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The Comparative Study on Third Party Mobile Payment Between UTAUT2 and TTF

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Abstract

Purpose – According to the research findings, it proposes corresponding market promotion schemes, for Alipay, WeChat wallet and even other payment service providers and mobile internet companies to understand the factors which promote or hinder users' acceptance of mobile payment.
Research design, data, and methodology – Statistic analysis of data and social science statistical software of IBM Statistics 23.0 and IBM SPSS AMOS 23.0 were adopted for all the data researched.
Results – The technical features of the third party mobile payment and the task characteristics of users have positive influence on the matching degree between task and technology, and the matching degree between task and technology of the third party mobile payment has positive influence on the performance expectancy, effort expectancy and usage intention. The social influence, facilitating condition, price value and enjoyment motivation have significant and positive influence on users' intention of mobile payment adoption. The perceive security of the mobile fingerprint payment of users has positive influence on users' intention of usage.
Conclusions – This research has the main contribution on the analysis on the key factors with influence on the third party mobile payment usage by utilizing the integrated model of UTAUT2 and TTF.

Keywords: UTAUT2, TTF, Mobile Third Party Payment, Alipay, WeChat Wallet.

JEL Classifications: M10, M15, M16.

1. Introduction

With the popularization of mobile terminals and the rapid development of mobile internet, mobile phones have developed to multi-functional carriers with various value added services from traditional and simple means of communication(Lee & Dae, 2014; Wu & Lee, 2016, 2017). Besides, with the wider and wider WI-FI coverage ranges, reduction of network expenses by telecommunication operators and continuing slowdown of price of smart phones, more and more users surf on line with mobile terminals(Lee & Dai, 2015; Liu, 2015).

According to the 34th Statistical Report on China Internet Network Development State published by China Internet Network Information Center CNNIC, up until June 2016, the population of Chinese netizens had achieved 0.71 billion, in which 21.32 million were newly added in the half year of 2016, with the growth rate of 3.1%, the internet penetration in China had achieved 51.7%, increased by 1.3% than that of the end of 2015, 3.1% higher than the global average level, and 8.1% higher than the average level of Asia; the population of Chinese mobile phone netizens had achieved 0.656 billion(CNNIC, 2016). Recently, with people's more and more attention to the mobile internet industry(Oh & Lee, 2012; Ju et al., 2014), people pay increasing attention to mobile payment services(Jo, 2014; Chun & Park, 2015). Mobile payment refers to the new payment method to pay for the accounts for the purchased products or services through communication network and with mobile equipment such as mobile phones, PDA and mobile PC(Lee et al., 2012; Kim & Jo, 2014). Compared with other payment methods, mobile payment has the advantage of conducting transactions at any time and location(Ghezzi et al., 2010).

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Units or individuals can send payment instructions to banks and financing institutions through the mobile equipment in a direct or indirect way, to generate currency payment and capital transfer behaviors, to realize the mobile payment functions(Baghdadi, 2013). The mobile payment integrates with terminal equipment, internet, application providers and financing institutions, to provide users with financial services such as currency payment and fee payment. Mobile payments are mainly divided into near field payment and remote payment; the so called near field means riding in a car or making purchase in a way of card sweeping by mobile phones, which is very convenient. The remote payment mans sending payment instructions(such as online bank, telephone bank and mobile phone payment).

According to China's Third-party Mobile Payment GMV issued by iResearch, the mobile payment transaction size of the third party mobile payment in the second quarter in 2016 achieved 9.4 trillion yuan, with a year-on-year growth of 274.9%, and with a comparative growth on moving base of 52.1%(iResearch, 2016).

Viewing from current market pattern, Alipay and WeChat not only occupy top two of the market, respectively, but also occupy most market shares as a whole. According to related data, in the third quarter of 2016, Alipay wallet still owned continuously grown user number and increasingly increased user viscosity, and continued to rank the first in mobile payment with the market shares of 50.42%(Analysys, 2016). The market shares of WeChat wallet, which ranked the second, in the first quarter was 38.12%; Alipay and WeChat had occupied nearly 90% of the market shares(Analysys, 2016). Although on the aspect of market shares, WeChat still needs to take effort to catch up with Alipay, in virtue of 0.6 billion WeChat users, WeChat wallet is widely regarded as with great prospect by people.

As the most payment platforms in China, Alipay and WeChat have their own characteristics and advantages; with different business emphasis as the largest difference between the two, Alipay tends more to network finance products, and WeChat tends more to social networking services. Alipay wallet has existed for very long, far before than WeChat wallet; with the accumulated brand effect in many years, as well as the integration between Alipay and financing products such as Yu'ebao, it is known as the profitable wallet. WeChat has the most enormous user group in all the mobile phone IM communication software, WeChat is a high frequency application, while Alipay is a relatively low frequency application.

As an emerging payment tool, mobile payment is changing people's payment method in a profound way (Cocosila & Trabelsi, 2016). Both the domestic and the overseas payments have huge market potential and wide market prospect. When facing with such huge mobile payment potential users, it is necessary to conduct research on the behaviors and the demands of mobile payment users.

With the constant promotion of the off-line application frequency of WeChat and Alipay, the two payment giants will have more and more influences on off-line payment method, market extension and people's payment habit. However, the hidden hazards on payment safety of WeChat and Alipay also have influences on the popularity and promotion strength of off-line payment applications; however, the demand of users is the core element to propel mobile payment. Therefore, starting with the aspect of mobile payment users, this research mainly conducts analysis on the key factors for acceptance and use of mobile payment services by users. Some domestic and overseas researches are conducted by analyzing the mobile payment field on the aspect of users, but only a few of them are conducted in combination of empirical investigations, and there are fewer of them are conducted by taking the most important mobile payment platforms of Alipay and WeChat wallet as the research objects in combination of empirical investigation. By taking the uses of the most important two mobile payment platforms in China as the research objects, this research conducts comparative analysis, to fill in the blanks of related research fields. This research applies the mainstream UTAUT at present to the research of the acceptance behavior of mobile payment users. In addition, according to the characteristics of mobile payment in China, on the basis of reading and concluding related literatures of UTAUT in mobile payment field, it takes UTAUT2 and TFF integrated model as the basis, and utilizes the perceived safety consumption theory, to conduct analysis and discussion on key factors which have influence on users' acceptance and use of mobile payment services.

On the basis of large quantities of data consultation, user research and empirical study, this research conducts hypothesis and argument to the users' acceptance behaviors which have influence on mobile payment, and makes comparisons between Alipay and WeChat wallet users. According to the research findings, it proposes corresponding market promotion schemes, for Alipay, WeChat wallet and even other payment service providers and mobile internet companies to understand the factors which promote or hinder users' acceptance of mobile payment.

2. Theoretical Background

2.1. Task technology fit: TTF

According to TFF(Task Technology Fit) theory proposed by Goodhue and Thompson(1995), the technology will be used by users only when the information technology features are fitted with the tasks to be engaged in by users, which can improve the individual performance of users. Users adopt an information technology generally because the technology can better fit with the requirements. Therefore,

the adoption behavior is partly determined by the fit degree of the technology and the specific task requirements. The connotation of TTF has preferable applicability on explaining the service condition of a technology or an information system by users.

TTF theory has been widely applied since it was proposed. Junglas conducted research on the use of the mobile location service by users based on TTF(Junglas et al., 2008); Lee et al.(2007) conducted research on the adoption of mobile insurance by users through TTF model; Chu and Huang(2005) conducted research on mobile commerce by utilizing TTF theory.

2.2. Consumer Acceptance and use of Technology: UTAUT2

The core of the theory of UTAUT is the inheritance and development to TAM model(Technology Acceptance Model). By taking the theory of faith attitude intention behavior in TRA(Theory of Reasoned Action) as the basis, TAM theory substitutes attitude with perceived usefulness and perceived ease of use, and explains the technology acceptance behavior of the computer information system. In TAM2 model, two variables of social influence process and cognitive instrumental process are added to expand and extend TAM model. TAM3 model is proposed by Venktesh, to improve the explanatory power to individual acceptance and adoption of information technology. Even so, the explanatory power of the benchmark TAM model can only achieve 30%-40%.

Venkatesh et al.(2003) proposed UTAUT(Unified Theory of Acceptance and Use of Technology) by integrating 8 basic theoretical models such as TRA, TAM, MM, TPB, MPCU, IDT and SCT in 2003. The performance expectation in UATUT model refers to the degree of the achievement of better work with the help of information technology regarded by individuals(Venkatesh et al., 2003); effort expectation refers to the degree of the ease of use of information technology regarded by individuals(Venkatesh et al., 2003; Choi & Kang, 2016; Zhang & Lee, 2016; Yang & Hwang, 2016); social influence refers to the degree of the influence on thoughts and behaviors of surrounding crowd on users on use of information technology; facilitating condition refers to if individuals have the individual knowledge and organization resources on use of information technology (Venkatesh et al., 2003; Choi & Kang, 2016; Zhang & Lee, 2016; Yang & Hwang, 2016). The explanatory power of UTAUT model achieves 70%, better than any of the past technology models(TAM1, TAM2); therefore, it is widely applied by researchers. Chauhan and Jaiswal(2016) conducted research on users' acceptance to ERP(Enterprise Resource Planning) software through UTAUT model; Abrahão et al.(2016) conducted empirical study on users' intention of usage of mobile payment users based on UTAUT model.

On the basis of UTAUT, Venkatesh et al.(2012) proposed the UTAUT2(Consumer Acceptance and use of Technology) specially aiming at the consumer acceptance behavior of information technology applications. Three variable are newly added in UTAUT2, including Hedonic Motivation, Price Value and Habit, which are proved to play important roles in users adoption of information technology in empirical researches. Hedonic Motivation refers to the joy obtained from information technology applications(Venkatesh et al., 2012; Zhang & Lee, 2016); Price Value refers to the balance between the technology use earning perception and use technology cost made by consumers(Venkatesh et al., 2012; Zhang & Lee, 2016); Habit refers to that it is regarded by users that in consumers' opinions, the use of information technology is the automatic or spontaneous behaviors (Venkatesh et al., 2012; Zhang & Lee, 2016).

Although UTAUT2 model is not as widely applied as UTAUT model, UTAUT2 has been gradually been taken into account by mobile commerce researchers. Morosan and DeFranco(2016) conducted empirical research on the usage intention of NFC mobile payment in hotels by users. Oliveira et al.(2014) conducted empirical research on the usage intention and recommending intention of mobile payment users based on UTAUT2 and TTF models as well as the sensory perceptual system security.

2.3. Perceived Security

Security is very important in mobile payment field, which is a severe social problem(Parasuraman et al., 2005). As for the customers of mobile payment, personal information and property protection related problems are the most sensitive problems. Therefore, the security of mobile payment is very important(Yoon, 2010). Although operators have taken a lot of efforts to improve the security of mobile payment(Shen et al., 2010), there are still a large number of customers worried about the security of mobile payment(Shen et al., 2010). Users are not very worried about the security of payment systems such as PIN(Personal Identification Number) and security credit card; on the contrary, they are more worried about the security of mobile payment(Oliveira et al., 2016).

It can be known from literatures that although the educational circle still conducts researches on security related topics, most researches lay particular emphasis on the security of information technology system, and they mainly focus on the technical development, embodiment and maintenance of security. There is little research with the emphasis on the psychological layer of mobile payment users. Therefore, scholars take Perceived Security as the focus for researches.

Only the new technology with high security standard attracts users to have the intention of owning it(Salisbury et al., 2001). The security problem is always one of the considerations in priority when they select the payment

method(Morosan & DeFranco, 2016). Therefore, it can be anticipated that the application of the high security standard payment method of fingerprint verification will have direct influence on the usage intention of users to mobile fingerprint payment.

2.4. UTAUT2 and TTF

Both UTAUT and TTF models have certain explanatory abilities, but with their own disadvantages. Due to the emphasis on individual psychology and behaviors, UTAUT pays less attention to task and task/technical adaption, and TTF lacks a mutually communicated bridge with user information system on any/technical adaption, and cannot reflect the inherent mechanism on individual behavior by any/technical adaption"(Oliveira et al., 2014).

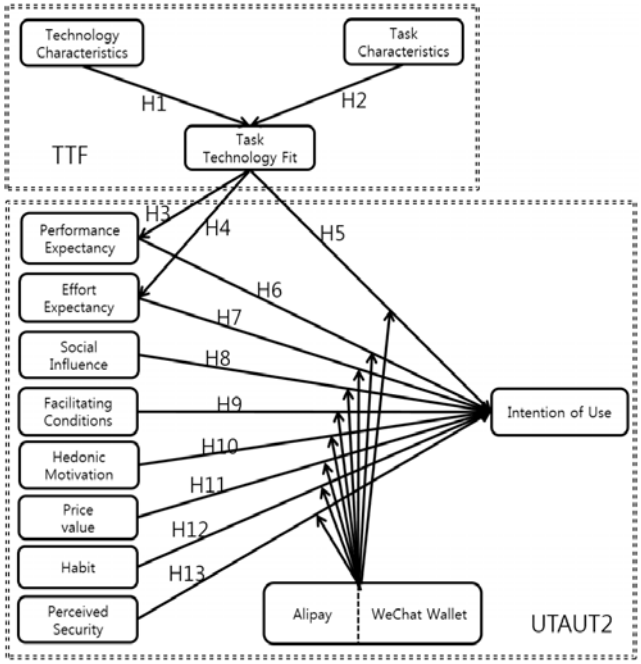
The use of mobile payment is different from general information technology adoption; even though users do not accept the information technology, the information technology may still be used by users, if it can be used to improve individual performance. The adoption of mobile payment is more likely to be influenced by the subjective factors of users, and the two shall be integrated, to compensate with each other, to research on the use of the mobile payment in a more effective way. The integration of UTAUT and TTF is applied in mobile commerce field. Oliveira et al.(2014) integrated UTAUT, TTF and ITM models, to conduct research on the adoption of mobile bank; Zhou et al.(2010) integrated UTAUT and TTF models, to conduct research on the adoption of mobile bank users.

3. Research model and Research hypotheses

3.1. Research model

UTAUT2 shall be taken as the theoretical basis for the construction of the mobile payment use intention model. Due to the complicated selection preference of users, psychological behaviors shall be taken into consideration; therefore, Alipay and WeChat are taken as the regulated variables for the model to conduct research on users' selection preference on mobile payment software. Due to the capital support is involved during the use of mobile payment, safety plays a very important role in the acceptance of mobile payment.

According to literature investigation findings, the research on the acceptance behaviors of mobile commerce users is mainly based on TAM and UTAUT models, which mainly analyzes users' acceptance behaviors on the aspect of their perception to technology. However, it is insufficient to conduct users' acceptance intention only on the aspect of users' perception to mobile payment, and it is also needed to pay attention to the matching degree between technology and users' tasks. Therefore, this research will integrate TTF and UTAUT theories, to analyze the influencing factors on users' acceptance of mobile payment on the aspects of task/technology matching and users' perception to information technology.



<Figure 1> Research model

3.2. Research hypotheses

3.2.1. Based on the Research hypotheses of TTF model

Mobile payment has the largest advantage of providing users with everywhere and timely services. Users can inquire and pay at any time and in any place. Therefore, compared with traditional payment method, mobile payment has great technical advantages, which will greatly meet users' demands on convenient and efficient payment actions, to improve task/technology matching degree and promote users' usage intention. Besides, according to TTF, complicated task characteristics will reduce the matching degree of task/technology; i.e., it is very difficult for technology to meet the requirements of task when the difficulty of the task is improved. For example, in condition of batch payment through transfer of accounts, it is very difficult for mobile payment to finish this task due to the limitation on processing ability and operation.

The mobile payment can give full play to the advantages only when the task the user is engaged in can be finished by mobile payment, to improve the performance of the user. On the contrary, if the task of the user is not matched with

the characteristics of mobile payment, it is difficult to achieve the relatively high performance expectancy of users. Besides, compared with traditional payment, mobile payment has relatively large technical advantages on aspects of information communication and social contact, and the advantages of mobile payment will provide great convenience for uses to conduct payment actions, which have influence on users' effort expectancy.

Users will adopt the technology only when the technology characteristics and the requirements on the task are matched with each other, i.e., the technology can meet the requirements of users; on the contrary, poor matching degree on task/technology will reduce users' adoption intention(Goodhue & Thompson, 1995). According to Oliveira et al.(2014), TTF has influence on users' usage intention of mobile banking.

According to the TTF model, the TTF in this research means that preferable matching between task and technology will promote users' adoption to mobile payment; on the contrary, it hinders users' adoption to mobile payment. For example, although with characteristics such as timeliness and mobility, in condition that users have no demand on mobile payment or there is large difficulty in realization of mobile payment, they will still select the traditional payment mode but not mobile payment. Based on the above analysis, this research proposes the following hypothesis:

<H1> There is significant technical characteristic on task of mobile payment users, which has positive influence on the matching degree between task and technology.

<H2> There is significant technical characteristic on mobile payment, which has positive influence on the matching degree between task and technology.

<H3> There is significant matching degree between task and technology, which has positive influence on users' performance expectancy.

<H4> There is significant matching degree between task and technology, which has positive influence on users' effort expectancy.

<H5> There is significant matching degree between task and technology, which has positive influence on users' usage intention of mobile payment.

3.2.2. Based on the Research hypotheses of UTAUT2 model

Generally speaking, when users consider about if to adopt a new information technology, they generally make comparison between the new technology and the current technology, and adjust if the new information technology can improve the efficiency for them to finish tasks. Users will tend to use the mobile payment if it can provide more help for users. If users can obtain better payment experience than traditional payment during the process of the usage of mobile payment, they will have the expectation on continuous usage of mobile payment. In this research, performance expectancy refers to the degree that users think that mobile payment can improve payment efficiency. According to researches related to mobile payment, performance expectancy is the variable with positive influence on usage intention(Morosan & DeFranco, 2016; Oliveira et al., 2016; Kijsanayotin et al., 2009). Therefore, this research proposes the following hypothesis:

<H6> There is significant performance expectancy, which has positive influence on users' intention of the usage of mobile payment.

When determining if to adopt a new technology, if uses feel that the technology is easier for use and takes not too much effort to learn, they have certain intention of adopt the technology. Therefore, effort expectancy in this research means the effortlessness degree of the usage of mobile payment. If users think they can fluently use mobile payment without too much effort, they tend to adopt mobile payment. On the contrary, if users think that they have to take too much effort for operating or learning mobile payment, they will give up the usage of it. According to many researches, EE(effort expectancy) has positive influence on behavior intention(Chang & Hwang, 2007; Kijsanayotin et al., 2009; Wang & Shih, 2009). Therefore, based on the above analysis, this research proposes the following hypothesis:

<H7> There is significant effort expectancy, which has positive influence on users' intention of mobile payment usage.

Social influence is just like the subjective scale in TRA (Theory of Reasoned Action), reflecting the influence of external factors on users' actions. As a kind of social animals, the actions of human beings are greatly influenced by others, especially the surrounding crowds. This characteristic reflected from the adoption action to information technology can be regarded as social influence in UTAUT model. Social Influence has very significant influence on usage intention(Tan et al., 2011); according to Oliveira's research on mobile payment, SI(Social Influence) has a positive influence on users' intention of mobile payment usage(Oliveira et al., 2016).

In this research, Social Influence is similar to the Herd Effect, referring to the degree of the recognition and influence of surrounding crowds on the usage of mobile payment in users' opinions. If the surrounding crowds of users actively recommend and use mobile payment, users will generate the idea of the adoption of mobile fingerprint

payment, although they have slight inconvenience or difficulty on usage; on the contrary, if users have the intention of use mobile payment, but their relatively, friends and colleagues deny mobile payment, users may follow others' opinions and deny their own opinions, to give up the usage of mobile payment; especially, the mobile and ubiquitous based information technology has great influence on the formation of the social relations between people. Based on the above analysis, this research proposes the following hypothesis:

<H8> Social influence has significant and positive influence on users' intention of mobile payment usage.

Most new users long for professional guidance to help them rapidly learn and fluently operate new technologies. In condition that users find that they have the ability to use the new technology or they can be provided with corresponding help during the usage process, they will have stronger intention of use information technology. At the same time, preferable usage environment promotes users to use mobile payment. In order to use mobile payment, users need to use network, WIFI or net charge, and people will not use mobile payment without such conditions. Based on the above analysis, this research proposes the following hypothesis:

<H9> Facilitating conditions have significant and positive influence on users' intention of mobile payment usage.

With the development of mobile terminals, people have closer and closer relationship with the entertainment functions of mobile phones. Users discover the enjoyments (such as WeChat red packet and snatching of blessings of Alipay) of mobile payment besides the usefulness and the usability during the usage of mobile payment. It can be seen that enjoyment motivation is a key factor having influence on users' adoption and usage of mobile phone. According to the research on NFC mobile payment by Morosan and DeFranco(2016), enjoyment motivation has direct influence on hotel consumers' usage intention of NFC mobile payment. Therefore, the enjoyment motivation in this research refers to the degree of physical and mental joys of users during the usage of mobile payment. And the following research hypothesis is proposed:

<H10> Enjoyment motivation has significant and positive influence on users' intention of mobile payment usage.

Any consumer has certain expectation on consumption, which originates from the perception on consumption formed before. Users will have declined adoption degree to the experience if related experience perception is lost during the consumption process. In the research on mobile payment, Oliveira thinks that price value has a positive influence on users' intention of mobile payment usage(Oliveira et al., 2016). During the mobile payment usage process, users need to use network, mobile equipment and spend handling charge for mobile payment; besides, they have to invest in time, effort and other cost. In addition, a lot of consumers give priority to the usage of mobile payment for price preference due to the competition of various enterprises in mobile payment market. In combination of domestic and overseas researches, as well as the practical situation in China, it is regarded by this research that price value refers to the balance between the perceived benefit and the practical monetary expense during usage of mobile payment of users, which is the important influencing factor for mobile payment usage of users; therefore, the following hypothesis is proposed:

<H11> Price value has significant and positive influence on users' intention of mobile payment.

In the research on NFC mobile payment, Morosan and DeFranco(2016) thinks that habit has direct influence on hotel consumers' intention of NFC mobile payment usage. Habit is a long term formed inertia for people, which is difficult to change; if this habit action can be formed during mobile payment, it will constantly strengthen users' usage of mobile payment. Therefore, the habit in this research refers to the degree of users' tendency of mobile payment usage in an automatic or spontaneous way, and the following hypothesis is proposed:

<H12> Habit has significant and positive influence on users' intention of mobile payment usage.

It is regarded by a lot of researches(Aladwani, 2002; Parasuraman et al., 2005; Shen et al., 2010; Yoon, 2010) that safety is very important to payment methods such as online bank and mobile payment, which has significant influence on users' intention of usage. Although mobile payment is simple for operation, people worry about its safety(privacy disclosure and account information disclosure). Various uncertain factors of users during the mobile payment process generate negative influence on users' usage intention, and users can have a good impression to mobile payment only in safe and reliable environments. According to Schierz et al.(2010) in the research on mobile payment, perceived security has direct influence on users' usage attitude and intention of mobile payment; it is advocated by Morosan and DeFranco(2016) in the UTAUT theory based NFC mobile payments research that perceived security has positive influence on users' intention of mobile payment usage. The perceived security in this research refers to the degree of guarantee for security problems such as privacy and account information they obtain during the use of mobile payment.

This research is not conducted on technology of the security system of mobile payment, but is conducted on the security degree of the usage of mobile payment of users on the psychological aspect. Although the influence of perceived security on mobile payment has been researched, and it is proved that perceived security has great influence on the adoption of mobile payment, there are changes on the degree of dependency between the two under different technical backgrounds in different stages. Therefore, this research introduces perceived security again, in order to verify if people have different opinions on the security state of mobile payment during the long term development in China.

<H13> Perceived security has significant and positive influence on users' intention of mobile payment.

3.2.3. Based on the Research hypotheses of regulated variable

At present, in the third party mobile payment market, Alipay payment and WeChat wallet have occupied the market shares of about 90%, and both of them are in the ultrahigh rise trend; with the acceleration on application of mobile internet to various aspects including working and living, the third party mobile payment will have wider increase space in the future. The third party mobile payment has always one of the hotspots in academic circle and industry circle, and a lot of researcher have conducted researches on influencing factors of users' adoption of the third party mobile payment. However, there are some defects on the existing researches, without division on different types of the third party mobile payment. In fact, there are great differences on users' considerations on usage of different the third party platforms; therefore, by taking Alipay and WeChat wallet as regulated variables, this research verifies the differences of different the third party mobile payment user groups on the usage intention of the third party mobile payment.

<H14a> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of TTF on the third party mobile payment usage intention.

<H14b> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of performance expectancy on the third party mobile payment usage intention.

<H14c> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of effort expectancy on the third party mobile payment usage intention.

<H14d> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of social influence on the third party mobile payment usage intention.

<H14e> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of promotional conditions on the third party mobile payment usage intention.

<H14f> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of enjoyment motivation on the third party mobile payment usage intention.

<H14g> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of price value on the third party mobile payment usage intention.

<H14h> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of habit on the third party mobile payment usage intention.

<H14i> The difference between the usage of Alipay and that of WeChat wallet of users has regulating effect on the influence of perceived security on the third party mobile payment usage intention.

4. Empirical Analysis and Hypothesis Test

The questionnaire of this research was during September 23rd 2016 to November 23rd, and totally 3628 questionnaires were returned through the website of http://www.sojump.com/. In order to ensure the validity of questionnaires, they were conducted with validity screening, in which 496 invalid questionnaires and dishonest questionnaires were deleted, and there were 3132 valid questionnaires, with the validity rate of 86%. Statistic analysis of data and social science statistical software of IBM Statistics 23.0 and IBM SPSS AMOS 23.0 were adopted for all the data researched.

The demographical analysis of this research is as follows. On the aspect of genders, there are 1942 men(62%) and 1190(37.9%) women in the samples, and men have a higher proportion than women. On the aspect of ages, 173 of them are under 20 years' old(5.5%), and 1855 of them are during 20-29 years' old(59.2%), and 843 of them are during 30-39 years' old(26.9%) and 261 of them are during 40-49 years' old(8.3%). In which, the people during 20-29 years' old occupy the largest proportion. On the aspect of educational background, 427 of them are high school graduates(13.6%); undergraduates occupy the largest

proportion, more than half of the total samples, achieving 1882(60.1%); 823 of them are master graduates and PhD graduates(26.3%). On the aspect of occupations, students occupy the largest proportion as 1396(44.6%); 269 of them are self-employed personnel(19.6%); 613 of them are company employees(19.6%). In an overall view, samples cover all groups of all industries, various ages and various educational backgrounds. They are important users for mobile fingerprint payment, playing an important role in the understanding on users' adoption of mobile fingerprint payment, which lays the sample foundation for the research of this article. In which, 1646 of them are users of Alipay, and 1686 of them are users of WeChat wallet, without significant difference on number of samples.

4.1. Measurement model

Reliability analysis to questionnaires is conducted through SPSS; according to calculation, the overall coefficient of the measurement model is 0.928, and the Cronbach's α of each variable is above 0.8, higher than ordinary level of 0.7(Hair et al., 2006), illustrating that the measurement model has preferable reliability.

The inspection to the convergent validity of the questionnaire is conducted through AMOS 23.0. All the loading values are higher than 0.4, and the CR(Composite Reliability) of each variable is higher than 0.7, and the AVE(Average Variance Extracted) of each variable is higher than 0.5. According to <Table 1>, the loading values of all the measurement items are higher than 0.8, and the CR value of each variable is higher than 0.8, and the AVE value of is higher than 0.6, illustrating that the measurement model has preferable convergent validity.

The confirmatory factor analysis is adopted to conduct inspection to structural model, and the values of common test indexes GFI and CFI shall be larger than 0.95, and the value of RMSEA shall be less than 0.05, and the value of CMIN/DF shall be less than 1-3, and the values of RMR, AGFI, NFI, RFI, IFI, TLI and PGFI shall be larger than 0.9, illustrating that there is preferable fitting degree(Hair et al., 2006). Some scholars think that the fitness value of CMIN/DF can be 1-5, because the value of CMIN changes larger in condition of too large number of samples; when the number of samples is more than 500, the specific value of CMIN/DF can be less than 5, but not less than 2 in general conditions(Jőreskog, 1971). In this research, the fit index of the structural model(x^2=3145.493(p=0.000, df=836), CMIN/DF=3.763, RMR=0.016, GFI=0.957, AGFI=0.949, CFI=0.972, NFI=0.962, RFI=0.957, IFI=0.972 and TLI=0.968) are all superior to the threshold level of the recommended value, illustrating preferable fitting degree of the structural model.

The indexes for evaluating the discriminant validity of the measurement model are: the square root of AVE shall be larger than the correlation coefficient between the variable and all the other variables, illustrating that various variables have preferable discriminant validity(Hair et al., 2006). The discriminant validity of the measurement mode is as shown in <Table 2>, in which the value of the opposite angles is the root mean square of the extracted average variance value of the variable, and the values under the diagonal is the correlation coefficient between the variable and other variables. It can be seen from <Table 2> that the square root value of the extracted average variance value of various potential variables in the measurement model(the value of the leading diagonal) is larger than the values of the same line and the same column not on the diagonal, illustrating that the measurement model has preferable discriminant validity.

<Table 1> Quality criterion(AVE, C.R., Cronbach's α) and loadings

Construct	Item	AVE	C.R.	Cronbach's α	Loading
Technology Characteristics	TC1	0.694	0.881	0.869	0.866
	TC2				0.813
	TC3				0.819
Task Characteristics	TaskC1	0.691	0.881	0.871	0.852
	TaskC2				0.793
	TaskC3				0.847
Task Technology Fit	TTF1	0.666	0.871	0.856	0.847
	TTF2				0.785
	TTF3				0.815
Performance Expectancy	PE1	0.671	0.899	0.891	0.831
	PE2				0.814
	PE3				0.818
	PE4				0.813
Effort Expectancy	EE1	0.656	0.899	0.885	0.814
	EE2				0.799
	EE3				0.805
	EE4				0.823

Construct	Item	AVE	C.R.	Cronbach's α	Loading
Social Influence	SI1	0.645	0.899	0.880	0.816
	SI2				0.803
	SI3				0.786
	SI4				0.805
Facilitating Conditions	FC1	0.630	0.897	0.871	0.800
	FC2				0.787
	FC3				0.782
	FC4				0.808
Hedonic Motivation	HM1	0.630	0.895	0.868	0.792
	HM2				0.776
	HM3				0.786
	HM4				0.801
Price Value	PV1	0.638	0.865	0.840	0.842
	PV2				0.732
	PV3				0.823
Habit	HA1	0.689	0.902	0.907	0.833
	HA2				0.826
	HA3				0.822
	HA4				0.837
Perceived Security	PS1	0.654	0.897	0.884	0.818
	PS2				0.803
	PS3				0.810
	PS4				0.806
Intention of Use	IU1	0.632	0.895	0.873	0.793
	IU2				0.799
	IU3				0.803
	IU4				0.785
x^2=3145.493(p=0.000, df=836), CMIN/DF=3.763, RMR=0.016, GFI=0.957, AGFI=0.949, CFI=0.972, NFI=0.962, RFI=0.957, IFI=0.972, TLI=0.968					

<Table 2> Matrix of correlation constructs and the square root of AVE (in bold).

Constructs	TC	Task C	TTF	PE	EE	SI	FC	HM	PV	HA	PS	IU
Technology Characteristics(TC)	**0.833**											
Task Characteristics(TaskC)	0.463	**0.831**										
Task Technology Fit(TTF)	0.478	0.422	**0.816**									
Performance Expectancy(PE)	0.153	0.117	0.049	**0.819**								
Effort Expectancy(EE)	0.234	0.255	0.225	0.376	**0.810**							
Social Influence(SI)	0.222	0.221	0.238	0.324	0.531	**0.803**						
Facilitating Conditions(FC)	0.285	0.272	0.361	0.299	0.473	0.531	**0.794**					
Hedonic Motivation(HM)	0.315	0.274	0.356	0.328	0.373	0.400	0.620	**0.789**				
Price Value(PV)	0.217	0.255	0.282	0.239	0.319	0.295	0.389	0.440	**0.799**			
Habit(HA)	0.118	0.130	0.176	0.165	0.231	0.350	0.207	0.264	0.343	**0.830**		
Perceived Security(PS)	0.204	0.211	0.229	0.348	0.354	0.375	0.412	0.537	0.508	0.369	**0.809**	
Intention of Use(IU)	0.243	0.291	0.335	0.424	0.512	0.536	0.607	0.648	0.503	0.296	0.571	**0.795**

4.2. Hypothesis Analysis

Compared with other software, AMOS has easier and more convenient operation. It can be known from the above analysis that the scale of this research has relatively high reliability and validity, and the model of this research has passed the check on overall fitting degree of the model; therefore, when conducting path analysis with AMOS software, it is not needed for module correction, and the result can be worked out by only setting models and importing data. Please refer to <Table 3> for the research of the hypothesis path coefficient and verification result.

<Table 3> Hypotheses analyses

Hypotheses	Estimate	S.E.	C.R.	P-value	Result
H1: Technology Characteristics→Task Technology Fit	0.339	0.021	16.114	***	Accepted
H2: Task Characteristics→Task Technology Fit	0.277	0.021	13.299	***	Accepted
H3: Task Technology Fit→Performance Expectancy	0.075	0.020	3.729	***	Accepted
H4: Task Technology Fit→Effort Expectancy	0.228	0.019	12.078	***	Accepted
H5: Task Technology Fit→Intention of Use	0.053	0.013	1.001	***	Accepted
H6: Performance Expectancy→Intention of Use	0.115	0.013	8.917	***	Accepted
H7: Effort Expectancy→Intention of Use	0.126	0.014	8.765	***	Accepted
H8: Social Influence→Intention of Use	0.147	0.019	7.915	***	Accepted
H9: Facilitating Conditions→Intention of Use	0.146	0.022	6.487	***	Accepted
H10: Hedonic Motivation→Intention of Use	0.265	0.023	11.326	***	Accepted
H11: Price Value→Intention of Use	0.123	0.017	7.046	***	Accepted
H12: Habit→Intention of Use	-0.013	0.014	-0.899	0.368	Rejected
H13: Perceived Security→Intention of Use	0.153	0.019	8.148	***	Accepted

Note: ***in P-value column means P<0.001

Firstly, the technical features of the third party mobile payment and the task characteristics of users have positive influence on the matching degree between task and technology, and the matching degree between task and technology of the third party mobile payment has positive influence on the performance expectancy, effort expectancy and usage intention, the results are same with the Zhou and Wang(2014) and Oliveira et al.(2014). Such a result illustrates that the technical characteristics of the third party mobile payment can meet the demands of users to payment actions such as efficient and convenient for usage, and promotes users' intention of the third party mobile payment usage. Performance expectancy and effort expectancy have significant and positive influence on users' intention of mobile payment usage, the results are also same with the Zhang and Lee(2016). This research finding illustrates that users believe that the third party payment can help them improve payment efficiency such as shortening payment time and improving payment convenience; besides, due to the simplified operation, the third party mobile payment greatly increases peoples' intention of the third party mobile payment usage. The TTF of the third party mobile payment has positive influence on users' intention of usage. It sufficiently illustrates that TTF has influence on intention mainly by performance expectancy and effort expectancy, and users do not need to pay too much effort to fluently use the third party mobile payment, to improve payment efficiency.

Secondly, social influence has significant and positive influence on users' intention of mobile payment adoption, the results are also same with the Zhang and Lee(2016). That is to say, the actions or recommendations of the third party mobile payment of some surrounding friends or relatively of users have influence on users, to make them generate the desire of using the third party payment. Moe and more new technologies make users accustomed to the mutual introduction of usage experience, which illustrates people's group psychology when facing with new things.

Thirdly, facilitating conditions have significant and positive influence on users' intention of the third party mobile payment, the results are different from Zhang and Lee (2016). Because during the usage of new technology, users are influenced by many external factors, and the beneficial ones will promote users to accept and use the new technology. On the contrary, even with the usage intention, users cannot use it due to the limitation of conditions. In this research, facilitating conditions have positive correlation with users' intention of the third party mobile payment; i.e., more perfect basic conditions for the usage of the third party mobile payment such as high internet speed of mobile phone and high WIFI coverage rate promote more users with intention of the third party mobile payment usage.

Fourthly, enjoyment motivation has significant and positive influence on users' intention of the mobile payment usage, the results are same with the Zhang and Lee(2016). According to the research finding, users have stronger intention of the usage of the third party mobile payment if they can obtain more enjoyment during the process. Most netizens surf online with mobile phones for entertainment; with the development of smart phones, there are more and more entertainment-oriented mobile phone applications, and the third party mobile payment satisfies the demand of users on entertainment.

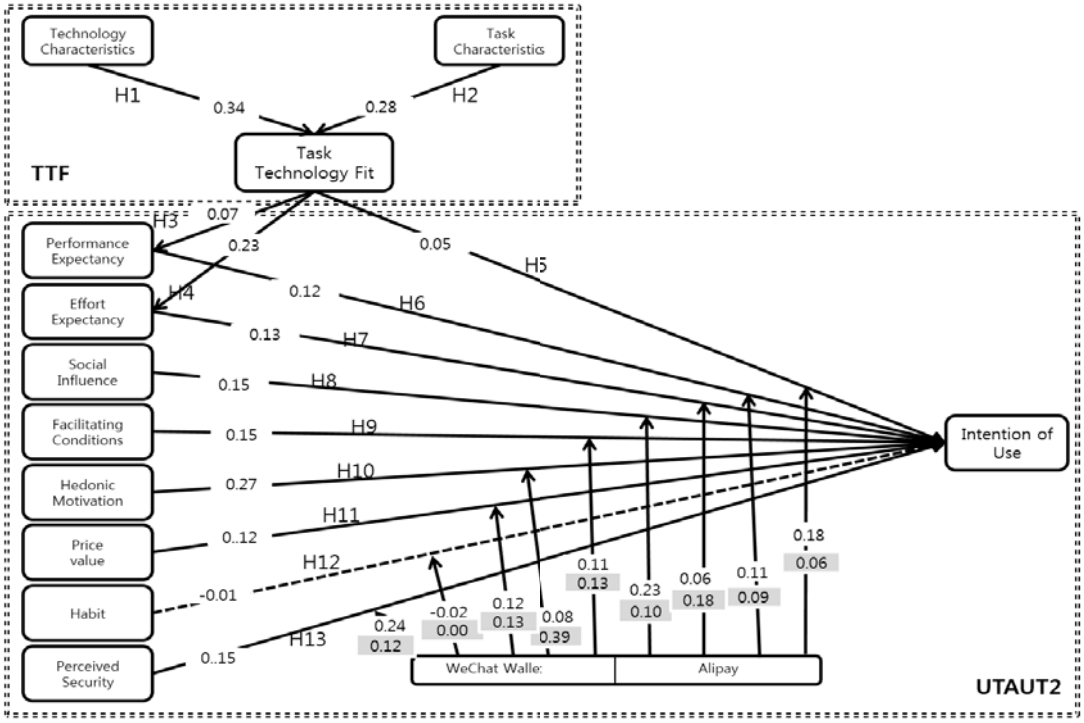
Fifthly, price value has significant and positive influence on users' intention of mobile payment usage, with the main reasons that the promotion of the third party mobile payment by various enterprises is still in primary stage, the results are different from the Oliveira et al.(2016). Due to the

competition on mobile payment market between enterprises, users pay for relatively low cost for the third party mobile payment, and some of them are even free services, and the cost for accounts transfer is lower than banks.

Sixthly, habit does not have a significant influence on the third party mobile payment users' intention of usage, the results are same with the Zhang and Lee(2016). In china, the third party mobile payment has not existed for a very long time, and most people are still consuming in cash; consuming in cash has been a consuming habit for people, which cannot be changed in short term.

Seventhly, the perceive security of the mobile fingerprint payment of users has positive influence on users' intention of usage, the results are same with the Oliveira et al.(2016). The third party mobile payment is a fresh thing with relatively high unknowns; some people may be worried about the potential safety hazards of the technology or the property loss caused by error operation before the usage of the third party mobile payment. However, the third party mobile payment is a mature technology based on multiple high technologies, and has passed the certifications of authorized departments. Users will be relieved from the strangeness and the sense of distrust to the third party mobile payment once they adopt the technology and understand it gradually.

Alipay and WeChat wallet have regulating effects on the influence of TTF on usage intention, in which the influence of Alipay(β=0.18) is larger than that of WeChat wallet(β =0.06); compared with WeChat wallet, which is only one of the services of WeChat, Alipay is a more perfect the third party payment application, and the internal financial commodities and services are more in accordance with users' demand on their own business. There is no regulating effect on Alipay and WeChat wallet on the influence of PE on the usage intention, and both of them improve users' payment efficiency, with almost the same capacity. Alipay and WeChat wallet have regulating effect on the influence of EE on usage intention; the influence of Alipay(β=0.06) is less than that of WeChat wallet(β=0.18). Various financial services and functions of Alipay make it complicated, reducing the effort expectancy of Alipay users. Alipay and WeChat wallet have regulating effect on the influence of SI on usage intention; the influence of Alipay(β=0.23) is larger than that of WeChat wallet(β=0.10). Due to the much longer history of Alipay wallet, it has accumulated preferable brand effect in these years. Alipay and WeChat wallet have no regulating effect on the influence of FC on usage intention; due to the popularity of WIFI and wireless network, there is no significant difference on external factors between Alipay and WeChat users. Alipay and WeChat wallet have the most significant regulating effects on the influence of HM on



Note: White is Alipay, grag is WeChat wallet.

<Figure 2> Structural model result

usage intention; the influence of Alipay(β=0.08) is less than that of WeChat wallet(β=0.39). As one of the functions of WeChat, WeChat wallet has high interactivity, which is proved by the popularity of WeChat red packet function in WeChat wallet. Alipay and WeChat have regulating effects on the influence of PV on usage intention. The promotion of the third party mobile payment is still in primary stage; due to the competition in the mobile payment market between enterprises, users of Alipay and WeChat wallet need to pay no handling charge. In consideration that HA has negative influence on usage intention, Alipay and WeChat wallet have no regulating effect on the influence of HA on usage intention, because the third party mobile payment has not existed for long, and neither of them can make users form the consuming habit of the third party mobile payment. Alipay and WeChat wallet have regulating effect on the influence of PS on usage intention; the influence of Alipay(β =0.24) is larger than that of WeChat wallet(β=0.12). Compared to WeChat wallet, one of functions of WeChat, Alipay has the core services of internet finance; with perfect security technology and long term accumulated brand effect, Alipay users have higher perceived security.

5. Conclusion

5.1. Implications

Up until now, the third party mobile payment has acquired rapid development at home and abroad, and the number of the third party mobile payment is increasingly grown. The third party mobile payment provides users with high quality services, and helps merchants propagate new type shopping modes in an effective way; with significant influence on consuming and living methods of people, it has great prospect in the future.

The theories and methods of this research: By taking UTAUT2 and TTF models as basis, by taking academic achievements such as perceived security theory as reference, and in combination of the characteristics of the third party mobile payment, this research conducts corresponding modification to the variables of the models, and proposes the UTAUT based the third party mobile payment user acceptance model; in this way, it tries finding out the main factors with influences on users' intention of the third party mobile payment usage as well as the mutual relationship. On this basis, it designs the research questionnaires and conducts empirical analysis to data. This research is conducted in order to understand the characteristics and influencing factors for users to use the third party mobile payment, in order to provide suggestions on the promotion and the development of the third party mobile payment.

This research has the main contribution on the analysis on the key factors with influence on the third party mobile payment usage by utilizing the integrated model of UTAUT2 and TTF. Besides, according to the research findings of this article, all the hypothesis of UTAUT2 are proved except for habit, and the empirical result of this research proves the correctness of UTAUT2 in the third party mobile payment field in China.

According to the <hypothesis 3> and <hypothesis 4> validation results, there are relations between the variables of TTF and UTAUT2, i.e., technical characteristics have significant influence on performance expectancy and effort expectancy. One of the important means for improving users' performance expectancy is to achieve the matching of task/technology. If what users acquire is the third party payment services not in accordance with their demand, this service cannot be utilized to achieve preferable performance; therefore, corresponding services shall be provided by the third party mobile payment according to users' task requirements. Besides, mobile phone netizens prefer short and delicate contents and services; therefore, the third party mobile payment needs to take the limitation of mobile terminal and network into consideration, to constantly improve the interface design, navigation, response speed and convenience for users to rapidly acquire the settlement information for target user groups according to advantages, to provide convenience for operation and usage of users and improve the effort expectancy. Especially, for some elder groups, the usability of the third party mobile payment is very important, and it is available to provide them with guidance by equipping professionals. According to the <hypothesis 5>, <hypothesis 6>, and <hypothesis 7> validation results, the performance expectancy and effort expectancy of UTAUT2 are the main variables with influence of users' usage intention, and the matching of task/ technology has direct influence on usage intention. In consideration of the combined actions of UTAUT2 and TTF on user actions as well as the relation between them, the integrated model is adopted for the research of users' usage intention. According to the research findings, the suppliers of the third party mobile payment shall not only pay attention to the functions and services of the third party mobile payment, but also lay emphasis on the matching between technology and users' task, to effectively promote users' usage intention.

According to the <hypothesis 8> validation results, the social influence of the third party mobile payment user groups perceived by users has positive influence on the usage intention, but habit does not have a significant influence on the usage intention of the third party mobile payment users. As for the third party mobile payment internet companies, it illustrates that social relationship and oral spreading play an important role in the spreading of the mobile fingerprint payment, and surrounding individuals and groups have profound influence on users' intention of the third party mobile payment. Therefore, the third party mobile payment internet companies or enterprises shall strengthen

education to users at the same time of developing services, to give full play to oral marketing. Besides, they shall make the social atmosphere of the usage of the third party mobile payment through network, offline activities and multiple channels, to strengthen the depth and breadth of propaganda, and expand publishing channels and enrich publishing forms. Develop multiple-angle and three- dimensional propaganda; especially, the network channels such as popular social contact platforms of Microblog and forum. Try to make users accept information related to the third party mobile payment in a convenient and quick way at any time and everywhere, to make users accept the third party mobile payment, and cultivate their habit on transaction or consumption with the third party mobile payment. During the whole propaganda process, the third party mobile payment internet companies or operators shall pay more attention to the active guidance of users' public praise and active propaganda, to establish preferable brand image, and integrate into the daily life of users in a subtle way. On the other hand, price value has significant and positive influence on users' intention of mobile payment usage. Therefore, at the same time of exploring business, the third party mobile payment enterprises shall reduce the service charge related to the third party mobile payment, which is the effective method for seizing of the market in short term.

According to the <hypothesis 9> validation results, facilitating conditions have positive influence on users' usage intention of the third party mobile payment users. In consideration that the technology and the environment of the third party mobile payment are still in constantly developing stage, at the same time of expanding the third party mobile payment market, operators shall solve respond and solve the problems on technology or service during the usage, to reduce user loss rate. They shall prevent users from feeling helpless by strengthening technical support and after-sales, to avoid users generating the sense of rejection to the third party mobile payment.

According to the <hypothesis 10> validation results, enjoyment motivation has significant positive influence on usage intention of the third party mobile payment users. It illustrates that users have stronger intention for usage if they acquire more enjoyment during the third party mobile payment process. Therefore, the third party mobile payment enterprises are required to pay more attention to the enjoyment of the overall design such as the design of the icons and buttons and the entertainment functions. For example, the enterprises can strength social contact functions, or develop unique entertainment applications, and pursue for irreplaceability, to make users experience the sense of pleasure brought by the third party mobile payment, which cannot be provided by other payment methods.

According to the <hypothesis 13> validation results, continue to strengthen the security of the third party mobile payment. Security on money is always the most important thing for people in any field. Although the third party mobile payment has had very perfect security, there are still mobile technical risks. Therefore, it is necessary to control the technical risks and protect the user data security. For example, strengthening and consolidating firewall, monitoring system, invasion and theft detection system and recovery mechanism, to ensure the integrity of data.

5.2. Limitations and Future Research

This research is developed by taking the usage intention of the third party mobile payment users as the center; although trying to achieve precise and innovative on literature reading, theoretical model establishment and questionnaire design and analysis, there are still some insufficiencies and limitations due to the limitations on objective conditions such as human and material resources.

The respondents shall be further expanded. Most of the respondents of this research are during 20-40 years' old, with the main groups of undergraduates, with multiple differences such as territories, jobs and income, there are differences on usage of the third party mobile payment, and the samples may not reflect the whole condition. Therefore, it is necessary to expand the territory and age ranges in the follow-up studies, to include respondents in a more overall way, in order to conduct more overall research on the third party mobile payment user actions.

The hypothetical influencing factors: This research proposes hypothesis mainly according to UTAUT2 and TTF, and the two model theories have been tested by predecessors repeatedly. The researches in the future can start with different theories and practical experience, to promote more diversified hypothetical influencing factors, to make the promotion strategies formulated in a more accurate and perfect way.

It is needed to adjust these results to other countries including Korea. To prove this, it is necessary to make empirical study world-widely.

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