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An Empirical Study on Continuance Using Intention of Mobile Social Apps

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Abstract: User's continuance intention is vital to the future of mobile social apps (i.e. applications) with rapid development and intensive competitions among their providers. We draw on the theory of flow experience and switching cost to build an integrated model to explain factors influencing users' continuance using intention. Our model is tested by survey and Structural Equation Model (SEM) in the mobile social apps context of Wechat because of its popularity. The empirical results show that: Perceived enjoyment has significant influence on flow experience, and further positively affect users' continuance using intention; Switching costs exert significant positive effect on continuance intention; Contrary to our hypothesis, time flexibility of mobile devices has no significant influence on users' continuance using intention towards mobile social apps. With regard to the mediating effect of flow experience, we find that it exerts partially mediating effect between perceived enjoyment and continuance using intention and exert no mediating effect between mobile time flexibility and users' continuance using intention towards mobile social apps.

Keywords: continuance using intention, mobile social apps, flow experience, switching costs; SEM

1. INTRODUCTION

The Internet and mobile technologies have penetrated all spheres of our daily life and significantly changed our behavior. Compared to traditional computer devices, mobile devices (i.e., smart phones, tablet computers, personal digital assistants, etc.) are more convenient and time-flexible, so they are reaching a mass audience. According to CNNIC's (i.e. China Internet Network Information Center) report, up to June, 2014, the number of mobile net citizens in China has reached 527 million, indicating mobile phones have become the largest internet terminals ^[1].

With the popularity of mobile devices, mobile social apps have become one of the most important entertainment media. Up to June, 2014, the number of social network service (SNS) user (e.g. renren) in China is 257 million, declining by 20.43 million compared to the users number in late 2013 ^[1]. One important reason for this severe drop is the competition of mobile social applications ^[1], which are programs that run on mobile devices and mainly perform social function. The wide use of mobile social apps brings not only great opportunities to their providers but also challenges. Building users' loyalty and retaining users are big challenges for providers, since a user can easily switch from one mobile social app to another. It is crucial for both academics and practitioners to better understand factors affecting the continuance using intention of mobile social apps. However, extant research into mobile social apps is still in its infancy. Prior research on continuance intention in IS context is mainly about online banking ^[2], e-learning ^[3], and short-message service ^[4], few studies have focused on mobile social apps continuance. In particular, little is known about the influence of flow experience and switching costs on mobile social apps users' post adoption, this study aims to fill this gap.

We apply the theory of flow experience and switching costs to build an integrated model to explain factors influencing users' continuance using intention. We attempt to enhance current understanding of users' continuance using intention by extending previous research in two ways. First, this study focuses on continuance using intention, which is often ignored by extant research. Prior research about information technology acceptance mainly focuses on the initial adoption stage. Second, we take the mediating effect of flow experience

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into account. Specifically, this study examines how perceived enjoyment and time flexibility enhance mobile social apps users' flow experience, and in turn, influence their continuance using intention.

The rest of this paper is structured as follows. In the second section, an overview of source theories are briefly discussed and research hypotheses are developed. In section 3, we present the methodology and the measures adopted for collecting data, after which we describe the data we assembled for this study. We conduct data analysis and test hypotheses in section 4. In the final section, we conclude the paper discussing main findings, implications for research and practice.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

We draw on the theory of flow experience and switching costs to build an integrated model to explain factors influencing users' continuance using intention. The research model is shown in Figure 1.

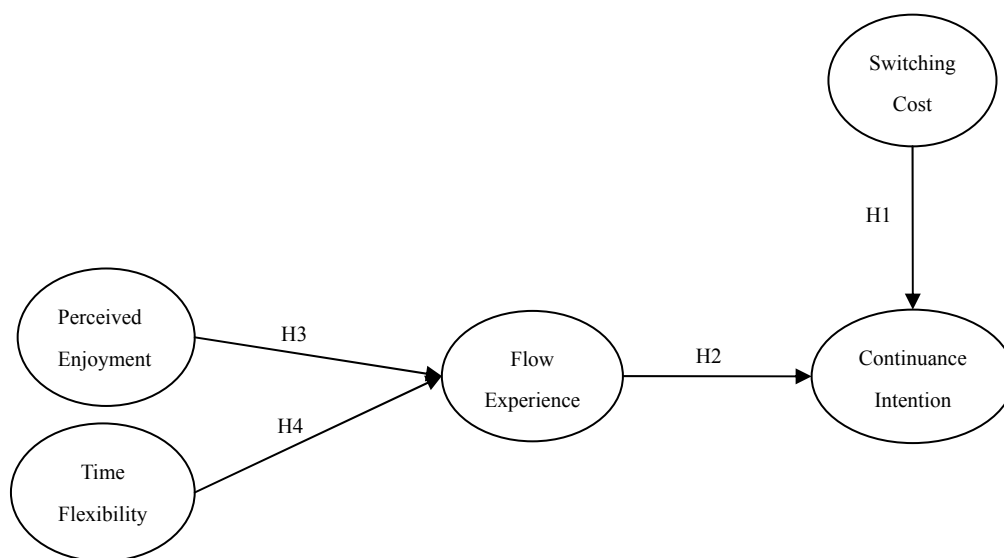


Figure 1. Research Model and Hypotheses

2.1 Continuance using intention of mobile social apps

Continuance intention is a mental state reflecting an individual's decision to repeat his/her current behavior and can be compared to intention to repurchase in marketing [5]. It refers to a form of post-adoption behavior, which follows initial acceptance [6], so post-adoption is often used as a synonym for continuance [7]. In this study continuance intention is the intention to continue using mobile social apps. We focus on discussing continuance intention instead of usage intention; simultaneously, no work on user intention to remain with mobile social apps has been done.

2.2 Switching costs and their effect on continuance using intention

Switching costs reflect the expected costs of switching from a current service provider to an alternative one [8]. Online users' switching costs are composed of vender-related costs (i.e. benefit-loss costs, service-uncertainty costs and brand-relationship costs) and user-related costs (i.e. search costs, transfer costs and learning costs) [8]. Extant research has reported the significant effect of switching costs on user behavior. Kim (2011) noted that switching costs affect user resistance to enterprise systems implementation [9]. Deng et al (2010) stated that switching costs affect user loyalty toward mobile instant messaging [10]. High switching costs will lock users into the relationship with online services or applications. Prior research has identified the effect of switching costs on user loyalty toward mobile instant messaging [10] and e-retailing [11]. Similarly, we argue

that user-related switching costs influence users' continuance using intention towards a mobile social app. Thus:

H1: Switching costs are positively associated with users' continuance using intention.

2.3 Flow experience and its influence on continuance using intention

Hoffman and Novak (1996) proposed that flow or flow experience was essential to understand navigation experiences in online environments^[12]. This study defines flow experience as a temporarily unaware experience, where an individual engages in mobile social networking activity with enjoyment, total concentration and control. When users experience flow which represents an optimal experience, they may feel great enjoyment and expect to obtain this experience again. A multitude of evidence shows that the flow experience can attract users and significantly affect subsequent attitudes and usage behavior. Prior research has demonstrated the positive relationships between flow experience and continuance intentions in the context of information technology^[13] and information systems^[14]. Zhou et al (2010) revealed the positive effect of flow on mobile SNS users' loyalty^[15] and Zhou (2013) further confirmed that flow affects continuance intention of mobile payment^[16]. In line with these findings, we suggest:

H2: Flow experience is positively associated with continuance using intention.

2.4 Effects of perceived enjoyment and time flexibility on flow experience

Previous studies have examined a number of dimensions to measure flow experiences, including perceived enjoyment, concentration, perceived control^[17], mergence of action and awareness^[18] and curiosity^[19]. Among them, perceived enjoyment and perceived control are the most often used dimensions^[17, 20]. Moon and Kim (2001) defined perceived enjoyment as "the pleasure individuals perceived objectively when committing a particular behavior or carrying out a particular activity"^[21]. In the context of mobile social apps, perceived enjoyment reflects the pleasure and enjoyment associated with using a mobile social app, and perceived control reflects the feelings of control over the activity and surrounding environment. Particularly, we used users' perceived time flexibility (i.e. the degree to which users play a mobile social app at any time and can control the time to play) to measure perceived control. It is reasonable to argue that perceived enjoyment and perceived control have influence on flow experience, so we argue that:

H3: Perceived enjoyment is positively associated with flow experience.

H4: Time flexibility is positively associated with flow experience.

3. RESEARCH METHODOLOGY

3.1 Instrument

To ensure content validity, all measurement items were adapted from previous literature, with minor modifications in wording to make them relevant in the context of mobile social apps. Continuance using intention was measured by adapting items from Kim et al (2008)^[4]. Perceived enjoyment was measured using three items adapted from Agarwal and Karahanna (2000)^[22], Kim et al (2007)^[23]. Items for time flexibility were adapted from Lin and Bhattacharjee (2008)^[24]. Switching cost were adapted from Sharma and Patterson (2000)^[25]. Three items for flow experience were adapted from Novak et al (2003)^[26].

As the respondents are Chinese, back translation method was followed to ensure the translation validity. First, a researcher whose native language is Chinese translated the items into Chinese. Next, another researcher independently translated these items back into English. Subsequently, the two researchers compared the two English versions and developed the first Chinese version of items together.

We then performed a pilot test to enhance the validity of the proposed model's measurement items. We distributed 30 questionnaires to whom are frequent Wechat users to check for any possible ambiguity in wording and format. Comments and suggestions on the item contents and structure of the instrument were solicited. Based on their feedback, we dropped a reversed item for continuance intention and made some minor

modifications to improve the comprehensiveness and user-friendliness of the measurement items.

Finally, the two initial translators checked this version together and finalized the Chinese questionnaire. All items were measured on a five-point Likert scale with 1= “not agree at all”, 3=“neutral”, and 5=“absolutely agree”.

3.2 Data collection

Our model is tested by survey and Structural Equation Model (SEM) in the mobile social apps context of Wechat because of its popularity. The mobile app was released by Tencent company in January 21st, 2011. Up to November, 2013, the number of Wechat registered users had passed 600 million, Wechat has the biggest user group in Asian. Therefore, it could provide insights into the best practices in this area and serve as an appropriate context for investigating the motivation behind mobile social apps.

The questionnaires were distributed in two public universities in China, and all the recipients have experience of using Wechat play on mobiles. The respondents were told that the questionnaire was used for academic research and their anonymity would be assured. The usage of university students might limit the generalizability of the results, we believe that this should not be major concern because research indicates that students represent the largest group (24.9%) of mobile internet users^[27] and mobile social apps as an emerging service is popular among young individuals, especially university students.

We distributed a total number of 247 questionnaires, and received a total of 225 response. However, 7 incomplete responses and 7 aberrant responses were excluded. As a result, 211 valid responses were obtained, producing a valid response rate of 85.4%. Table 1 summarizes the demographic information of the final sample. There are more female respondents (55.5%) in terms of gender distribution and the majority of respondents are between 18 and 24 years of age (55.5%). Furthermore, most respondents started to use Wechat in 2013, and the majority of respondents have experience of using other mobile social apps. With respect to usage frequency, 33.2% of respondents chose frequently use.

Table 1. Demographics of respondents (n=211)

Profiles	Options	Number	Percent (%)
Gender	Male	94	44.5
	Female	117	55.5
Age	18 or younger	2	0.9
	18-24	117	55.5
	25-30	75	35.5
	31 or older	17	8.1
Year started to use Wechat	2011	31	14.7
	2012	71	33.6
	2013	82	38.9
	2014	27	12.8
Frequency of using Wechat	Frequently use	68	33.2
	Often use	104	49.3
	Sometimes use	29	13.7
	Seldom use	10	4.7
Experience of using another mobile social app	Yes	114	54
	No	94	44.5
	Incomplete	3	1.4

4. DATA ANALYSIS AND RESULTS

4.1 Instrument

4.1.1 Principal Component Analysis

The data is subjected to Principal Component Analysis (PCA) with Varimax rotation. Factor loading for item SC1 on the intended loading is only 0.275, so we decided to drop this item for further analysis. After dropping SC1, seven stable factors (with eigenvalue greater than 1) emerge, and these factors explain 73.2% of the variance in data. All question loadings on the intended factor exceed 0.7, and details are shown in Table 2.

Table 2. Results of principal component analysis

Item	Factor loading				
	FE	SC	TF	ENJ	INT
ENJ1	0.167	0.068	0.076	0.888	0.222
ENJ2	0.151	0.100	0.075	0.916	0.124
SC2	0.164	0.759	0.018	0.159	0.074
SC3	0.096	0.855	0.039	0.078	0.021
SC4	0.249	0.744	0.064	-0.060	0.154
TF1	0.154	0.026	0.771	0.089	0.222
TF2	-0.027	0.031	0.844	-0.011	-0.024
TF3	0.022	0.054	0.804	0.078	-0.100
FE1	0.786	0.136	0.031	0.155	0.143
FE2	0.817	0.113	0.097	0.155	0.085
FE3	0.733	0.274	0.011	0.037	0.072
INT1	0.023	0.071	0.044	0.178	0.897
INT2	0.306	0.169	0.000	0.168	0.804

Note: bold values indicate that the value is greater than 0.7.

4.1.2 Confirmatory Factor Analysis

To validate the research model, we assess the convergent validity and discriminant validity of the measurement scales via confirmatory factor analysis (CFA) [28] using AMOS 20. The CFA of this study shows an acceptable model fit. The results are as follows: $\chi^2/df=1.531$, GFI = 0.945, AGFI = 0.908, CFI = 0.967 and RMSEA = 0.050. Convergent validity, which is the degree to which the items of a given construct are measuring the same underlying latent variable [29]. We assess convergent validity based on three criteria. First, standardized path loadings must be greater than 0.7 and statistically significant [30]. Second, composite reliability and Cronbach's alphas, must be greater than 0.7 [31]. Third, the average variance extracted (AVE) for each factor must exceed 0.5 [32]. The standardized path loadings of all items are statistically significant and are greater than 0.7, with the exception of SC2, TF1, TF3, FE3, INT1. However, their loadings are close to 0.7, and their *t*-statistics are significant at the 0.05 level of significance. After carefully reviewing the wording of these items, we still retained them for further data analysis. The values of composite reliability range from 0.742 to 0.877, which are above the recommended level of 0.7, and Cronbach's alphas range from 0.741 to 0.875, which satisfy the recommended level. AVE scores for every construct except SC and TF range from 0.507 to 0.782, which are also higher than the recommended benchmark of 0.5, however, the AVE scores of SC (0.498) and TF (0.489) are very close to 0.5. Hence, convergent validity is established. Table 3 shows the results of convergent validity tests.

Table 3. Results of Convergent Validity Tests

Constructs	Items	Standard loading	AVE	Composite reliability	Cronbach's alpha
ENJ	ENJ1	0.927	0.782	0.877	0.875
	ENJ2	0.839			
SC	SC2	0.655	0.498	0.748	0.744
	SC3	0.743			
	SC4	0.717			
TF	TF1	0.692	0.489	0.742	0.741
	TF2	0.725			
	TF3	0.681			
FE	FE1	0.740	0.507	0.755	0.749
	FE2	0.746			
	FE3	0.646			
INT	INT1	0.648	0.659	0.789	0.755
	INT2	0.948			

Note: bold values indicate that the value is lower than 0.7.

Discriminant validity is the degree to which the measures of two constructs are empirically distinct^[29]. It is established if the square root of a construct's AVE is larger than its correlation with any other construct^[32]. As may be seen in Table 4, which shows the square root of AVE for each construct exceeds the correlation between that construct and other constructs. Thus, discriminant validity is established.

Table 4. Construct correlations and test of discriminant validity

No.	Constructs	Mean(Std.Dev.)	Correlations ^a				
			1	2	3	4	5
1	ENJ	3.604(0.760)	0.884^b				
2	SC	3.254(0.740)	0.214**	0.706			
3	TF	3.904(0.632)	0.161*	0.114	0.699		
4	FE	2.992(0.791)	0.338**	0.430**	0.138*	0.712	
5	INT	3.671(0.649)	0.399**	0.281**	0.091	0.360**	0.812

Note: ^a Two-tailed significant levels are reported for the correlation coefficients.

^b Diagonal elements represent the square root of AVE for that construct.

*: p<0.05, **: p<0.01.

4.2 Hypotheses testing

The hypotheses are tested using the AMOS 20 structural model. The structural model shows an acceptable model fit: $\chi^2/df=2.091$, GFI=0.921, AGFI=0.876, RMSEA=0.072, CFI=0.927. With good fit indices, the standardized path coefficients (see Figure 2) can be used to test the hypotheses.

Table 5 presents the results of hypotheses testing. All the hypotheses are supported, with the exception of H4. Perceived enjoyment has significant influence on flow experience and explains 23% of the variance. Contrary to hypothesis 4, time flexibility has no significant impact on flow experience. Flow experience and switching costs significantly affect continuance intention, explaining 58% of the variance.

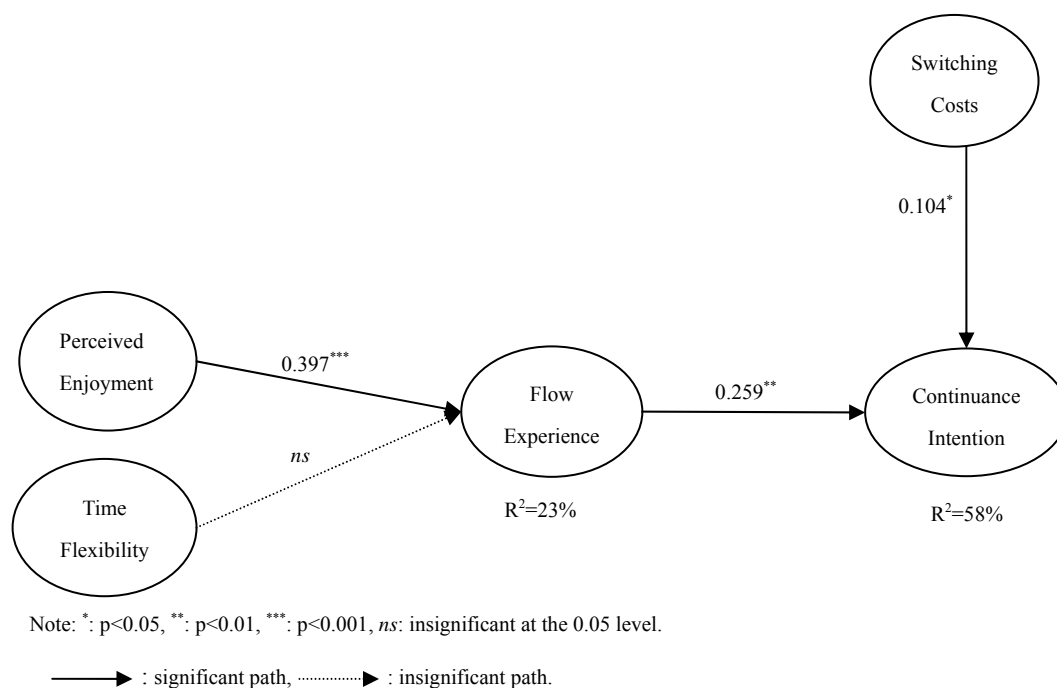


Figure 2. Structural model testing results

Table 5. Results of hypothesis testing

Hypothesis	Relationships	Beta	t-Statistic	Results
H1	SC→INT	0.104	2.056	Supported
H2	FE→INT	0.259	3.345	Supported
H3	ENJ→FE	0.397	4.748	Supported
H4	TF→FE	0.126	1.226	Not supported

4.3 The mediating effect testing

The mediating effect of flow experience is further tested following Baron and Kenny's casual step approach [33]. Table 6 shows the results of mediating effects test.

Table 6. Test for mediating effects

IV	M	DV	IV→DV	IV→M	IV+M→DV		Mediating
					IV	M	
ENJ	FE	INT	0.336***	0.358***	0.260***	0.211***	partial
TF	FE	INT	0.088	0.180*	0.035	0.292***	no

Note: NP= Number of Peers, PC= Perceived Complementarity, USE= Perceived Usefulness, FE=Flow Experience, INT=Continuance Intention; IV represents Independent Variable, M represents Mediating Variable, DV represents Dependent Variable.

***: p<0.001, *: p<0.05.

5. DISCUSSION AND IMPLICATIONS

5.1 Results discussion

The key purpose of this research is to identify factors affecting continuance using intention of mobile social apps. Our model integrates flow experience and switching costs. Specifically, we provide empirical evidence that perceived enjoyment has significant influence on flow experience, further positively affect users'

continuance using intention. Switching costs exert significant positive effect on continuance intention.

Among factors affecting continuance using intention directly, flow experience and switching costs all have significant positive effect on continuance using intention and flow experience exert relatively larger influence ($\beta=0.259$). Contrary to our hypothesis, time flexibility of mobile devices has no significant influence on users' continuance using intention towards mobile social apps.

With regard to the mediating effect of flow experience, we find that it exerts partially mediating effect between perceived enjoyment and continuance using intention and exert no mediating effect between mobile time flexibility and users' continuance using intention towards mobile social apps.

5.2 Theoretical and practical implications

From a theoretical perspective, this research enriches the understanding of continuance using intention. Existing IS research on technology acceptance mainly focuses on technology initial adoption. How to retain users is a crucial issue to mobile social app developers, while research into this field is still in its infancy. In order to extend previous research, we draw on the theory of flow experience and switching costs to build an integrated model to explain factors influencing users' continuance using intention of mobile social apps. From a practical perspective, this research can help practitioners retain users. The empirical result shows that both flow experience and switching costs exert significant influence on users' continuance using intention, therefore, creating switching barrier is essential for developers to retain users.

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