ☐0.5-1 hours   ☐1-1.5 hours
   ☐1.5-2 hours   ☐2-3hours
   ☐More than 3 hours

8. How long have you been playing online games (when did you start to play online games) ?
   ☐Less than 1 year ago   ☐1-3 years ago
   ☐3-5 years ago   ☐5-7 years ago
   ☐More than 7 years ago

   Please use the five-Likert scale to comment on the following state-ments: 1= Disagree; 2= Slightly Disagree; 3= Neutral; 4=Slightly Agree; 5= Agree.

9. Please comment on the following statements on escapism according to your experience of playing the SNG.

I play the SNG when I feel frustrated.	1 2 3 4 5
I like playing the SNG when I've had a bad day.	1 2 3 4 5
Playing the SNG lets my anger out.	1 2 3 4 5
Playing the SNG is the best way to block off the world.	1 2 3 4 5

10. Please comment on the following statements on fantasy according to your experience of playing the SNG.

I play the SNG to experience things I do not experience in daily life.	1 2 3 4 5
I play the SNG to pretend I am someone/somewhere else.	1 2 3 4 5

I play the SNG to pretend I am someone/somewhere else. 1 2 3 4 5

I play the SNG to immerse myself in the life of the gaming world. 1 2 3 4 5

11. According to your experience of playing the SNG, you think the SNG is:

Uninterested … Interested 1 2 3 4 5

Not fun … Fun 1 2 3 4 5

Dull … Exciting 1 2 3 4 5

12. Please comment on the following statements on social presence according to your experience of playing the SNG.

I trust that other players in the SNG will help me if I need it. 1 2 3 4 5

I feel connected to other players in the SNG environment. 1 2 3 4 5

In my interactions with other players in the SNG, I am able to be myself and show what kind of person I really am. 1 2 3 4 5

I feel like I am a member of the SNG community during the game playing. 1 2 3 4 5

13. Please comment on the following statements on self-presentation according to your experience of playing the SNG.

I play the SNG, because I want other players in the SNG to perceive me as likable. 1 2 3 4 5

I play the SNG, because I want other players in the SNG to perceive me as friendly. 1 2 3 4 5

I play the SNG, because I want other players in the SNG to perceive me as skilled. 1 2 3 4 5

14. Please comment on the following statements on social interaction according to your experience of playing the SNG.

I open up more to others via the SNG than in other communication channels. 1 2 3 4 5

I have a network of friends made via playing the SNG. 1 2 3 4 5

Playing the SNG enables me to connect with friends in my real life. 1 2 3 4 5

Playing the SNG enables me to keep in touch with friends in my real life. 1 2 3 4 5

15. Please comment on the following statements on the sense of

achievement you obtained during playing the SNG.

I play the SNG to achieve a higher level in the game.	1 2 3 4 5
I play the SNG to have more power than others in the game.	1 2 3 4 5
I play the SNG to have better equipment/items than other players' in the SNG.	1 2 3 4 5
I play the SNG to prove to other players in this game that I am the best.	1 2 3 4 5

16. Please comment on the following statements on social influence according to your experience of playing the SNG.

Most people who are important to me support my continued playing of the SNG.	1 2 3 4 5
People who influence my decisions want me to continue playing the SNG.	1 2 3 4 5
People whose opinions I value prefer that I continue playing the SNG.	1 2 3 4 5

17. Please consider on your future intention to continue playing the SNG, and comment the following statement

It's worth playing the SNG in the future.	1 2 3 4 5
I am willing to play the SNG in the near future.	1 2 3 4 5

Part 2 Questionnaire for Investigating Switching Intention

5. Have you switched to playing other SNGs ?
   ☐Yes   ☐No, I am not playing any
                                     other SNGs at present.
(The questionnaire was automatically ended when the respondents who selected "No" in Question 5.)

Please use the five-Likert scale to comment on the following statements:
1= Disagree; 2= Slightly Disagree; 3= Neutral; 4=Slightly Agree; 5= Agree.
6. According to your experience of playing the SNG, please comment on the following statements on your satisfaction regarding the SNG.

Very dissatisfied … Very satisfied.	1 2 3 4 5
Very displeased ... Very pleased.	1 2 3 4 5
Very frustrated … Very contented	1 2 3 4 5

7. According to your experience of playing the SNG, you think the SNG is:

Uninterested …. Interested.	1 2 3 4 5
Not fun … Fun.	1 2 3 4 5
Dull … Exciting.	1 2 3 4 5

8. Please comment on the following statements on the service quality of the SNG according to your experience of playing the SNG.

Overall, I consider the service of SNG to be excellent.	1 2 3 4 5
The quality of the SNG service is generally good.	1 2 3 4 5
I believe the general quality of the SNG is high.	1 2 3 4 5

9. Please comment on the following statements on your change experience of SNGs according to your experience of playing SNGs.

I have often switched among SNGs in the past.	1 2 3 4 5
I have a lot of experience in switching between SNGs.	1 2 3 4 5
I have often switched to alternative SNGs after playing one SNG for some time (such as one month).	1 2 3 4 5

10. Please comment on the following statements on the alternative attractiveness according to your experience of playing the SNG.

I believe that alternative SNGs offer a better entertainment than this game.	1 2 3 4 5
I believe that alternative SNGs offer a better customer service	1 2 3 4 5

than this game.

I believe that alternative SNGs have a better reputation than this   1 2 3 4 5
game.

11. Please comment on the following statements on the subjective norms according to your experience of playing the SNG.

Most people who are important to me support my switching   1 2 3 4 5
from this game to other SNGs.

People who influence my decisions wanted me to switch from   1 2 3 4 5
this game to other SNGs.

People whose opinions I value preferred that I should switch   1 2 3 4 5
from this game to other SNGs.

12. Please comment on the following statements on the descrip-   1 2 3 4 5
tive norms according to your experience of playing the SNG.

I feel many important friends of mine switched from this SNG   1 2 3 4 5
to other SNGs

I think most people whose opinion I value have switched from   1 2 3 4 5
this SNG to other SNGs.

I perceive people who influence my decision switched from this   1 2 3 4 5
SNG to other SNGs.

13. Please comment on the following statements on the need for variety according to your experience of playing the SNG.

I would rather stick with this SNG than try other SNGs I am not   1 2 3 4 5
very sure of.

If I like the SNG, I rarely switch from it just to try something   1 2 3 4 5
different.

I am very cautious about trying out new and different SNGs.   1 2 3 4 5

14. Please comment on the following statements on the adaptation cost you perceived when you switched to a new SNG.

I need to spend time and effort searching for a substitute by   1 2 3 4 5
switching from this SNG to other SNGs.

When switching from this SNG to other SNGs, I have to learn   1 2 3 4 5
new rules and tactics for the new SNG.

By switching from this SNG to other SNGs, I have to learn a   1 2 3 4 5
new policy and accumulate new experience to get involved in
the new online community.

15. Please comment on the following statements on the sunk cost you perceived when you switched to a new SNG.

If I do not play the SNG, I will lose relationships I have built through this game. 1 2 3 4 5

If I do not play the SNG, a lot of energy, time, and effort I have put into playing this game will be wasted. 1 2 3 4 5

If I do not play the SNG, I will lose the virtual items accumulated in this game. 1 2 3 4 5

If I do not play the SNG, I will lose particular privileges in this game. 1 2 3 4 5

16. Please consider on your future intention to switch from the SNG, and comment the following statement

I have considered switching from this game and playing other SNGs instead. 1 2 3 4 5

The likelihood of me switching from this game to other SNGs is high. 1 2 3 4 5

Appendix 2 the Survey Questionnaire (in Chinese)

感谢您参与问卷调查。填写本次问卷大约需要 10 分钟。本次调查的目的是研究玩家在社交游戏中的后使用行为。您对问卷的回答仅用于本次研究，我们不会跟踪任何个人信息。(由于保密原因，用于本次调查的公司以及游戏名称在本论文中隐去，下称"这个游戏"。 在进行问卷调查时，这个游戏已运行 6 个月。)

1 请问您的性别?

    ☐男   ☐女

2 请问您的年龄?

    ☐15 岁以下   ☐16-18 岁
    ☐19-24 岁   ☐25-30 岁
    ☐31-35 岁   ☐36 岁以上

3 您玩过这个游戏么？

    ☐玩过   ☐没玩过
（在第三题中，当用户选择"没玩过"时， 答题自动结束。）

4 您最近一个月（30 天内）玩过这个游戏么？

    ☐玩过   ☐没玩过
（在第四题中， 当用户选择"玩过"时， 则回答问卷的第一部分"社交游戏用户持续使用意愿调查问卷"； 当用户选择"没玩过"时， 则回答问卷的第二部分"社交游戏用户转移意愿调查问卷"。）

第一部分. 社交游戏用户持续使用意愿调查问卷

5. 您玩这个游戏多长时间了？

  ☐1 个月   ☐2 个月
  ☐3 个月   ☐4 个月
  ☐5 个月   ☐6 个月

6. 平均来说，您玩这个游戏的频率是多少？

  ☐一天数次   ☐一天一次
  ☐一周数次   ☐一周一次
  ☐ 少于一周一次   ☐少于一个月一次

7. 平均来说，每次您花多长时间来玩这个游戏？

  ☐0-15 分钟   ☐16-30 分钟
  ☐0.5-1 小时   ☐1-1.5 小时
  ☐1.5-2 小时   ☐2-3 小时
  ☐多于 3 个小时

8. 您玩在线游戏多久了（从您开始玩在线游戏开始计算）？
  ☐1 年以下   ☐1-3 年
  ☐3-5 年   ☐5-7 年
  ☐7 年以上

请使用李克特五分制量表对下面的叙述进行评判:
1= 不同意; 2= 基本不同意; 3= 无所谓同意或不同意; 4=基本同意; 5= 同意。

9. 请根据您玩这个游戏的经验，对以下描述"逃避现实"的叙述进行评价。
当我感觉沮丧时，我会玩这个游戏   1 2 3 4 5
当我经历了糟糕的一天时，我会玩这个游戏。 1 2 3 4 5
这个游戏能够让我扫除不快。   1 2 3 4 5
玩这个游戏是一个很好的与现实世界脱离的方式。 1 2 3 4 5

10. 请根据您玩这个游戏的经验，对以下描述"幻想"的叙述进行评价。
玩这个游戏能够让我体验到我日常生活中不能体验的事情。 1 2 3 4 5

玩这个游戏能够让我扮演其他人或者感觉身处不同的时空。　　1 2 3 4 5

玩这个游戏能够让我将自己沉浸在游戏的情境中。　　1 2 3 4 5

11. 请根据您玩这个游戏的经验，您认为这个游戏：

很无趣　……　有趣。　　1 2 3 4 5

不好玩　……　好玩。　　1 2 3 4 5

无聊　……　令人兴奋。　　1 2 3 4 5

12. 请根据您玩这个游戏的经验，对以下描述"社交存在感"的叙述进行评价。

我相信当我需要帮助时，这个游戏的其他玩家会帮助我的。　　1 2 3 4 5

在这个游戏环境中，我感觉与其他玩家是联系在一起的。　　1 2 3 4 5

我与这个游戏的其他玩家交流时，我能展现真正的自我。　　1 2 3 4 5

我感觉我是这个游戏社区的一员。　　1 2 3 4 5

13. 请根据您玩这个游戏的经验，对以下描述"自我展示"的叙述进行评价。

我希望别的玩家认为我是讨人喜欢的。　　1 2 3 4 5

我希望别的玩家认为我是友善的。　　1 2 3 4 5

我希望别的玩家认为我的游戏技能高超。　　1 2 3 4 5

14. 请根据您玩这个游戏的经验，对以下描述"社交"的叙述进行评价。

和其他沟通方式相比，通过这个游戏进行沟通令我更坦诚。　　1 2 3 4 5

我通过这个游戏结识了一群朋友。　　1 2 3 4 5

玩这个游戏让我能够和现实生活中的朋友保持联系。　　1 2 3 4 5

玩这个游戏能让我联系上现实生活中的朋友。　　1 2 3 4 5

15. 请根据您玩这个游戏的经验，对您通过玩这个游戏所获得的成就感进行评价。

我玩这个游戏是为了达到更高的游戏等级。　　1 2 3 4 5

我玩这个游戏是为了比其他玩家具备更强的能力。　　1 2 3 4 5

我玩这个游戏是为了比其他玩家有更好的游戏装备。　　1 2 3 4 5

我玩这个游戏是为了向别的玩家证明我是最棒的。　　1 2 3 4 5

16. 请根据您玩这个游戏的经验，对以下描述"社会影响"的叙述进行评价。

多数对于我来说较重要的人赞成我继续玩这个游戏。　　1 2 3 4 5

那些影响我做决定的人认为我应该继续玩这个游戏。　　1 2 3 4 5
那些我看重其意见的人觉得我应该继续玩这个游戏。　　1 2 3 4 5

17. 请根据您将来继续玩这个游戏的意愿，对以下描述
进行评价。
这个游戏值得我在将来继续玩。　　　　　　　　　　1 2 3 4 5
我很愿意在不久的将来继续玩这个游戏。　　　　　　1 2 3 4 5

第二部分. 社交游戏用户转换意愿调查问卷

5. 您目前转移去玩其他社交游戏么？？

    □是的   □不是，我目前没有玩任何社交游戏

(在第五题中，当用户选择"不是"时，答题自动结束。)

请使用李克特五分制量表对下面的叙述进行评判:
1= 不同意; 2= 基本不同意; 3= 无所谓同意或不同意; 4=基本同意;
5= 同意。

6. 请根据您玩这个游戏的经验，对这个游戏的满意度进行评价。 您认为这个游戏:

令人不满意 … 不满意。	1 2 3 4 5
令人觉得不愉快 … 令人觉得愉快。	1 2 3 4 5
令人沮丧 … 令人满足。	1 2 3 4 5

7. 请根据您玩这个游戏的经验， 您认为这个游戏:

很无趣 … 有趣。	1 2 3 4 5
不好玩 … 好玩。	1 2 3 4 5
无聊 … 令人兴奋。	1 2 3 4 5

8. 请根据您玩这个游戏的经验，对这个游戏的质量作出评价。

总的来讲， 我认为这个游戏的质量较好。	1 2 3 4 5
我觉得，这个游戏的整体质量比较高。	1 2 3 4 5
这个游戏的服务总的来讲很不错。	1 2 3 4 5

9. 请对您在社交游戏中的转移经验进行评价。

我过去频繁地更换玩不同社交游戏。	1 2 3 4 5
我有很多在社交游戏间转换的经验。	1 2 3 4 5
我经常玩某个社交游戏一段时间（例如 1 个月）后，就换成玩别的社交游戏了。	1 2 3 4 5

10. 请根据你玩这个游戏的经验， 对以下描述"竞品吸引力"的叙述进行评价。

其他可选的社交游戏比这个游戏更好玩。	1 2 3 4 5
其他可选的社交游戏提供了比这个更好的游戏服务。	1 2 3 4 5
其他可选的社交游戏比这个有更好的声誉。	1 2 3 4 5

11. 请根据你玩这个游戏的经验， 对以下描述"主观行为规范"的叙述进行评价。

大多数对于我来说比较重要的人都赞成我去玩别的社交游 1 2 3 4 5
戏而不是这个游戏。

那些影响我做决定的人认为我应该去玩别的社交游戏而不 1 2 3 4 5
是这个游戏。

那些我看重他们的意见的人觉得我应该去玩别的社交游戏 1 2 3 4 5
而不是这个游戏。

12. 请根据你玩这个游戏的经验，对以下描述"描述行为规范"的叙
述进行评价。

在我的社交网络中，很少有人继续玩这个游戏。 1 2 3 4 5

那些影响我做决定的人选择去玩别的社交游戏而不是这个 1 2 3 4 5
游戏。

那些我看重他们的意见的人选择去玩别的社交游戏而不是 1 2 3 4 5
这个游戏。

13 请根据你玩这个游戏的经验，对您的"多样化需求"进行评价。

与其它我不太确定的游戏相比，我宁可继续玩目前在玩的 1 2 3 4 5
社交游戏。

如果我喜欢我目前在玩的社交游戏，我很少尝试其他的游 1 2 3 4 5
戏。

我对于尝试不同的社交游戏抱谨慎的态度。 1 2 3 4 5

14. 如果您转换去玩别的社交游戏，请对您感知到的适应成本进行评
价。

如果我去玩别的社交游戏，那么我需要花时间和精力去找 1 2 3 4 5
这个游戏的替代品。

如果我去玩别的社交游戏，那么我不得不学习新的玩法和 1 2 3 4 5
策略。

如果我去玩别的社交游戏，那么我不得不学习新的政策及 1 2 3 4 5
积累经验以融入到新的游戏社区中去。

15. 如果您转换去玩别的社交游戏，请对您感知到的沉没成本进行评
价。

如果我不玩这个游戏了，我会失去通过该游戏建立起来的 1 2 3 4 5
社交关系。

如果我不玩这个游戏了，我在玩该游戏中所花费的精力， 1 2 3 4 5
时间和努力都浪费了。

如果我不玩这个游戏了，我将失去我在玩该游戏过程中积 1 2 3 4 5
累的虚拟物品。

如果我不玩这个游戏了，我将失去在该游戏里所拥有的特 1 2 3 4 5
权。

16. 请根据您将来转换去玩别的社交游戏的意愿，对以下描述进行评价。

我考虑玩别的社交游戏来取代这个游戏。   1 2 3 4 5

我将来去玩别的社交游戏而不是这个游戏的可能性比较   1 2 3 4 5
高。

Appendix 3 List of Concepts

Concept	Definition	Reference
Enjoyment	The extent to which the activity of playing the SNG is perceived to be enjoyable.	Ryan and Deci (2000)
Escapism	The extent to which playing the SNG will help players escape unpleasant realities or distract his/her attention from problems and pressures.	Holbrook and Hirschman (1982)
Fantasy	The degree of the imagined events or sequences of mental images representing an integration of the demands realized when playing the SNG.	Holbrook and Hirschman (1982)
Social Presence	The extent to which the player's psychological sense of physically interacting and establishing personal connections with others via playing the SNG is realized.	Biocca et al. (2003)
Self-presentation	The extent to which playing the SNG will help the player generate a particular image of self and thereby influence how others perceive and treat the player.	Goffman (1959)
Social interaction	The extent to which players use the SNG as a social environment to interact with others	Yee (2006a)
Achievement	The extent to which playing the SNG to gain power, progress rapidly and accumulate game symbols of wealth or status as well as competing with others is important	Yee (2006a)
Social influence	The degree to which an individual perceives that important others believe he or she should continue playing the SNG.	Venkatesh et al. (2003)
Price value	Consumers' cognitive tradeoff between the perceived benefits of the applications and the monetary cost of playing the SNG.	Dodds et al. (1991); Venkatesh et al. (2012)
Habit	Habits are learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end-states.	Verplanken and Aarts (1999); Limayem et al. (2007)
Satisfaction	A SNG player's evaluation and affective response to his or her overall experience with playing the SNG.	Oliver (1980)
Service Quality	A SNG player's perception of the SNG's overall service performance.	Wixom and Todd (2005)

Alternative Attractiveness	The degree to which a SNG player perceives that an alternative is better, such as more enjoyable or has a better service.	Hou et al. (2011)
Descriptive Norms	The degree to which an individual perceives that significant others have switched from the SNG	Rivis and Sheeran (2003)
Subjective Norms	The degree to which an individual perceives that most people who are important to him/her think he/she should switch from the SNG	Ajzen (1991)
Need for variety	The individual psychological need for change as result of not being satisfied by a single SNG but rather many different SNGs.	Vázquez-Carrasco and Foxall (2006)
Sunk Cost	The degree of an individual player's perception of loss in financial, performance-related, social and psychological costs regarding a SNG when switching to an alternative.	Kim et al. (2006)
Adaptation Cost	The degree of an individual player's perception of the cost of adapting to a new game, such as search cost and learning cost.	Kim et al. (2006)

Research article 1

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PLEASE STAY WITH ME! AN EMPIRICAL INVESTIGATION ON HEDONIC IS CONTINUANCE MODEL FOR SOCIAL NETWORK GAMES

Completed Research Paper

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Abstract

It has long been a challenge for online game providers that, after playing a game for a certain period of time, online game players frequently switch to alternative games without much hesitation. Current IS continuance theories, that are mainly developed to interpret user continuance of general utilitarian IS, are ineffective to interpret user continuance of hedonic IS. In this study, based on the uses and gratifications theory, a hedonic IS continuance model is developed by incorporating three sorts of gratifications, namely hedonic gratification (enjoyment, fantasy and escapism), social gratification (social interaction and social presence) and utilitarian gratification (achievement and self-presentation). Age and gender are the moderating factors in the model. Based on 3919 validated respondents, the research model is assessed while a number of interesting findings are reported.

Keywords: Social network game, Uses and Gratifications, Continuance Intention, Hedonic IS

Introduction

Nowadays, people are increasingly exploring IS for hedonic purposes. For instance, playing online games has become primary leisure activities for adolescents, and individuals are increasingly using online games in daily life for various needs and interests, such as for entertainment, keeping connecting with friends and escaping from the reality (Liu et al. 2013). In the world there have been about one billion online game players (McGonigal 2011). Despite the fast growing game market, online game providers are facing a challenge that it is difficult to retain a game player for a long term relationship (Playnomics 2012). Game players frequently switch to new games without much hesitation. Thus, understanding the post adoption behavior (such as hedonic IS continuance and switch behaviors) of online game players are of importance in practice. In the context of this study, we refer to hedonic IS continuance as the continuous use of a specific hedonic IS product.

Unlike utilitarian IS, hedonic IS aims to provide self-fulfilling value to users (Heijden 2004). A dominant design objective of hedonic IS is to facilitate a prolonged use of the IS by i.e. offering hedonic content, animated images, interaction, colors and so on. The dominant IS theories cannot fully explain hedonic IS adoption or sustained usage of hedonic IS as these theories mainly developed for utilitarian-oriented systems (Xu et al. 2012). Furthermore, prior studies have been mostly grounded on the use of user satisfaction or system features (i.e perceived usefulness) to interpret continuance of IS (Bhattacherjee 2001). Many studies imply that the satisfaction-based theory cannot properly explain the phenomenon why some online game players switch from one online game to another even though they are satisfied with the previous game. Bhattacherjee et al. (2012, p. 327) argued that "despite the increased incidence and relevance of such switching phenomenon, our understanding of it has remained scant". Steenkamp and Baumgartner (1992) argued that switching behavior may occur among satisfied customers due to their attempt to try something novel or different for fun or thrill. Customers may be satisfied with their choices, but may still switch to alternatives due to a desire for novelty or complexity in consumption (Fiske and Maddi 1961), or for curiosity (Raju 1980), or getting bored, fed up, on repetitively doing the same thing (Herrnstein and Prelec 1992).

To address the above issues, we borrow the Uses and Gratifications (U & G) theory from the field of media research to examine hedonic IS continuance. It is postulated that individuals' continuous playing of a specific online game will be determined by the gratifications they have achieved in their prior use of the game, while age and gender have moderating effect on the proposed relationships. The proposed research model was empirically tested via the valid questionnaires from 3919 individuals, who are the players of a specific social network game (SNG) – a kind of popular online game.

This study contributes to the IS literature in several ways. First, the research provides a theoretical framework to investigate the antecedents of players' continuance in the context of hedonic IS from the uses and gratifications perspective and offers evidence that user satisfaction does not work effectively in determining individuals' hedonic IS continuance. Second, an investigation of the demographic factors as moderator in the research model will help understand hedonic IS users' perceptions development, which will be useful for future hedonic IS research.

Following this section, we present a brief theoretical background of the U & G theory, which facilitates the development of our research model. This is followed by a description of our research design and result, including research instrument development, data collection, data analysis and research findings. Thereafter, we discuss the research findings and highlight the implications for theories and practices. Finally a framework for future research as well as the limitations of the current research are discussed.

Theoretical background

Uses and gratifications theory

The U & G framework is originated in the 1940s, which has, thereafter, been widely used in the mass communications research. The U & G approach focuses on individual user-level view on media use in consumer market and explains the reason why people choose a communication medium over alternative

media to gratify their various needs (Katz et al. 1974; Weibull 1985). According to the U & G theory, people are active in choosing and using media based on their needs. They are aware of their needs and their behaviors are goal-oriented. Their needs arouse their motives that influence their use of communication media, which further leads to their affective, cognitive and behavior outcomes (Katz et al. 1974; Weibull 1985). Prior U & G research suggests that people use a communication medium for the content gratification (such as entertainment or information) and/or for the process gratifications (such as the experience of actual use of the medium) (Katz et al. 1973; Stafford and Stafford 1996).

The U & G approach provides a nomological network for research rather than providing the predefined set of constructs or factors. For instance, Blumler (1979) posited that the gratifications obtained from the use of communication medium are closely related to the nature of communication medium. The U & G approach has been widely applied in the traditional mass communication research, such as radio (Mendelsohn 1964), newspapers (Elliott and Rosenberg 1987), and television (Babrow 1987), as well as in the new media and communication technologies research, such as email (Dimmick et al. 2000), the Internet (Stafford et al. 2004), virtual community (Cheung and Lee 2009), social network sites (Xu et al. 2012) and online game (Wu et al. 2010), based on different operationalization of individuals' gratifications obtained from their use of these media.

In this study, the U & G approach was selected as the basis of the research framework to explore individuals' continuous use of an online game due to the following reasons. Compared to the dominant IS theories, which are mainly theories of workplace technology use, the U & G approach fits well into the motivation research of volunteer use of hedonic IS, because people volunteered to use online games to fit their particular needs (Wu et al. 2010). In addition, playing online games are experience-oriented. The U & G approach fits well into explaining how online game users will continue playing an online game when their needs are fulfilled in their use and they obtain gratifications in their playing experience. Furthermore, the U & G approach takes a user-level view in understanding media use and it fits to the research context of IS consumer market.

In the IS literature, there are a growing number of IS studies suggesting the use of the U & G approach to explain individuals' continued use of communication technology (Liang et al. 2007). Weibull (1985) argued that gratifications are relevant to individuals' reactions to their actual media use experiences, and in turn influence their further motivation for media use, such as continued motivation. Stafford et al. (2004) suggested that the U & G approach can be used to explain continued use of something that has already been chosen, such as continued use of IS. Based on a review on technology use theories, Stafford et al. (2004) argued that the U & G approach fits best with the motivational theories as included in the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003). The recent research results based on the U & G approach in the new communication technologies or systems, such as Internet (Stafford et al. 2004), social network sites (Xu et al. 2012), found that there are three gratifications for using them, including content gratifications, process gratifications, and social gratifications.

The role of gender and age in online game adoption

Demographic variables like age and gender has attracted the attention of IS researchers. Gefen and Straub (2003) integrated gender as a moderator into the TAM to explore individuals' use of email and found that the perceptions toward email use differ by gender. In UTAUT model, Venkatesh et al. (2003) posited that age and gender have moderating effecting on the relationships between performance expectancy, effort expectancy, social influence on behavioral intention. A number of prior research on online games suggested that players' perceptions differ by age and gender since at the initial stage of online game diffusion online games are more popular among the young generation and among males (See Table 1).

Table 1 Literature review on the role of age and gender in online games			
Author	**Theory**	**Context**	**Research Result**
Lee (2009)	Theory of Planned Behavior	Online games	Age is not a moderator. Gender exerts moderating effect on the relationship between attitude and intention, perceived enjoyment and intention.
Wang and Wang (2008)	Self-developed Model	Online games (MMORPG)	Gender is a moderator. Computer self-efficacy is a stronger predictor of behavioral intention for men than for women, and computer anxiety negatively influenced behavioral intention more strongly for women than for men.
Ha et al. (2007)	TAM	Mobile games (under mobile broadband wireless access environment)	Age is a moderator, exerting moderating effect on the relationships between perceived ease of use and enjoyment, perceived ease of use and flow experience, perceived enjoyment and perceived usefulness as well as flow experience and attitude. Gender only exerts moderating effect on the relationship between perceived ease of use and perceived enjoyment.
Van Reijmersdal et al. (2010)	Exploratory study	Online games	Behavioral intention is moderated by age. The advertising in the game has stronger influence on the intention of younger children without use experience than older children with experience.
Lin et al. (2008)	Self-developed Model	Online games	Gender exerts moderating effects on the paths from satisfaction and commitment to loyalty as well as the paths from virtual power status, incentives and enhancement to satisfaction and commitment respectively.

Research model and hypotheses development

According to the U & G theory, individuals select or choose a media to gratify their needs. Research from existing IS research suggest that people's use of IS is driven by the desired outcomes of IS, such as for the utilitarian outcome of IS (e.g. perceived usefulness or perceived performance), or hedonic outcome of IS use (e.g. perceived enjoyment and fun), or social outcome of IS use (e.g. status and image). According to Venkatesh and Brown (2001), the adoption of hedonic IS were driven by mainly the hedonic outcomes, utilitarian outcomes and social outcomes from adoption. According to the U & G theory, individuals use hedonic IS mainly due to their needs, such as hedonic needs, social needs and utilitarian needs. Individuals' needs will be fulfilled in their usage of hedonic IS and will obtain hedonic gratification, utilitarian gratification and social gratification. The gratifications obtained in hedonic IS use will further influence their continuance intention to use this hedonic IS.

Online game is a kind of hedonic IS. Prior research on IS adoption has identified that perceived enjoyment as the main hedonic motivation for individuals initial acceptance and sustained use of hedonic IS. Holsapple and Wu (2007) argued that many of the new technologies integrated into our daily lives are both utilitarian-oriented and hedonic-oriented. Thus, utilitarian motivation is suggested to be another motivation to use hedonic IS, such as online game, virtual world. Further, prior IS research found that individuals are also trying to keep social connection with others via their interaction in IS, such as social network sites (Xu et al. 2012). Thus, social motivation is also included in the human factors which affect individuals' IS use. In brief, individuals' acceptance and sustained use of online games are mainly determined by their hedonic, utilitarian and social motivations. Accordingly, following the motivation theories, we propose three gratifications achieved in people's prior online game experience will influence their continuance intention with the game, including hedonic gratification, utilitarian gratification and social gratification.

The U & G perspective evolved in the literature to identity and profile individuals' use of communication

medium. In order to identify the gratifications obtained in playing online games based on the nature of online games, some constructs derived from both IS adoption theories and marketing theories are included in the research model to capture hedonic, social and utilitarian gratifications (See Table 2).

Table 2. List of research constructs in the research model			
Gratification	**Construct**	**Theory**	**Definition**
Hedonic Gratification	Enjoyment	Motivation Theories, Self-determination theory	The extent to which the activity of playing SNG is perceived to be enjoyable (Ryan and Deci 2000).
	Fantasy	Hedonic Theory	The degree of the imagined events or sequences of mental images representing an integration of the demands of all the psyche and reality components are realized in playing SNG (Hirschman and Holbrook 1982).
	Escapism	Hedonic Theory	The extent to which playing SNG will help players to escape unpleasant realities or to distract his/her attention from problems and pressures (Hirschman and Holbrook 1982).
Social Gratification	Social Interaction	Self-determination Theory	The extent to which players use SNG as a social environment to interact with others (Deci and Ryan 2000).
	Social Presence	Social Presence Theory	The extent to which the player's psychological sense of physically interacting and establishing personal connection with others via playing SNG (Biocca et al. 2003).
Utilitarian Gratification	Achievement	Self-determination Theory	The extent to which playing SNG to gain power, progress rapidly and accumulate in-game symbols of wealth or status, as well as competing with others (Ryan and Deci 2000; Yee 2006) .
	Self-presentation	Self-presentation Theory	The extent to which playing SNG will help the player to generate particular image of self and thereby influence how others perceive and treat the player (Goffman 1959.

In prior IS literature, enjoyment has been extensively proven as a strong determinant of intention to use hedonic IS (Heijden 2004; Turel et al. 2010) or to play games (Ha et al. 2007; Hsu and Lu 2007). According to the hedonic theory (Hirschman and Holbrook 1982) in marketing discipline, the hedonic factors for individuals' hedonic consumption include both imaginal (such as fantasy and escapism) and emotional response (such as enjoyment). In the study, we suppose that fantasy, escapism and enjoyment are the three factors to capture the hedonic gratification in online games as online game players might not only obtain hedonic gratification from the fun they achieve in playing an online game, the fantasy of the game and escaping from the reality might also help them achieve the hedonic gratification.

Researchers have always recognized that online games can offer hedonic gratification to online game users. To most scholars online games are with a second nature of being socializing and building relationships with others. Wang and Wang (2008) stated that social interaction in online games is highly essential as online game players must collaborate with other players in the game for different goals, such as establishing network, achieving rewards, making advance in games and so on. Online game users can meet their needs to closely connect with others or be accepted by others by playing online games. Thus, social gratification in online games is suggested to be captured by social interaction and social presence.

Utilitarian outcome has been widely validated and applied in utilitarian-oriented IS, such as workplace and student settings (Venkatesh and Brown 2001). Across the different IS theories, constructs related to users' perceptions on utilitarian outcomes are emerged as strong predictors of IS usage behavior, such as perceived usefulness, relative advantage, job fit, performance expectancy (Davis 1989; Goodhue and Thompson 1995; Moore and Benbasat 1991; Venkatesh et al. 2003). Obviously, these constructs cannot be used to explain the utilitarian gratification of using hedonic IS. In this research, we propose that the utilitarian gratification can be captured by achievement and self-presentation. In prior literature it was postulated that online game users desire to gain power, gather virtual game objects and valuable performance points, competing with others as well as to generate particular image of player-self (Wu et al. 2010; Yee 2006; Lee et al. 2012). Online game offers a gateway for self-presentation among online game users.

In prior IS literature, perceived enjoyment has been identified as the dominant variable for individual to use hedonic IS and a prominent intrinsic motivation to use hedonic IS (Ryan and Deci 2000), such as in the research context of online games (Heijden 2004; Hsu and Lu 2007), social network site (Xu et al. 2012). Abundant studies confirm that if there is more fun and pleasure in playing online games, individuals intend to have higher intention to continue playing/engaging in online games (Boyle et al. 2012; Wu et al. 2010). Following the above reason, in this study enjoyment is supposed to be one of the main motivator driving individual' continuous intention with the SNG, and the following hypothesis is suggested:

H1. Enjoyment is associated with continuance intention positively.

In the hedonic theory, Hirschman and Holbrook (1982) point out that leisure and playing activities are important part of individuals' needs in life as these activities can provide individuals with hedonic experience and gratifications. They highlight the importance of fantasy for individuals to meet their needs and to obtain hedonic gratification in their usage of hedonic products/services. Fantasy has been repeatedly identified as a key motivation for initial and sustained use of online games in different online game genres (Chou & Tsai 2007). When individuals achieve more fantasy in their prior play of online games, such as building own city and farm, they are more likely to continue playing the online games in order to meet their need for fantasy realization. In playing SNG, people can do some activities which will not be possible for them to do in real life, such as having new identities, being a pop star, decorating avatar to achieve fantasy (Lee et al. 2012). Hence, we expect that fantasy individuals achieved in their prior SNG playing experience will affect their continuous intention to play this SNG, and the following hypothesis is suggested:

H2. Fantasy is associated with continuance intention positively.

Hirschman and Holbrook (1982) also point out that escapism plays important role in fulfilling individuals' hedonic need and achieving hedonic gratification in using hedonic products/services. Escapism refers to escaping unpleasant realities or to distract his/her attention from problems and pressures (Holsapple and Wu 2007). Escapism represents an aspect of hedonic behavior which offers individuals an avenue to a more desirable state than the current one experienced (Hirschman 1983). Prior studies found that escapism is a sub-dimension of immersion which is a major motivation to play online games (Wan & Chiou 2006; Yee 2006). When players are immersed in playing online games, they can easily get away from the real problems in their real life. As Yee (2006) and Xu et al. (2012) argued that escapism is not only positively associated with continued play of online games, but also a strong predictor for extensive game play. Thus, we expect that escapism will exert influence on individuals' continuous intention to use this SNG, and the following hypothesis is posited:

H3: Escapism is associated with continuance intention positively.

Social interaction has largely involved in playing online game and provided social gratification for players. Social interaction is shown to be a major motive to play different game genres and cross genders and ages (Yee 2006). Prior studies argued that online games should be reckoned as a social place, as players can use it to develop social relationship and expect feedback from others (Huang and Hsieh 2011). The process of playing SNG is highly associated with virtual social environment. When players achieve more social interaction gratification in their prior play, they might have higher intention to continue playing the game. Thus, it is assumed that:

H4. Social interaction is associated with continuance intention positively.

Social presence refers to the psychological sense of physically interacting and establishing personal connection with others via media (Biocca et al. 2003). People are motivated to choose the media with high level of social presence to gratify the need of psychological connection with each other and warm human contact (Lowry et al. 2006). Social presence has been found to be a very influential factor predicting individual intentions towards various IS usage, such as virtual world (Schwarz et al. 2011), social networks (Cheung et al. 2011), online shopping (Gefen and Straub 2003). With regard to SNG, players are connected with their friend, family and others in the virtual world via vivid 3D avatar, instant and asynchronous message. We expect that the more gratification achieved via social presence from prior SNG play, the higher intention for individuals to continue playing this SNG game, and the following hypothesis is suggested:

H5. Social presence is associated with continuance intention positively.

Achievement refers to playing SNG to gain power, progress rapidly and accumulate in-game symbols of wealth or status, as well as competing with others (Deci and Ryan 2000; Wu et al. 2010). It has been suggested that one of the motivations to play online game stems from the sense of achievement (Wan and Chiou 2006; Yee 2006). Achievement was found to be the most important motive for players to play MMORPG (Suznjevic and Matijasevic 2010). Similarly, Wu et al. (2010) conducted an empirical study and indicated that achievement positively predicted continuance intention to play online game (Wu et al. 2010). Motivated by the sense of achievement, players can use SNG to possess fancy decorations or have good game performance. Moreover, the objective of getting achievement cannot be attained without practice, repeated attempts and perseverance (Xu et al. 2012). Hence, we assume the following hypothesis:

H6. Achievement is associated with continuous intention positively.

Self-presentation refers to playing SNG will help the player to generate particular image (usually in socially desirable ways) of self and thereby influence how others perceive and treat the player (Goffman 1959; Schlenker and Leary 1982). Goffman (1959) suggests that people tend to engage in strategic activities to manage their performance in order to present appropriate images to others. According to social presence theory, people want to present themselves in a good manner which leads others to perceive them to be socially likable and competent for achieving greater social rewards (Dominick 1999). Papacharissi (2002) pointed out that self-presentation represented a key utilitarian motivation for individuals to use personal homepage usage (Papacharissi 2002). Studies conducted by Lee et al. (Lee et al., 2012) and Mehdizadeh (2010) reinforced the importance of self-presentation as a strong motivation to play SNG and use SNS respectively (Lee et al. 2012; Mehdizadeh 2010). Thus, the following hypothesis is suggested:

H7. Self-presentation is associated with continuance intention positively.

As we have discussed above that prior research found that individuals' perceptions on online game adoption differ by age and gender. In this study we propose that individuals' gratifications achieved in their prior SNG experience will differ by age and gender. Hence, age and gender are supposed to be moderators in our research model.

Figure 1 presents our research model and hypotheses.

Figure 1. The research model
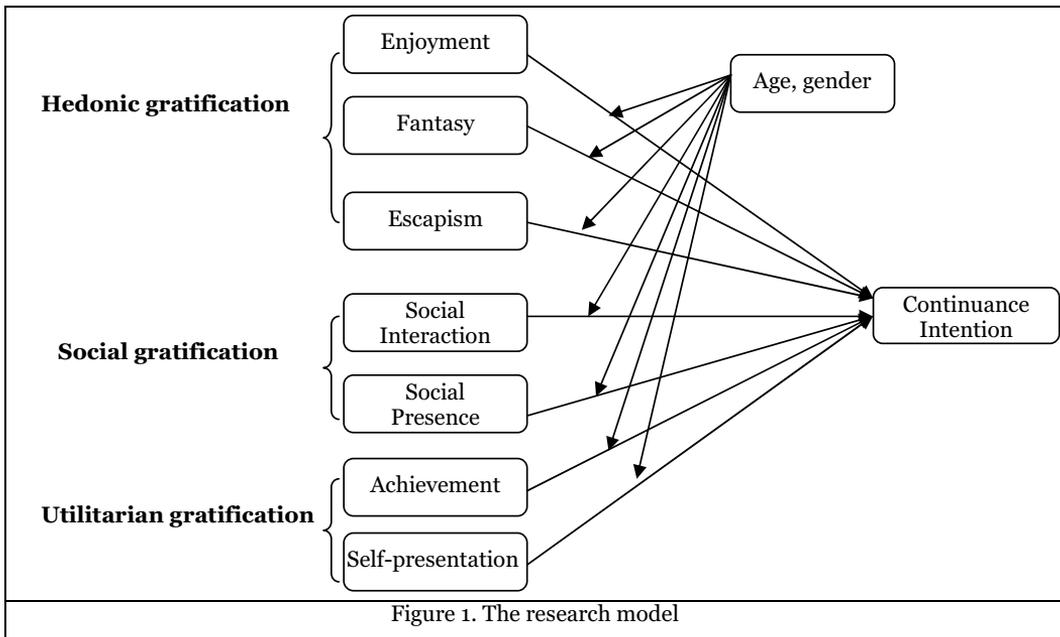
Research design

Research instrument development

In the study we use survey research method to collect quantitative data. A cross-sectional survey research strategy appears appropriate since this study involves an empirical test of some hypotheses derived from a well-defined research model. The scale items included in the survey were mainly adopted from the prior literature but adapted to the SNG research context. The items included in the research instrument are listed in Appendix 1. 5-point Likert scale ranging from 1 (Disagree) to 5 (Agree) is used to measure each item.

After the initial questionnaire was generated, a pilot study was conducted to confirm the content validity of the questionnaire. Seven participants (including three current SNG players, three IS researchers, and a manager of the SNG company) were interviewed in the pilot test to verify the wording, the completeness and the appropriateness of the research instrument. The questionnaire was refined based on the feedback from the respondents, such as rephrasing sentences and eliminating ambiguous questions.

Data collection

The research setting of this study was a social network game offered by one of the biggest Chinese social network sites. The site has over 552 million active users. The SNG has been running for 6 months before our data collection (November 2012). This company mainly uses its social network services (e.g. social network sites) to distribute and market this SNG to its current social network service users. The SNG investigated is one of the main games the company has developed.

The data for our study was collected via an online survey. The questionnaire was distributed to the registered players of the SNG by the company. The purpose of the survey is to collecting data for studying continued use of this SNG and switching behavior between SNG service providers respectively. In current study, we focus on continued use of this SNG. For reaching the most potential continuous users, we

identified them via self-selected question by asking if they have played 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. Players provided their answers voluntarily and no reward was provided. Finally, totally 7769 responses were collected from the survey, including continued use, switching and discontinued use of SNG. 3919 responses from the SNG players, who have played the SNG in the past one month, are used as the valid sample for the current study. The demographic information of the respondents is presented in Table 3. A majority (about 70%) of the respondents have played online game more than 1 year. More detailed use experience information is presented in Table 3 as well.

Data analysis

Confirmatory factor analysis was utilized to test the adequacy of the measurement model using Amos 20. Two items measuring escapism are found to have low factor loadings, which were therefore removed from the analysis. After deleting the items, we rerun the model. The results of the analysis demonstrated a satisfactory fit (GFI = 0.917; AGFI = 0.894; NFI = 0.962; IFI = 0.965; TLI = 0.958; CFI = 0.965; RMSEA = 0.058). CMIN/DF index is sensitive to sample size, which is therefore not considered due to the big sample size of the study.

Table 3. Demographic information of respondents			
Measure	Items	Frequency	Percentage
Gender	Male	2357	60.1
	Female	1562	39.9
Age	Under 15	481	12.3
	16-18	602	15.4
	19-24	1298	33.1
	25-30	1009	25.7
	31-35	326	8.3
	Over 36	203	5.2
Time period in playing this game	One Month	1860	47.5
	Two Months	673	17.2
	Three Months	505	12.9
	Four Months	205	5.2
	Five Months	162	4.1
	Six Months	514	13.1
Frequency in playing this game	Several times a day	1321	33.7
	Once a day	774	19.7
	Several times a week	793	20.2
	Once a week	432	11.0
	Less than once a week	354	9.0
	Less than once a month	245	6.3
Time duration in each session in playing this game	0-15mins	626	16.0
	16-30mins	974	24.9
	0.5-1 hour	722	18.4
	1-1.5hours	425	10.8
	1.5-2 hours	317	8.1

	2-3 hours	285	7.3
	More than 3 hours	570	14.5
Online game playing experience	Less than 1 year	1166	29.8
	1-3 years	1016	25.9
	3-5 years	670	17.1
	5-7 years	393	10.0
	More than 7 years	674	17.2

As shown in Table 4, the values of Cronbach's Alpha (α), composite reliability (CR) and average variance extracted (AVE) of the constructs are all over the thresholds of 0.7, 0.7 and 0.5 respectively. The squared roots of AVE are higher than their correlations with other constructs, as shown in Table 5. The results show that all items fit their respective factors quite well. The results suggest unidimensionality, convergent and discriminant validity of the measures. Harmon's one-factor test is applied to test common method bias. No factor is found to account for the majority of the covariance in the variables. In addition, single factor model test is performed. The single-factor model showed a poor fit (GFI = 0.462; AGFI = 0.368; NFI = 0.558; IFI = 0.559; TLI = 0.521; CFI = 0.559; RMSEA = 0.204) against the existence of common method bias.

Table 4. Reliability and convergent validity statistics				
Construct (no. of items)	α	Composite reliability	Minim. factor loading	AVE
Escapism (2)	0.88	0.88	0.67	0.67
Fantasy (3)	0.85	0.86	0.73	0.67
Self-presentation (3)	0.92	0.92	0.88	0.80
Social interaction (4)	0.94	0.94	0.85	0.79
Social presence (4)	0.96	0.96	0.91	0.88
Achievement (4)	0.94	0.94	0.81	0.81
Enjoyment (3)	0.93	0.93	0.88	0.82
Continuance intention (2)	0.95	0.95	0.95	0.91

Table 5. Discriminant validity								
Construct	ES	FA	SEP	SI	SP	AC	EN	BCI
Escapism (ES)	**0.81**							
Fantasy (FA)	0.58	**0.82**						
Self-presentation (SEP)	0.56	0.73	**0.89**					
Social Interaction (SI)	0.61	0.77	0.71	**0.89**				
Social presence (SP)	0.55	0.70	0.62	0.78	**0.93**			
Achievement (AC)	0.51	0.69	0.63	0.70	0.62	**0.90**		
Enjoyment (EN)	0.16	0.25	0.15	0.20	0.23	0.18	**0.91**	
Continuance intention (BCI)	0.52	0.68	0.58	0.69	0.70	0.62	0.35	**0.95**

(The bold diagonal values are the square roots of the AVEs of the individual constructs; off diagonal values are the correlations between constructs)

Research model and hypotheses test results

Structural model test indicated a good fit between the model and data (GFI = 0.917; AGFI = 0.894; NFI = 0.962; IFI = 0.965; TLI = 0.958; CFI = 0.965; RMSEA = 0.058). As shown in Figure 2, among the seven hypotheses in the basic research model, six are supported. Escapism (β = 0.052; $p < 0.001$), fantasy (β = 0.188; $p < 0.001$), social presence (β = 0.274; $p < 0.001$), achievement (β = 0.133; $p < 0.001$), social interaction (β = 0.166; $p < 0.001$) and enjoyment (β = 0.170; $p < 0.001$) are found to be significant determinants of continuance intention. Inconsistent with our expectations, self-presentation does not have significant influence on continuance intention. The model is found to have a good explanatory power, which interprets 61.1 percent of the variance of continuance intention.

Figure 2. Results of basic model evaluation (***: $p < 0.001$; n.s. : not significant)
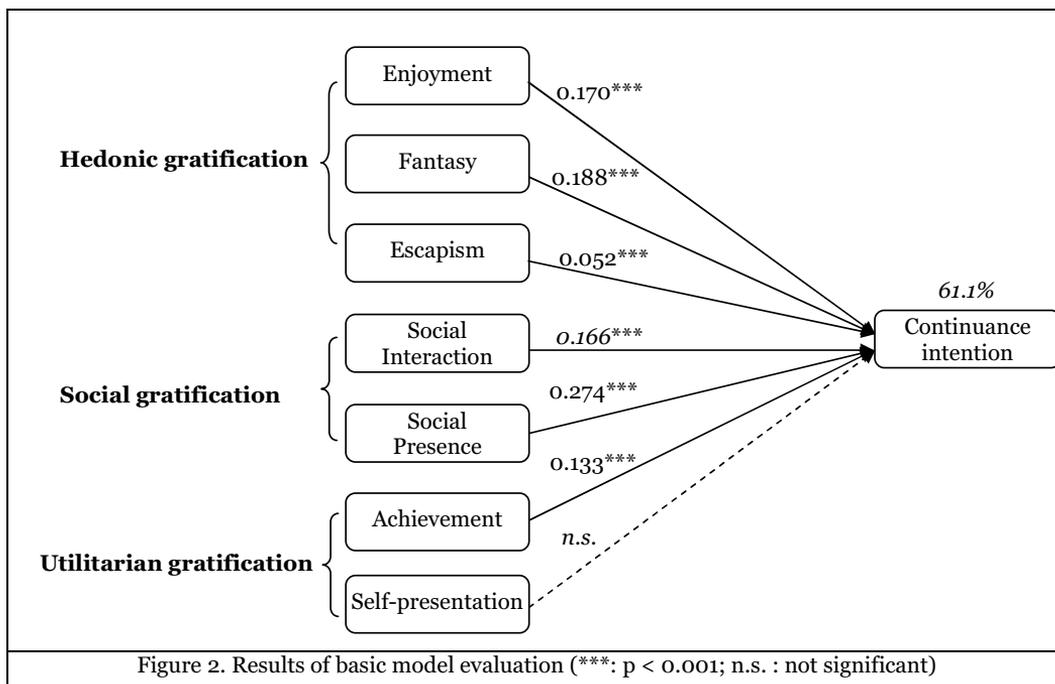
We further examine whether strength of the relationships between antecedents (enjoyment, fantasy, escapism, social interaction, social presence, achievement and self-presentation) and continuance intention vary by age and gender. Linn (1982) suggested that researchers should compare the explained variance (R^2) by research model as well as the associated regression results when examining subgroups. The results on different gender and age groups are presented in Table 6 and Table 7.

Enjoyment, social interaction, social presence, fantasy and achievement are found to be the factors influence both male and female player's continuance intention to use a specific hedonic IS significantly. However, escapism only has significant influence on female players, but not on male players. Self-presentation has no significant influence on both female and male subgroups. Compared to model test with all the samples, the model of male group predicts 3 percent more of the variation of continuance intention, whereas the model of female group predicts 3.5 percent less of the variation. A simple comparison of standardized path coefficients among the male and female subgroups suggests that enjoyment, escapism, social interaction, social presence, fantasy, self-presentation and achievement have different influences on continuance intention between the different subgroups of gender. The results (See Table 6) indicate that the influences of both enjoyment and social interaction on continuance intention for women and men subgroups are significantly different, whereas escapism, fantasy, social presence, self-expression and achievement have no significant difference.

Human Behavior and IS

Enjoyment, social presence and achievement are significant predictors of player's continuance intention in all different age subgroups. However, fantasy, escapism, self-presentation and social interaction only affect continuance intention in specific subgroups. Obviously, enjoyment, escapism, social interaction, social presence, fantasy, self-presentation and achievement have different influences on each subgroup's continuance intention. The results (See Table 7) indicate that the path coefficients of each antecedent to continuance intention for different age subgroups are significantly different from the full sample ($p<0.1$).

Table 6. Subgroup analysis of the basic research model (gender)		
	Gender (basic model), χ2= 4729.292, df = 592	
	Male	**Female**
EN → CI	β=0.129, **p<0.001**	β=0.224, **p<0.001**
	χ2=4752.813, Δχ2=23,521, **p<0.01**	
SI → CI	β= 0.229, **p<0.001**	β=0.100, **p<0.005**
	χ2= 4736.325, Δχ2=7.033, **p<0.01**	
SP → CI	β= 0.258, **p<0.001**	β=0.280, **p<0.001**
	χ2= 4729.960, Δχ2=0.668, n.s.	
SEP → CI	β=0.025, n.s.	β=0.006, n.s.
	χ2=4729.520, Δχ2=0.228, n.s.	
FA → CI	β= 0.193, **p<0.001**	β=0.175, **p<0.001**
	χ2= 4729.344, Δχ2=0.052, n.s.	
ES → CI	β=0.030, n.s.	β=0.070, **p<0.005**
	χ2= 4731.179, Δχ2=1.887, n.s.	
AC → CI	β= 0.119, **p<0.001**	β=0.138, **p<0.001**
	χ2= 4729.464, Δχ2=0.172, n.s.	
R²	**0.641**	**0.576**

Discussion

This study attempted to explore the factors that influence individuals' continuance intention to use a specific hedonic IS product in the context of SNG, as well as the moderating effect of gender and age. The results show that three sorts of gratifications affect individuals' continuance intention to use the SNG significantly, including hedonic gratification (enjoyment, fantasy and escapism), utilitarian gratification (achievement) and social gratification (social interaction and social presence). The results provide a weak support for the gender effects on the relationship between each antecedent and continuance intention, but a strong support for the moderating effect of age.

Gratifications and SNG continuance intention

Consistent with our expectations, we found that hedonic gratification (enjoyment, fantasy and escapism) still plays important role in determining individuals' continuance intention to use a specific SNG since it is taken for granted that SNG is primarily used for fun. Contrast to the prior research finding, we found that enjoyment is not a dominant factor to capture hedonic motivation in online games, and fantasy seems to be of high importance in predicting the hedonic motivation in online games, while escapism play only a marginal effect. In playing SNG, players can easily capture happiness as SNGs are with the simple and feature the universal themes, such as building their farmers, cities. Meanwhile, players decorator their avatar as well as act in different roles in the virtual world of SNG and get away from the reality, such as displeasure or problems in reality. These features satisfy players' desire for hedonic gratifications, which in turn drive their continued use of this SNG.

Table 7. Subgroup analysis of the basic research model (age)						
	Age (basic model), χ2= 6866.402, df = 1776					
	Below 15	**15-18**	**19-24**	**25-30**	**31-35**	**Above 35**
EN →CI	β=0.124, **p<0.001**	β=0.133, **p<0.001**	β=0.180, **p<0.001**	β=0.175, **p<0.001**	β=0.211, **p<0.001**	β=0.283, **p<0.001**
	χ2=6874.805, Δχ2=8.403, **p<0.01**					
SI →CI	β=0.284, **p<0.001**	β=0.225, **p<0.001**	β=0.195, **p<0.001**	β=0.051, n.s.	β=0.202, **p<0.05**	β=0.025, n.s.
	χ2=6877.599, Δχ2=11,197, **p<0.01**					
SP →CI	β=0.199, **p<0.001**	β=0.316, **p<0.001**	β=0.248, **p<0.001**	β=0.290, **p<0.001**	β=0.330, **p<0.001**	β=0.281, **p<0.005**
	χ2=6870.587, Δχ2=4.158, **p<0.05**					
SEP →CI	β=0.061, n.s.	β=0.026, n.s.	β=0.029, n.s.	β=-0.003, n.s.	β=-0.003, n.s.	β=-0.283, **p<0.005**
	χ2=6877.592, Δχ2=11.19, **p<0.01**					
FA →CI	β=0.213, **p<0.001**	β=0.123, n.s.	β=0.183, **p<0.001**	β=0.199, **p<0.001**	β=0.132, n.s.	β=0.339, **p<0.005**
	χ2=6870.236, Δχ2=3.834, **p<0.1**					
ES →CI	β=0.065, n.s.	β=-0.012, n.s.	β=0.037, n.s.	β=0.089, n.s.	β=0.005, n.s.	β=0.241, **p<0.001**
	χ2=6880.537, Δχ2=14,135, **p<0.01**					
AC →CI	β=0.084, **p<0.05**	β=0.147, **p<0.001**	β=0.128, **p<0.001**	β=0.162, **p<0.001**	β=0.148, **p<0.05**	β=0.162, **p<0.05**
	χ2=6870.494, Δχ2=4.074, **p<0.05**					
R²	**0.689**	**0.618**	**0.591**	**0.580**	**0.651**	**0.647**

Social gratification (social interaction and social presence) is another key factor that has strong positive impacts on continuance intention. Social presence has the strongest impact on SNG continuance intention. SNG players can interact and communicate with each other in the game through their embedded social network sites (Shin and Shin 2011), while ample opportunities are available for players to share their gaming experience within their existing network via social network sites, such as friends or family members. Players of SNGs can use their existing social network friends as resources in playing SNGs, such as getting virtual harvest from friends' farms, or getting extra rewards if their friends are with high game levels (Consalvo 2011). In addition, SNG players can invite others, such as friends or family members, to participant in SNG (Lee et al. 2012). The finding on social gratification is aligned with the primary characteristics of SNG to be social. As such, it is no surprise that social presence and social interaction directly affects SNG continuance intention. The finding shows that the social support in SNG helps players to fulfill their inner socio-psychological needs and motivates individuals to continue use the SNG.

In this study we also found that utilitarian gratification (achievement) positively affects continuance intention of SNG. Normally, SNG is primarily used for fun at the early stage since players mainly use some basic features of SNG. With the continued use of SNG, utilitarian gratification will start to emerge when players discover more features that fit to their utilitarian need, such as gaining power in the SNG, accumulating skills in competing with other players, and upgrading status in SNG. The finding is consistent with the work of Magni et al. (2010) that, with more time in using hedonic technology, the effect of hedonic factors on individuals' intentions to continue using the technology decreases whereas the effect of utilitarian factors increase.

The role of age and gender in SNG continuance intention

Gender was found to have weak moderating effects. Gender only has a significant moderating effect on the paths from enjoyment and social interaction to continuance intention, but not on the paths of other independent variables (social presence, fantasy, escapism and achievement) to continuance intention.

Among the hedonic factors, consistent with the prior research findings, enjoyment exerts a stronger effect on SNG continuance intention in female subgroup than in male subgroup. Social interaction exerts a stronger influence among the male subgroup than the female subgroup. It might be due to the reason that females have more need for fun, but less need for social interaction in SNG while females are more easily get involved in social interaction. With the increase use of SNG, males do not think the fun in playing SNG is important for them any more. Male regard SNG as an important communication media with others via social interaction, and the social interaction also meet their needs.

Age was a strong moderator in this study. The comparison between different age subgroups exerts interesting findings. The moderating effect of age is significant on each path from the antecedents to SNG continuance intention. Apparently, SNG players at different age groups have different needs to be fulfilled. Perceived enjoyment exerts less effect on adolescence than on adults whereas fantasy influences the players both less than 15 years old and more than 35 years old and the effects are stronger than in the other age groups. Social interaction exerts a strong influence on the adolescence than the adults. Social presence exerts strong influence on continuance intention across all the groups. It is consistent with the prior findings that adolescences use games to intensify their friendship as well as to establish social relationships via social interaction, instead of getting power or status in the virtual world. This also helps explain why achievement exerts less influence on those less than 15 years old. The reason why the strong negative influence of self-presentation and strong positive effect of fantasy and escapism on continuance intention among people between 31 to 35 years old might due to the reason that people at this age are eager to experience fantasy as they may experience more stress in daily life than the younger people. They have a need to temporally escape from the reality by immersing to the SNG. But they are not eager to present them in the virtual world for i.e. friends, as they may not want to interact with other players who are mostly much younger than them.

Implications for research and practices

The findings of this study have significant implications for both academia and practice relating to the issues of IS continuance. Firstly, our finding adds knowledge to IS continuance research by integrating the U & G approach into IS space. In the study we found that gratifications are the main motivators for individuals to continue use an online game, including hedonic, social and utilitarian gratifications that derived from their prior game experience. The finding helps explain that hedonic IS is becoming a sort of multi-purpose-oriented IS. In online game adoption, individuals make their decisions to continue use one online game on a basis of the gratifications they have achieved in their prior use, but not satisfaction, even though satisfaction was suggested to be a dominant variable in determining continuance intention. In fact we conducted a further analysis of our basic research model by integrating satisfaction as a direct determinant of continuance intention. We found that, whilst satisfaction ($\beta=0.130$, $p<0.001$) influences continuance intention to use the SNG significantly, the effect is not as strong as other gratification factors. Secondly, a primary contribution of this study is the detection of the moderating role of demographics (age and gender) on the path from independent variables to continuance intention. The moderating effect of gender in online game field is diminishing with the penetration of online games into people's life, and age is still a strong moderator since the needs for people at different ages are quite different from each other. The role of demographic factors should be considered when examining individuals' continuance intention to use a hedonic IS.

Practical implications for game developers can be drawn from these findings. Firstly, considering the importance of different dimensions in gratifications, game developers should develop features in their games to meet the needs of players, such as the features to help players to meet their needs for social presence, fantasy and achievement, and achieve gratifications from their play. Secondly, game developers should develop more features in their games to meet the different needs of players at different ages.

Limitation and Future Research

There are several limitations of our study. First, the research model was tested with the empirical data collected in China. It might limit the generalization capability of the research results. Thus, further research can be conducted to test the research model in different research contexts and to general the research model to different hedonic IS field. In addition, the research attempted to explore the U & G approach in IS continuance research, further research can consider a comparison of the U & G approach with the dominant IS adoption models to identify their predictive power in exploring IS continuance. Further, while the current research preliminary identify the general moderating effects of age, future studies may put more effort into investigating the feature of each age groups and into figuring out more detailed results with deep analysis.

Conclusion

The purpose of this study is to delineate and examine how a player's gratifications affect his or her continuance intention to play an online game. Our results supported that hedonic, social and utilitarian gratifications obtained from a player's prior online game experience influence their continuance intention. Furthermore, we confirmed that the moderating effects of demographic factors are diversified. For instance, in our research, age is found to be a strong moderator, while gender is a weak moderator. Our findings provide evidences of the predictive power of the U & G approach in IS field, and offer online game companies with insights into the sustainability of online game services and online game design.

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Appendix

Construct	Item	Measurement	Reference
Escapism	ES1	I play the SNG when I feel frustrated.	Colwell 2007
	ES2	I like playing the SNG when I've had a bad day.	
	ES3	Playing the SNG lets my anger out.	
	ES4	Playing the SNG is the best way to block off the world.	
Fantasy	FA1	I play the SNG to experience things I do not experience in daily life.	Sherry and Lucas 2006
	FA2	I play the SNG to pretend I am someone/somewhere else.	
	FA3	I play the SNG to immerse myself in the lives of the game world.	
Enjoyment	EN1	Uninterested … Interested	Ghani and Deshpande 1994
	EN2	Not fun … Fun	
	EN3	Dull … Exciting	
Social Presence	SP1	I trust that other players in the SNG will help me if I need it.	Wu et al. 2010
	SP2	I feel connected to other players in the SNG environment.	
	SP3	In my interactions with other players in the SNG, I am able to be myself and show what kind of player/person I really am.	
	SP4	I feel like I am a member of the SNG community during the game playing.	
Self presentation	SEP1	I play the SNG, because I want other players in this game to perceive me as likable	Papacharissi 2002; Lee et al. 2012
	SEP2	I play the SNG, because I want other players in this game to perceive me as friendly.	
	SEP3	I play the SNG, because I want other players in this game to perceive me as skilled.	
Social Interaction	SI1	I open up more to others via the SNG than in other communication modes.	Wu et al. 2010
	SI2	I have a network of friend made via playing the SNG.	
	SI3	Playing the SNG enables me to connect with friends in my real life.	
	SI4	Playing the SNG enables me to keep in touch with friends in my real life.	
Achievement	AC1	I play the SNG to achieve a higher level.	Wu et al. 2010
	AC2	I play the SNG to have more power than others.	
	AC3	I play the SNG to have the equipment/items, which are better than other players in this game.	
	AC4	I play the SNG to prove to other players in this game that I am the best.	
Continuance Intention	CI1	It's worth playing the SNG in the future.	Lee 2009
	CI2	I am willing to play the SNG in the near future.	

Research article 2

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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 catch 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.
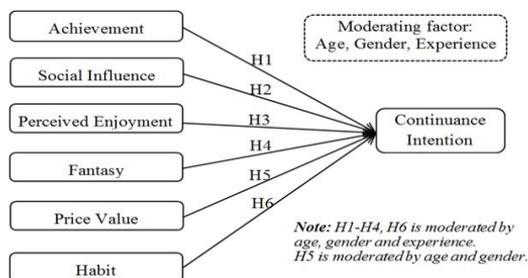
Figure 1. Research Model

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]. χ^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.
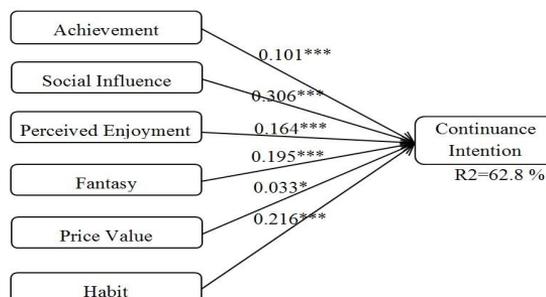
Note. * p<0.05, **p<0.005, ***p<0.001, n.s: not significant.
Figue 2. Structure Model Results of Multi-group Model

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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Research article 3:

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Understanding Individuals' Switching of eService:
An Empirical Study of Social Network Games Switching Intentions in China

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Abstract. Competitors in social network game (SNG) are constantly providing substitutes to attract SNG players, and SNG players switch among SNGs. In prior IS literature, little research has attempted to study the switching behavior of IS users. This paper aims at exploring users' switching behavior in the context of SNG. We applied the push-pull-mooring framework from the marketing field to examine the determinants of SNG players' switching intention. In addition, we investigate the moderating role of individuals' demographics, such as age and gender. We tested the proposed research model with 541 responses collected via an online survey among Chinese SNG players. The research results suggest that perceived enjoyment (push effect), descriptive norms and alternative attractiveness (pull effects), as well as adaptation cost (mooring effect), have significant effects on individuals' switching intention in SNGs. Meanwhile, demographics (such as age and gender) are moderating effects on relations among independent variables to switching intention in various degrees.

Keywords: eService, social network game, switching intention, switching cost.

1   Introduction

One of the fastest growing e-Services is computer game moving on to the Internet. Social network game (SNG) is becoming a promising market for online game providers. Along its growing popularity, the SNG market is turning more competitive as well [1]. SNG players are provided with various online game options, and it is easy for them to switch between SNGs. As Bhattacherjee et al. (2012) indicated, nowadays, new IS substitutes are only one click away [2]. Previous studies argued that switching behavior threats the long-term customer relationship (e.g. engagement) and results in negative influence on profitability of firms [3]. Thus, user switching is becoming a primary concern for SNG providers [4].

Prior studies posit that switching behavior among different alternatives (e.g. switching from one SNG to another SNG) does not necessarily suggest that users discontinue using a general IS service (e.g. online game) [5]. Such as in SNGs,

individuals may switch between different SNGs, but they still continue using SNGs. As Ye et al. (2006) suggest that switching behavior represent a form of IS continuance (general IS continuance) [6]. In this study we explore individuals' switching behavior between SNGs.

As indicated in social psychology literatures, human cognitions and perceptions are important factors predicting individuals' behavioral intentions. The dominant stream of prior post-adoption studies focuses on IS continuance mainly based on IS adoption theories. These theories mainly focused on users' perceptions of the current service, little attention has been paid to users' perceptions of the alternatives, which is a key concept in switching behavior. In addition, switching cost, as an important determinant of switching behavior as indicated in marketing literature, has not been very much studied in IS field [7].

In this paper, we apply Push-Pull-Mooring (PPM) model originated from human migration study as our theoretical framework to explore the key determinants of individuals' switching intention in SNGs. In addition, we investigate the moderating role of individuals' demographics, such as age and gender, which has been examined as important moderators in online game usage. The research model was tested with 541 valid responses among Chinese SNG users. This study sheds light on the switching behavior of SNG players, and helps explain the key determinants of switching intention of SNG players. The findings also help practitioners make appropriate strategies for maintaining current users as well as attracting new users in their customer management.

The rest of this paper proceeds as follows. We present the theoretical background in section two. In section three, we propose our research model and hypotheses. In section four, we describe the research methodology, including study context, data collection, measurement development as well as research validity and reliability. In section five, the research results are presented. In section six, we discuss the research findings and its implications for researchers and practitioners and conclude with discussions of limitations of the current research and future research.

2   Theoretical Background

Migration is defined by Boyle et al. (1998) as the movement of a person from one place to another for a certain period of time [8]. By embracing this concept from human migration study, marketing researchers suggest that consumer service switching refers to migration of users from one service to another [9]. In IS research, Hou et al. (2011) argued when players switch from one online game to another, they perform the behavior of migration among online games [10]. Hence, we use the metaphor of migration to describe SNG players' switching behavior.

In migration literature, the PPM framework is a dominant paradigm to explore switching behavior [11]. In PPM model, *push* effects capture users' perception of negative factors which drive them away from current service. *Pull* effects represent users' perception of positive factors that attract users to a substitute. *Mooring* factors can be personal, social, and situational variables, which can either hamper or facilitate the migration decision [12].

IS researchers have attempted to apply PPM to study users' switching behavior in various research contexts, such as blogs [13], online games [10], web browsers [14]. PPM represents a unifying framework for clarifying, integrating and positioning determinants of switching intention [11,14]. In addition, user-related attributes, such as demographics, are also found to be closely associated with switching behavior in IS field, such as in the context of mobile services [9] and blogs [15]. However, in IS field little research has attempted to investigate SNG switching behavior based on the PPM model as well as to examine the moderating roles of user demographics, such as age and gender. Therefore, in this paper, the moderating role of demographics will be integrated into PPM as an exploratory study to understand users' switching intention in the context of SNGs.

3   Research Model and Hypotheses

3.1   Push Effect

According to motivation theory, perceived enjoyment is a prominent intrinsic motivation to form the intention for individuals to use some products or services, especially in hedonic IS [16]. Van der Heijden (2004) argued that any hedonic IS should consider enjoyment as a driving factor for user's adoption and usage [17]. SNG is a typical hedonic IS offering players enjoyment in playing SNG. If players perceive a low enjoyment of the current SNG they are playing, their motivation to continue playing the current SNG might decrease, and they have high possibility to switch to alternative SNGs. Thus, we expect that perceived enjoyment of the current SNG will be a negative factor driving players away from the current SNG, and exert push effect on their switching intention. Thus, the following hypothesis is proposed:

H1: Perceived enjoyment of the current SNG is negatively associated with switching intention.

3.2   Pull Effect

According to PPM, users are more engaged in migrating to a substitute service if they perceive the substitute provides more benefits, such as better service, fairer prices and more enjoyment [11]. Previous literature in marketing supports this argument and suggests that alternative attractiveness influence consumers' switching intention significantly and positively [18]. *Alternative attractiveness* refers to the "reputation, image and service quality of the replacing carrier, which is expected to be superior or more suitable than those of the existing carrier" [19] (pp.149). Rusbult and Farrell (1983) suggest that the intention to continue/switch is a function of users' perception of performance of the current service versus that of alternatives [20]. Therefore, we propose the following hypothesis:

H2: Alternative attractiveness is positively associated with switching intention.

Descriptive norm depicts indirect social influence, referring to the perception that certain behavior is actually affected by important friends/peers in an individual's

social network. According to social learning theory [21], perception of peers'/friends' behavior of usage influences the respondents' own approval of usage [19].

In prior research on online games, Lu and Wang (2008) suggest that descriptive norm is positively associated with intention to play online game [22]. More specifically, when players observe the other important people in his/her social network are performing a certain behavior (such as usage or switching behavior), they are more likely to perform the same behavior [18]. When SNG players observe that more friends in their social network are switching to other SNGs, we expect to see an increase in their intention to switch between SNGs as well. Hence, we propose the following hypothesis:

H3: Descriptive norm is positively associated with switching intention.

3.3   Mooring Effect

Migration among SNGs is a complex decision making process. Previous studies have mapped switching cost as mooring effect, which is negatively associated with switching intention [10,13,23]. When the perception of switching cost is high, customers are reluctant to switch to alternatives [10,24]. Prior studies in marketing classified switching cost into different categories, such as continuity cost, sunk cost and learning cost [16], or loss cost, adaptation cost, move-in cost [21]. Switching cost is found to be one of the most important factors influencing switch intention [13]. In order to explore whether the explanatory powers of different types of switching cost also apply in predicting switch intention in e-Services, such as the SNG context, we decompose switching cost into sunk cost and adaptation cost.

Sunk cost refers to user's perception of loss in financial, performance-related, social and psychological cost towards the current SNG when switching [19]. SNG players will experience sunk cost when they switch to a substitute, since the investment of effort, time, and money (such as virtual items purchased), developed social relationships and accumulated privilege, cannot be transferred to the alternative SNG game they switch to. When the perceived sunk cost in SNG is high, SNG players seems to have lower intention to switch to other SNGs. Thus, the following hypothesis is suggested:

H4: Sunk cost is negatively associated with switching intention.

Adaptation cost refers to the perceived cost of adaptation for a new game, such as search cost and learning cost [19]. When switching to a new SNG, players have to spend time and put efforts in gathering information for an alternative. They also have to learn new tactic for accumulating game experience from the very beginning, to develop new social relationships with other game players, and to join in a new game community. Therefore, it is reasonable to assume that if SNG players perceive that the adaptation cost will be high when they switch to alternative SNGs, they are not likely to switch. Hence, we propose the following hypothesis:

H5: Adaptation cost is negatively associated with switching intention.

3.4   Age and Gender in Online Game

Prior IS research put a lot efforts on examining the perception differences in IS usage among different age and gender groups, such as research based on TAM and UTAUT found that age and gender moderate users' perceptions on IS usage no matter in work setting or home setting [25]. In the prior online game research, age and gender have also been largely explored as moderator of online game usage. For example, males rate social interaction, fantasy and challenge more important in determining their use of digital games than female [26]. Individual players are less likely to be achievement-driven in playing video game when they get older [27]. Jones and Fox (2009) reported that online teens are more likely to play online games and to use social media than any other generation [28]. However, little research has investigated the effect of age and gender in switching behavior in online games. Considering switching behavior is also an important form of post-adoption behavior, we assume that there will be perception differences among different age and gender groups on switching behavior. In the current we test the moderating effect of age based on two age groups, such as the adolescents (up to 18 years old) and the adults (over 18 years old), and two gender groups.

On these grounds we suggest a research model presented in Figure 1.
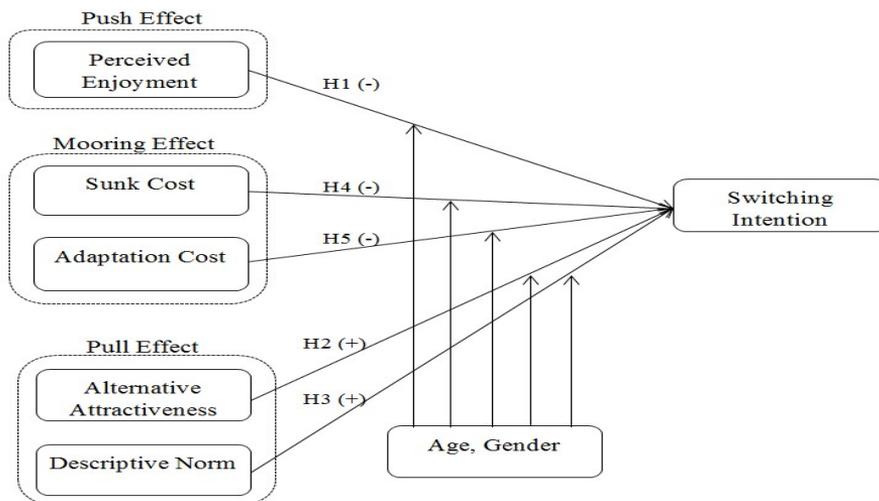
Fig. 1. Research Model

4   Conduct of Research

4.1   Development of the Measures

The measurements of six constructs in the model are adapted from prior research, and some modifications are applied in order to fit our research context.

Perceived enjoyment is adapted from the study of Ghani and Deshpande (1994) [29]. Alternative attractiveness is measured with three items from Bansal et al. (2005) [11]. The three items of descriptive norm were adapted from the study of Park et al.

(2012) [23]. Sunk cost is measured with 4 items adapted from the study of Jones et al. (2002) [30] and Hsieh et al. (2012) [13]. Adaptation cost is measured with 3 items adapted from the study of Kim et al. (2004) [21]. Switch intention is measured with two items adapted from the work of Hsieh et al. (2012) [13]. All items are measured using a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree).

To improve the validity of the questionnaire, we conducted a pilot test with seven participants, including three IS researchers, three current SNG players, and a manager of the SNG company. The final questionnaire is based on respondents' feedback on the constructs and wording of the questions.

4.2   Data Collection

The data collection aims at investigating SNG players' post adoption behavior, including both continuous use and switching behavior. In this paper we confine us to the data on switching behavior.

We chose a popular SNG (hereafter, 'the SNG') in China as our research target. Before our data collection, this SNG has been running for 6 months by a multi-million-user social network company in China. The SNG is distributed primarily via the social network site and advertised with other e-Services of the company.

220, 000 electronic questionnaires were sent to a random selected sample among registered players of the SNG during a five-day period in Nov. 23rd and 27th, 2012. Pop-up tool is used to help invite players to answer the online survey. Only those selected respondents see the pop-up windows when they logged into their accounts of the social network service provided by the company. The players only need to click the pop-up, and then they will automatically link to the webpage with the questionnaire. All responses were provided voluntarily without rewards. No private information regarding respondents was collected in this survey.

In order to reach a representative sample, respondents were identified via self-selected questions in the questionnaire, such as whether they continue playing the SNG in the recent one month or switch to other SNGs. In this research if a player did not play the SNG in the past one month but played other SNGs, the player was identified as potential switching player.

Among 7769 responses received, 542 are switching players (with one missing data and 541 valid responses). The SNG manager pointed out that normally in this company online survey has been run without rewards, and the response rate in this data collection is quite consistent with that of other online surveys in this company.

According to iResearch report released in 2012, in China 67.8 percent of online game players are male, and 32.2 percent are female. 37 percent online game players are below 18 years old and 63 percent are above 18 years old [31]. Among the whole samples in our study, including both continuous and switching users, 59.1 percent of the respondents are male and 40.9 percent are female. 33.6 percent of the respondents are below 18 years old, and 66.4 percent are over 18 years old. The respondent sample included in our study fits to the sample demographic distribution among online game users in China in the investigation of iResearch. In this study, we focus on the switching users. The demographic information of the switching users is presented in Table 1.

Table 1. Demographic information

Measure	Items	Frequency	%
Gender	Male	277	51.2
	Female	264	48.8
Age	Up to 18 years old	414	76.5
	Over 18 years old	127	23.5

5   Data Analysis and Results

5.1   Assessment of Measurement Model

A confirmatory factor analysis using AMOS 20 was conducted to test the measurement model. All the model-fit indices used to estimate the measurement model exceed the acceptance level: χ^2/df=2.55, GFI=0.938, AGFI=0.912, NFI=0.967, CFI=0.979 and RMSEA=0.054. Relevant goodness of fit indices (GFI, AGFI, NFI, CFI) are greater than 0.90. RMSEA shows a satisfactory value of less than 0.08 and the value of chi-square is less than 3. The results indicate a good overall performance of the model [32, 33].

Convergent validity is measured by factor loading (greater than 0.70), average variance extracted (AVE) (greater than 0.50) and composite reliability (greater than 0.8) of each construct. Cronbach's alpha of all constructs should exceed 0.80 as well. The results in Table 2 indicate a good internal consistency and reliability of our research model.

Table 2. Confirmatory Factor Analysis Result

Construct	Mean	Minimal factor loading	Cronbach's Alpha	Composite reliability	AVE
Perceived Enjoyment (3 items)	2.735	0.815	0.914	0.917	0.786
Sunk Cost (4 items)	3.003	0.788	0.922	0.932	0.775
Alternative Attractiveness (3 items)	3.390	0.857	0.914	0.915	0.783
Adaptation Cost (3 items)	2.901	0.732	0.881	0.888	0.728
Descriptive Norm (3 items)	3.661	0.868	0.936	0.936	0.831
Switching Intention (2 items)	3.378	0.945	0.949	0.904	0.949

Table 3. Inter-construct Correlations

	ENJ	DN	SC	AC	AA	SI
ENJ	**0.884**					
DN	-0.529	**0.902**				
SC	0.482	-0.414	**0.880**			
AC	0.467	-0.443	0.635	**0.853**		
AA	-0.660	0.707	-0.528	-0.550	**0.885**	
SI	-0.628	0.611	-0.515	-0.619	0.720	**0.974**

As shown in Table 3, each square root of the AVE is greater than the correlations with other constructs, which is considered to indicate good discriminant validity in the current study.

5.2   Structural Model

All the indices indicate a good model fit of the current study ($\chi2/df$ = 2.55, GFI=0.938, AGFI=0.912, NFI=0.967, CFI=0.979 and RMSEA=0.054). As the multi-group model presented in Table 4, perceived enjoyment (β =-0.201, $p<0.001$), adaptation cost (β =-0.272, $p<0.001$), descriptive norm (β =0.148, $p<0.001$) and alternative attractiveness (β =0.327, $p<0.001$) are found to be the significant factors determining individual SNG players' switching intention. However, sunk cost is not significantly associated with switch intention (β =-0.011). Our research model explains 62.7 percent of the variance of switch intention.

A two-group test is employed to examine the age/gender differences in the strength of path coefficients respectively and presented in Table 4.

Table 4. Structural Model Results

	Multi-group basic model	Age (basic model $\chi2$= 574.795, df = 240)		Gender (basic model $\chi2$= 555.902, df = 240)	
		Adolescence	Adult	Male	Female
Perceived enjoyment → switching intention	β=-0.201, $p<0.001$	β=-0.138, $p<0.05$	β=-0.346, $p<0.001$	β= -0.128, $p<0.05$	β=-0.221, $p<0.001$
		$\chi2$=580.865, $\Delta\chi2$=6.07, $p<0.05$		$\chi2$=557.421, $\Delta\chi2$=1,519, n.s	
Descriptive norm → switching intention	β=0.148, $p<0.001$	β =0.151, $p<0.001$	β =0.130, n.s	β=0.133, $p<0.05$	β=0.200, $p<0.005$
		$\chi2$=574.836, $\Delta\chi2$=-0.041, n.s		$\chi2$=556,898, $\Delta\chi2$=0.996, n.s	
Alternative attractiveness → switching intention	β=0.327, $p<0.001$	β =0.420, $p<0.001$	β =0.083, n.s	β=0.192, $p<$ 0.05	β=0.348, $p<0.001$
		$\chi2$=582.503, $\Delta\chi2$=7.708, $p<0.01$		$\chi2$=558.422, $\Delta\chi2$=2.52, n.s.	
Sunk cost → switching intention	β=-0.011 n.s	β =-0.02, n.s	β =-0.038, n.s	β=-0.105, n.s	β=-0.033, n.s
		$\chi2$=574.827, $\Delta\chi2$=-0.032, n.s		$\chi2$=558,625, $\Delta\chi2$=2.732, $p<0.01$	
Adaptation cost → switching intention	β=-0.272, $p<0.001$	β =-0.204, $p<0.001$	β =-0.445, $p<0.001$	β=-0.435, $p<0.001$	β=-0.179, $p<0.005$
		$\chi2$=581.570, $\Delta\chi2$=6.665, $p<0.01$		$\chi2$=562.706, $\Delta\chi2$=6.804, $p<0.01$	
R^2	0.627	0.619	0.713	0.723	0.558

Note. n.s: not significant

Age is moderating the effect of perceived enjoyment, adaptation cost and alternative attractiveness on switching intention significantly. For adolescent gamers, perceived enjoyment, adaptation cost, descriptive norm, and alternative attractiveness

are still the four determinants of switching intentions, whereas for adult players there are only two factors, i.e., perceived enjoyment and adaptation cost, driving their switching intentions. The model accounts for 61.9 percent (adolescents) and 71.3 percent (adults) of the variance in switch intention. Sunk cost was not found to be a significant factor in either age group.

Gender is also moderating the effect of sunk cost and adaptation cost on switching intention significantly. In Table 4, the model accounts for 72.3 percent and 55.8 percent of the variance in switch intention among male and female players. Sunk cost was not found to have significant effect on switching intention for either male or female SNG players, although there is significant effect difference among male and female groups.

6   Discussion and Implication

6.1   Discussion

Our results are consistent with prior studies [6,10,24]. Among the four significant determinants, alternative attractiveness exerts strongest influence on switch intention positively, i.e., when the substitute is perceived to be attractive enough and the adaptation cost for switching is not high, players have high tendency to switch to another SNG. However, the influence of perceived enjoyment of current SNG and descriptive norms on players' switching intention is not so strong as that of alternative attractiveness and adaptation cost on switching intention. When the alternative is attractive and player's peers/friends perform a switching behavior, the current SNG players are with high intention to switch as well. Thus, alternative attractiveness and descriptive norm exert a positive pulling effect to drive players into switching behavior.

Perceived enjoyment of current SNG is a strong determinant which impacts switch intention negatively, as expected. When SNG players consider switching to a substitute, perceived enjoyment of the current SNG exerts negative influence on driving players away from current SNG. Thus, perceived enjoyment of the current SNG has a negative push effect on switching intention.

Mooring effect is captured by adaptation cost, but not with sunk cost. Adaptation cost was found to influence switching intention negatively. This finding is also consistent with prior studies [10,24]. It can be inferred that the perceived effort (e.g. time, money, and energy) required to switch to another SNG is an obstacle for SNG players to switch to an alternatives, even in cases, where SNG players perceive a low enjoyment of current SNG, and peers/friends in their social network already performed switching behavior.

However, in the current study, sunk cost is not found to be a significant factor influencing switching intention. The possible explanation can be based on the following two reasons: one is that the players still have the accounts for the current SNG even though they switch to alternatives. The switch is not exclusive: players will not lose their social, financial and performance-related cost totally. They can always come back to the SNG and enjoy the accumulated virtual items and game skills at any

time if they want. Even though they leave this SNG, they can still keep the social relationships built in their SNG in their social networks as well as in other SNGs. Another reason could be that the sunk cost might be easily ignored if the current SNG is not enjoyable any more, various attractive SNGs are available to players, and more friends are switching to alternatives. In conclusion, the finding suggests that mooring effect can be mainly represented by perceived adaption cost, which holds back switching intention.

The adolescents and adults are different in their switching intentions. Perceived enjoyment and adaptation cost all exert less effect on adolescence than on adults, relatively speaking. Compared to adults, adolescences do not perceive adaptation cost as strong obstacle preventing them from switching to a substitute. This could be due to the fact that most teens are skillful online game players, and learning and getting involved in a new SNG is less difficult for them. Meanwhile, teen players are also more sensitive to perceived enjoyment, they would consider switching to a substitute even the perceived enjoyment of current SNG is not that low and the alternative is more attractive. Alternative attractive is not significant determinant of switch intention among adult players. This perception might due to that younger players are more curious and keen to try different SNGs whereas adult players are not.

Finally, though influences of perceived enjoyment, descriptive norm and alternative attractiveness on switching intention are different among the female and male groups, gender does not have significant moderating effect on significant paths from independent variables (perceived enjoyment, descriptive norm and alternative attractiveness) to switching intention, except for sunk cost and adaptation cost. Adaptation cost influences switching intention strongly on male than female. The higher adaptation cost perceived by male players suggests that, compare to female players, male players want the time, energy and money spent for switching to a new SNG to be less, even they think it is easy to get involved in a new SNG.

6.2   Implications

The findings of this study have implications both for academia and game developers.

This paper makes the argument that making decisions on switching behavior in SNG is a complex mechanism which integrates push, pull and mooring effects together. The perceptions of the current SNG are not adequate to explain switching behavior. The perceptions on the substitutes and the switching cost in switching from one SNG to another should also be considered. In addition, this study helps explain the barrier and drivers for individuals' switching behavior in SNGs. Furthermore, this study use PPM framework in the marketing field to explain switching behavior in SNGs. It offers some fresh insights into post adoption behavior study in IS fields.

This study also offers some implications for practitioners. In order to keep their current players, SNG providers should pay attention to the design and attributes of their current SNG as well as keep their eyes on the SNG offered by their competitors. SNG provider should update their SNG in time and offer more intriguing features to provide enjoyment for the current players. It will help SNG providers to retain the current customer and keep them away from switching to alternatives. However, the

adults find low adaptation costs to the alternatives important, whereas the female players find switching worth trying if their peers switch, too. The mechanisms for lucrative alternatives should take these factors into account.

7   Limitations and Future Research

There are several limitations of our study. SNG is only one type of e-Services and online games and the data was collected in China. It might limit the generalization of the research results only in the SNG field in China. Therefore, future study can explore other types of online game and collect data in an international cross-cultural background, paying special attention to the moderating factors beyond age and gender, such as prior experience, and habit.

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Research article 4

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Abstract

Social network game (SNG) is attracting more and more players and becoming a promising market for game providers. Competing game providers are also constantly providing substitutes to attract SNG players to switch among SNGs. In prior IS literature few studies have tried to investigate the switching behaviour. In order to explore IS user's switching behaviour in SNGs, we examine the determinants of individuals' switching intention to alternative SNGs and their discontinuing use of the current SNG. We propose and test a research model with 541 responses from Chinese SNG gamers collected via an online survey. The research model suggests that satisfaction, subjective norm, alternative attractiveness and variety-seeking behaviour have significant effects on individuals' switching intention. Finally, we made a discussion on these findings as well as limitations and future study.

Keywords: Social network game, Switching intention, Satisfaction, Alternative attractiveness.

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1 Introduction

The success of social network game (SNG) such as Farmville or Cityville, has made it one of the most popular entertainment services attracting tens millions of gamers, especially through social network sites (SNS) (Shin & Shin, 2011). According to a report released by China Internet Network Information Centre (CNNIC), by the end of June 2012, there were about 33.1 million online game players in China (CNNIC, 2012). As reported by iResearch, 17 percent of Chinese online game players have played SNGs (iResearch, 2012). Though the SNG market is thriving, the competition in SNG market is also fierce. Bhattacherjee et al. (2012) stated that online game players can easily find information about and switch to a substitute via downloading or registering to another game. Survey results from Playnomics (2012) indicate that 85 percent of SNG gamers play a SNG only once and then never return.

Clearly, there is a high switching rate in the field of SNG use. Keaveney (1995) claimed that customers' switching behaviour resulted in a loss of future revenue for SNG providers. Hence, for practitioners, it is of importance to understand what motivates individuals' switching behaviour.

Ye et al. (2006) indicate that user switching behaviour represents a form of post-adoption behaviour. In prior studies, IS use continuance was the dominant explanation for long-term user behaviour. These studies mainly apply IS acceptance theories to explore post adoption behaviour, such as Technology Acceptance Model (TAM) (Davis, 1989), Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1973), and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), and suggest that users' perceptions of and attitude toward IS use are the main factors determining individuals' IS continuance.

Recently, IS users' switching behaviour has attracted IS researchers' attention, as switching has become a common as well as an important phenomenon for businesses in the virtual market. Prior IS research has attempted to explore factors determining individuals' switching intention in various contexts mainly by integrating the existing IS acceptance and IS continuance theory with theories from other disciplines (Bhattacherjee et al., 2012; Hou et al., 2011; Kim et al., 2006; Zhang et al., 2012). However, Bhattacherjee et al. (2012) argued that "despite the increased incidence and relevance of such switching phenomenon, our understanding of it has remained scant" (pp.327). Therefore, there is a need for research on individuals' switching behaviour which can help explain the switching behaviour phenomena in different contexts (Bhattacherjee et al., 2012).

Based on the gap identified above, this study proposes a research model to examine the switching behaviour of IS users by integrating key determinants of switching intention from existing IS theories and relevant concepts from marketing disciplines. The research model is empirically tested in the context of SNG. This study sheds light on the switching behaviour of SNG users, and helps to explain the key determinants of switching intention of SNG users. For practitioners, the study offers some suggestions for SNG game providers to appreciate the importance of key determinants of switching intention and to understand how to make right strategies in customer management.

The rest of this paper is arranged as follows. Firstly, we introduce the research background with a brief literature review on SNG and switching behaviour in both IS and marketing field

in section 2. Then we present our research model and hypotheses in section 3. In section 4, the research methodology is discussed, including measurement development, data collection as well as validity and reliability. In section 5, the hypotheses test results are presented. In section 6, we conclude our findings and provide implications for both researchers and practitioners. Finally, discussions of limitations and future research are presented.

2 Research Background

2.1 Social Network Game

Social network game (SNG) refers to a type of browser game, which is distributed mainly through social networks, such as Facebook (Järvinen, 2009; Shin & Shin, 2011). SNG provides ample opportunities for players to mainly play with people within the players' existing network via social network sites. This trait of SNG distinguishes it from other digital games (such as games designed for players to play offline, or games which are played with online friends outside of the players' offline networks) (Lee et al., 2012). Players of SNGs can use their existing social network friends as resources (Shin & Shin, 2011). The more friends SNG players' social network has, the higher possibility the players will get to make progress in the SNGs. Meanwhile, many SNG are asynchronous. For example, corps keeps grow in Happy-farm and interaction among players continues in SNG even the player is offline (Consalvo, 2012). This trait distinguishes SNG from other types of online game which only proceeds when gamers play them online.

Prior research on SNG mainly attempted to explore the factors motivating individuals' use of SNG (Shin & Shin, 2012; Lee et al., 2012) as well as SNG design (Järvinen, 2009). Hou et al. (2011) conducted an empirical study in massively multiplayer online role playing games (MMORPG), and argued that though switching in online games is common, few studies have tried to examine players' switching behaviour in online games.

2.2 Switching Behaviour

For individuals, there are always various optional, competing information systems, such as in our research case SNGs, users are provided with various SNGs with similar functionality. Individuals may continue using an IS after they have used it for some time, or switch to an alternative IS that meets their needs or desires (Keaveney & Parthasarathy, 2001). Bhattacherjee et al. (2012) suggested that users' IS switching behaviour involves a complete or partial replacement of the IS use with a substitute that serves similar needs. Similarly, Ye et al. (2006, pp.1943) defined information technology user switching as "users' termination or significant reduction in usage of one technology product while replacing it completely or in large part with an alternative product that satisfies identical needs".

3 Research Model and Hypotheses

As there are few models specially designed for investigating switching behaviour in SNGs, we build a tentative, simple model on switching behaviour to explore users' switching intention in the research context of SNG. In this light, we shall below define and give grounds for the following key elements of switching antecedents being of importance: satisfaction,

subjective norm, need for variety, alternative attractiveness, which are suggested to explain the variation in switching intention among SNG gamers.

3.1 Subjective Norm

Subjective norm refers to the perceived social pressure surrounding the performance of the behaviour (Ajzen, 1991). In current study, the subjective norm refers to the perceived social pressure towards the performance of switching behaviour. Subjective norm is included as a direct determinant of behavioural intention in TRA (Fishbein & Ajzen, 1975) and subsequently the Theory of Planned Behavior (TPB) (Ajzen, 1991). The rationale for a direct effect of subjective norm on intention is that people may choose to perform the behaviour, if they are motivated to comply with important references who think the person should perform the behaviour (Venkatesh & Davis, 2000).

Previous research suggests that subjective norm directly impacts customer's attitude toward switching behaviour and switching intention (Bansal et al., 2005). Lee (2009) pointed out that many Internet users play online games only because their friends are playing online game and recommend them to play it. Hence, it is also reasonable to assume that players are more likely to switch to another SNG if their friends suggest them to perform the behaviour. Therefore, the following hypothesis is proposed :

H1. Subjective norm is positively associated with switching intention in SNG.

3.2 Satisfaction

Satisfaction refers to an individual's evaluation and affective response to his or her overall experience with a service or product (Oliver, 1980). Based on the Expectation Confirmation Theory (ECT) (Oliver, 1980), individuals have expectations toward certain service before using it. After having used the service, satisfaction or dissatisfaction will occur by evaluating the comparison of the actual performance of the service and their expectations, i.e. there emerges a discrepancy between the expected and experienced. Satisfaction occurs when actual performance is better than expected. Conversely, dissatisfaction occurs when actual performance is less than expected.

The predictive power of satisfaction to switching intention has been widely examined in different e-services, such as email (Kim, et al., 2006), blog (Zhang et al., 2012), online game (Hou et al., 2011), cloud computing (Park & Ryoo, 2012). Hou et al. (2011) concluded that comparing with satisfied users; unsatisfied users usually have a stronger intention to switch to a substitute. Dissatisfied users are more likely to switch to alternatives instead of continuing using the current one. Bhattacherjee et al. (2012) support this argument and claimed that users' intention to continue or to discontinue IS usage is determined by satisfaction with their current IS usage. Thus, it is reasonable to assume that players with high satisfaction of current SNG would have a lower intention to switch to a substitute, and the following hypothesis is proposed:

H2. Satisfaction is negatively associated with switching intention in SNG.

3.3 Need for Variety

Need for variety is defined as one of the major individual psychological traits towards high tendency to switch (Vázquez-Carrasco & Foxall, 2006). Physiological evidence indicates that once individuals' reactions to attributes of a stimulus reach 'optimum stimulation level', the individual may feel satiated, and then choose to consume a different attribute next time (Coombs & Avrunin, 1977). In purchase behaviour, the tendency of variety-seeking is a driver for seeking newness, which usually leads to choices of unknown or untried products/brands (Hoyer & Ridgway, 1984). Steenkamp and Baumgartner (1992) suggest that switching behaviours may occur among satisfied customers due to their attempt to try something novel or different for fun or thrill. In other words, customers may be satisfied with their choices; they may still switch to perceived alternatives to satisfy a desire for novelty or complexity in consumption or because of curiosity, or because of getting bored, fed up, on repetitively doing the same thing (Herrnstein & Prelec, 1991). Previous study in online game also confirms the predictive power of the need for variety in explaining switching intention (Hou et al., 2012). Therefore, we propose the following hypothesis in the SNG context :

> H3. Need for variety is positively associated with switching intention in SNG.

3.4 Alternative Attractiveness

Rusbult and Farrell (1983) suggested that the intention to continue/switch is a function of the attractiveness of the existing service versus that of alternatives. Users are more likely to migrate to a substitute service if they perceive the new one better, or different, at fairer prices and more enjoyment by expectation (Hou et al., 2011). Besides, SNGs are usually provided for free and are aggressively marketed in social media, or informed by word-of-mouth of the peer players, which enhance the attractiveness of alternatives. As a result, players can be attracted by alternatives and make the decision to switch easily without monetary attachment. Thus, the following hypothesis is proposed:

> H4. Alternative attractiveness is positively associated with switch intention in SNG.

The regret theory (Lommes & Robert, 1982) has been applied to study satisfaction and evaluation by considering the performance of alternatives. The regret theory suggests that people feel regret when the evaluation of the outcome of a perceived alternative is better than present choice. In marketing literature, customers' perceptions of good performance of an alternative will result in a decrease of their post-purchase evaluation, such as satisfaction towards the chosen brand (Inman et al., 1997). Thus, we proposed the following hypothesis:

> H5. Alternative attractiveness is negatively associated with satisfaction of current SNG.

This leads us to propose as simple as possible a research model below for studying switching intention of the gamers of SNGs (See Figure 1).
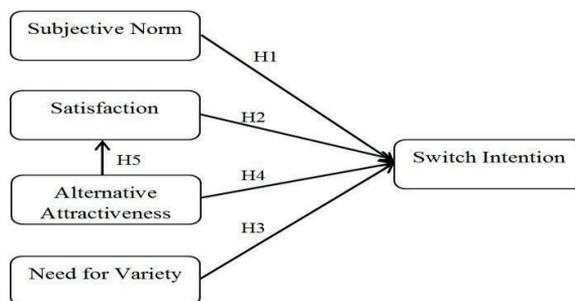
Figure 1: Research model

4 Research Methodology

4.1 Measurement Development

The five constructs in current research model were: need for variety, dissatisfaction, subjective norm, alternative attractiveness and switching intention. All constructs were measured by using multiple-item perceptual scales, which are adapted from prior research. Items were modified slightly from previous studies in order to fit our research context. All items were measured using a 5-point Likert scale ranging from 1 (disagree) to 5 (agree). The instrument is presented in appendix A.

The questionnaire was initially developed in English and then subsequently translated into Chinese by one of the manuscript's authors, a native Chinese speaker. A pilot test was conducted among 7 respondents; including 3 IS researchers, a manager of the SNG investigated in this research and 3 current game players. The purpose of this pilot test is to evaluate the validity of the questionnaire. According to their opinions, some revision has been done to improve the questionnaire quality.

4.2 Data Collection

A popular SNG in China has been chosen to be our research target, and for reasons of confidentiality, the name of the SNG will not be publicized in the study, which is hereafter called as "The SNG". The SNG is designed for Chinese players in Chinese language and ran by one of the big social network companies with multi-million users in mainland China. The SNG has been running for over 6 months before our data collection. It is mainly marketed and distributed via the social network sites of the company.

With the help of the company, an online survey was conducted to collect data for studying continuous use and switching behaviour in SNG respectively. The two segments were identified via self-selected questions in the questionnaire. Players were identified by questions towards whether they have been playing the SNG or switched to play other SNGs in the recent one month. In this research, the SNG manager suggested that if a player hasn't played the SNG for one month, the player was identified as potential switching or discontinuous player.

The company sent out 220, 000 electronic questionnaires to a random selected sample from registered players of the SNG during Nov. 23rd and 27th, 2012. All responses were provided voluntarily without rewards. In the survey, no personal information about the respondents has been collected. The electronic questionnaire was implemented with a pop-up that has been added to the SNG homepages and the selected 220,000 players are invited to answer the questionnaire. If and when the players clicked the pop-up, they were lead to the questionnaire webpage to answer the questionnaire.

7769 responses were received, including: (i). Registered users who claimed have never played the SNG before (2128); (ii). Discontinuous players who claimed that they quit (1181) from any online games; and (iii). Continuous players (4123) of the SNG; 4. Switching players (542) of the SNG. Finally, 4460 valid responses including continuance players and switching players were collected. According to the SNG manager, this is a typical response rate for such a questionnaire in their SNG population. Among 4460 valid responses, 541 responses were valid regarding switching behaviour and used as the valid data base in this study. The description of the data is presented in Table 1.

Type	Total cases	Invalid cases	Valid cases	Included in this study
Non-players	2128	0	2128	NO
Discontinuous players	1181	0	1181	NO
Continuous players	4123	204(missing data)	3919	NO
Switching players	542	1(missing data)	541	YES
Total	7974	205	7769	

Table 1: Responses Distribution.

According to iResearch (iResearch, 2012), 67.8 per cent of Chinese online game players are male in their research sample, and 32.2 per cent are female. In our study (including continuous and switching users), 59.1 per cent of respondents are male and 40.9 per cent are female. In addition, according to iResearch (2012), 61.4 per cent of online game players are below 24 years old, and 20.1 per cent are 25 to 35 years old. In our study, 64.8 per cent of respondents are below 24 years old, and 30 per cent are 25 to 35 years old. The sample (switching user) included in this study also largely fits to iResearch sample's demographic information in China. The sample demographic information is presented in Table 2.

Measure	Items	Frequency	%
Gender	Male	277	51.2
	Female	264	48.8
Age	Under 15	236	43.6
	16-18	178	32.9
	19-24	92	17
	25-30	17	3.1
	31-35	16	3
	Over 36	2	0.4

Table 2: Demographic Information

4.3 Validity and Reliability

This study tested the research model by examining both the measurement model and the structural model with AMOS 20. A confirmatory factor analysis was conducted to test the reliability, convergent validity, and discriminant validity of all the constructs. The values of factor loading, composition reliability, average variance extracted (AVE) and Cronbach's

alpha of all the five constructs satisfied recommended levels of 0.70, 0.80, 0.50 and 0.80 respectively (See Table 3). The results indicate a good internal consistency and reliability of our research instrument.

Construct	Minimal factor loading	Cronbach's Alpha	Composite reliability	AVE
Need for variety (3 items)	0.80	0.86	0.86	0.67
Subjective norm (3 items)	0.88	0.86	0.94	0.85
Alternative Attractiveness (3 items)	0.86	0.91	0.92	0.78
Satisfaction (3 items)	0.87	0.94	0.94	0.83
Switch intention (2 items)	0.94	0.95	0.95	0.90

Table 3: Confirmatory Factor Analysis Result

Discriminant validity is used to evaluate whether the measurements of two distinct theoretical constructs are empirically distinct (Williams & Clippinger, 2002). As presented in Table 4, each square root of the AVE is greater than the correlations with other constructs. A good discriminant validity is supported in this study (Hair et al. 2006).

	NFV	SN	SAT	AA	SI
NFV	**0.821**				
SN	0.685	**0.921**			
SAT	-0.447	-0.554	**0.911**		
AA	0.689	0.715	-0.599	**0.885**	
SI	0.642	0.718	-0.556	0.718	**0.901**

Table 4: Inter-construct Correlations

4.4 Model Fit

Several common used model-fit indices were used to estimate the measurement model and structural model fit (Hari et al., 2006; Bagozzi & Yi, 1988): (1) Chi-square/degree of freedom (X^2df); (2) the Goodness-of-Fit Index (GFI), the Adjusted Goodness-of-fit Index (AGFI); (3) Root Mean Square Error of Approximation (RMSEA); (4) Normed Fit Index (NFI); and (5) Comparative Fit Index (CFI) as seen in Table 5. All the indices indicate a good model fit of the current study.

Fit statistics	Measurement model	Structural model	Recommended value
X^2df	2,903	3.125	<5
GFI	0.953	0.948	>0.90
AGFI	0.926	0.921	>0.90
RMSEA	0.059	0.063	<0.08
CFI	0.982	0.980	>0.90
NFI	0.973	0.971	>0.90

Table 5: Fit Indices for Measurement Model and Structural Model

5 Research Results

In this study, all the seven hypotheses were supported as shown in Figure 2. Subjective norm (β=0.32), satisfaction (β=-0.14), alternative attractiveness (β=0.30) and need for variety (β=0.15) are found to be the significant factors determining individual SNG players' switch

intention. Alternative attractiveness (β=-0.61) significantly relates to individual SNG players' Satisfaction. The proposed research model explained 62 percent of variance of switch intention.
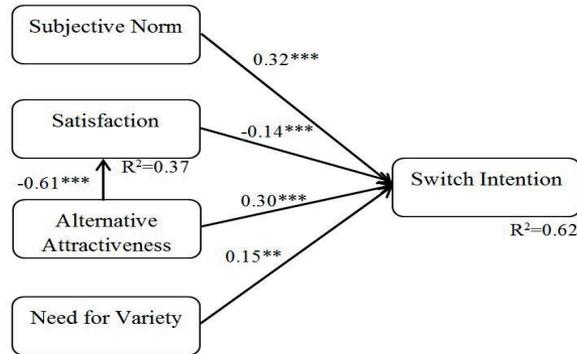
*Note: * p < 0.05; ** p < 0.01; *** p < 0.001*

Figure 2: Research model results

6   Discussion and Conclusion

The data analysis of our model shows that satisfaction, subjective norm, alternative attractiveness and need for variety are all significantly associated with switch intention. The research results are consisted with prior studies (Bhattacherjee, 2012; Zhang et al., 2012). Surprisingly, subjective norm and alternative attractiveness are more strongly associated with switch intention compared to that of satisfaction and need for variety. In other words, subjective norm and alternative attractiveness are the prime determinants of switch intention in SNG.

SNG players' switching intention is strongly correlated with the favourable subjective norms towards switching behaviour. According to our definitions, this finding implies that positive suggestions from SNG players' social network (such as friends, families or colleagues) towards switching to substitute SNGs play a key role in individuals' switching decision making process, confirming H1. Therefore, subjective norm does not only have influence on intention of IS adoption and continuance in prior studies, but also has significant effect on switching intention in current study. This study broadens the explanatory power of the conceptual relationship from subjective norm to behavioural intention.

The research result implies that alternative attractiveness has a strong and significant effect on SNG players' switching intention. If the alternative SNG is more attractive than the current SNG, the players are very likely to switch to the alternative one (strong support to H5). Comparably speaking, the predictive power of satisfaction on switch intention is not as strong as that indicated in the prior research. Our interpretation is that individual SNG players will have intentions to switch to alternative SNG if their social networks recommend them to switch and the alternative SNG is perceived more attractive, even though their satisfaction to the current SNG might not be so low yet. The founding also consists with prior studies which pointed out that under the situation of high competitive attractiveness, a user continues the

relationship with current service provider only when satisfaction is very high (Sharma & Patterson, 2000). Thus, individuals' switch intention in SNG context is related to not only the SNG service itself, but very much on the alternative SNG of the competitors and on the social networks of individual players.

In addition, alternative attractiveness is correlated with satisfaction significantly. The result suggests that in a situation of high competitive substitutes, when players perceive a better entertainment and customer services provided by the alternatives, the satisfaction towards current SNG will decrease. This finding leads us to believe in the low elasticity of substitution in SNGs.

Based on the above discussion, some practical implications can be arrived at. Firstly, it is crucial for SNG providers to understand the competition and development trends in SNG market and to update their SNG in order to keep their users from switching, or to attract other SNG users to switch. In the latter case employing social networks seems helpful in attracting new customers from the other SNG competitors.

7 Limitations and Future Study

There are some limitations in our study. First, as we use the Chinese SNG players as the research sample, we cannot be sure, whether the findings are applicable to other digital services, too. Therefore, future study can explore other types of online games and collect data in an international cross-cultural background. In addition, the elements of our simple model may be elaborated further in future studies, especially in terms of decomposed subjective norms and temporal perceived amelioration of present services.

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Appendix A. Instrument

Construct	Item	Measurement	Reference
Satisfaction	SAT1	Very dissatisfied … Very satisfied	Oliver &
	SAT2	Very displeased ... Very pleased	Swang
	SAT3	Very frustrated … Very contented	(1989)
Subjective Norm	SN1	Most people who are important to me support my switching from this game to other SNGs.	Liao et al. (2007)
	SN2	People who influence my decision wanted me to switch from this game to other SNGs.	
	SN3	People whose opinions I valued preferred that I should switch from this game to other SNGs.	
Need for Variety	NFV 1	I would rather stick with current SNG other than try a SNG I am not very sure of.	Bansal et al. (2005)
	NFV 2	If I like my current SNG, I rarely switch from it just to try something different.	
	NFV 3	I am very cautious about trying out new and different SNGs.	
Alternative Attractiveness	AA1	I believe that alternative SNGs offer much better entertainment than this game.	Bansal et al. (2005)
	AA2	I believe that alternative SNGs offer much better customer service than this game.	
	AA3	I believe that alternative SNGs have better reputation than this game.	
Switching Intention	SI1	I consider switching from this game and play other SNGs instead.	Hsieh et al. (2012)
	SI2	The likelihood of me switching from this game to other SNGs is high.	

Research article 5

Liu, Y. – Li, H. – Xu, X. – Kostakos, V – Heikkilä, J.

(in review)

A Cognitive Dissonance Framework for Modeling IT Switching Behavior in Social Network Games.

Unpublished Manuscript.

A COGNITIVE DISSONANCE FRAMEWORK FOR MODELING IT SWITCHING BEHAVIOR IN SOCIAL NETWORK GAMES

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Abstract

Despite the rich literature on IT acceptance and continuance, IT users' switching behavior is not well understood, in particular from the perspective of the dynamics of competition among different IT providers. In this study, an IT switch framework is developed in the context of a social network game (SNG), in which alternative attractiveness, as a product of change experience, is proposed to negatively affect perceived service quality and satisfaction of the chosen IT. The results show that users' perceived satisfaction and service quality toward a SNG will be significantly deteriorated under competitors' presence of attractive SNG alternatives. The situation is worse for the customers who have a rich change experience.

Keywords: switch behavior, loyalty, cognitive dissonance, alternative attractiveness, satisfaction, change experience

1. Introduction

The rapid proliferation of IT innovations has resulted in similar ITs from different developers or brands becoming increasingly available for users nowadays. Naturally, this rich availability of alternative ITs has prompted users to frequently switch from one IT provider to an alternative one among its competitors (Bhattacherjee et al., 2012). Users can freely switch between different IT products, and "switching to a competing IT is almost as easy as downloading and installing it, or completing an online registration form to sign up for a different service" (Bhattacherjee et al., 2012, pp. 327). Therefore, Yang and Peterson (2004) warned that competition in an Internet environment is just a click away while customers appear to face only minimal barriers to switching product or services providers.

In contrast to the rich availability of IT adoption and continuance literature, limited research has been conducted on IT switch behavior, leading to a dearth of knowledge on the key drivers of IT switch (Bhattacherjee et al., 2012). In this study, we introduce the cognitive dissonance theory to IS in order to model the mechanism of how dynamics of market competition alter consumers' perception on their present IT choice, and quantify the effect of alternative attractiveness and change experience in motivating switching intention and behavior. In addition, the moderating effects of change experience are examined. Rather than holding the view that consumer perception of service quality is relatively static and derived from an evaluation of the IT itself, our study argues that consumers' feeling on the chosen IT brand changes dynamically in response to market competition exerted by alternative IT providers. The research framework is evaluated through the responses collected from 541 users with the aid of a leading online service provider in China.

The study focuses on users' switching behavior in social network games. The success of games such as Farmville or Cityville, has made social network games one of the most popular entertainment service attracting tens millions of gamers (Shin & Shin, 2011). Due to the thriving market, the competition in the social network game market is fierce and users are found to switch frequently (Xu, Li, Heikkilä, & Liu, 2013). In other words, social network games provide researchers a fertile and data-rich setting to investigate IS switching behavior.

The rest of the paper is structured as follows. Next section discussed relevant literature while section 3 present the research framework and hypotheses. Research methodology is presented in section 4, followed by conclusion and discussion section. Limitations and future research avenues are discussed in section 6

2. Related work

In prior studies, switching behavior has been widely regarded as an outcome of deteriorated consumer loyalty, based on the assumption that loyal consumers will not switch (c.f. Valvi & Fragkos, 2012; Wang, Wu, Lin, & Wang, 2011; Yang & Peterson, 2004). Prior studies on IT service loyalty (e-loyalty) suggested that an improvement of various service characteristics enhance consumer satisfaction, which brings about consumer loyalty and helps keep consumers from switching. This conceptualisation of service charactertics (in particular service quality dimensions) has been adopted broadly in prior literature (c.f. Cristobal, Flavián, & Guinalíu, 2007; Floh & Treiblmaier, 2006; Gummerus, Liljander, Pura, & Riel, 2004; Ribbink, Riel, Liljander, & Streukens, 2004; Semeijn, Riel, Birgelen, & Streukens, 2005; Yen & Lu, 2008). By summarizing the research results of 217 relevant academic papers, Valvi and Fragkos (2012) noted that e-loyalty has been a main product of e-satisfaction and e-trust, which are affected by web service quality (ServQual). This stream of studies offers insights to enhance consumer loyalty and prevent consumer switch from the angle of the current service provider by identifying the most important service characteristics that affects consumer satisfaction.

This perspective, however, seems inefficient in interpreting how the dynamics of market competition stimulate the change of consumer interest to a different brand (see. Jones & Sasser, 1995). For instance, given a company providing a constant quality of its IT product, consumers may lose their original interest and switch when more attractive products are offered in the market by competitors (c.f. Jones & Sasser, 1995). This phenomenon may become more conspicuous when breakthrough technological innovation emerges.

Furthermore, there is a need to understand how consumers become more demanding along with the advance of new IT capabilities. It comes naturally that the advent of new and more attractive technology and products prompt consumers to dynamically shift from one brand to another, resulting in a natural evolution of market as well as consumer taste. For instance, today's most sophisticated smartphones are likely to lose their appeal within a few years.

A number of prior studies have investigated consumers' switching behavior directly. Based on a summary of tens of prior studies in relevance to switching among service providers, Bansal et al. (2005) incorproated 12 predictors in a push-pull-mooring framework to explore the determinants of switching behavior in the context of a tangible service. All the push, mooring and pull effects are found to significantly relate to consumer switching intention (Bansal et al. 2005).

The push-pull-mooring paradigm was later applied in the context of IS research on users' e-service switching by Hou et al. (2011), Hsieh et al. (2012), Zhang et al. (2012) and Xu et al. (2013). Investigating massively multiplayer

online role playing games, Hou et al. (2011) found that mooring and pull factors have significant influences on switching intention while push factors do not. Hsieh et al. (2012) studied user switching from blogs to Facebook. They found that pull, push and mooring effects all have significant influences on switching intention. Switching intentions significantly interpret 28% of the variance in switching behavior. Based on a longitudianl survey, Bhattacherjee et al. (2012) explored web broswer switching among student subjects, and reproted that relative advantage and satisfaction with prior IT are significant determinants of IT switching intention. In addition, IT switching intention, together with habit, sigificantly interpret 15% of variance in IT switching behavior. Note that, prior IT switch research has reported to intrepret a limited percentange of the variance of IT switch behavior. This implies that there is other possible determinants of IT switching behavior in addition to the switching intention. The research gaps discussed above motivate the current study.

3. Theoretical framework

Based on the cognitive dissonance theory, we developed a research framework by incorporating alternative attractiveness, perceived service quality and satisfaction to predict IT switching intention and behavior. In the framework, 10 hypotheses are proposed and visualized in Figure 1.
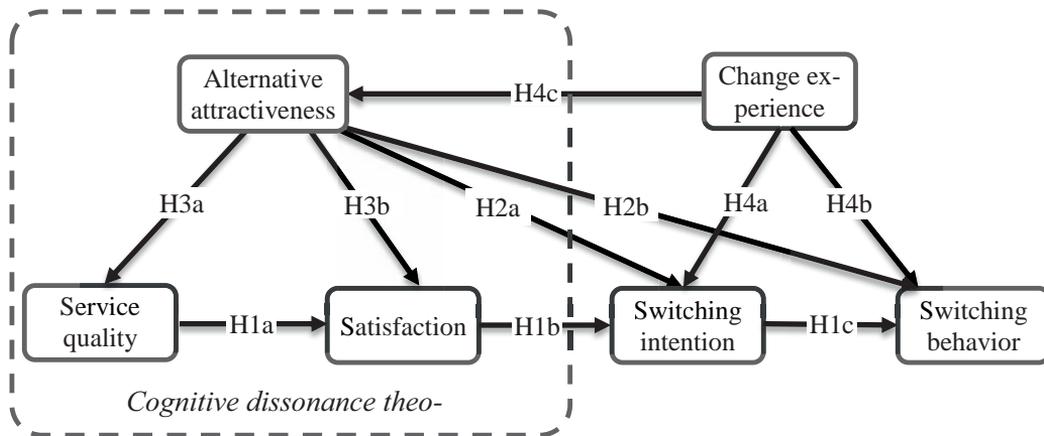
Figure 1. A cognitive dissonance IT switch framework

3.1. Service quality, satisfaction and switching behavior

E-loyalty building has been widely proposed as an effective approach to resist consumer switch, in which the service quality - satisfaction - e-loyalty relationship has been widely adopted in prior studies (Valvi & Fragkos, 2012). In other words, when an IT brand has good quality, consumers will feel satisfied toward

the brand, which in turn enhances their loyalty to the brand and prevents them from switching. In recent switching behavior research, satisfaction has been found to exert a significantly negative influence on switching intention (Bansal et al., 2005; Bhattacherjee et al., 2012). Therefore, it is proposed that a positive perception on IT service quality may bring about a higher level of consumer satisfaction, which later prevents the intention of switch. Accordingly we proposed:

H1a: Perceived service quality positively relates to satisfaction with present IT.

H1b: Satisfaction with present IT negatively relates to switching intention.

H1c: Switching intention positively relates to switching behavior.

3.2. Alternative attractiveness

The availability of alternatives is an important precursor for consumers to switch. Consumers will be trapped with a service provider when/if no alternative service provider is available. Jones and Sasser (1995) studied how different industry environments affect consumer loyalty. They reported that, in a market with regulated monopoly or few alternatives, consumers will be stuck like '*hostage*'. Despite of their dissatisfaction with current service provider, consumers will behave with a high loyalty. In contrast, in a highly competitive market with many low-differentiated alternatives, consumers become '*mercenary*'. Despite of a high level of satisfaction, consumers have low commitment toward their current brand.

A study of Rusbult and Farrell (1983) suggested that the intention to continue/switch is a function of the attractiveness of the existing service versus that of alternatives. Users are more likely to migrate to a substitute service if they perceive the new one better, or different, at fairer prices and more enjoyment by expectation (Hou et al., 2011). Therefore, alternative attractiveness may contribute to an important predictor of switching intention. Accordingly, we hypothesized:

H2a: Alternative attractiveness positively relates to switching intention.

As above noted, switching intention was found to interpret a limited amount of the variance of IT switching behavior, indicating the possible existence of other direct predictor of IT switching behavior. Bhattacherjee et al. (2012) noted that, IT switching somewhat differs from switching of other products and services, in that it allow for partial switching and the user may choose to use both the old and *the new IT concurrently*. For instance, a user may utilize two different web broswers or operating systems concurrently. Hou et al. (2011) suggested that an e-service user may switch to other service provider while keeping their current service account. In other words, an IT user may actually utilize a new IT brand without deliberating on whether s/he should give up the current IT service or not.

Therefore, we proposed that alternative attractiveness would exert a direct influence on IT switching behavior.

H2b: Alternative attractiveness positively relates to switching behavior.

3.3 Cognitive dissonance theory and alternative attractiveness

Cognitive dissonance theory is a frequently applied social psychology theory that has generated over 1.000 relevant experiments (Nail & Boniecki, 2011; Tanford & Montgomery, 2014). It describes how one's perceptions of different alternatives interact with each other to ultimately reduce the possible dissonance in one's beliefs. The theory suggests that consumers have cognitive elements or knowledge about their past behavior, their beliefs and attitudes and their environment, i.e. previous purchase experience of a specific product or service (Anderson, 1973; Oshikawa, 1968). The consumers continually receive various kinds of product information from their own experience, associates, advertisements and salesmen. These stimuli of information bring about potential cognitive inconsistencies (Anderson, 1973; Holloway, 1967). When consumers have two ideas which are psychologically dissonant, they strive to reduce this mental discomfort by changing or distorting one or both of the cognition to make them more consonant (Anderson, 1973). In other words, the consumers are stimulated to reduce the psychological tension generated by altering their perception of the product to make conflict idea consonant (Anderson, 1973). The stronger the cognitive dissonance, the more motivated consumers are to reduce dissonance by reevaluating the cognitive element (Brehm & Cohen, 1962). For instance, a recent study shows that low-income women tend to devalue more expensive brand name products compared to the ones they bought, and reduce dissonance by enhancing the perceived quality of the products they purchased (Gbadamosi, 2009).

The cognitive dissonance theory has been widely applied in a wide array of topics such as attitudes toward smoking, condom use and conservation of water and energy and in a diversity of disciplines like economics, law, philosophy, political science and anthropology (see. Aronson, 1992, 1997; Metin & Camgoz, 2011). In consumer behavior research, the theory is now enjoying a second wave of popularity after the first wave in 1970s (for a summary see Bawa & Kansal, 2009; Soutar & Sweeney, 2003). For instance, the theory has been recently applied to study consumer behavior in the context of relationship marketing (Sharifi & Esfidani, 2014), hospitality purchases (Kim, 2011), travel purchases (Nail & Boniecki, 2011), grocery products purchases (Gbadamosi, 2009), quitting smoking (Fotuhi et al., 2013) as well as e-service user behavior like movie and music downloads (Redondo & Charron, 2013). Recent functional magnetic resonance imaging studies lend good support to the theory by demonstrating that motor and cognitive conflict, as well as affective distress, can often be resolved within seconds as a result of activity in the right inferior frontal gyrus (Jarcho, Berkman, &

Lieberman, 2011). In other words, the process of cognitive dissonance reduction happens quickly at the moment of decision (Jarcho et al., 2011).

Consistent with prior studies, we believe that the cognitive dissonance theory can also be applied to the context of studying IS user behavior. For example, when IS users face a new IS product choice that connotatively advertises new features outperforming consumers' prior choice of IS product, the implied new choice (switching to an alternative) will conflict with consumers' established good feeling and positive experience toward their current product provider, leading to psychological dissonance. Giving up a satisfying relationship with an existent service provider which has provided the consumer a good product experience may not be an easy decision, as the consumers may have feelings of betrayal or due to habit and high switching costs. As a result, they will reduce the psychological discomfort by either (i) altering their perception that the new product has been over-exaggerated or is unreliable, and their existent choice is still the best one for them, or (ii) changing their positive perceptions on the old brand (i.e. the old product becomes outdated and should be further improved, therefore is not good enough now) to cater for their perceptions that new products have advantages and it may be necessary for them to make a change.

A constant exposure to advertisement of new products will increase the chance of positive feeling toward new products, as well as the chance for consumers to reevaluate the appropriateness of buying the old product. Therefore, it is possible that consumers regret a prior purchase of a specific brand (satisfaction), or feel the present brand to be unattractive (service quality), after being aware of the attractiveness of other brands (c.f. Holloway, 1967). In an experiment conducted by Brehm (1956), 225 participants rated a series of common appliances and were then allowed to choose one of two appliances to take home as a gift. A second round of ratings indicated that the participants increased their ratings of the item they chose, and lowered their ratings of the item they rejected (Brehm, 1956). Consumers' perceptions of good performance of an alternative will result in a decrease of their post-purchase evaluation, such as satisfaction towards the chosen brand (Inman et al., 1997). Furthermore, another explanation can be made from a perspective of performance expectancy. When consumers perceive a good performance of alternatives, they may realize that they can have a higher expectation on service performance which cannot be met by the present brand, therefore leading to a lower level of perceived service quality and satisfaction. Based on the above discussion, we assume that a promoted perception of alternative attractiveness will enhance the chance for consumers to perceive the prior service produce to be low-quality and feel dissatisfied with the prior service choice.

H3a: Alternative attractiveness negatively relates to perceived service quality.

H3b: Alternative attractiveness negatively relates to perceived satisfaction.

3.4. Change experience

Change experience is a measurement of consumer past switch behavior. Prior studies indicated that the inherent human tendency of variety-seeking is a driver for seeking newness, which usually leads to a change of consumer choices to the unknown or untried products (Hoyer & Ridgway, 1984). Steenkamp and Baumgartner (1992) suggest that switching behaviour may occur among satisfied customers due to their attempt to try something novel or different for fun or thrill. Therefore, it is common that some consumers may wish to change and have a rich change experience than those who are more reluctant to change. In addition, from the perspective of migration theory, individuals with a successful migratory experience are more likely to move again while the unsuccessful migratory experiences may have the opposite effect (Hou et al., 2011; Kuznets & Thomas, 1984). Similar effects have been observed in the context of marketing and IT switch research, in which prior change experience was reported to significantly influence subsequent switching behavior (i.e. Bansal et al., 2005; Ganesh, Arnold, & Reynolds, 2000; Hou et al., 2011). Therefore, we hypothesized:

H4a: Change experience positively relates to switching intention.

H4b: Change experience positively relates to switching behavior.

Individuals with a rich change experience are more ready to make a switch (c.f. Hoyer & Ridgway, 1984; Kuznets & Thomas, 1984). Compared to those who is reluctant to change, these consumers may be more sensitive to or interested in the information of alternative products, therefore being more likely to perceive the attractiveness of alternatives. In addition, consumers with a rich change experience are more familiar with different alternative products and therefore encounter with less switching barriers. They may have an effective contact with other products, i.e. advertising email directly from other companies. Therefore, it is hypothesized:

H4c: Change experience positively relates to alternative attractiveness.

4. Method

4.1. Measurement development

A survey questionnaire was developed to collect empirical data. All constructs of the research framework were measured via the use of multiple-item perceptual scales, which are adapted from prior research. Items were modified slightly from previous studies to fit our research context. All items were measured using a 5-point Likert scale ranging from 1 (disagree) to 5 (agree). The instrument is presented in appendix A.

The questionnaire survey was administrated to collect responses from users of a social network game (SNG). The questionnaire was initially developed in English and then subsequently translated into Chinese by one of the manuscript's authors, a native Chinese speaker. A pilot test was conducted among 7 respondents; including 3 IS researchers, a manager of the service provider and 3 current service users. The purpose of this pilot test was to evaluate the validity of the questionnaire. Based on their feedback, updates were made to improve the questionnaire quality.

4.2 Data collection

To maintain anonymity we refer to the social network game we investigate as "The SNG". The SNG is designed for Chinese players in Chinese language and ran by one of the biggest social network companies with over 570 million users in mainland China. The SNG has been running for over 6 months before the data collection. It is mainly marketed and distributed via the social network site of the company.

With the aid of the company, an online survey was deployed to collect data for studying a) continuous use and b) switching behaviour in SNG. The two segments were identified via self-selected questions in the questionnaire. The SNG manager suggested that experienced players who have not played the SNG in the past one month can be identified as potential switching players. Accordingly, responses from those potential switching users were collected to investigate the driving factors of their switching behaviours.

The company sent out 220.000 electronic questionnaires to a random selected sample from registered players of the SNG during Nov. 23rd and 27th, 2012. All responses were provided voluntarily without reward. In the survey, no personal information about the respondents has been collected. The electronic questionnaire was implemented with a pop-up that has been added to the SNG homepage and the selected 220.000 players are invited to answer the questionnaire. If and when the players clicked the pop-up, they were lead to the questionnaire webpage to answer the questionnaire.

Note that switching users tends to be a very small proportion of the whole user population of this new SNG in particular when the user's amount of this SNG is still growing. Therefore, the result of study switching users might be highly skewed by including all the respondents into the analysis. For instance, when there are only 5 percent of switching users in a sample consisting of 95 percent of continuance users, the result of e.g. regression analysis based on all respondents will be highly skewed to the attributes of continuance users.

Therefore, we borrowed a sample-adjusting method from data mining field by manipulating the experiment to enlarge the proportion of potential switching us-

ers in the sample. For instance, to study bank default, data mining researchers will manipulate the data analysis to enlarge the proportion of actual defaulters to study their differences with non-defaulters. In our study, we restricted the model by testing on the respondents who did not play the SNG of the past 4 weeks at the moment of filling in the questionnaire, in an attempt to raise the proportion of potential switching users in the sample. As shown in Appendix C, this approach facilitated us to obtain a good proportion of both switching and non-switching users, which will be specified later.

Finally, 7769 responses were received from 220.000 players, including: (i) registered users who claimed have never played the SNG before (N = 2128); (ii) discontinuous players who claimed that they quit (N = 1181) from any online games, therefore are not our target of switching users; and (iii) continuous players (N = 4123) of the SNG; (iv) potential switching users (N = 542) of the SNG who did not play the SNG for the past 4 weeks. Finally, after removing those with missing data, 4460 valid responses including continuance players and switching players were collected. According to the SNG manager, this is a typical response rate for such a questionnaire in their SNG population. Among 4460 valid responses, 541 responses were valid regarding switching behaviour and used as the valid data base in this study. The description of the data is presented in Table 1.

According to a report by iResearch (2012), 67.8% of Chinese online game players are male in their research sample, and 32.2% are female. In our study (including continuous and switching users), 59.1% of respondents are male and 40.9% are female. In addition, according to iResearch (2012), 61.4% of online game players are below 24 years old, and 20.1% are 25 to 35 years old. In our study, 64.8% of respondents are below 24 years old, and 30% are 25 to 35 years old. The demographic information of potential switching user sample is presented in Table 2.

Table 1: Responses Distribution

Type	Total cases	Invalid cases	Valid cases	Included in this study
Non-players	2128	0	2128	NO
Discontinuous players	1181	0	1181	NO
Continuous players	4123	204(missing data)	3919	NO
Potential switching players	542	1(missing data)	541	YES
Total	7974	205	7769	

Table 2: Demographic Information

Measure	Items	Frequency	%
Gender	Male	277	51.2
	Female	264	48.8
Age	Under 15	236	43.6
	16-18	178	32.9
	19-24	92	17
	25-30	17	3.1
	31-35	16	3
	Over 36	2	0.4

4.3. Measurement validity and reliability

Confirmatory factor analysis was utilized to test the adequacy of the measurement model using Amos 21. The results of which demonstrated a satisfactory fit (CMIN/DF = 2.352; GFI = 0.955; AGFI = 0.931; NFI = 0.971; IFI = 0.983; TLI = 0.977; CFI = 0.983; RMSEA = 0.050). The values of Cronbach's Alpha (α), composite reliability (CR) and average variance extracted (AVE) of the constructs are all over the thresholds of 0.7, 0.7 and 0.5 respectively, as shown in Table 3. The squared roots of AVE are higher than their correlations with other constructs, as shown in Table 4. In addition, principle component analysis was conducted to further test measurement validity, as shown in Appendix B. The results show that all items fit their respective factors quite well. The results suggest unidimensionality, convergent and discriminant validity of the measures. A single factor model test is conducted to test common method bias. The single-factor model showed a poor fit (CMIN/DF = 30.819; GFI = 0.562; AGFI = 0.428; NFI = 0.587; IFI = 0.595; TLI = 0.531; CFI = 0.594; RMSEA = 0.235) against the existence of common method bias. Based on the recommendations in Podsakoff et al. (2003) and Malhotra et al. (2006), we introduced a common fac-

tor to test common method bias, and the improvement was found to be close to 0% indicating the common method bias is not a pervasive problem in this study.

Table 3. Reliability and validity of measurement

Construct (number of items)	Minimal factor loading	α	CR	AVE
Service quality (3)	0.763	0.863	0.870	0.692
Change experience (3)	0.823	0.908	0.911	0.773
Alternative attractiveness (3)	0.855	0.914	0.915	0.783
Satisfaction (3)	0.865	0.935	0.936	0.831
Switch intention (2)	0.942	0.949	0.949	0.904
Switch behavior (2)	0.884	0.902	0.904	0.824

Table 4. Inter-construct Correlations (diagonal values are squared roots of AVE)

	SQ	CE	AA	SAT	SI	SB
Service quality (SQ)	**0.832**					
Change experience (CE)	-0.386	**0.879**				
Alternative attractiveness (AA)	-0.539	0.654	**0.885**			
Satisfaction (SAT)	0.540	-0.389	-0.601	**0.911**		
Switch intention (SI)	-0.458	0.616	0.721	-0.569	**0.951**	
Switch behavior (SB)	-0.406	0.536	0.705	-0.524	0.757	**0.908**

4.4. Evaluation of research framework

Structural model test indicated a good fit between the model and data (CMIN/DF = 2.386; GFI = 0.952; AGFI = 0.931; NFI = 0.971; IFI = 0.983; TLI = 0.978; CFI = 0.983; RMSEA = 0.051). Except hypothesis H4b, all the hypotheses are supported, as shown in Figure 2. Alternative attractiveness significantly affects service quality (β = -0.542, P < 0.001), satisfaction (β = -0.438, P < 0.001) and switching intention (β = 0.427, P < 0.001). Service quality is a significant predictor of satisfaction (β = 0.303, P < 0.001), which in turn is a precursor of switching intention (β = -0.215, P < 0.001). Switching behavior is a product of both switching intention (β = 0.517, P < 0.001) and alternative attractiveness (β = 0.335, P < 0.001). Change experience positively influences both alternative attractiveness (β = 0.655, P < 0.001) and switching intention (β = 0.253, P < 0.001). However, no significant influence is found from change experience to switching behavior. Overall, the model interpreted 42.9% of variance of alterna-

tive attractiveness, 29.4% of service quality, 42.8% of satisfaction, 58.7% of switching intention and 62.7% of switching behavior. Total effects of different determinants were calculated as well via the use of AMOS 21, as shown in table 5.
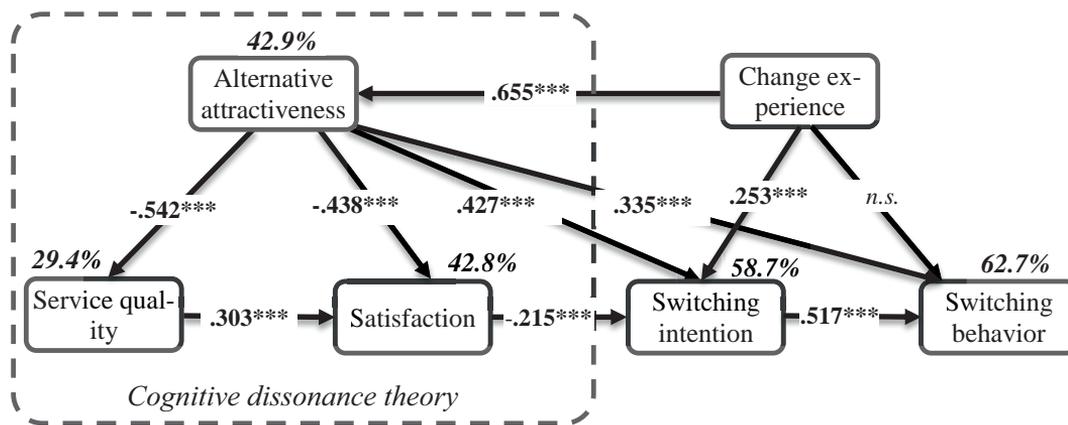
Figure 2. Results (***: P < 0.001; *n. s.* = not significant)

Table 5. Total effects (*: P < 0.05; **: P < 0.01; CE: change experience)

	CE	AA	SQ	SAT	SI
Alternative attractiveness (AA)	.655*				
Service quality (SQ)	-.355**	-.542**			
Satisfaction (SAT)	-.395**	-.603**	.303*		
Switch intention (SI)	.617**	.556*	-.065*	-.215*	
Switch behavior (SB)	.536*	.623*	-.034**	-.111**	.517**

An ad hoc test was used to further examine the validity of building cognitive dissonance relationships in the framework by removing the connections from alternative attractiveness to service quality and to satisfaction. The structural model test showed an apparent deterioration of the model fit (CMIN/DF = 4.125; GFI = 0.923; AGFI = 0.890; NFI = 0.949; IFI = 0.961; TLI = 0.951; CFI = 0.961; RMSEA = 0.076) in comparison to the original model. On the other hand, this result suggests the necessity to include alternative attractiveness as a precursor of service quality and satisfaction.

4.5. Testing moderator effect of change experience

Experience has been identified as an important moderating factor in the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris,

Davis, & Davis, 2003). In a similar way, it is possible that users with rich change experience will perceive and behavior differently compared to those with little switching experience. Therefore, we conducted an exploratory analysis on the possible moderating effect of change experience through a multi-group moderation test via AMOS 21.

The whole sample was divided in two subgroups of low change experience (N = 324, Mean value ≤ 3) and high change experience (N = 217, Mean value > 3) respectively. An ANOVA analysis was performed to detect whether there are substantial perceptual differences between two subgroups, as shown in Appendix C. The results show that people with low change experience tend to have a significantly lower perception on alternative attractiveness, higher perception of service quality and satisfaction with present brand, and are less willing and likely to switch. The high change-experience group has both high switching intention (Mean = 3.98, Std. = 1.053) and switching behavior (Mean = 4.1613, Std. = 1.060), while the values for the low change-experience group are significantly lower.

Table 6. Multi-group analysis of the basic research model (change experience)

	χ^2	df	$\Delta\chi^2$ from base model	Path coefficient in group of low change experience	Path coefficient in group of high change experience
Unconstrained base model [a]	249,226	116			
Constrained paths [b]					
AA → SQ	**253.878**		**4.652, p < 0.05**	**β = -0.432, p < 0.001**	**β = -0.561, p < 0.001**
AA → SAT	250.519		1.293, n.s	β = -0.404, p < 0.001	β = -0.436, p < 0.001
AA → SI	250.444		1,218, n.s	β = 0.537, p < 0.001	β = 0.414, p < 0.001
AA → SB	249.478		0.252, n.s	β = 0.302, p < 0.001	β = 0.287, p < 0.001
SQ → SAT	249.288		0.062, n.s	β = 0.310, p < 0.001	β = 0.277, p < 0.001
SAT → SI	250.444		1.218, n.s	β = -0.224, p < 0.001	β = -0.283, p < 0.001
SI → SB	**255.074**		**5.848, p < 0.05**	**β = 0.566, p < 0.001**	**β = 0.398, p < 0.001**
R^2(Switching behavior)				63.6%	37,4%

[a] Paths for the two groups were allowed to be freely estimated.
[b] The path specified was constrained to be equal across the two groups.
[ns] not significant.

Furthermore, the results of multi-group analysis indicate there are substantial differences between low and high change experience users. Alternative attractiveness exerts a significantly stronger negative influence on perceived service quality for users with rich change experience (β = -0.561, P < 0.001) in comparison to those with limited change experience (β = -0.433, P < 0.001). Switching intention has a significantly stronger effect on switching behavior for low change experience users (β = 0.397, P < 0.001) in comparison to those frequently switched (β = 0.585, P < 0.001). Trend lines of subgroup samples were estimated to visualize the significant moderating effects of change experience, as shown in Appendix D and E.

5. Discussion and Conclusion

In this study we developed a cognitive dissonance IT switch framework to model the influence of dynamics of market competition through investigating the influence of alternative attractiveness. In addition, change experience is incorporated into the framework to investigate how personal experience alters users' perception toward IT service and affects its future switching behavior. Considering the facts that there is a dearth of IT switch research and that IT switch have different features in comparison to conventional tangible services (Bhattacherjee et al., 2012), our study offers an alternative perspective for future investigation on the IT switching phenomenon.

The study makes several contributions to both IS and e-business literature. First, the study introduced the cognitive dissonance theory to the space of IS research. Consistent with expectation, the results of the study indicates that an enhanced positive feeling of alternative attractiveness will substantially deteriorate consumers' positive perceptions on the current IT users are using. As a result, two new and strong relationships from alternative attractiveness on service quality and satisfaction were introduced on the basis of the theory.

Second, the results suggest that a deterioration of consumers' perception to an IT brand may not necessarily derive from an actual deterioration of service quality of the brand itself. Instead, it may be essentially caused by the enhanced attractiveness of competitors' products. Our study shows that alternative attractiveness exerts a rather strong negative influence on perceive service quality and satisfaction. In particular, regarding the total negative influence, alternative attractiveness is the most influential determinant of satisfaction ($\beta = -0.542$, $P < 0.01$), which is much stronger than service quality ($\beta = 0.303$, $P < 0.01$), as shown in Table 5. Note that prior studies based on push-pull-mooring paradigm have regarded user statisfaction (push factor) and alternative attractiveness (pull factor) as in-parallel predictors of switching intention (e.g. Zhang et al., 2012). In this study, we quantified the interdependence between user satisfaction and alternative attractiveness from the cognitive dissoance theory perspective.

Third, the study provides a new perspective towards understanding the most influential predictor of IT switching behavior. While it has been argued that consumer satisfaction is one of the strongest factors to make consumers loyal (c.f. Valvi & Fragkos, 2012) and therefore to prevent them from switching, some scholars note that industry environment (i.e. availability of alternatives) or relative advantages of alternatives may exert a dominant influence on both consumer satisfaction as well as their switching behavior (c.f. Jones & Sasser, 1995; Bhattacherjee et al., 2012). In the present study, considering the total effects, alternative attractiveness and change experience are much stronger determinants of switching intention and behavior in comparison to satisfaction (see the Table 5).

Also it is necessary to note the study by Bhattacherjee et al. (2012) suggests that satisfaction exerts a much lower influence to the switching intention and behavior in comparison to the perceived relative advantage of a new IT.

Fourth, the study, to the best of our knowledge, is the first to introduce alternative attractiveness as a direct precursor of IT switching behavior in addition to the switching intention. A significant direct relationship was found between alternative attractiveness and switch behavior. As Bhattacherjee et al. (2012) indicated that IT users may utilize two different IT brands concurrently, users may switch to use a new IT without making a deliberation to give up the prior IT.

Fifth, prior studies suggest users with a habit to use an IT will automatically use the IT while reducing the influence of intention on behavior. Our study reports somewhat similar findings. A user with rich change experience will be more likely to adopt switching behavior. And the influence of switching intention on behavior is weaker for those with rich change experience. It may imply that frequently switched users will more likely to utilize an alternative IT while thinking little about the prior one. A user with more change experience will be more likely to switch to new ITs as well in the future.

The research contributes a number of managerial insights to practitioners. First, the results emphasizes the strong influence of market competition in altering consumers' satisfaction and, as a result, motivate consumers to switching among different IT services. In addition to focusing on improving the quality of service, an IT service provider should pay essential attention to its competitors. The advent of attractive IT products from competitors may deteriorate consumers' perceptions on the current brand, making them switch. Therefore, a close watch to competitors and a rapid implementation of new functions available in the market are important for IT providers to retain current customers by reducing the attractiveness of the alternatives. A temporally good perception on the IT among consumers is not sustainable in particular facing the advent of new and potentially more attractive alternatives offered by competitors.

Second, the results suggest that when previously satisfied consumers are found to become dissatisfied and begin to switch, it does not mean that the company performs badly and offers low quality service. Instead, it may be a sign of the emergence of new attractive alternatives, making consumers feel the old product outdated. In this case, practitioners should focus more on updating the products with new and attracting features, or invest in developing new and competitive alternatives.

Third, the results indicate that the cognitive dissonance phenomenon is a double-edged sword for current IT service providers as well as for competitors. On one hand, an IT company may easily lose its customer if failing to offer new and attractive functions offered by the competitors. On the other hand, when an IT company delivers distinguished service to consumers that cannot be matched by

its competitors, customers from its competitors will be more likely to switch to the company due to functionality of cognitive dissonance. Therefore, quick following or 'duplicating' competitors for new and attractive functions and investing in developing unique service capability may be an effective competition strategy for an IT company.

Fourth, IT providers should focus more on users who have limited change experience for a long-term customer relationship. Our results show that a user with rich change experience may not be a 'good' customer in the sense that they are more likely to detect or feel alternatives products to be attractive, and therefore easily switch to a new IT. Therefore, it is necessary for an IT company to adopt different business strategy regarding the users with different change experience. For instance, when an IT company markets its new products, focusing its resources (advertisement campaign) on the users with rich change experience should be an effective strategy, as they are more sensitive to the company's advertisement and likely to change. However, after attracting those customers with rich change experience, it may be necessary to increase their switching costs in order to prevent their switch. Furthermore, consumers with limited change experience are important treasures of a company, and therefore it might be necessary for the company to offer them more favorable terms. IT companies should have a sustained attention on their customers who have limited change experience. When these consumers start to switch to competitors, the true crisis of survival may have initiated.

6. Limitations and future work

Our framework is tested in the context of SNS game. Therefore it would be interesting to examine how the framework performs in the context of other IT contexts, such as different industry environments. In addition, other factors, like switching costs, are important determinant of e-loyalty in prior studies, which are not investigated in the study. New insights may be drawn through incorporating those factors in the framework. Another limitation of the study is that we sought to manipulate the experiment to enlarge the proportion of potential switching users in order to avoid the possible skewed results from over-presented continuance users. However, despite our efforts, this experiment manipulation method has been focused on risky users who did not play the SNG for a period of time. Therefore, more perfect data manipulation methods are needed in order to avoid over-presented subsamples.

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Appendix A. Questionnaire

Construct	Item	Measurement	Reference
Satisfaction	SAT1 SAT2 SAT3	Very dissatisfied … Very satisfied. Very displeased ... Very pleased. Very frustrated … Very contented.	Oliver & Swang (1989)
Service Quality	SQ1	Overall I consider the service of SNG to be excellent.	Taylor & Baker (1994)
	SQ2	The quality of the SNG service is generally good.	
	SQ3	I believe the general quality of the SNG is high.	
Change Experience	CE1 CE2	I have switched SNGs often in the I have a lot of experience in switching among SNGs.	Bansal et al. (2005)
	CE3	I have often switched to alternative SNGs after playing SNG for some time (such as 1 month)	
Alternative Attractiveness	AA1	I believe that alternative SNGs offer much better entertainment than this game.	Bansal et al. (2005)
	AA2	I believe that alternative SNGs offer much better customer service than this game.	
	AA3	I believe that alternative SNGs have better reputation than this game.	
Switching Intention	SI1	I consider switching from this game and play other SNGs instead.	Hsieh et al. (2012)
	SI2	The likelihood of me switching from this game to other SNGs is high.	
Switching Behavior	SB1	In terms of frequency of playing, I play other SNGs more than this	Hsieh et al. (2012)
	SB2	Regarding the time I spend, I spend more time on playing other SNGs than this SNG.	

Appendix B. Result of principal component analysis

Rotated Component Matrix

	Component					
	1	2	3	4	5	6
SQ1	-,157	,181	**,799**	-,146	-,111	-,078
SQ2	-,135	,182	**,871**	-,153	-,105	-,109
SQ3	-,081	,225	**,828**	-,145	-,044	-,091
AA1	,271	-,213	-,200	**,772**	,286	,111
AA2	,302	-,252	-,207	**,770**	,201	,236
AA3	,266	-,247	-,220	**,755**	,190	,237
CE1	**,863**	-,058	-,134	,228	,152	,133
CE2	**,875**	-,132	-,101	,191	,140	,192
CE3	**,814**	-,176	-,166	,208	,147	,130
SI1	,280	-,259	-,173	,272	,302	**,780**
SI2	,295	-,236	-,174	,272	,332	**,770**
SB1	,203	-,184	-,164	,308	**,800**	,259
SB2	,224	-,208	-,094	,222	**,846**	,232
SAT1	-,112	**,856**	,218	-,215	-,160	-,145
SAT2	-,121	**,870**	,235	-,171	-,190	-,148
SAT3	-,145	**,857**	,221	-,182	-,084	-,131

Appendix C. ANOVA analysis of perceptual differences between low and high change experience subgroups

		N	Mean	Std. Deviation	F	Sig.
Alternative attractiveness	Group 1	324	2,8951	1,02964	193,875	,000
	Group 2	217	4,1290	,98065		
	Total	541	3,3900	1,17697		
Satisfaction	Group 1	324	3,1348	1,17303	44,589	,000
	Group 2	217	2,4147	1,30881		
	Total	541	2,8460	1,27790		
Service quality	Group 1	324	3,5484	1,07704	39,346	,000
	Group 2	217	2,9109	1,27061		
	Total	541	3,2927	1,19893		
Switching intention	Group 1	324	2,8786	1,08164	136,863	,000
	Group 2	217	3,9770	1,05311		
	Total	541	3,3192	1,19739		
Switching behavior	Group 1	324	3,0602	1,23679	115,715	,000
	Group 2	217	4,1636	1,06053		
	Total	541	3,5028	1,28758		

Group 1: low change experience; Group 2: high change experience

Appendix D. The relationship between alternative attractiveness to service quality regarding two subsamples (CE: change experience)
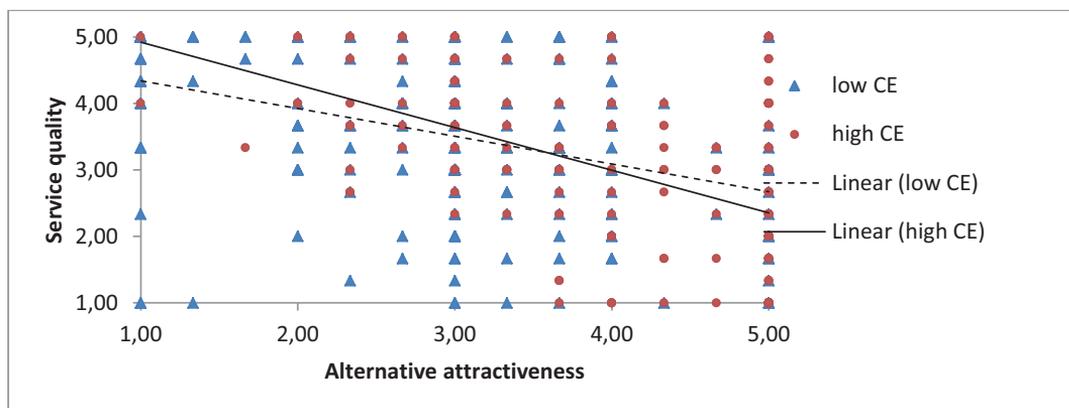
Appendix E. The relationship between switching intention to switching behavior regarding two subsamples (CE: change experience)
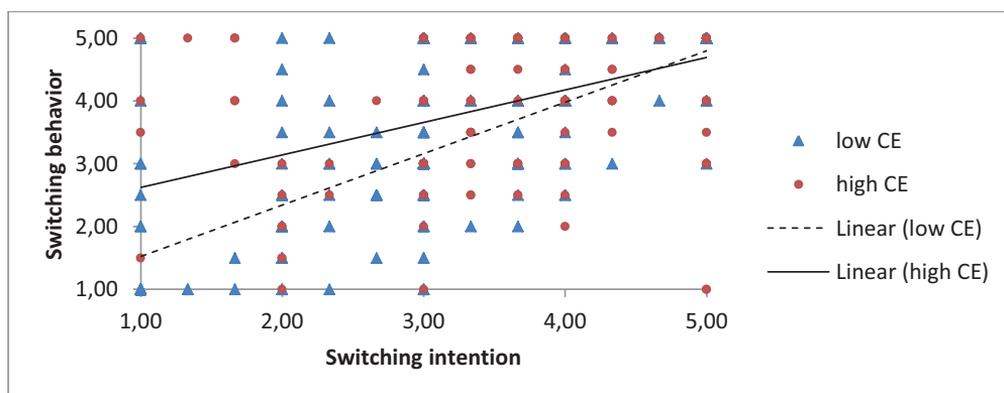
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