User-switching behavior in social network sites: A model perspective with drill-down analyses

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ABSTRACT

Social network sites (SNSs) are considered the most representative and influential Web 2.0 applications. Users frequently switch between SNSs and user devices because of the intense SNS market competition and the increasing mobile-device user base. However, the switching behavior of SNS users is yet to be explored to gain new knowledge and practical suggestions. This study uses a higher level research model and lower level switching pattern drill-down analysis to understand the actual switching behavior of SNS users. Users of major SNSs filled out an online questionnaire, which yielded 343 valid samples. The partial least square (PLS) results of the proposed research model show that both service quality and switching cost indirectly influence the switching intention of users through the satisfaction and switching barriers, respectively. Convenience and peer pressure are the top reasons for switching SNS platforms, whereas mobile capabilities and real-time access are the top motivations for switching to mobile SNSs. Six managerial implications are derived from the research model and the switching pattern analysis. Two research limitations are also provided with the conclusions.

1. Introduction

The development of the Internet has led to the emergence of a variety of Web 2.0 network applications, of which the social network sites (SNSs) are prominent. For example, Facebook and Twitter are trends that are sweeping the world. In addition, as users of smartphones and mobile browsing devices, such as tablet PCs, continue to grow, the combination of SNSs and mobile devices coincides with the concept of community media (FIND, 2010). Therefore, using mobile devices to surf SNSs is one of the latest network applications and has become a major driving force encouraging people to surf mobile Internet.

According to the information published by the United Nations in 2012, the worldwide cell phone user population has exceeded 5 billion, and 950 million of them use mobile phones to go online; thus, smartphones have the most growth potential among all mobile devices that can access the Internet (FIND, 2012a). eMarketer estimates that the number of US consumers with a smartphone will more than double from 93.1 million in 2011 to 192.4 million by 2016, when 58.5% of the total US population are

expected to own smartphones (eMarketer, 2012). The smartphone market share in Taiwan has reached 62% in the fourth quarter of 2011, and among the reported Internet activities, browsing SNSs is the highest (20.5%), whereas updating SNSs content ranked third (15.3%) (InsightXplorer, 2012). As the frequency and influence of using mobile devices to browse SNSs rapidly increase, mobile phone users are in the early stage of developing mobile social behavior. Therefore, it has become a hot topic requiring attention and discussion so that mobile SNS players can gain new users and retain existing ones.

Most of the current SNS-related studies are focused on the applications and development of SNSs. One school of thought utilizes a distinct viewpoint, i.e., coherent theoretical model, to discuss usage behavior, royalty, satisfaction, key factors of success, and assessment index (Ellison, Steinfield, & Lampe, 2007; Kim, 2011; Lin & Lu, 2011; Waters, Burnett, Lammb, & Lucas, 2009), as well as the effects on different traits or types of SNSs (Ganley & Lampe, 2009; Pfeil & Zaphiris, 2009; Roblyer, McDaniel, Webb, Herman, & Witty, 2010). To our knowledge, current studies focus only on a few specific domains such as the impact of Facebook on school education (Cheung, Chiu, & Lee, 2011; Ellison et al., 2007; Forkosh-Baruch & Hershkovitz, 2012; Kim, Sohn, & Choi, 2011; Kirschner & Karpinski, 2010; Roblyer et al., 2010). This observation is supported by Boyd and Ellison (2007), who proposed that many previous studies only focused on a few areas,

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including image management and friendship performance, networks and network management, as well as online and offline connectivity and privacy. With the rise of mobile SNS, the SNS market has become more competitive and dynamic. Whenever users find another SNS platform that better fits their personal needs, they may be inclined to switch. Therefore, recent studies have started to investigate why users switch between SNSs or online service platforms, as well as how online service providers can retain their users (Choi, Jung, & Lee, 2013; Haj-Salem & Chebat, 2013; Hsieh, Hsieh, Chiu, & Feng, 2012; Zhang, Cheung, & Lee, 2012; Zhang, Lee, Cheung, & Chen, 2009). In particular, some studies introduced the switching cost concept to the social and mobile domains to explain such switching behavior (Kim, Park, & Jeong, 2004; Haj-Salem & Chebat, 2013; Hsieh et al., 2012; Zhang et al., 2009).

In SNS literature, no formal research has discussed the switching behavior between SNSs and corresponding devices, which are critical and practical issues that must be considered by SNS providers to enable them to succeed in future market competition and share change. Therefore, this paper addresses general switching issues on both SNSs and devices by proposing a higher level research model with a corresponding lower level switching pattern analysis to gain basic knowledge and insights into consumer perceptions and behavior. Background literature is reviewed, and an empirical study is conducted to provide useful discussion and interpretation in the remaining part of the article.

2. Literature review

2.1. Social network sites

Before SNS was coined, Creulo, Ruane, and Cayko (1992) defined an online community as a group of members communicating with each other through an electronic platform. Later, Tredinnick (2006) pointed out that SNS is a website driven by user participation and the content generated by users. Boyd and Ellison (2007) further defined SNS as an Internet-based service that allows individuals to do the following: (1) establish a public or semi-public personal data system with restricted access; (2) have a list of other users and share connections with them; and (3) browse within this system and link to other users via the user list. Therefore, SNSs are web-based services and communities established within the Internet, mainly by a group of people with common interests, activity preferences and experiences, or by professionals in a certain field in order to have an interactive platform, in which members can participate in various social communications, emotionally contact each other, and exchange information.

Most SNSs provide a variety of services, including online chat (MSN and Yahoo instant messaging), e-mail, video and file sharing (Youtube), discussion groups, blogs, and others, to allow participants to communicate with each other and share information. SNSs often have millions of registered users, and have become part of the daily lives of their users. Numerous SNSs are available at present, and the most popular ones are Facebook, Plurk, and Twitter. According to the April 2012 survey of InsightXplorer, the overall SNSs flow in Taiwan has reached second place, ranking only after the portals. In addition, the phenomenon of using mobile Internet to browse SNSs has shown a rising trend along with the expansion of wireless network construction. As global mobile Internet users connect to SNSs through mobile devices, Facebook, MySpace and Twitter remain the most widely used and the most frequently visited SNSs by mobile Internet users in the U.S., which is estimated to reach 5.62 million in 2013 (FIND, 2012b).

The rapid development of SNSs has also triggered research on the intentions or motivations of SNSs users (Cheung et al., 2011; Kim et al., 2011; Lin & Lu, 2011; Vasalou, Joinson, & Courvoisier,

2010), and the influences of different factors on behaviors or applications (Forkosh-Baruch & Hershkovitz, 2012; Men & Tsai, 2011; Steinfield, Ellison, & Lampe, 2008). Research shows that majority of SNSs users use these to interact with others, such as to seek new friends and maintain relations with old friends or parents (Cheung et al., 2011; Forkosh-Baruch & Hershkovitz, 2012; Kim et al., 2011; Lin & Lu, 2011; Men & Tsai, 2011; Vasalou et al., 2010; Zhong, Hardin, & Sun, 2011), and to find enjoyment or entertainment (Cheung et al., 2011; Kim et al., 2011; Lin & Lu, 2011). The culture factor has also been discussed in these studies to determine whether or not different cultural traits influence various user aspects (Kim et al., 2011; Men & Tsai, 2011; Vasalou et al., 2010).

Privacy, information disclosure, and uncertainty concerns are among the top issues discussed in resent SNS studies (Antheunis, Valkenburg, & Peter, 2010; Debatin, Lovejoy, Horn, & Hughes, 2009; Humphreys, 2011; Kim, 2011; Men & Tsai, 2011; Stutzman, Capra, & Thompson, 2011; Tokunaga, 2011; Waters & Ackerman, 2011; Weiss, 2009). Some of these problems have been resolved and research suggestions, such as that of Weiss (2009), have been adopted by SNSs providers. However, with the rapid increase of information flow on SNSs, especially in terms of private data, the visible part of privacy topics only reveals a small amount of the whole, i.e., the iceberg model (Debatin et al., 2009).

The survey summary shows that logging into SNSs to update their status and to check the status and photos of their friends have become part of the daily routine of SNS users. Separating users from SNSs has become increasingly difficult because of the increasing popularity of surfing the Internet through mobile devices. Therefore, understanding user satisfaction with mobile SNSs and their willingness to switch is also a key point that the current study aims to examine. Most of the users have been attracted by the benefit of using SNSs, such as establishing relationships with people and searching for entertaining or amusing contents in SNSs, but are displeased with issues related to the invasion of their privacy. Thus, SNS providers should consider how these factors influence user perception when they offer such functions or services.

2.2. E-service quality (E-SQ)

The phenomenal growth of e-services has prompted a stream of research to develop our understanding of the dimensions of e-service quality (e-SQ) and its relationship with overall performance. Zeithaml, Parasuraman, and Malhotra (2002) proposed a model for understanding and improving e-service quality, which relates the design and operation of the website to certain customer perspectives. Related studies in e-SQ do not fully concur with the dimensions and statements explored. However, Hernona and Calvert (2005) identified the following guidelines: (1) e-SQ is multifaceted, not unidimensional; (2) most of the personal service issues are part of recovery service, which involves dimensions that are different from the core service; (3) e-SQ affects satisfaction, purchase intention and purchase; and (4) technology readiness, a customer-specific construct, is related to the perceptions of e-SQ.

Based on the evolving literature, Parasuraman, Zeithaml, and Malhotra (2005) combined various concepts of online service quality (Loiacono, Watson, & Goodhue, 2002; Wolfinbarger & Gilly, 2003; Yoo & Donthu, 2001) and proposed the most comprehensive work on e-service quality. They used an empirical test and a multiple-item scale (E-S-QUAL) to assess the service quality of online shopping providers. Their study divided service quality into two categories, namely, core web service quality (E-S-QUAL) and the E-Recovery Service Quality (E-RecS-QUAL). In comparison, previous studies have only provided important theoretical framework and research instruments.

Majority of recent studies on website e-SQ have touched on commercial behavior, which is fundamentally different from the

nature of SNSs. The retail-oriented studies mentioned earlier have good measurement scales, but are not appropriate or adequate for directly measuring the quality of SNSs services. To fill this gap, constructing a dedicated measurement scale for SNS service quality seems a reasonable endeavor, because of the popularity of SNSs. Therefore, careful investigation of SNS service quality is desirable.

2.3. Switching cost

According to literature in economics and marketing, switching is considered an important strategic element. First proposed by Porter (1980), switching cost refers to the rising cost of buyers switching suppliers. Subsequent research shows that switching cost may cover various types of costs from different perspectives of economics, psychology, or marketing or because of different industrial categories. When a consumer switches to a different service provider, Jones, Mothersbaugh, and Betty (2000) defined the switching cost as the increase of time, money, and effort. When a switch occurs, Dick and Basu (1994) referred to switching cost as the increase of time, money, and psychological costs. However, from the perspective of perceived risk, this switch refers to any possible loss of operators when the customer perception switches, which include the financial and performance losses as well as reduced social, psychological, and security levels (Murray, 1991).

Jones, David, Mothersbaugh, and Beatty (2002) discussed switching cost from the perspective of service in six essential sub-types of services, including lost performance, uncertainty, pre-switching search and evaluation, post-switching behavioral and cognitive costs, as well as setup and sunk costs. They further summarized these six sub-types of services into three bigger categories, namely, continuity, learning and sunk costs, using an empirical analysis verified in the banking and the hair service sectors. Burnham, Frels, and Mahajan (2003) listed eight types of switching costs, and came up with three major categories, namely, procedural switching costs (with economic risk, evaluation, learning, and set-up costs); financial switching costs (with benefit loss and monetary loss costs); and relational switching costs (with personal relationship loss and brand relationship loss costs). Furthermore, both studies indicated that switching cost would strongly affect the switching barrier.

Recent studies have provided more evidence on why users switch from one SNS or online service platform to another (Choi et al., 2013; Haj-Salem & Chebat, 2013; Hsieh et al., 2012; Zhang et al., 2009, 2012), which is related to satisfaction and switching barrier, as abstracted below. Zhang et al. (2009) studies the post-adoption behaviors of bloggers and confirmed that a user's satisfaction and attractive alternatives affect switching intention. Notably, gender serves a moderating function in these two relationships. In addition to the positive effect on blogger post-adoption behaviors, Hsieh et al. (2012) utilized the push–pull–mooring framework to investigate further why bloggers switch to other SNS. They concluded that switching cost and past experience serve a mooring function on the negative effect and moderate the push effect on switching intention in online service switching behavior. Meanwhile, Zhang et al. (2012) also integrated the push–pull–mooring paradigm into their research framework by continuing their previous study (Zhang et al., 2009) and taking satisfaction (push), attractive alternatives (pull), and sunk costs (mooring) as indicators that influence bloggers' intention to switch. They confirmed that satisfaction and sunk costs negatively affect switching intention, whereas attractive alternatives have a positive effect. In an SNS switching study, Choi et al. (2013) identified cultural, social, and economic motives for using SNS to be the main factors that cause Korean users to switch from a domestic to a global SNS.

In summary, the above studies believe that the increase of switching cost reduces the switching behavior of consumers. Lam, Shankar, Erramilli, and Murthy (2004) stressed that switching cost has a positive impact on customers. However, the constructs of switching costs are generally used as indicators for measuring customer loyalty. One implication of this literature leads to a practical observation that various switching costs in different service industries have different constructs.

3. Research method

3.1. Research model and hypotheses

The research model and corresponding analyses are presented in this section. The first part focuses on a higher level perspective to investigate why users switch to other SNS. Consequently, a path model is constructed with research hypotheses based on relevant literature. The second part is a lower level drill-down analysis to understand further how and why current users migrate between SNSs over time through the use of migration matrix analysis with a corresponding simple questionnaire data analysis.

Previous research on satisfaction/gratification treats service quality as the antecedent that significantly influences perceived satisfaction of users/consumers. Hernona and Calvert (2005), Parasuraman et al. (2005), and Wolfinbarger and Gilly (2003) all declared that greater service quality comes with better satisfaction or gratification. We thus propose the following hypothesis based on these empirical studies:

H1. Greater SNS service quality is associated with higher satisfaction.

As mentioned in the literature review, some researchers indicated that the switching barrier is positively associated with switching cost (Jones et al., 2000; Kim et al., 2004), that is, a higher switching cost to customers result in a stronger intangible restriction, thus weakening the intention to switch to other products/services. In other words, customers have certain switching barriers that influence their decision to use opposite products/services. Thus, we assume the following hypothesis:

H2. Greater switching cost is associated with a higher switching barrier.

Satisfaction is considered an antecedent of sustained use or switching intention (Bateson & Hoffman, 1999), Jones, Ravid, and Rafaeli (2004) have also mentioned that user will simply switch from one virtual community to another that can satisfy his needs. Several studies have proven that customers tend to repurchase or continuously use the same product and hold stronger loyalty to the providers when they are satisfied with a product or service (Hernona & Calvert, 2005; Loiacono et al., 2002; Parasuraman et al., 2005; Wolfinbarger & Gilly, 2003; Yoo & Donthu, 2001). In these cases, behaviors, such as repurchasing or continuously using the product, means that users tend to remain using the same products or services and would not be willing to switch to other alternatives. This finding leads to the following hypothesis:

H3. Greater satisfaction is associated with a lower intention to switch.

Jones et al. (2000) defined switching barriers as the factors that prevent customers from changing service providers. In contrast, Kim et al. (2004) declared that switching barriers positively affect user loyalty in the form of combined favorable attitude of the customer and repurchase behavior. The findings of Liu, Guo, and Lee (2011) support the relationship between switching barrier and customer loyalty because they concluded that switching barriers

have significant effects on customer loyalty, which drives them to stay with their current mobile service provider. With switching intention defined as the customer's intention to leave the current provider due to unsatisfactory services, we infer the following hypothesis:

H₄. Greater switching barrier is associated with lower intention to switch.

As shown in Fig. 1, the conceptual research framework can be integrated based on the established hypotheses (H₁–H₄).

With the second analytical matrix, we aim to gain a better understanding of the switching patterns of SNS users for drill-down discussions. The design of this matrix is based on the switching matrix of Tao and Yeh (2003), which is a common risk management analytics tool used for in the banking industry to rate customer credit over time. This matrix is also called credit migration or transition matrix (Chan, Wong, & Zhao, 2012; Jarrow, Lando, & Turnbull, 1997). The switching analysis in the current study is based on three dimensions, namely, time, SNSs, and end-user devices. Specifically, time dimension is further divided into "one year ago" and "the present." The SNS dimension covers the top five SNSs in Taiwan, namely, Facebook, Twitter, Plurk, MSN, and Wretch. The devices include both PC and mobile devices, which include smart phones, PDAs, and notebooks.

In theory, an approximate total of 21 switching patterns can be found within the one-year period. This figure is obtained by multiplying three devices (PC, mobile, and none) by seven SNS (five SNSs, other SNSs, and not using any SNS). As an initial attempt to conduct switch pattern analysis and facilitate ease of data collection, nine switching patterns are defined for conducting the switching pattern analysis, as shown in Table 1.

3.2. Measurement scales and data collection

A questionnaire approach was used to validate the research model and the switching pattern analysis presented above. The questionnaire was developed through a series of four stages, including secondary literature review, user interview, expert-user pretest, and formal test. These stages are briefly described below. In the first stage, 18 representative factors and 77 items that affected SNS switching were initially identified in drafting the questionnaire. These factors were obtained by reviewing related literature. To confirm the appropriateness of the identified factors and to acquire additional potentially critical factors, 6 mobile and 10 regular SNS expert users were interviewed for their views on SNS provider and platform switching in the second stage. Their opinions were used to merge and revise the items, which generated a total of 73 items.

The third stage is a small-scale user pretest. Of the 122 SNS users who filled out the paper-based questionnaire, including working professionals and students, 72 valid items were used to further reduce the questionnaire items to 51. The final version of the questionnaire items was divided into four parts, namely, network usage behavior; measurement of factors that influence SNS switching intention, perceived SNS service quality and satisfaction measurement; and respondents' demographics. These items are shown in the Appendix. In this research, "intention to switch"

Fig. 1. The research model.

assumed that the users were asked to fill out their intention one year ago, which was an important factor because the switching pattern analysis used the actual switching behavior. The questions in the last two parts applied a seven-point Likert scale, wherein 1 represented "strongly disagree" and 7 represented "strongly agree." The questionnaire was setup in html format on a Web server with a fixed IP address. Using instant message or email, users of major SNSs in Taiwan were invited to fill out the questionnaire. Online questionnaire data were saved in the database server setup for future analysis.

A total of 380 questionnaires were recorded in the database. Reverse questions in the questionnaire were used to filter out invalid questionnaires that were falsely filled. After further removing 37 invalid or nonconforming ones, 343 valid records were retained for the following analyses.

A brief profile of the subjects is provided here. The male to female ratio was 46.4–53.6%, and the 21–30 age group accounted for 66.0%, followed by the 31–40 age group, which accounted for 26.8%. Students formed the largest group, accounting for 42.5%, followed by the service and technology industries with 17.0% and 11.1%, respectively. The top two groups of times spent on SNSs were almost 10 h/week and 20 h/week, which accounted for 49.7% and 27.5%, respectively.

Scales for the SNS service quality, switching costs, satisfaction, switching barrier, and intentions to switch were first refined using exploratory factor analysis (EFA) and Cronbach's α reliability analysis. Confirmatory factor analyses (CFAs) were then conducted for further model and hypothesis verification (Anderson & Gerbing, 1988; Churchill, 1979). Data analysis methods in the EFA phase used principal component analysis (PCA) to extract the eigenvalue. Varimax orthogonal rotation was used to analyze factor dimensions. Both methods were implemented in SPSS 15. Partial least square (PLS), which was implemented in SmartPLS 2.0 M3, was used in the CFA phase to process the hypothesis model fitting and testing.

4. Data analysis and results

4.1. Model fitting and testing

The EFA results are presented in Table 2. The factor loading of each variable exceeds 0.5, an acceptable value suggested by Hair, Anderson, Tatham, and Black (1998), and the reliability (Cronbach's α) of each construct is more than 0.6, which exceeds the acceptable level suggested by Murphy and Davidshofer (1988). Composite reliability (CR) values show that the reliability of each construct is higher than the suggested value of 0.7 by Nunnally and Bernstin (1994), indicating that the proposed model has good construct reliability. Average variation extracted (AVE) values for all constructs are greater than 0.5, which also indicates a model with convergent validity (Hair et al., 1998). For the means of items and constructs in Table 2, those with values less than 4, such as privacy, compensation, contact, responsiveness and intention to switch, indicate negative perception, while those higher than 4 indicate positive perception.

In Table 3, no pair of measures is found with correlations that exceed the criterion of 0.9 suggested by Hair et al. (1998), indicating that no multicollinearity exists among the constructs. We assumed Kline's proposal that the discriminant validity can be established when an interfactor correlation is below 0.85 (Kline, 2005). Fornell and Larcker (1981) suggested a more robust method of measuring discriminant validity, in which a correlation between two constructs should be lower than the squared root of the AVE value for any of the two constructs. According to these suggestions, all constructs have discriminant validity.
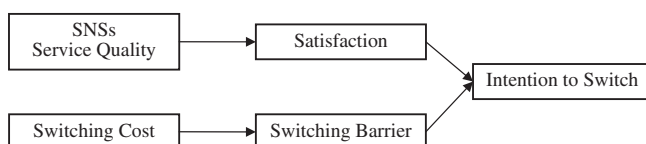
Table 1
Switching patterns defined for use in this study.

Pattern #	Switching pattern	Description
1	Staying with PC for using SNSs	During the past year, the user has retained a PC platform for using primary SNSs
2	Switching from PC to mobile device for using SNSs	During the past year, the user has switched from PC to mobile device for using primary SNSs
3	Switching from mobile device to PC for using SNSs	During the past year, the user has switched from mobile device to PC platform for using primary SNSs
4	Staying with mobile device for using SNSs	During the past year, the user has retained a mobile device platform for using primary SNSs
5	Starting to use SNSs on PC	During the past year, the user has started using primary SNSs on a PC platform
6	Starting to use SNSs on mobile device	During the past year, the user has started using primary SNSs on a mobile device
7	No intention to use SNSs	During the past year, the user has not started using any SNS yet
8	Discontinuing SNS use on a PC	During the past year, the user has stopped using primary SNSs on a PC platform
9	Discontinuing SNS use on a mobile device	During the past year, the user has stopped using primary SNSs on a mobile device

Table 2
Results of the measurement model.

	Mean	Loading	α	AVE	CR	R^2		Mean	Loading	α	AVE	CR	R^2
SNS service quality							**Switching cost**						
Efficiency (Ef)							Economic risk (Risk)						
	5.27		0.86	0.78	0.91	0.31		4.75		0.82	0.65	0.88	0.80
Ef1	5.10	0.66					Risk1	4.60	0.71				
Ef2	5.40	0.72					Risk2	4.80	0.68				
Ef3	5.30	0.70					Risk3	4.70	0.76				
Fulfillment (Ful)							Risk4	4.90	0.71				
	4.48		0.89	0.76	0.93	0.66	Evaluation (Evl)						
Ful1	4.00	0.53						4.53		0.79	0.70	0.88	0.70
Ful2	4.70	0.67					Evl1	5.00	0.71				
Ful3	4.60	0.71					Evl2	4.20	0.64				
Ful4	4.60	0.69					Evl3	4.40	0.66				
Privacy (Priv)							Learning (Learn)						
	3.77		0.92	0.86	0.95	0.69		4.85		0.69	0.76	0.86	0.56
Priv1	4.00	0.60					Learn1	5.00	0.73				
Priv2	3.70	0.56					Learn2	4.70	0.67				
Priv3	3.60	0.57					Benefit loss (BnfL)						
System availability (SA)								4.80		0.70	0.63	0.83	0.61
	4.17		0.66	0.62	0.82	0.46	BnfL1	5.00	0.56				
SA1	5.60	0.50					BnfL2	4.90	0.65				
SA2	3.40	0.55					BnfL3	4.50	0.69				
SA3	3.50	0.50					Brand relationship loss (BRL)						
Compensation (Comp)								4.77		0.77	0.68	0.87	0.24
	3.43		0.92	0.87	0.95	0.65	BRL1	5.00	0.72				
Comp1	3.50	0.61					BRL2	4.50	0.69				
Comp2	3.50	0.60					BRL3	4.80	0.70				
Comp3	3.30	0.58					Personal relationship loss (PRL)						
Contact (Cont)								5.10		0.72	0.77	0.87	0.31
	3.87		0.89	0.82	0.93	0.47	PRL1	5.00	0.79				
Cont1	4.10	0.55					PRL2	5.20	0.87				
Cont2	4.00	0.53					**Other constructs**						
Cont3	3.50	0.57					Satisfaction (Sat)						
Responsiveness (Resp)								4.97		0.94	0.89	0.96	0.28
	3.80		0.92	0.81	0.94	0.82	Sat1	5.00	0.92				
Resp1	3.90	0.63					Sat2	4.90	0.96				
Resp2	3.80	0.62					Sat3	5.00	0.93				
Resp3	3.70	0.60					Switching barrier (SB)						
Resp4	3.80	0.62						4.88		0.82	0.58	0.87	0.10
							SB1	4.90	0.70				
							SB2	5.00	0.77				
							SB3	4.80	0.76				
							SB4	4.80	0.83				
							SB5	4.90	0.84				
							Intentions to switch (SI)						
								3.30		0.97	0.94	0.98	0.29
							SI1	3.30	0.96				
							SI2	3.30	0.98				
							SI3	3.30	0.96				

The results of the second-order structural model testing are shown in Table 4. The findings of the hypotheses testing are all significant at $p < 0.001$. Thus, all four hypotheses are supported. The final results of the research model are shown in Fig. 2. The loading of each construct in SNS service quality and the switching cost are also displayed.

4.2. Switching pattern analysis

As described in the research method, the behaviors of 343 respondents were classified into nine switching patterns defined in Table 1. Generally, the distribution of 343 respondents based on the switching patterns is composed of the following: 78

Table 3
Correlations and discriminant validities of all constructs.

	Ef	Ful	Priv	SA	Comp	Cont	Resp	Risk	Evl	Learn	BnfL	BRL	PRL	Sat	SB	SI
Ef	**0.88**															
Ful	0.51	**0.87**														
Priv	0.36	0.55	**0.93**													
SA	0.45	0.64	0.48	**0.79**												
Comp	0.27	0.52	0.63	0.39	**0.93**											
Cont	0.22	0.42	0.50	0.30	0.66	**0.90**										
Resp	0.38	0.64	0.80	0.53	0.73	0.56	**0.90**									
Risk	0.04	0.15	0.01	0.15	0.08	0.11	0.07	**0.81**								
Evl	−0.02	0.11	−0.02	0.15	0.09	0.11	0.05	0.70	**0.84**							
Learn	−0.03	0.09	0.04	0.09	0.04	0.06	0.05	0.59	0.70	**0.87**						
BnfL	0.04	0.14	0.03	0.11	0.04	0.10	0.08	0.64	0.54	0.48	**0.79**					
BRL	0.24	0.35	0.20	0.25	0.17	0.14	0.19	0.33	0.20	0.15	0.32	**0.83**				
PRL	0.27	0.21	0.11	0.13	0.02	0.07	0.06	0.38	0.30	0.30	0.35	0.46	**0.88**			
Sat	0.56	0.49	0.41	0.37	0.32	0.26	0.45	0.14	0.06	0.05	0.14	0.49	0.35	**0.94**		
SB	0.21	0.18	0.05	0.12	−0.06	−0.01	0.02	0.25	0.20	0.20	0.30	0.19	0.25	0.28	**0.76**	
SI	−0.21	−0.08	0.01	0.01	0.13	0.07	0.04	−0.02	0.05	−0.03	−0.03	0.00	−0.10	−0.25	−0.53	**0.97**

The squared root of the average variance extracted (AVE) value is in bold italic type on the diagonal.

Table 4
Results of model testing.

Hypothesis: Path	Estimates	SE	T value	Results
Hypothesis 1: SNS' service quality → satisfaction	0.530	0.05	10.98***	Supported
Hypothesis 2: Switching cost → switching barrier	0.311	0.06	5.05***	Supported
Hypothesis 3: Satisfaction → intention to switch	−0.102	0.05	2.01*	Supported
Hypothesis 4: Switching barrier → intention to switch	−0.504	0.06	8.57***	Supported

*** Significant value at $p < 0.001$, one-tailed.
* Significant value at $p < 0.01$, one-tailed.
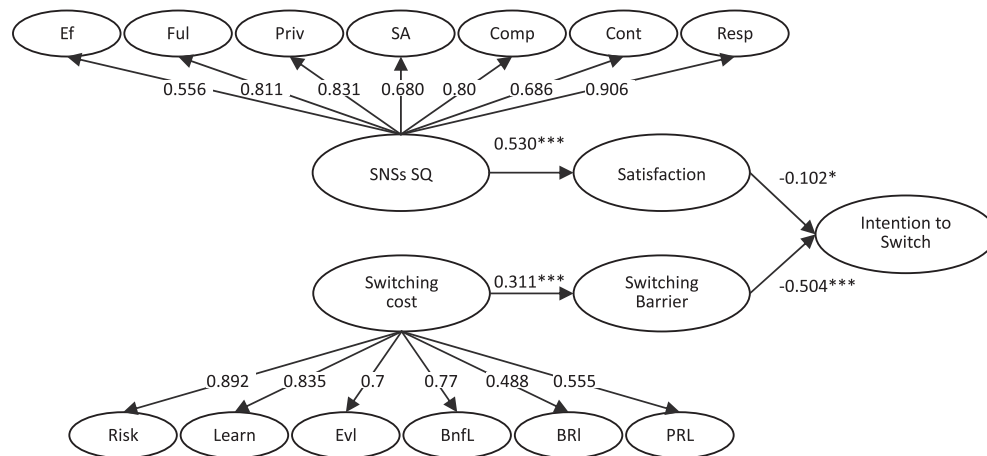
Fig. 2. Results of the research model.

respondents in (1) maintained the use of their PCs in using SNSs, 70 in (2) switched from PC to mobile device in using SNSs, 69 in (3) switched from mobile device to PC in using SNSs, 97 in (4) maintained the use of their mobile device in using SNS, 12 in (5) and (6) started to use SNSs through the PC and their mobile devices, respectively, 5 in (7) expressed no intention in using SNS, and no respondents in (8) and (9) discontinued SNS use on PC and on mobile devices, respectively. Therefore, the largest switching pattern is (4), which consists of respondents who continued to use SNSs via their mobile devices, followed by (1) or respondents who continued with a PC platform in using SNSs. Interestingly, switching to mobile device (1) and to PC (3) have similar

percentages, while no respondent subsequently stopped using SNSs on either PC (8) or mobile device (9).

To further examine the micro-view of the switching patterns among 343 respondents, graphical representations of their switching patterns from the previous year to the present, from one device to another, and from one SNS to another is illustrated in Table 5. A respondent can use one or two devices and/or none to more SNS at the same time, which result in the figures not obtaining 343 or 100% of the above analysis. For SNS utilization rate (the frequency% in Table 5), the most used SNS is Facebook for both one year ago (39.65%) and the present (44.02%), followed by MSN (30.32% and 29.45%, respectively), while Twitter has the least user population

Table 5
Switching matrix of SNS users.

Present / 1 year ago			PC						Mobile Device						None
			FB	Twitter	Plurk	MSN	Wretch	other	FB	Twitter	Plurk	MSN	Wretch	other	
		Frequency (%)	151 (44.02)	8 (2.33)	26 (7.58)	101 (29.45)	46 (13.41)	5 (1.46)	169 (49.27)	5 (1.46)	28 (8.16)	68 (19.83)	21 (6.12)	1 (0.29)	5 (1.46)
PC	FB	136 (39.65)	85.9%[3]						90%[4]						0 (0)
	Twitter	7 (2.04)		0%		94.2%[1]				0%		100%[2]			
	Plurk	30 (8.75)			9%						4%				
	MSN	104 (30.32)				47%						33%			
	Wretch	66 (19.24)					14%						1%		
	other	2 (0.58)						0%						0%	
Mobile Device	FB	157 (45.77)	91.3%[4]						89.7%[3]						0 (0)
	Twitter	7 (2.04)		0%		100%[2]				0%		76.29%[1]			
	Plurk	32 (9.33)			4%						4.1%				
	MSN	71 (20.7)				33.3%						12.4%			
	Wretch	20 (5.83)					1.4%						1%		
	other	6 (0.87)						0%						1.03%	
None		29 (8.45)	12(41.38)						12(41.38)						5 (17.24)

1. The light gray panels represent the sum of the SNS platform switching rate on PC or mobile device.
2. The dark gray panels represent the sum of the device switching rate from a year ago to the present.
3. The diagonals in each light gray panel represent the rate of the respondents' non-willingness to switch devices in different SNS platforms.
4. The diagonal sections in each dark gray panel are the switching rate of devices in different SNS platforms.

(2.04% and 2.33%, respectively), which may be due to the English interface that renders the site unpopular among the Taiwanese SNS population. Meanwhile, 1.46% of the respondents have no SNS experiences at all. According to the two-dimensional switching pattern analysis, the results of which are indicated in gray in Table 5, 94.2% of the respondents demonstrate SNS switching behavior in using the PC and 76.29% in using mobile devices, while 100% of the respondents switched from PC to mobile devices and vice versa.

To further comprehend the fundamental reasons behind the usage patterns, the respondents were asked a number of simple follow-up questions to address some interesting issues in this research. The first issue is on the reasons why respondents switch SNSs or devices. As shown in Table 6, the main reason is "peer pressure" (50%), followed by "information content" (42%), "convenience" (40%), and "user interface" (40%). The least known reasons for switching include "layout" (8%) and "task/school work need" (10%).

A cross-tabulation consisting of the first six switching patterns, excluding pattern (7), which indicated no intention to use SNS, and patterns (8) and (9), which had no data, and the 13 reasons listed in Table 6 was conducted. The results are presented in Table 7, in which the top three reasons in each pattern are highlighted. "Convenience" emerges as the common critical reason for the respondents across all six patterns, followed by "peer pressure" across five switching patterns, and "user interface" across four switching patterns. Both "information content" and "friends'

Table 6
Reasons for switching.

Reasons	Peer pressure	Information Content	Convenience	Friends' recommendation	Entertainment	User interface	Value-added	Fashionable factor	Platform factor	Web design	Task/schoolwork need	Layout	Others
Total (%)	50	42	40	40	39	38	27	24	23	21	10	8	3

recommendation" are critical reasons for the three switching patterns.

In order to understand the factors that motivate respondents to use mobile SNSs, respondents who had experiences in accessing SNS on their mobile devices were asked to choose among a list of possible reasons. Interestingly, "mobile capabilities" and "real-time access" were the top two motivating factors for choosing a mobile device to browse SNSs, followed by "convenience" and "connection quality," and then "Internet access charges." The descriptive statistical results are presented in Table 8.

Among the five participants who never accessed any SNS since a year ago, "privacy issue" is the top-ranking concern, followed by "spending too much time" and "too busy" (Table 9).

Table 7
Switching reasons of SNS users under different conditions.

Reasons / Switching Patterns	Peer pressure	Information Content	Convenience	Friends' recommendation	Entertainment	User interface	Value-added	Fashionable factor	Platform factor	Web design	Task/schoolwork need	Layout	Others
(1) Staying with PC for using SNSs	51[*]	44	44	42	37	28	28	27	18	17	17	9	5
(2) Switching from PC to mobile device for using SNSs	23	46	56	33	41	46	33	27	21	26	7	13	3
(3) Switching from mobile device to PC for using SNSs	59	51	59	45	46	48	33	32	32	32	13	7	1
(4) Staying with mobile device for using SNSs	26	28	37	30	28	32	14	10	18	16	4	7	0
(5) Starting to use SNSs on PC	58	33	75	42	33	42	33	33	17	25	8	17	0
(6) Starting to use SNSs on mobile device	58	33	75	42	33	42	33	33	17	25	8	17	0

[a] The unit is %.

Table 8
Motivating factors of mobile SNS users.

Motivating Factors / Types	Real time access	Convenience	Connection quality	Mobile capabilities	Internet access charges	Operability	Screen size	Fashionable factor	Friends' recommendation	Task/schoolwork need	Peer pressure	Others
Using SNSs from PC to mobile device (%)	57	56	47	47	36	33	31	19	10	9	9	0
Remain using SNS from mobile device (%)	37	43	35	35	34	22	23	11	4	5	9	1
Beginning to use SNS on mobile device (%)	67	42	33	50	58	33	8	17	17	8	0	0

Table 9
Reasons for non-willingness to use SNSs.

Reasons / Types	Privacy issue	Spending too much time	Too busy (for work)	Too busy (for schoolwork)	Others	Inconvenience	Too much information	Extra charges
Non-willingness to use SNSs (%)	40	20	20	20	20	0	0	0

5. Discussion and conclusions

5.1. Conclusions and contributions

Two research objectives of the proposed research model and the switching pattern analysis are concluded below.

First, the proposed research model is fully supported with the verification of all four hypotheses identified in this empirical study, as shown in Table 4 and Fig. 2, in which SNS service quality and switching costs indirectly affect the intention to switch with satisfaction and switching barrier respectively serving a mediating function (i.e., higher switching costs increase user switching

barriers). These outcomes match those from previous studies on service quality and switching costs, such as the conclusion presented by Parasuraman et al. (2005) (i.e., greater service quality results in higher satisfaction) and by Kim et al. (2004) (i.e., higher switching costs increase user's switching barriers). Accordingly, both high satisfaction and more switching barriers in present SNSs decrease the intention of users to switch.

The abovementioned conclusion is also the primary research contribution, that is, satisfaction and switching barriers should be simultaneously considered in one model as indicators to that predict the dependent variable of "the intention to switch," which is often replaced by loyalty in previous studies (Hernona & Calvert, 2005; Kim et al., 2004; Liu et al., 2011), as well as fill the gap among service quality or switching cost and switching intention. Furthermore, extant research results indicate that a higher the switching cost results in a higher switching barrier and reduced user intention to switch to other SNSs (Burnham et al., 2003; Caruana, 2004; Weiss & Heide, 1993). However, the mediating role of switching barriers is rarely reported between switching cost and switching intention. By contrast, the relationship among service quality, satisfaction, and intention to switch can be found in our result, indicating that higher service quality will increase customer's satisfaction (Kim et al., 2004), consequently decreasing user intention to switch (Zhang et al., 2009, 2012).

Second, according to the analysis of the SNS switching matrix in Table 5, Facebook is identified as the most used SNS in Taiwan, followed by Windows Live. The ranking is consistent across the one-year period and in either the macro-level of the frequency percentage or the micro-level of the individual SNS switching percentages presented in Table 5. In contrast, Twitter is the least used SNS due to its English interface. In fact, this was the same disadvantage of Facebook when it was first introduced in Taiwan. Generally, the top four reasons for switching are peer pressure, information content, convenience, and friends' recommendation. With regards switching patterns, convenience is the most common critical reason for respondents across all six switching patterns, and then followed by peer pressure across five switching patterns. For mobile SNS respondents, the top two reasons are real-time access and mobile capabilities. Finally, the top reason for not using SNSs is because of privacy issues.

Applying the switching pattern matrix is another contribution of this research because drill-down analysis is seldom supplemented to help readers, especially practitioners, in understanding the research agenda of the higher and abstract levels of analysis, as shown in Fig. 2. Meanwhile, because of this switching pattern analysis, additional implications can be suggested as described below. In other words, this research demonstrates that the combination of higher level model-driven research and a drill-down data-driven analysis provides a synthesized value for deriving academic and practical research implications.

5.2. Managerial implications

Based on the findings of this study, several managerial implications can be derived. The first and the most important implication based on the validated research model is that SNS providers cannot retain current users by merely improving their SNS service quality for higher user satisfaction. Furthermore, providers must simultaneously deploy effective strategies to build higher switching barriers to prevent current users from switching to other competitors, such as providing more niche services, partnering with critical players, building a creative and innovative brand image, and reducing customers' capability to switch by locking them in. This may be particularly urgent for competitors of Facebook, since more users are switching to Facebook as reported by the switching pattern analysis. Twitter, for example, may adopt a Chinese interface to quickly increase its user base in Taiwan, similar with the previous experience of Facebook.

The second implication is that SNS providers can strategically prioritize their efforts to enhance customer perceptions on constructs under SNS service quality and switching costs that are based on factor loading and on the means illustrated in Fig. 2 and Table 2. For factor loading, results in Fig. 2 showed that responsiveness (Resp, 0.906), privacy (Priv, 0.831), fulfillment (Ful, 0.811) and compensation (Comp, 0.80) were the key factors in assessing SNS service quality, which also implies their significant and positive effect on user satisfaction. Similarly, economic risk costs (Risk, 0.892), learning costs (Learn, 0.835), benefit loss costs (BnfL, 0.77), and evaluation costs (Evl, 0.7) are important in evaluating switching cost. Construct means, specifically, privacy, compensation, contact, and responsiveness related to SNS service quality with negative perceptions, can be potential opportunities for service providers to gain competitive advantages by transforming negative perceptions of customers into positive perceptions. In contrast, construct means related to switching cost may imply two counter perspectives to any service provider. On one hand, market leaders can continuously build switching barriers for higher switching cost, such as on high costs of personal relationship loss, to prevent customers from switching to competitors. On the other hand, service providers who aim for higher market shares may reduce some of the barriers for potential customers to join them with low switching costs, such as on economic risk, learning, and benefit loss.

The third implication is that any SNS provider should strive a campaign to have users of the competing SNSs to join its SNS service in social networking with their own friends. Users are likely to have several SNSs at the same time, based on the 76.29% to 100% switching percentages in the four gray areas presented in Table 5. Therefore, initially sharing new customers with competitors will be a more effective and cost-saving strategy to gain additional user base. Follow-up strategies and efforts can be deployed to retain existing customers and their friends.

Fourth, among the top factors that influence switching behaviors, peer pressure, friends' recommendation, and convenience should also be considered by SNS providers, according to the results in Tables 6 and 7. Since SNSs are typically social groups formed by the interdependent relationship between people, factors such as peer pressure and friends' recommendations become natural driving forces for users to switch to sites where most of their friends are. SNS providers should provide good incentives or motivations for their users to persuade their friends to switch or join. Meanwhile, convenience is another significant factor revealed by the respondents, which implies good usability for both SNS functionalities and access for providing a pleasant experience to potential users.

Fifth, although the respondents who do not use SNSs comprise a small percentage in this study, addressing privacy issues should be a major concern of SNS providers in marketing SNS to this particular segment of the population. Given that privacy is also a critical factor to other SNS users, SNS providers must focus on customizing strategies for these users, who may comprise a niche market for some SNS providers.

Finally, certain critical factors for switching behavior may be reasonably linked with service quality and switching cost in the dual-factor research model, in which the matching of the top switching reason, "convenience," with the switching cost, "evaluation cost," can be reasonably interpreted by convenient functions provided by SNS providers. These functions can, in turn, decrease the users' evaluation cost and switching barrier, thereby decreasing the probability of switching to a new SNS provider. Meanwhile, "peer pressure" and "friends' recommendation" matching the "personal relationship loss costs" indicate that SNSs are indeed

socialization platforms. Therefore, SNS providers should provide more incentives to users who recruit their friends in using their sites. Similarly, the switching motivations to mobile SNS, namely, "real time access" and "mobile capabilities," illustrate higher scores in "efficiency" and "system availability," thereby implying that an SNS provider should enhance its hardware facilities and software design to suit mobile SNS characteristics.

5.3. Limitations and future research

First, to simplify the questionnaire, respondents were only asked to select all five SNSs in use at two time points, without indicating the ranked order. Therefore, this research is limited in the simple distribution analysis of nine switching patterns and of the rough switching descriptions by device and by SNS, as shown in Table 5. It is recommended that future studies include all available SNSs in Taiwan and the ranked order of selected SNSs currently being employed by users to accurately describe the switching pattern in Table 5, with the column and the row obtaining a total of up to 100%. In addition, the questionnaire can add all SNSs used during the one-year period so that a full switching history can be analyzed, thus expanding the coverage for more interesting and insightful switching behavioral analyses.

Second, this study requested the respondents to indicate the SNSs they used within the year based on their memory, which may not truthfully reflect the actual situation. Therefore, a follow-up research is recommended as part of a longitudinal research to accurately track SNS usage for the switching-across-time analysis.

Third, this research only targeted SNS users in Taiwan. To broaden the coverage of the research model and of the switching pattern analysis, global SNSs can be selected from among top-ranked sites provided by Alexa (2012). Consequently, the factor of cultural differences must be explored in implementing the research model as well as in conducting global switching pattern analyses.

Acknowledgements

Appendix A

No.	Measurement scales	Sources
SNSs' service quality		
Ef1	It loads SNSs pages fast	Parasuraman et al. (2005)
Ef2	This SNS is simple to use	
Ef3	This SNS enables me to log onto it quickly	
SA1	This SNS is always available for business	
SA2	This SNS does not crash	
SA3	Pages at this SNS do not freeze after I enter my order information	
Ful1	SNS quickly responds to my request	
Ful2	SNS sends out the responses requested	

Appendix A (*continued*)

No.	Measurement scales	Sources
Ful3	SNS has services the site claims to have	
Ful4	SNS is truthful about its offerings	
Priv1	SNS protects information about my Web-surfing behavior	
Priv2	SNS does not share my personal information with other sites	
Priv3	This SNS protects information about my private information	
Resp1	This SNS handles problems well	
Resp2	This SNS offers a meaningful guarantee	
Resp3	It tells me what to do if my transaction is not processed	
Resp4	SNS takes care of problems promptly	
Comp1	This SNS compensates me for problems it creates	
Comp2	SNS compensates me when what I requested doesn't achieve	
Comp3	SNS actively informs me to deal with the problems when it happened	
Cont1	This SNS provides a telephone number to reach the company	
Cont2	This SNS has customer service representatives available online	
Cont3	SNS offers the ability to speak to a live person if there is a problem	
Switching cost		
Evl1	It takes time to go through the steps of switching to a new SNS	Burnham et al. (2003), Kim et al. (2004)
Evl2	Switching SNSs involves an unpleasant process	
Evl3	There are a lot of formalities involved in switching to a new SNS	
Learn1	Learning to use the features offered by a new SNS as well as I use my existing SNS would take time	
Learn2	I cannot afford the time to get the information to fully evaluate other SNSs	
Risk1	Switching to a new SNS will probably result in some unexpected hassle	
Risk2	Switching to a new SNS	

Appendix A (continued)

No.	Measurement scales	Sources
	will probably involve hidden costs/charges	
Risk3	I worry that the service offered by other SNSs won't work as well as expected	
Risk4	I don't know what I'll end up having to deal with while switching to a new SNS	
BnfL1	Switching to a new SNS would mean losing or replacing points, credits, services, and so on that I have accumulated with my existing SNS	
BnfL2	This SNS provides me with particular privileges, so I would not receive else	Jones et al. (2002)
BnfL3	Switching to a new SNS would involve some up-front costs (set-up fees, membership fees, deposits, etc.)	Burnham et al. (2003), Kim et al. (2004)
PRL1	I would miss with the people at my SNS if I switched SNS	
PRL2	I am more comfortable interacting with the people of my SNS than I would be if I switched SNS	
BRL1	I care about the brand/company name of the SNSs I use	
BRL2	I support my SNS as a firm	
BRL3	I like the public image that my SNS has	
Switching barrier		
SB1	My personal relationships within SNS will be lost if I switch to others	Kim et al. (2004)
SB2	The perceived risk is higher when I switch to other SNSs	
SB3	Economic loss associated with switching SNSs	
SB4	Psychological burden associated with switching SNSs	
SB5	Time loss associated with switching SNSs	
Satisfaction		
Sat1	I am satisfied with my decision to use this SNS	Cheng, Wang, Lin, Chen, and Huang (2008), Parasuraman et al. (2005)
Sat2	My choice to use this SNS was a wise one	Cheng et al. (2008)

Appendix A (continued)

No.	Measurement scales	Sources
Sat3	I think I did the right thing by using this SNS	
Intention to switch		
SI1	I intend to switch the SNS in recent 1 year	Venkatesh et al. (2003)
SI2	I predict I would switch the SNS in recent 1 year	
SI3	I plan to switch the SNS in recent 1 year	

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