

An Empirical Study on Consumer's Continuous Usage Intention of Smartphone Services in China

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I. Introduction

Smartphone services have been changing the ways in which people communicate with others, find information, have fun, and manage their everyday lives. With changing trend from third generation mobile phones to fourth generation, the 4G mobile phone has introduced a new wireless service platform to deliver information and services between service providers and

customers. In addition to traditional services, smartphone services can now be used to provide advanced mobile services, including banking service, e-commerce, chat room, gaming, and parking services, etc. Thus, smartphone service providers expect customers to widely accept and use these new services.

Unlike newly industrialized countries, China had already established the technology for mediated conversation by means of the fixed telephone before the advent of the mobile

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phone. The China handset market has exhibited strong growth. According to the Ministry of Industry and Information Technology (MIIT), the total number of mobile users in the country reached over 1 billion in 2014 (MIIT, 2014). The increase of smartphone adoption in China is even more dramatic. With the rapid growth of smartphone users and availability of 4G networks in China, this ability will create many opportunities for telecom service providers, where fierce competition exists among major smartphone service providers for acquiring and retaining customers. All the competing telecom companies should consider how to retain their customers and their market share. Therefore, it is more meaningful for researchers to study factors which can induce positively customers' continuous usage of smartphone service in China.

Previous researches are based on technology acceptance model (TAM) (Fang et al., 2006), innovation diffusion theory (IDT) (Hsu et al., 2007), and the unified theory of acceptance and use of technology (Park et al., 2007) with some proved variables. However, the original TAM model suggested by Davis (1989) cannot fully explain the field of smartphone service, because smartphone users will expect to get more fun at the same time. For example, some studies based on TAM (Park et al. 2013; Joo and Sang, 2013) neglected the intrinsic benefit in the adoption of smartphone. Heijden (2004) further pointed out that perceived enjoyment is an

important factor in predicting the intention to use a pleasure-oriented information system, according to the hedonic information system. So this study excludes the perceived ease of use in the smartphone context. We will choose perceived usefulness and perceived enjoyment as perceived benefits to explore continuous usage intention on smartphone service.

In China, the smartphone service environment has been undergoing a dramatic change because of smartphone market growth and customer's demanding requirements. It is necessary to improve smartphone service quality. Another important antecedent with respect to the use of smartphones is individuals' innovativeness, since smartphones are one of the most advanced currently available communication technologies across the world. Obviously, For Chinese people, opinions of friends and relatives always have a significant impact on a person. That may due to cultural reason. Social influence should be considered as an important factor. Many studies also focus on these factors, such as innovativeness (Lu et al., 2005; Cheng et al., 2013), social influence (Lu et al., 2005; Lopez-Nicolas et al., 2008) and service quality (Kuo et al., 2009; Landrum and Prybutok, 2004; Jang and Noh, 2011; Shin et al., 2013) in mobile context. Meanwhile, a lot of researches have focused on examining the factors affecting users' initial adoption and usage of mobile services (Sheng et al., 2008; Kim et al., 2009; Kuo and Yen, 2009; Mallat et al., 2009; Shin, 2009).

However, compared with researches on initial adoption, the continuous usage intention has received less attention in China.

Based upon literature review conducted on the acceptance of mobile information technology, we proposed a structural model that would help better understanding on the relationship between individuals' characteristics and intention to reuse smartphone services. We focus on three different respects: innovativeness as individual characteristic, social influence as Chinese culture factor, and service quality as smartphone system features. Meanwhile, we will use perceived usefulness and perceived enjoyment as mediators based on user acceptance of hedonic information systems (Heijden, 2004).

This paper aims at finding out how these factors influence customer's continuous intention to use smartphone services in China. The scope of this study focused on Chinese smartphone users by conducting survey. To accomplish these purposes, a review of the empirical studies on the antecedents of individual adoption and use was performed. From an extensive literature search, the factors that had been investigated in these studies were classified according to their similarity and patterns of their findings. Then, academic and practical implications of the findings will be presented.

II . Literature Review

1. Smartphone services in China

Smartphone is a generic term of a kind of mobile phone like a personal computer that owns independent operating system, enables users to install the third party program, such as software and game, and extends the mobile phone's function by this kind of program and accessing wireless network. People can check their email and manage social networking sites at any place and at any time on their smartphones because they can easily connect to the Internet.

Some mobile commerce applications such as SMS (Short Message Service), MMS (Multimedia Message Service) and WAP (Wireless Application Protocol) have become very popular. According to a report issued by China Internet Network Information Centre (CNNIC) in 2014, China had 527 million smartphone-based mobile Internet users, accounting for 83.4% of the Internet population (CNNIC 2014). This shows the great mobile user base in China. Since mobile communication technology was introduced, it has developed rapidly. Users with smartphone can send an electronic greeting card with images, have a live video communication connected from two places apart with their relatives, and stay active in on-line commerce activities with their phones. This interactive feature may be one of the most appealing functions to smartphone users

and also creates a profit opportunity for mobile network operators. The advent of smartphone brings more opportunities to online applications software providers, e.g. QQ and weixin, which rely on wireless Internet technology. Smartphones are useful for information search and surfing, email checks, music downloads, map information, schedule management, use of social networking sites, gaming and mobile shopping. The specifics of the 4G network are geared toward high-quality service and fast data transfer rates. Priorities for this standard include better reception, with less dropped data, and faster information exchanges.

In China, the top three Chinese mobile operators - China Mobile, China Unicom, China Telecom take the lead in smartphone service market. They provide basic telecommunication services such as wireless services and mobile services, and value-added services such as Internet access services and information services. China Mobile was finally the first carrier to offer 4G LTE in China on December in 2013, followed by China Unicom and China Telecom, the country's other two major carriers. In order to compete with other service providers as well as attract users to reuse their services, they should pay more attention to the quality of the service. In terms of Chinese market, there exists a large number of smartphone service users. However, services adopted by Chinese users are not as various as those in Korea. Smartphone services are more

widely spreaded in Korea than in China. New products also update very quickly.

In many information systems literature, research on smartphone services acceptance focuses mainly on TAM, such as perceived usefulness and perceived ease of use (Park et al.2013; Joo and Sang, 2013). Hong et al. (2008) drew on the decomposed theory of planned behavior (TPB) to explain user adoption of mobile data services. Previous studies in the area of consumer continuous acceptance and adoption have also focused on the effect of culture (Lee, 2007), perceived value (Kuo et al., 2009). Lee et al. (2009) adopted the two-factor theory to explain the post-adoption usage of mobile data services.

2. TAM and Hedonic Service

Individual acceptance and use of information technology is one of the richest streams of IS research (Venkatesh et al., 2003). Davis(1989)' technology acceptance model (TAM) posits that user acceptance can be explained by two beliefs: perceived usefulness and perceived ease of use. In general, TAM is useful to explain and predict individual adoption of IT. Perceived usefulness is defined as "The degree to which a person believes that using a particular system would enhance his or her job performance"(Davis, 1989, p.320). Perceived ease of use is defined as "the degree to which a person believes that using a particular system

would be free of effort” (Davis, 1989, p.320). In TAM, behavioral intention to use is jointly influenced by attitude and usefulness, where the latter affects the former directly.

There have been several previous studies that used the TAM as a theoretical framework, in the areas of personal computers and software applications (Venkatesh and Brown, 2001), online communities (Chung et al., 2010), and wireless mobile data services (Lu et al., 2005). Davis et al. (1989) had indicated that perceived usefulness and perceived ease-of-use influenced end-user’s attitude and intention toward a broad range of IT usage. However, usefulness or ease of use may not fully explain the overall user’s behavior toward accepting or using the IT.

Prior studies on TAM focused mainly on utilitarian information systems. We found that the influence of perceived usefulness is higher than perceived ease of use on behavior intention. However, perceived enjoyment have attracted attention in addition to perceived usefulness and perceived ease of use in traditional TAM, according to the determinants of intentions to use hedonic information system. Heijden (2004) studied the differences between user acceptance models of utilitarian and hedonic information systems and found that, in the hedonic information systems, perceived enjoyment and perceived ease of use are stronger determinants of intentions to use than perceived usefulness. Bhattacharjee and Lin(2010) expanded the research on attitude

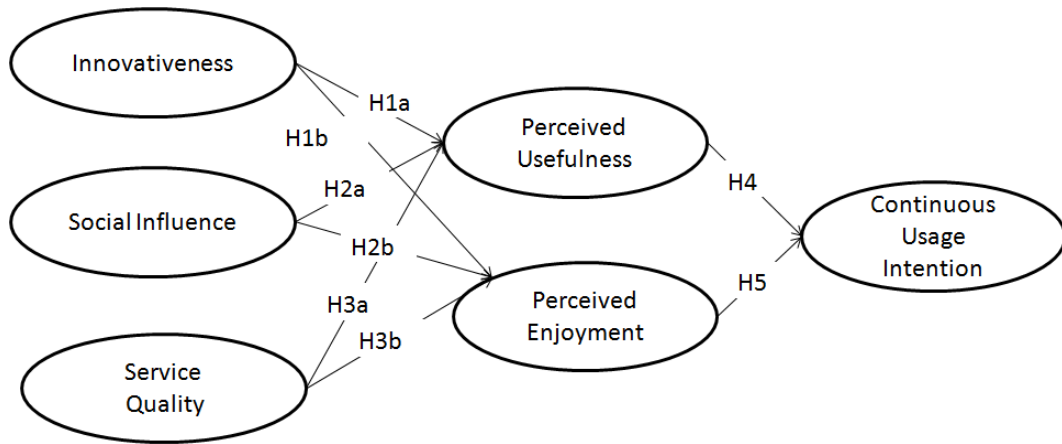
theories and proposed an initial model of interactive hedonic system usage. Specifically, they replace perceived usefulness and perceived ease of use with perceived enjoyment and social image as the core cognitive drivers of usage, and further link these beliefs to different technological attributes.

III. Research Model and Hypothesis

1. Research Model

Smartphones are new products that include all kinds of functions such as voice and video communication, Internet access, and data retrieval and management (Park et al., 2013). In the studies of information technology system, TAM has two particular beliefs, namely, perceived usefulness and perceived ease of use, which are primary relevance to the users’ attitude toward using the computer (Davis, 1989). Many studies have shown that both perceived ease of use and perceived usefulness are determining factors for acceptance and use of IT (Malhotra et al., 1999; Moon and Kim, 2001). Venkatesh and Davis (2000) developed the “TAM2” model, as the revised model of TAM that explores the antecedents of perceived usefulness. It takes into account social influences and cognitive processes, affecting technology acceptance.

Heijden(2004) revised the technology



<Figure 1> Research Model

acceptance model, and use it to explain the individual acceptance for utilitarian and hedonic information systems. Prior studies examined the factors affecting the people’s use of smartphones within the framework of the technology acceptance model (TAM) (Park et al., 2013; Joo and Sang, 2013).

However, the basic TAM theory predicted and explained the user behavior without including the intrinsic benefit such as enjoyment. Therefore, this study attempts to overcome the limitation of TAM and extends the technology acceptance model (TAM) by integrating hedonic factor. So we suggest a research model, which is shown in Figure 1.

In research model of this study, we examine the influence of the factors that have been identified as important by prior studies in consumers’ continuous usage intention on smartphone. Those factors include innovativeness (Lu et al.,2005; Cheng et al.,2013), social influence (Lu et al.,2005;

Lopez-Nicolas et al., 2008) and service quality (Kuo et al., 2009; Landrum et al., 2004; Jang and Noh, 2011; Shin et al., 2013). Smartphone usage is related to individual adoption and use of information technology. According to the individual-level technology adoption model, we choose innovativeness as individual customer behavior characteristic, social influence as subjective norms, and service quality as facilitating conditions, which an individual believes that an organizational and technical infrastructure exists to support use of the system(Venkatesh et al., 2003; Sykes et al., 2009). We attempt to study whether innovativeness, social influence and service quality has a positive effect on revised TAM variables such as perceived usefulness and perceived enjoyment in order to investigate the behavior of smartphone customers in China.

2. Research Hypotheses

1) Innovativeness

Previous research has focused on examining the various constructs and relationships between them based TAM (Davis, 1986; Taylor and Todd, 1995). Agarwal and Prasad (1998) have proposed a new construct to illuminate the relationships in technology acceptance models, such as personal innovativeness. They defined innovativeness as “the willingness of an individual to try out any new information technology” (Agarwal and Prasad, 1998). Innovativeness is one of the variables that potentially affect how people respond to innovations. It means a person is characterized as innovative, if he or she is early to adopt an innovation. Past studies found that innovativeness was a significant determinant of perceived usefulness (Lu et al., 2005; Cheng et al., 2013; Lee et al., 2014) and behavior intention (Dai and Palvi, 2009). Rouibah and Abbas(2010) proposed a relationship among innovativeness, subjective norm and attachment motivation based on TAM in mobile phones. Hence, we propose the following hypothesis:

- H1a: Innovativeness positively influences perceived usefulness in smartphone services.
- H1b: Innovativeness positively influences perceived enjoyment in smartphone services.

2) Social influence

Subjective norm (also called social norm) can be expected to be important in determining technology acceptance. Venkatesh and Davis(2000) used "subjective norms" in their model, which is defined as "the person's perception that most people who are important to him think he should or should not perform the behavior in question". Venkatesh et al.(2003) defined social influence in their study as the degree to which an individual perceives that important others believe he or she should use the new system. Lewis et al. (2003) sought to explain for perceived usefulness from social aspects and found the expected relationship. For smartphone services, Lu et al. (2005) suggested that there should be great emphasis on the importance of social influences. Lopez-Nicolas et al. (2008) also show that social factors exert an important influence on people's decision to adopt advanced mobile service. Such social influences can affect an individual's opinions, decisions, and behaviors through mobile interactions and communications. Hence, we propose the following hypothesis:

- H2a: Social influence positively influences perceived usefulness in smartphone services.
- H2b: Social influence positively influences perceived enjoyment in smartphone services.

3) Service quality

Service quality is a subjective category, depending on the comparison between customer's expectations on service quality and their actual perceived service level(Grönroos,1982). Grönroos(1984) conceived that service quality means there is the difference between how the service is delivered and how the user expected it to be delivered by the customers. In this study, service quality refers to the overall assessment of functional benefits provided to consumers by smartphone. Kim et al. (2009) used service quality as an antecedent for perceived usefulness, perceived ease of use, and perceived enjoyment. Recent studies examined the relationship among quality, ease of use, usefulness, and enjoyment based on TAM (Ha et al., 2009). Song and Han (2009) proposed a relationship between content quality and perceived enjoyment in mobile phone service. Hence, we propose the following hypothesis:

H3a: Service quality positively influences perceived usefulness in smartphone services.

H3b: Service quality positively influences perceived enjoyment in smartphone services.

4) Perceived usefulness and Perceived enjoyment

Researchers have given lots of attention to customers' continuous intention to use. Continuous intention has been frequently used

as a basis for predicting customers' future behaviors (Kuo et al., 2009). It can be defined as customers' intentions to repurchase products or services from the same retailer and spread their experience of buying and using the product or service to their friends (Wang et al., 2004; Zeithaml et al., 2002; Park and Chae, 2014).

Based on TAM, behavioral beliefs such as perceived usefulness and perceived ease of use have a direct influence on behavioral intention except their indirect influence via attitude (Davis, 1986; Moon and Kim, 2001). These variables can explain user's adoption of information technology such as Internet and mobile systems. Perceived usefulness is examined as determinant of behavioral intention, such as the acceptance of social networking sites (Lee et al., 2012), and instant messaging (Lu et al., 2009).

Prior research has measured the importance of hedonic beliefs (i.e. perceived enjoyment) in shaping attitudes, such as the use of information technology in the household (Brown and Venkatesh, 2005) and online shopping (Childers et al., 2001). In this study, we employ perceived enjoyment, defined as the extent to which using a smartphone service is enjoyable, as a hedonic belief. Especially, perceived enjoyment has been found to be a more powerful determinant of acceptance intention than perceived usefulness or ease of use (Heijden, 2004). Perceived enjoyment can

influence the behavioral intention via attitude but also has a direct effect (Nysveen and Pedersen, 2005). Perceived enjoyment is examined as determinant of the customers' continuous usage intention to use in an airline B2C e-commerce website (Kim et al., 2009), and consumer e-shopping (Ha and Stoel, 2009). Hence, we propose the following hypothesis:

- H4: Perceived usefulness positively influences continuous usage intention of smartphone services.
- H5: Perceived enjoyment positively influences continuous usage intention of smartphone services.

IV. Research Method

1. Operational Definition of Variables

The measures used to operationalize the constructs included in the research model are mainly adapted from previous studies with modifications to fit the target contexts. The questionnaire had two parts. The first part included questions on the demographics of the sample. The second part included all the items measuring the constructs. The operational definition of each construct is given out in the <Table 1>. Each item was measured on a five-point Likert-type scale, which ranging from “disagree strongly” (1) to “agree strongly” (5).

<Table 1> Measurement Instrument

Variable	Operational Definition	Item	Measurement Items	Reference
Innovativeness	The willingness of individuals to try out smartphone	INNO1	Among my peers, I am usually the first to try out new technologies and products.	Agarwal et al. (2000) Lewis et al. (2003)
		INNO2	In general, I am not hesitant to try out new ideas and knowledge.	
		INNO3	I like to experiment with new ideas and methods to solve the problem.	
		INNO4	If I heard about information and products, I would look for ways to experiment with it.	
Social Influence	The degree to which individuals believed that others thought they should use smartphone	SI1	People around me think it is a good idea for me to use smartphone.	Lopez-Nicolas et al. (2008)
		SI2	People around me have encouraged me to use smartphone.	
		SI3	People around me are using advanced smartphone.	
		SI4	Many people will use the upcoming smartphone.	
		SI5	People are increasingly aware of smartphone.	
Service Quality	The overall assessment of functional benefits provided to consumers by a smartphone	SQ1	The quality of smartphone service is excellent.	Kuo et al. (2009) Shin(2009)
		SQ2	When the smartphone is used, the service is useful without stopping or communication lost.	
		SQ3	When any problem occurs, the telecom company can instantly cope with it.	
		SQ4	The telecom company provides reliable services.	
		SQ5	I am very confident the information gained from a smartphone.	
Perceived enjoyment	The extent to which smartphone usage is	PE1	When I use smartphone service, I am very satisfied.	Chen et al. (2000)

Variable	Operational Definition	Item	Measurement Items	Reference
	perceived to be personally enjoyable in its own right aside from the instrumental value of the technology	PE2	When I use smartphone service, I am very happy.	Kim et al. (2007)
		PE3	I experienced absorbing in using the smartphone.	
		PE4	I was unaware of the passing of time in using the smartphone.	
		PE5	I was very fun and interesting in using the smartphone.	
Perceived usefulness	The degree to which an individual believes that using smartphone would enhance his/her job performance	PU1	I can increase my productivity through the use of a smartphone.	Kim et al. (2007) Kuo et al. (2009)
		PU2	I can achieve my target through the use of a smartphone.	
		PU3	I can enhance my job effectiveness through the use of a smartphone.	
		PU4	I can improve my performance through the use of a smartphone.	
		PU5	I can accomplish my tasks more quickly through the use of a smartphone.	
Continuous usage intention	The willingness to reuse smartphone	CU1	If the price is reasonable, I intend to reuse smartphone.	Kuo et al. (2009)
		CU2	If it is useful, I intend to reuse smartphone.	
		CU3	I intend to use smartphone as much as possible.	
		CU4	I will speak positively others to use smartphone.	
		CU5	I will strongly recommend others to use smartphone.	

2. Sampling and Data Collection

The Data of questionnaire was collected from among individual users who are using smartphone in China. A total of 316 questionnaires were collected using multidimensional survey methods, including online, offline, email, and fax.

The demographic statistics indicated that female (72.2%) was more than male (27.8%). Fifty-seven percent of respondents were under 30 year. Period of the Smartphone usage was under 2 years (69%). Demographics of the respondents are shown in<Table 2>.

<Table 2> Demographic characteristics

Measure	Items	Frequency	Percentage
Age (years)	10s	7	2.2
	20s	175	55.4
	30s	113	35.8
	Over 40s	21	6.6
Gender	Male	88	27.8
	Female	228	72.2
Occupation	Student	87	27.5
	Official	109	34.5
	Professional	81	25.6
	Self-employed	8	2.5
	Others	31	9.9
Length of time using smartphone	under 6 month	56	17.7
	6 months ~ 1 year	66	20.9
	1 year ~ 2 year	96	30.4
	2 year ~ 3 year	46	14.6
	Over 3 year	52	16.4

V. Data Analysis

1. Validity and Reliability

We investigate the reliability and validity analysis of the items measured. Cronbach's alpha is estimated to obtain a measure of reliability of a set of question items. A widely advocated level of adequacy for coefficient alpha has been at least 0.70. From <Table 3>, the alpha's for the variables with composite measures ranged from 0.770 to 0.909. We can see that the Cronbach's α of each variable is

higher than the standard of 0.7, indicating a good reliability of the variables.

Convergent validity is assessed by the correlation among items which make up the scale or instrument measuring a construct. And the standardized indicator item loading of 0.7 is considered adequate for the confirmatory purposes. We consider a construct to display convergent validity if average variance extracted (AVE) is at least 0.5 (that is, when variance explained by the construct is greater than measurement error).

<Table 3> Convergent Validity

Factors	Item	Standard Estimate	S.E.	C.R.	Cronbach's Alpha	AVE
Innovativeness (INNO)	INNO1	0.773	-	-	0.891	0.677
	INNO2	0.907	0.064	17.299		
	INNO3	0.825	0.066	15.202		
	INNO4	0.779	0.070	14.366		
Social Influence (SI)	SI3	0.738	-	-	0.899	0.762
	SI4	0.933	0.077	16.824		
	SI5	0.934	0.074	16.856		
Service Quality (SQ)	SQ1	0.866	-	-	0.770	0.544
	SQ2	0.654	0.076	11.180		
	SQ5	0.673	0.078	10.591		
Perceived enjoyment (PE)	PE3	0.772	-	-	0.818	0.615
	PE4	0.682	0.083	11.11		
	PE5	0.886	0.081	14.079		
Perceived usefulness (PU)	PU1	0.722	-	-	0.909	0.721
	PU3	0.847	0.080	14.905		
	PU4	0.894	0.087	15.508		
	PU5	0.919	0.089	15.770		
Continuous usage intention (CU)	CU3	0.811			0.907	0.772
	CU4	0.924	0.054	18.839		
	CU5	0.897	0.057	19.172		

$\chi^2/DF=1.820$; $GFI=0.919$; $AGFI=0.890$; $PGFI=0.678$; $RMR=0.030$; $NFI=0.934$; $CFI=0.969$; $RMSEA=0.051$

<Table 3> shows the result of convergent validity test. Except for SQ2, SQ5 and PE4 with the Standard Estimate slightly (standardized indicator item loading) smaller than the recommended criterion, all the other items have a value above the standard of 0.7. And all the Average Variance Extracted (AVE) are above 0.5. Such result indicates constructs that are expected to be related show a correlated relationship.

The criterion-related validity tells us how well each attribute or measure is to predict other research constructs. In this paper, we performed the Pearson's correlation analysis to find out the linear relationship among them. As shown in <Table 4>, each variable shows the mean value as higher than normal level. Specifically, social influence are higher in mean value than others. Also, the correlation indicators are all less than the square root of AVE and most of them are significant at the 0.01 level, showing that the items are valid to use in this study.

2. Hypothesis Testing

The followings are the overall model fit and the tests of each research hypotheses. As shown, the result of the full model indicated fit indices. The adequacy of the structural equation models was evaluated on the criteria of overall fit with the data. Next, we evaluated the individual paths of the model. These results are summarized in <Figure 2>, and it is path figure showing the AMOS analysis result of the research model suggested in this study.

The hypothesized paths were tested; All were supported. According to the result, Innovativeness has a significant effect on perceived usefulness (H1a:0.197^{***}) and perceived enjoyment (H1b:0.174^{***}). Social influence has the smallest influence on perceived usefulness (H2a:0.160^{***}) and perceived enjoyment (H2b:0.174^{**}).

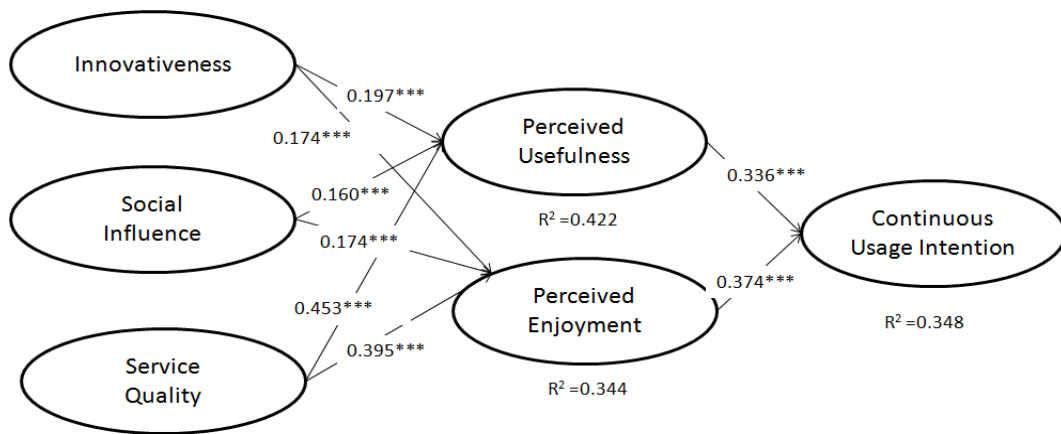
But the significant level is not very high. Among all the independent variables, service quality has the largest influence on perceived

<Table 4> Discriminant Validity

	Mean	Std. Dev.	INNO	SI	SQ	PE	PU	CU
INNO	3.555	0.829	.823					
SI	4.135	0.747	.304 ^{**}	.873				
SQ	3.393	0.723	.290 ^{**}	.340 ^{**}	.737			
PE	3.619	0.729	.324 ^{**}	.319 ^{**}	.368 ^{**}	.849		
PU	3.580	0.686	.384 ^{**}	.384 ^{**}	.500 ^{**}	.432 ^{**}	.784	
CU	3.762	0.706	.315 ^{**}	.422 ^{**}	.407 ^{**}	.461 ^{**}	.481 ^{**}	.879

Note) ** Correlation is significant at the 0.01 level (2-tailed).

Diagonal shows the square root of the AVE for each construct.



X²/DF=1.933;GFI=0.914;AGFI=0.886;PGFI=0.692;RMR=0.039; NFI=0.929; CFI=0.964; RMSEA=0.054

<Figure 2> Result of Structural Model Analysis

usefulness (H3a:0.453^{***}) and perceived enjoyment (H3b:0.395^{***}). Finally, Perceived usefulness (H4) and perceived enjoyment (H5) also had significant effect on continuous intention to use smartphone services (H4:0.336^{***}; H5:0.374^{***}). From <Figure 2>, according to R² results, 42.2% variance of perceived usefulness can be jointly explained by innovativeness, social influence and service quality; while 34.4% variance of perceived enjoyment can be explained by these three

factors, which is a little bit lower. 34.8% variance of continue to use can be jointly explained by perceived usefulness and perceived enjoyment.

Innovativeness, social influence and service quality have positive influence on perceived usefulness and perceived enjoyment. Service quality has the highest weight. Also, perceived usefulness and perceived enjoyment have positive influence on continuous to use smartphone services. Perceived enjoyment has

<Table 5> Summary of hypothesis tests

Hypothesis (Path)		Standard Estimate	Standard Error	Composite Reliability	p-value	Test Result
H1a	INNO → PU	0.197	0.043	3.377	***	Accepted
H1b	INNO → PE	0.174	0.050	2.741	***	Accepted
H2a	SI → PU	0.160	0.055	2.734	***	Accepted
H2b	SI → PE	0.174	0.064	2.690	***	Accepted
H3a	SQ → PU	0.458	0.058	6.275	***	Accepted
H3b	SQ → PE	0.395	0.061	5.444	***	Accepted
H4	PU → CU	0.336	0.073	5.251	***	Accepted
H5	PE → CU	0.374	0.072	5.601	***	Accepted

Note) Significant levels: *p<0.10, **p<0.05, ***p<0.01

bigger influence on continuous to use smartphone services than perceived usefulness. Summary of hypothesis testing is shown in <Table 5>.

3. Discussion and Implications

1) Academic Implications

According to the results, this study may have the following academic implications. First, this study proposed customer's continuous acceptance of smartphone service based on modified TAM. From data analysis, innovativeness, social influence and service quality are proved to have positive influence on perceived usefulness and perceived enjoyment. Innovativeness has the positive influence on perceived usefulness and perceived enjoyment. Lu et al., (2005) and Cheng et al., (2013) also supported this result. Innovativeness is the degree of interest in trying a new thing, new concept, or an innovative product or service. Therefore, higher personal innovativeness leads to a more positive information technology adoption intention. If users have high level of innovativeness, they may have more interest in using smartphone services. So they can perceive more enjoyment.

Second, the result of this study on social influence is similar to the prior studies of Lewis et al. (2003), Lu et al. (2005), and Lopez-Nicolas et al. (2008). Social influence has the weakest influence on perceived

usefulness. An individual may believe that a system and service is useful because the system and service enhances their image and social status, it may be particularly significant in Chinese context.

Third, service quality can be proved that it has the strongest positive effect on perceived usefulness and perceived enjoyment. The result of this study on service quality is similar to the prior studies of Song and Han(2009) and Jang and Noh(2011). The customers can enjoy various services on smartphone.

Fourth, perceived usefulness is a basic variable in TAM. It had a positive influence on continuous intention. The smartphone users reuse these services because they can gain useful information, such as education, weather, stock and so on. We adopted perceived enjoyment in our model instead of perceived ease of use. Because it is considered as an important variable of smartphone characteristics to decide the customers reuse intention. Smartphone services provide various facilities for members to use to interact with their online connections. The users usually gain more pleasure due to using these services.

These results give us some empirical evidences to understand customers' reuse intention on smartphone in China. Thus, the academic contribution of this paper is to empirically extend the TAM model integrating hedonic information services and to examine the continuous intention on smartphone in

China.

2) Practical Implications

According to the empirical results, this study may have the following practical implications. Since users of smartphone choose their own apps to help them deal with daily work or use them as a tool of entertainment based on the specific requirements and preferences, Chinese users generally are much more using smartphone for entertainment than for work or study. First, perceived enjoyment have a significant role in the users' continuous intention to use smartphone services. We suggest that smartphone company should provide more interesting functions to enhance user's enjoyment. Meanwhile, when people perceived more enjoyment ,they are becoming willing to continue to use smartphone services.

Second, the result of this study shows that individual innovativeness plays a significant role in the users' continue to use smartphone. In China, Chinese people do not have much experience of using smartphone at the beginning of 4G smartphone services. So Initial adopters are very clear about their adoption of new technologies are important for them to win respect from others and maintain their higher status of social networks, because the higher status can help them improve work efficiency.

Third, for Chinese people, social influence exerts an important influence on people's decision to adopt smartphone services.

Opinions of friends and relatives always have a significant impact on a person. That may due to cultural reason. Chinese people tend to become a member of a certain group or do according to the opinion of the majority. Meanwhile, our results indicate that social influences should be viewed as an antecedent of constructs explaining the adoption of smartphone services. From a managerial viewpoint, continuous intention depends significantly on innovativeness and social influences through perceived usefulness. In addition, the result also shows that perceived usefulness acts as a mediating factor between innovativeness and continuous intention. Smartphone telecommunication service providers should take these findings into consideration if they want to distinguish themselves from others in a highly competitive market.

Fourth, we examined the relationships between service quality, perceived enjoyment and continuous intention in smartphone services. Smartphone can reduce loneliness and anxiety, promote a sense of security and well being, increase social interactions, and maintain cohesion within family and friendship groups. Service quality is positively related to perceived enjoyment, indicating that when telephone companies should provide high quality service, the customers' perceived enjoyment can be enhanced. Perceived enjoyment directly and positively influence continuous intention.

Therefore, the development of smartphones' service quality should attract more customers to use these services again. The result of this study shows some evidences on how smartphone company can make services reuse to attract customers.

VI. Conclusion

Recently, more Chinese people own their smartphones. because smartphone has been paid more attention in China. The main goal of this paper was to examine what factors would determine the user reuse of smartphone services by collecting data on Chinese users. This study extended the original TAM by integrating perceived enjoyment, as a hedonic construct of smartphone on continuous intention. Our study proved that perceived enjoyment has a positive influence on continuous intention to use smartphone services. The managers of smartphone companies should take more considerations on how to provide more enjoyable service and attract customers to reuse their services.

Among the results of this study, service quality has the highest weight to influence on perceived usefulness and perceived enjoyment. This suggests users focus on service quality when they reuse smartphone services. Smartphone company should provide higher functional quality service such as usability,

accessibility, security for obtaining mobile contents in the online services via wireless Internet. Also, both perceived usefulness and perceived enjoyment have positive influence on continuous intention to use smartphone services. Perceived enjoyment has bigger influence on continuous intention to use smartphone services than perceived usefulness. The result of this study shows that perceived enjoyment plays more significant role in user's intention to reuse smartphone services.

Although this study provides meaningful implications for continuous usage of smartphone, there still exist some limitations. First, this study collected data in China with small sample size. Most respondents in this research are female(72.2%), this may produce the bias on the result of data analysis in mainly explaining the continuous usage intention of smartphone. Female users in China pay much more attention to mobile shopping than male users. Second, we proposed a model that was intended to understand smartphone services of customers in China. This result has a limitation, because it was limited only in one culture of China, as a single market without any comparison. Therefore, we need additional studies to collect more data from China for validating the proposed model by expanding sample size. Also, the comparative studies between nations will be needed to identify the effect of socio-cultural and socio-technical issues for future research.

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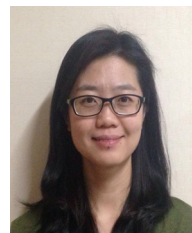
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천연(Chen, Yan)



현재 동국대학교 대학원 테크노경영협동과정 경영정보학 박사과정을 수료하였으며, 남개대학교 기업관리학과에서 석사학위를 취득하였다. 대학원에서의 주요관심분야로는 e-business, mobile commerce,

SNS 등이다.

문태수(Moon, Taesoo)



현재 동국대학교 경영계열 경영학부 교수로 재직 중이다. 한국외국어대학교에서 학사, 동대학 경영정보대학원에서 경영정보학 석사, 그리고 고려대학교 대학원 경영학과에서 경영정보학 박사학위를 취득하였다.

포항산업과학연구원 주임연구원, 고려대 기업경영연구원 연구원, 한국정보화진흥원 연구원으로 근무하였다. 주요 관심분야로는 정보시스템 전략계획과 평가, ERP, SCM, e-Business 등이다.

<Abstract>

An Empirical Study on Consumer's Continuous Usage Intention of Smartphone Services in China

Chen Yan · Moon, Taesoo

With the active smartphones user exceeding 500 million by the end of 2014, China has now become the largest smartphone market in the world. Smartphone companies provide variety of information through a range of applications, such as communications, entertainment, games, and so on. There were many studies conducted about the user acceptance and continuous intention of mobile service. However, it is still not quite clear what factors attract people to reuse smartphone in China. This paper examines the continuous intention of smartphone about Chinese customers. This study incorporates perceived enjoyment as a additional construct into a extended TAM model, by integrating a hedonic service of smartphone. We propose a research model that reflects the individual characteristics and usage contexts of smartphone, such as innovativeness, social influence, and service quality, and analyze the structural relationship between the main variables through empirical study. This study empirically investigated a research model and conducted a survey of smartphone service users in China. Our study proved that perceived enjoyment has a positive influence on continuous intention to use smartphone services. This paper provides the managers an insight that smartphone companies should take more consideration on how to provide more enjoyable service and attract customers to reuse their services.

Keywords: Smartphone Services, Hedonic Service, Continue to use, Innovativeness, Social influence, Service quality, Perceived usefulness, Perceived enjoyment

<국문요약>

중국 스마트폰 서비스의 지속적 사용의도에 관한 실증연구

천연 · 문태수

중국은 2014년 말 스마트폰 사용자들이 5억 명을 넘어서면서 전 세계적으로 가장 큰 스마트폰 시장이 되었다. 스마트폰 제조기업은 인터넷 통신과 엔터테인먼트, 게임과 같은 응용프로그램을 통해 다양한 정보서비스를 제공하고 있다. 최근 모바일 서비스의 사용자 수용의도와 지속적인 사용의도에 관한 연구들이 많이 진행되었으나, 중국인들의 스마트폰 사용에 대해서는 명확히 규명된 것이 별로 없다. 본 연구는 중국 스마트폰 소비자들의 지속적인 사용의도에 영향을 미치는 요인을 도출하고, 그 영향관계를 규명하고자 한다. 이를 위해 스마트폰의 쾌락적 서비스와 확장된 TAM모형, 그리고 인지된 즐거움을 연구변수로 구성하여 연구모형을 제안한다. 본 연구는 개인적 특성을 고려한 혁신성, 사회적 영향, 서비스 품질을 반영한 연구모형을 구성하고 실증적 연구를 통해 주요 변수들간의 구조적 관계를 분석하였다. 중국의 스마트폰 서비스 사용자를 대상으로 설문조사를 수행한 결과, 인지된 유용성과 인지된 즐거움은 스마트폰 서비스의 지속적인 사용의도에 긍정적인 영향을 미치는 것으로 나타났다. 본 연구는 스마트폰 서비스의 재사용과 소비자를 유지하고 획득하기 위한 방법을 제안하고 실용적 유용성과 쾌락적 즐거움을 고려한 서비스 제공의 중요성을 제안하고 있다.

키워드: 스마트폰 서비스, 쾌락적 서비스, 지속적 사용의도, 혁신성, 사회적 영향, 서비스 품질, 인지된 유용성, 인지된 즐거움

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