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Analysis on Affecting Factors of the Users' Adoption of Third-party Mobile Payment

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Abstract: According to analysis on the adoption problem of the third-party mobile payment, this paper put forward a third-party mobile payment adoption model based on value acceptance model. To test the capability of the proposed model in interpreting affecting factors of users in adoption of third-party mobile payment service, structural equation model method is used and the data is obtained from questionnaire investigation. The results shows that except for perceived cost and perceived risk, which are widely recognized as two remarkable affecting factors, perceived benefit, perceived convenience and herd mentality convenience are also three outstanding factors that influence the use of the third-party mobile payment. According to this conclusion, suggestions for improvement of service are put forward to the third-party mobile payment business operators.

Keywords: Third-party mobile payment, Value acceptance model, Herd mentality, Perceived benefit, Perceived convenience

1. INTRODUCTION

As the rapid development of mobile Internet, a profound change has also happened on the electronic commerce. Mobile commerce has become one of the most common ways that people use electronic commerce. Accordingly, mobile payment has also become the core and essential part in mobile business operation.

Generally, there are three models for mobile business users to make their payments, payment via telecom business operators, payment via bank, and via third-party payment service providers (third-party mobile payment, 3PMP). In 3PMP model, users do not make their payment via telecom business operators nor traditional banks. However, they make their payment via some new service channels, and these new services are usually provided by e-commerce operators, network platform operators and some other institutions such as finance, fund and payment website. Among them, the e-commerce operators and network platform operators are the main service providers. Alipay is China's largest third-party payment platform, which is operated by the famous Chinese e-commerce operator, Alibaba group, its mobile payment transaction amount in 2012 took up 60 percent of the total transaction amounts of third-party payment of the same year. Tencent and Tianhong asset manage company jointly launched WeChat payment service. In addition, to join the competition of 3PMP market, third-party payment platform service providers such as QuickMoney, Karanka and YeePay have also launched their mobile payment services.

3PMPs is a kind of new payment service that has just appeared in our daily life for a few years, and it has not yet been widely accepted by public users just as other traditional payment ways. As a new payment way, added by the use of mobile device to complete the whole payment process, provide the payment model with several distinctive natures from the traditional ways. Of course, these distinctive natures will necessarily affect the usage behavior of user in using mobile payment. Therefore, it is necessary to investigate the factors that affecting users' adoption of 3PMP.

At present, there a few scholars have studied the 3PMP adoption problem [1] [2] [3] [4]. But those researches mainly established their theory model based on technology adoption model (TAM) or other derivative model of TAM (such as TAM2 and UTAUT) to analyze the influence of how customers use 3PMP.

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According to these ideas, researchers pay much their effort on the investigation the influence of factors such as usefulness, usability, social norms and others in the process of users' adoption of 3PMP[3].

From the above mentioned literatures, we can see that TAM based researches can only capture factors from the technology aspects such as usefulness, ease of use and etc. that can be perceived by users and factors from social aspects such as characteristics of users. Undoubtedly, in the process of the use of mobile payment, there are factors underlying in the service model itself, such as risk that will exert their much influence on users. This kind of risk not only includes the financial risk of the users, but also the risk of personal information privacy [5]. In these views, this paper attempt to use perceived value theory to recognize factors from service model aspect so as to well interpret user behavior in adoption of 3PMP service. This research will provide useful suggestions to third-party payment service providers.

2. PERCEIVED VALUE THEORY AND ITS APPLICATION

Perceived value theory is put forward by Peter Drucker in his book "the practice of management "in 1954. This theory believes that it is the value not the products that the customers purchase and consume [6]. Since 1990's, an increasing number of scholars have carried out their researches and application on the theory. Monroe (1991) argued that customer value gives expression to the proportion of cognitive gains and loss [7]. Bruns (1993) suggested that perceived value is the combination of functional value, emotional value, social value, cognitive value and situational value [8]. Zeithaml (1998) gave a definition of perceived value from the aspect of customer psychology, in which he defined the perceived value as the overall evaluation of product or service utility that customers made by evaluating its perceived profits against its cost to obtain it [9].

Kim and Chan (2007) used the perceived value theory in the field of mobile Internet adoption for the first time. In his research, he proposed a model called value acceptance model (VAM) based on the theory which considered perceived value as a direct impact factor on consumers. And perceived value is the result of mutual influence of the cognitive gains and loss. At the same time Kim and Chan argued that the cognitive gains mainly include the perceived usefulness and perceived entertainment, cognitive loss mainly include perceived cost and specialty [10].

At present, there also several Chinese scholars carried out their researches on the user behavior of mobile payment adoption based on the theory. Zhu Ge at al. proposed a research model based on improved VAM, and via empirical research approach they confirmed that factors affecting users to use a mobile phone payment include functional value, social value, perceived risk and perceived cost [11]. Jiadong Teng at al. suggested that the influence factors of mobile payment include perceived usefulness, ease of use, compatibility, economic risk, privacy, security risks and etc. [12]. From the above mentioned researches, however, this paper argues that the current researchers failed to take enough importance of perceived value in the influence on user adoption of mobile payment service, and therefore lead to some extent in their researches the unawareness of benefits and risks underlying in mobile payment service. Furthermore, this paper also argues that the influence from so called herd mentality play their roles in the user adoption of mobile payment service due to the asymmetry of information between service providers and users or the lack of professional knowledge of users.

In conclusion, given that the 3PMP service is of the characteristics of service product and users' adoption behavior is under voluntary situations, considering the characteristics of the 3PMP, this paper will outline a theoretic model based on VAM to investigate affecting factors that influence user's behavior in their adoption of 3PMP service, and an empirical test of the proposed model will be presented. At the last part of the paper, suggestions for improvement of service are put forward to the 3PMP business operators.

3. THEORY AND HYPOTHESIS

Perceived value theory suggests that the acceptance of a product or service by a person is affected by its perceived value of the person. Perceived value means the overall evaluation of the utility of a product or service which is made by customer through evaluating its perceived profit against its cost to obtain it. So, the factors that contribute to the formation of perceived profit and cost of a product or service constitute the main factors that affect the perceived value of a person to the product or service.

Though current researches on user adoption of mobile payment have identified a variety factors that may have their influences on user behavior in adoption of mobile payment service, such as usefulness, ease of use, trust, risk, social norm, compatibility, technical concern, interface appearance, speed, system quality, privacy, security, cost, convenience, mobility and etc.. This research only extracts a few factors from these researches in the construction of our research model, and these factors we extracted include perceived convenience, perceived cost and perceived risk. An important consideration in our research model lies that perceived benefit is introduced from the viewpoint of perceived value theory and the all factors introduced in the model are classified into two groups, perception profit and perception lost. The research model is shown in figure 1.
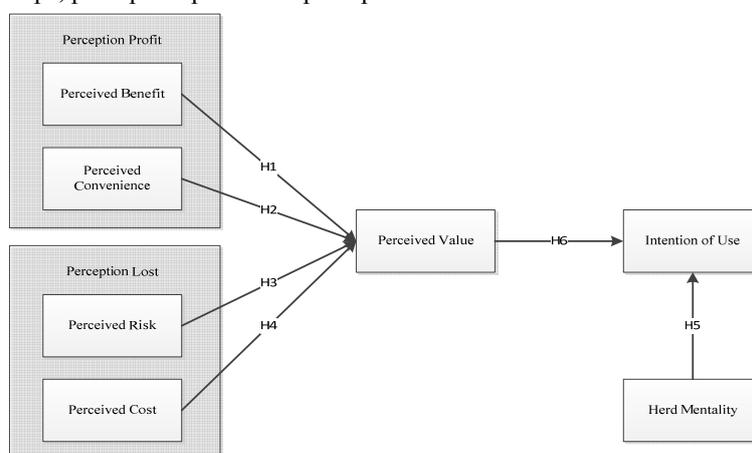

Figure 1.   Theoretical Model

3.1 Perceived benefit

Perceived benefit refers to the economic benefit that the third-party payment users can perceive directly. Perceived benefit mainly manifested in two aspects in real practices. First, in order to promote their mobile payment products and extent their market shares, 3PMP business operators will offer discount and hand out "lucky red packet" to their consumers when they shopped online and made their payment via 3PMP service. Second, through some financial products, such as keeping money in Yu Ebao or Icardpay, the users can use their deposit at any time even obtain higher dividends. Most potential users of 3PMP service will be induced by the direct economic benefit of 3PMP service to use it firstly, and then breed the paying habit to use it after repeatedly experience and become loyal users of 3PMP service. Hereby, the following hypothesis is put forward:

H1: Perceived benefit has a significant impact on perceived value.

3.2 Perceived convenience

Perceived convenience refers to that users can make their payment at any time and place, and can conduct their shopping on a wider range of products and services. Due to the connectivity of the internet and ubiquitous of the mobile communication, mobile payment service users can make their payments by using their hand-help mobile devices at any time and place without any limitations. And compare with other mobile payments, 3PMP service integrates the advantages of bank and telecom services. A 3PMP service user can purchases a wider

range of products and services in a convenient way, which cannot do just via bank payment service or telecom payment service. Hereby, the following hypothesis is put forward:

H2: Perceived convenience has a significant impact on perceived value.

3.3 Perceived risk

Risk refers to the unpredictable lose a consumer may suffer in his consumption activities. The concept of perceived risk is brought up by Bauer (1960) from the perspective of psychology. Bauer suggest that risk exists in the whole process of consumer's consumption. Because each consumption actions taken by the consumers may produce unpredictable results, and some of the results are at least may be unsatisfying, so this kind of unpredictable results is the risk a user may encounter. Accordingly, this paper defines perceived risk as the negative consequences to some extent a user may suffers from the uncertainties and errors of internal and external environment in the process of make payment by using mobile devices. Hereby, we have the following hypothesis:

H3: Perceived risk has a significant impact on perceived value.

3.4 Perceived cost

In the context of the research, cost mainly include the consumptions of time and effort of a user in learning to use a 3PMP service, and the economic cost that the user need to pay to use such a service. Zhu Ge thinks that equipment cost and transaction cost are the main costs in use of mobile payment service, while potential mobile payment users would also consider the cost it may occur from comparing the benefit with other services [5]. As to the aspects of economic cost, however, the 3PMP platform operators are always free of charge to use their payment service, so the economic cost for 3PMP service users may mainly include the spending on purchasing their own mobile devices while the software to support the use of the service can be installed for free. Hereby, the following hypothesis is put forward:

H4: Perceived cost has a significant impact on perceived value.

3.5 Herd mentality

Herd mentality refers to the behavior of people who take actions not from his own perception, judgment and knowledge, but follow the action that the majority of people may take just for the reason to conformity with them. In 3PMP service, due to the limitation of professional knowledge of users related to 3PMP service and the asymmetry of information between the service providers and the users, users usually make their decision on whether to use the service or not just by watching what the people around them have done, rather than by making decision from his own rational judgment. Hereby, the following hypothesis is put forward:

H5: Herd mentality has a significant impact on intention of use.

4.   EMPIRICAL ANALYSIS

In order to test the capability of the proposed model in interpreting affecting factors of users in adoption of 3PMP service, an empirical approach is used in which data is obtained from questionnaire investigation and structural equation model method is used to analyze the data.

4.1 Scale design and data collection

This paper uses Likert 5 grade scale. Measurement options include strongly disagree, disagree, uncertain, agree and strongly agree and they are represented by a score from 1-5 separately. The subjects for questionnaire investigation are all ordinary 3PMP users in public. In order to expand the diversity of the sample, field survey and E-mail questionnaire survey are used to collect the data. 360 questionnaires were delivered in total, 248 returned, among them 202 questionnaires were valid. The population description is shown in Table 1.

Table 1.   Population description

Variable	Classification	Number	Percentage
Sex	Male	87	43.07%
	Female	115	56.93%
Age	18 or Less	0	0.00%
	18-24	125	61.88%
	25-29	69	34.16%
	30-34	8	3.96%
	More than 35	0	0.00%
Educational Background	High school	0	0.00%
	College	4	1.98%
	Bachelor	178	88.12%
	Master or More	20	9.90%
Occupation	Student	145	71.78%
	Office Worker	57	28.22%

4.2 Reliability analysis and validity analysis

Reliability of the collected data is tested by Cronbach α test. SPSS software was used to calculate the data, and the results are shown in Table 2. Cronbach α coefficient of each factor is greater than 0.7. In accordance with the usual Cronbach α test, the reliability of data in this research can be considered credible, or even very good.

Table 2.   Reliability analysis

Variable	Cronbach's Alpha	Number
Perceived Benefit	0.814	3
Perceived Convenience	0.901	5
Perceived Risk	0.730	4
Perceived Cost	0.820	3
Herd Mentality	0.942	3
Perceived Value	0.892	3
Intention of Use	0.910	3

Validity testing is undertaken by KMO and Bartlett's test. The result is calculated by using SPSS software, shown in Table 3. All KMO values are greater than 0.5 and the Bartlett's test results are significant.

Table 3.   Validity analysis

Variable	KMO	Bartlett
Perceived Benefit	0.758	.000***
Perceived Convenience	0.71	.000***
Perceived Risk	0.582	.000***
Perceived cost	0.668	.000***
Herd mentality	0.701	.000***
Perceived Value	0.746	.000***
Intention of Use	0.716	.000***

4.3 Path analysis and discussions

Amos software is used to test the various paths assumptions of the theoretical model, the results are shown in table 4 and Figure 2.

Table 4.   Path analysis results

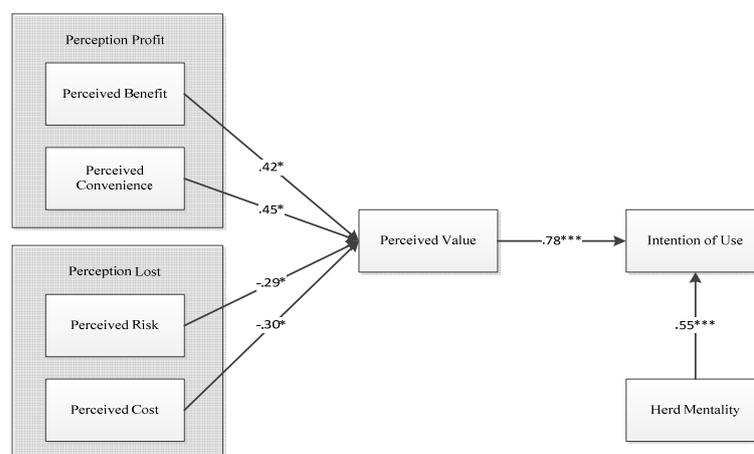|	Estimate	CR（Critical Ratio）	P	Standard Estimate
H1	.543	2.474	.013	.42
H2	.517	3.141	.002	.45
H3	-.383	-2.148	.032	-.29
H4	-.197	-2.509	.012	-.30
H5	.593	4.798	***	.55
H6	.899	6.278	***	.78

Figure 2.   Path analysis results

In table 4, the values in column estimate are the correlation coefficients between the two variables in each hypothesis. Standard estimate are the correlation coefficients when variables are standardized. CR is the Z statistic that the hypothesis is supported if its absolute value is greater than 2.

Perceived benefit affects perceived value significantly, the path coefficient is 0.42 and CR value is greater than 2, so H1 is supported. This means perceived benefit can largely affects perceived value. This conclusion confirms that the promotion strategies which are commonly used by 3PMP service providers in practices, such as give discount and free of charge to use their service and so on, can largely improve the acceptance of their service by users. So, it is suggested that the 3PMP service providers should launch more promotion strategies to attract more users.

Perceived convenience affects perceived value significantly, the path coefficient is 0.45 and CR value is greater than 2, so H2 is supported. Perceived convenience is the most important factor that affects perceived value. This conclusion confirms that the services that make people feel convenience in doing their shopping, such as ordering a meal and buying train tickets and so on, can largely improve the acceptance of their service by users. So, it is strongly suggested that 3PMP service providers should provide more services so that make their users can do their shopping in a wider range of goods and service, and as a result this will greatly reduce the use of cash and bank cards and make users feel more convenience.

Perceived risk affects perceived value significantly, the path coefficient is -0.29 and the absolute value of CR is greater than 2, so H3 is supported. However, the values of P and CR are negative. It indicates that perceived risk

negatively correlated with perceived value. This means the higher risk a user perceived to use the service, the lower value the user would take the service of. This paper argues that the most important reason for users to feel risk to use 3PMP service lies in that they have not well understood the service. Therefore, it is suggested that 3PMP service providers should publicize their services much more through ways like advertising on TV and on the internet and etc., this would make more people understand their services better.

Perceived cost affects perceived value significantly, the path coefficient is -0.30 and the absolute value of CR is greater than 2, so H4 is supported. However, the values of P and CR are negative. It indicates that perceived cost negatively correlated with perceived value. This means the higher cost a user perceived to use the service, the lower value the user would take the service of. This paper argues that the most important reason for users to feel cost to use 3PMP service lies in that the mobile devices people use for 3PMP service must satisfy some conditions(Android 2.3 and above, ISO 5.0 and above), and the users must have knowledge of 3PMP. Therefore, the 3PMP service providers should improve their software that it can be much easier to use and can be used on most mobile devices.

Herd mentality affects intention of use significantly, the path coefficient is 0.24 and CR value is greater than 2, so H5 is supported. It shows that there are quite a crowd of people doesn't know the advantages of 3PMP service and also don't care risks, but these do not prevent them from using this service. They do so just following what other people have done. In this case the so called herd mentality appears. Therefore, it is suggested for 3PMP service providers that it is also an important strategies to make users keep their loyalty to the service and increase their customer retention.

5.   CONCLUSIONS

This paper put forward a third-party mobile payment service adoption model based on value acceptance model. Structural equation model method is used to test the capability of the proposed model in interpreting affecting factors of users in adoption of third-party mobile payment service. According to the results from our empirical study, suggestions for improvement of service are put forward to the third-party mobile payment business operators. There is one thing need to be pointed out that the subjects for our questionnaire investigation are mostly university students, therefore the population sample in our research is limited.

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