

Empirical Study of Influence Factors of Adaption Intention of Mobile Payment based on TAM Model in China

Jing Li¹, Jia-Le Liu² and Huan-Yong Ji³

¹*School of economic and management, Tianjin University of Technology and Education*

²*Investment department, NAN YUE Bank*

³*School of economic and management, Beijing University of Posts and Telecommunications*

¹ *lijingjing@live.com*, ² *illjl@163.com*, ³ *jihuanyong1986@126.com*

Abstract

This paper studies the influence factors and the influence mechanism which effect Chinese adaption intention of mobile payment based on TAM model, theory of social psychology and innovation diffusion. It takes near-field mobile phone payment as practical example to do questionnaire survey with 623 samples in China and then the data were analyzed by SPSS20.0 and AMOS20.0 software .The result shows that the direct factors influencing mobile payment adoption are ranked as follows: altitude, consumer's confidence in the operator, number of merchants, scope of service, cost to use, subjective normalization and operation scenario. The number of merchants, the scope of service, the perceived ease of use and the compatibility have a significant influence on the perceived usefulness. The people at different ages and with different incomes are different significantly in their willingness to purchase through the mobile-phone payment. At the end of this paper management suggestion for operators was given.'

Keywords: TAM model, innovation diffusion, mobile payment, adoption of technology

1. Introduction

Global communications solutions and services company Erikson report released in November 2012 showed the number of mobile phone users would reach 7.5 billion that was more than the total population of the world, the number of global mobile users would be continual increasing and reach 9.3 billion by the end of 2018. With the wide application of electronic commerce, the constant update of mobile phone technology and the continuous innovation of payment system, the global mobile payment market is promising. From \$20 billion in 2005, to \$38 billion in 2010, the annual growth rate remained at about 80% [1] as shown in Figure 1.

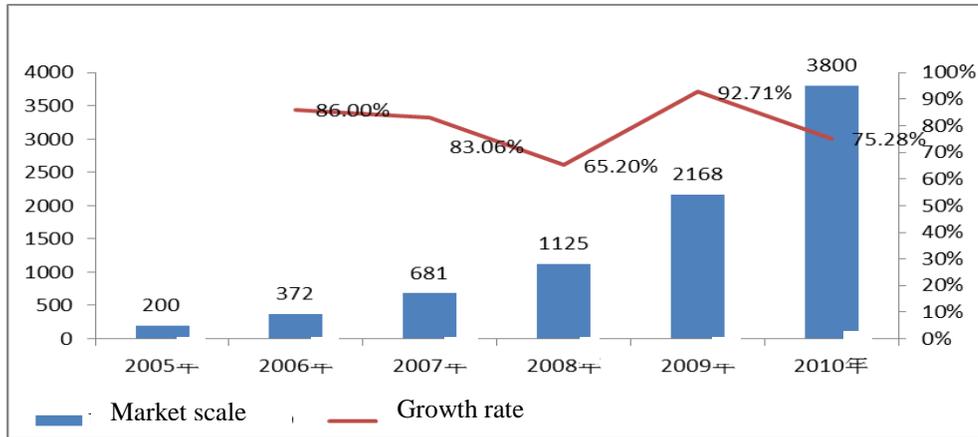


Figure 1. 2006-2010 Global Payment Market Scale and Growth Rate

The development of Chinese mobile communication infrastructure and users of mobile phone are also booming. According to the “communications industry statistics monthly report” announced by Ministry of industry and information technology in July 2012 [2], at present China has 1.12 billion mobile users, and mobile phone penetration rate has reached 82.6 phones every hundred people, which accounts for 80% of the total number of telephone users. Mobile payment was attached more importance as the important part of China’s information work by the all parties from the industry chain such as government, operators, financial institutions, technology solution providers and marketing institute. According to the DCCI Report, number of user with mobile payment in China has reached 136 million, and the market scale will be more than \$150 billion in 2013. By the end of January 2013 there are 233 enterprises obtained the payment operating license from People’s Bank in China, which means that on one hand Chinese government intends to rule the third party payment industry, on the other hand, the third party payment industry will enter more competition segment, and the mobile payment will become the new trend and new blue ocean for payment operator. But some scholars held that the popularity of mobile payment can’t be measured by the popularity of mobile Facility (Anchar&D’Ireau, 2007) [3]. China’s mobile payment marketing penetration rate is only 10%. Mobile payment marketing in China is still in its infancy compared to that in Europe, Japan and Korea. In addition to attributes to incoherent standard and lack of coordination of all parties in the mobile payment industry, some scholars put forward that the Chinese acceptance rate is the most crucial factor influence the development of China’s mobile payment.

In other countries, because of the early start and rapid development, mobile bank services, which relying on the lead advantages in GSM and Financial Service Industry, are attracted by both academia and industry. Besides plenty of researches that focus on mobile payment and business model, there are many research projects related to mobile payment, and the customer’s acceptance behavior of mobile payment is being investigated by many scholars. So far, most researches about the customer adoption behavior of mobile payment are investigated with TAM (Technology Acceptance Model), which is powerful in explaining the customers’ adoption behavior. In the meantime, external variables, which are used to explain external influence factors of perceived usefulness and perceived ease of use, are added to expend TAM in many researches. Hernan&Rosa [4] (2010) studied the influence of relative competitive advantage to perceived usefulness, Nicole *et al.*, [5] (2010) studied the influence of compatibility to perceived usefulness and perceived ease of use. Mohammad [6] (2011) studied the influence of speed, mobility access, advertising, function to perceived usefulness,

and the influence of self-efficacy, compatibility to perceived ease of use. Except predisposing factors, some researches started focusing on the differences of customers' adoption behavior of mobile bank among different user groups, discussed the role of moderating variables. Hernan&Rosa [4] (2010) studied the regulating effect of gender on customers' adoption behavior of mobile banking services. Tommi&Mika [7] (2008) studied differences of gender, age, education, profession, household income, size of household between users and non-user of mobile bank. In China, so far, few researches are related to customers' adoption behavior of mobile payment business, and many researches have been technical, such as implementation technique [8, 9] (Junwei Zhou, 2005; Lihua Gao, 2006) and safety technology [10] (Hao Zhai, 2005).

Edgar Dunn & Company [11] (2007) proposed that acceptance degree is the most important key factor of mobile payment, and the research of adoption intention can answer the question of whether and why customer use it or not, as it is necessary to verify the factor influenced the customer mobile payment adoption intention and behavior. Therefore, in order to act quickly and grab the anticipated opportunity in the tremendous potential payment market, the operators must accurately obtain and understand the key influence factors and influence mechanism which effects mobile payment adoption intention, design and develop effective business strategy. Western scholars have done a lot of research about technology acceptance, which present reference value for the adoption and development of information technology industry, however, the relevant research about mobile payment in China is much less and is still a new thing. Whether the conclusion drawn from western scholars is suitable for China market needs to be tested. This paper took the near-field mobile payment as empirical object, constructed conceptual model of adoption intention based on TAM model combined with theory of social psychology and innovation diffusion, and analyzed the factors and mechanism which effect Chinese people accepting mobile payment in China. The research conclusion provides a theoretical and practical reference for marketing strategy that operators attract and maintain Chinese consumer.

2. Related Theories

2.1. Mobile Payment

Generalized mobile payment is one kind of service refers to the user using mobile facility such as mobile phone, laptop or PDA to finish payment on the consumption of services and goods [12] (Dahlber, 2008). China's scholar defines that mobile payment is a transaction activity which is through the communication way such as short message service, wireless application protocol by means of mobile communication facilities such as mobile phone, PDA and laptop [13] (Chen huaping, 2006). Special definition about mobile payment refers to the service of accounting payment for the consumption of services or products through the mobile phone by users. Mobile phone payment can be divided into two categories in terms of business scenarios: (1) Remote mobile phone payment which is based on information and communication technology such as SMS or accessing the network by the phone and using a bank or other payment enterprises' payment services to accomplish the function of payment. (2) Near filed mobile phone payment. People use NFC, RFID radio frequency identification and SIMPASS technology, making it possible to realize Localized field service between the mobile phone and the terminal equipment, such as buses, convenience stores and shopping *etc.*

The definition of mobile payment in this paper refers to near-field mobile phone payment under the operator- dominant operation mode.

2.2. Technology Acceptance Model

The Technology Acceptance Model (TAM) was put forward by Davis [14] (1986) for the first time, analyzing and explaining the individual acceptance behavior of information technology. Basing on subjective norm had little effect on the acceptance degree to the technology, and it is difficult to measure the influence from the social culture, given that the adoption of a new technology depends on two factors: perceived usefulness and perceived ease of use. Perceived usefulness is users' subjective expectation for the specific application system to improve their work performance or learning performance, while perceived ease of use is how easy users feel the learning adoption system. Both factors have a positive effect on adoption attitude. Perceived usefulness's effect individual's adopting is larger than perceived ease of use. The external variable of the model includes demographic variables, system variables and environmental variables. These external variables affect individual attitude through perceived usefulness and perceived ease of use.

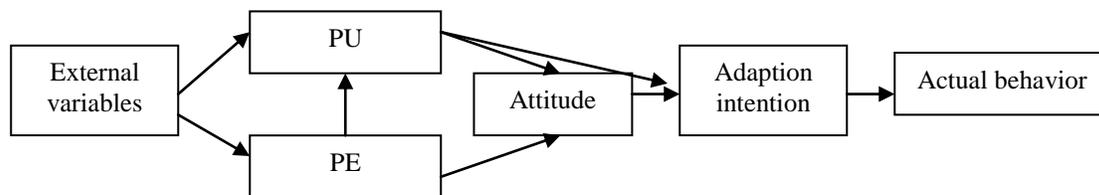


Figure 2. Technology Adoption Model

2.3. Theory of Social Psychology

From the point of view of social psychology, people's behavior is not only decided by the of behavior motivation, but also influenced by other factors, such as surrounding social and group environment, skills, time, resources, and opportunities [15]. Ajzen (1985) put forward the theory of planned behavior and claimed that human behavior is influenced by three factors: the attitude towards behavior, subjective norm and perceived behavioral control. The impact of any external factors on behavior will be adjusted by the three internal psychological factors in the regulation of TPB model. Among them the perceived behavioral control is the control ability to the necessary opportunities and resources when individuals take action, in other words, an individual thinks that the more opportunity or resource she/he has, the less obstacle he overcome. Perceived behavioral control is influenced by control beliefs and perceived conditions. Control beliefs refer to the degree of control of needed opportunities and resources when individuals take action. Perceptual conditions refer to the degree of importance to take action about the needed opportunities and resources. Subjective norms mean that an individual feels the pressure from the social and group environment, and this feeling is influenced by normative beliefs and obeying motivation. And actual behavior is also influenced by the demographic characteristics and situation factor.

2.4. Theory of Innovation Diffusion

TAM model has been widely applied in the field of information technology, including electronic commerce, information systems, network use behavior, *etc.* However, as mobile phone payment is an emerging technology and business form, we must consider it's innovation characteristics. Innovation refers to any commodity, service or idea which is considered new by people. Consumer-adoption process starts after the innovation stage is finished, including how the innovation is known, on trial and accepted or refused by potential customer (Rogers, 1962). Innovation will extend to the social system over time, Everett M.

Rogers (1983) [16] proposed innovation diffusion was “a diffusion process for a new concept from the inventions and innovations to ultimate adoption by users or market. In addition to relative advantage, compatibility, compatibility, trialability and observability, personal innovation characteristics, initial cost, operation cost, venture and uncertainty, system reliability and applause from the social and so on also affect the innovation adoption rate.

3. Research Model and Study Method

3.1. Research Model

This study takes TAM model as the main framework integrating the theory of social psychology, and adds the perceived control and subjective norms variables. According to theory of innovation diffusion, Rogers(1995) purposes individual innovation characteristics which mean that the degree of an individual adopting new things compared to others in the social system would influenced the adoption of innovation. Near-field Mobile phone payment is a new way, which must be influenced by the personal innovation characteristics; Szmigin&Bourne [17] (1999) points out that mobile payment is a new network to pay and the adoption is partly decided by the number of company providing mobile payment, which will affect the use opportunities, as result affects consumer’s perceived control.

There is an invisible gap of trust between the consumer and trading companies due to the asymmetry of information and consumer trust in business will affect level of perceived control [18] (Zhou, 2010). Business scope refers to range of product and service transaction by the mobile payment. The wider business scope the range of product and service transaction by mobile payment means, the more convenient the users feel and the stronger the users’ perceived control sense is. And as the external cue, brand can keep people’s perceived risks down, and improve feeling of people’s perceived behavior control. Kim [19] (2007) proposed that the consumer will contrast the cost produced by mobile payment and by other way, then made decision whether she/he should use mobile payment or not. Additional cost will be produced such as mobile facility, communication expenses and transaction charge, to some extent, which will affect consumers’ perceived conditions.

Perceived condition is also influenced by the use situation which is the key factor affecting the consumers’ demand recognition. Consumers will produce psychological stress when some micropayment or convenient payment demand don’t be met in special circumstances, which promote people to adopt mobile phone payment to relieve stress. Open Wireless communication network, unstable cooperation, imperfect electronic platform and script, malicious mobile phone viruses seriously affect the security of mobile payment. Lin & Wang [20] (2006) study shows that consumers are very concerned about the protection of personal privacy of mobile payment, 26% of respondents abandon the use of mobile payment because of worrying about issues of leakage of privacy. Soussan Djamab [21] (2010) considered the system security an important factor affecting the popularization of mobile payment. The hypothesis model of this study is shown in Figure 3.

3.2. Study Method

3.2.1. Variable Measurement: 14 variables were involved in the conceptual model of mobile payment adoption intention, including subjective norm, perceived usefulness, perceived ease of use, compatibility, individual innovation, system security, the number of businessmen, business brand, business scope, the degree of trust, the use of cost and use situation, attitude and behavior intention. Likert scale is used to measure the variables in the study design, and

the mature scale items are used as a reference combined with the mobile phone payment characteristics.

3.2.2. Questionnaire Design and Data Collecting: In this study, we randomly selected people from different age as the research object, using a combination of the online questionnaire, street intercept and operator business hall intercept. In this study, 766 questionnaire samples were sent out in total, and 623 validate ones were called back. The validity of questionnaire are related to two principles: (1) If there are continuous and massive same answers of items in scale emerging in one sample, we consider that this sample is invalid; (2) If on one sample more than 10% of value rates were missed, we consider that this sample is invalid.

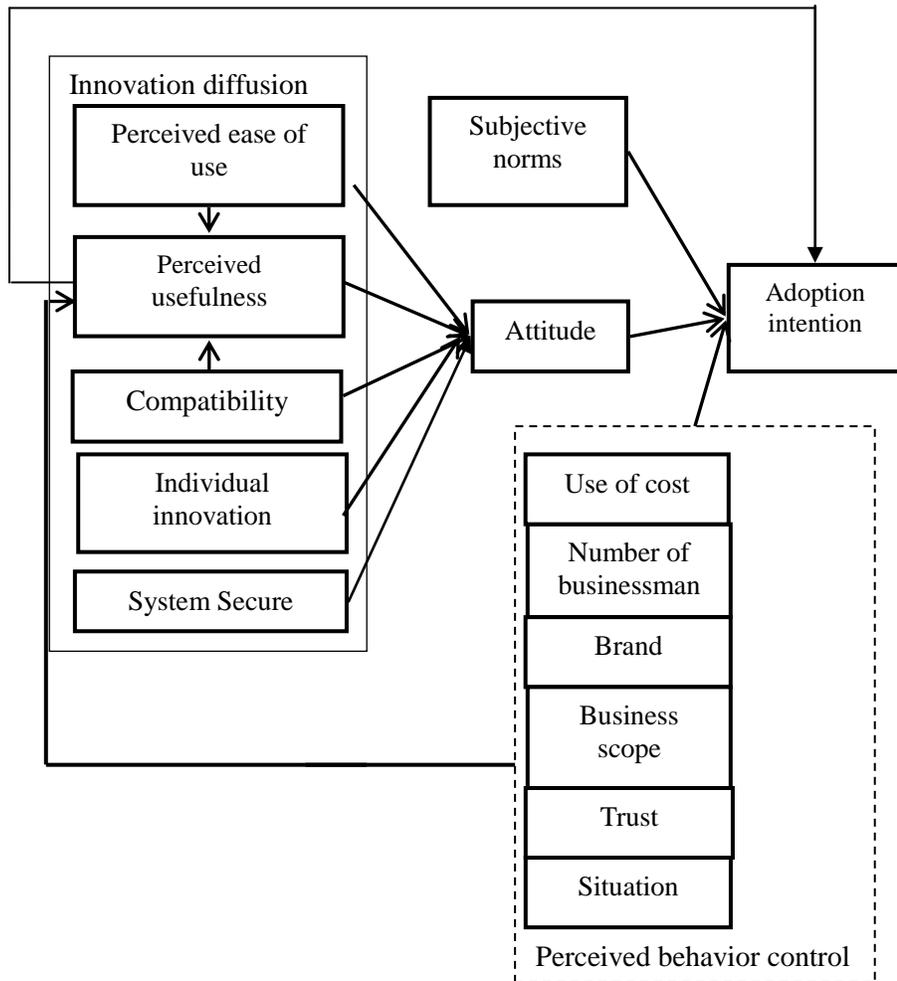


Figure 3. Mobile Payment Adoption Model

4. Empirical Study

4.1. Population Samples Description

Gender Distribution of samples are: male, 61.8%; female, 38.2%. For age distribution, people below 20 years old accounted for 4.4% of the population, 20-30 years old accounted

for 77.4%, 30-40 years old 14.3%, and 40 years old or above accounted for 4% of the population. Distribution of income is that Monthly income below 1000yuan accounts for 25.1%, 1000 -2000 yuan accounts for 27.8%, 2000-3000 yuan 16.5%, 3000-4000 yuan more than 8.4%, and more than 4000 yuan accounted for 22.2%. Overall sample distribution accords with characteristics of customer segment of technology service, the survey has high reliability.

4.2 Analysis of Reliability and Validity

Cronbach's α coefficient is used to test scales reliability by software SPSS20.0 in this study, and the result is shown in Table 1. Cronbach's α coefficient in this study are all above 0.7, indicating that the internal consistence of items constituting scales is high and this research scale has good internal reliability.

Table 1. Reliability Analysis Result

Scale	Items	Cronbach'a	Variable	items	Cronbach 'a
Innovation characteristics	12	0.852	perceived ease of use,	3	0.737
			Perceived usefulness	3	0.813
			Compatibility	3	0.767
			Individual innovation	3	0.817
System security	3	0.871	System security	3	0.871
Subjective norm	3	0.934	System security	3	0.934
Perceived behavior control	12	0.834	business number	2	0.719
			Brand	2	0.891
			business scope	2	0.879
			Degree of trust	2	0.887
			Use cost	2	0.619
			Use situation	2	0.891
Attitude	3	0.844	Attitude	3	0.844
Adoption intention	3	0.771	Adoption intention	3	0.771

The measurement subject chosen for this study has been formed by referring to the scholars' mature scales in a large amount of reading literature and also considering the features of mobile payment service. Therefore, the constructed variables of this study have better content validity, and the convergent validity test can use a measurement model of SEM (structural equation model) to determine whether the measurement items have been closely loaded on the variables. There are two criteria: (1) observe the loading of measurement items on the variables through the confirmatory factor analysis – the standard factor loading is greater than 0.50; (2) judge the goodness of fit of model by the fit index of structural equation.

In the course of data analysis, we at first used the AMOS software to change the indexes into Gaussian distribution. By taking the correlation coefficient matrix of samples as the input

matrix, we conducted the confirmatory factor analysis on various hidden variables in the measurement model. The results of confirmatory factor analysis, also the fitting degree indexes of structural equation, are given in Tables 2 and 3. With a few exceptions, all the indexes are acceptable and their factor loading on their own measurement concept is also highly significant (standardized estimate value >0.50, T >1.96), indicating that every measurement scale has a high convergent validity.

Table 2. Parameter of Measurement Model

Scale	variable	item	Standard factor loading	T value	Scale	variable	item	Standard factor loading	T - value
Innovati-on diffusion	Perceived usefulness	A1	0.59	13.82	System security	System security	B1	0.65	16.65
		A2	0.64	15.73			B2	0.98	30.90
		A3	0.76	20.26			B3	0.89	30.90
	Perceived Ease Of Use	A4	0.61	13.42	Subjectiv-e norm	Subjectiv-e norm	C1	0.65	16.65
		A5	0.72	17.22			C2	0.8	21.64
		A6	0.59	13.67			C3	0.88	24.43
	compatibili-ty	A7	0.71	16.58	Perceive-d behavior control	Business number	D1	0.65	16.65
		A8	0.62	13.72			D2	0.98	30.90
		A9	0.64	14.62		Business scope	D3	0.89	30.90
	Individual innovation	A10	0.56	12.36			D4	0.81	22.01
		A11	0.58	13.899		Brand	D5	0.75	19.85
		A12	0.78	24.90			D6	0.87	24.28
Attitude	Attitude	E1	0.86	24.13		Degree of trust	D7	0.81	22.01
		E2	0.70	17.37			D8	0.72	17.22
Adoptio-n intention	Adoption intention	F1	0.84	23.02		Use cost	D9	0.81	21.60
		F2	0.75	20.58			D10	0.59	13.82
						Use situation	D11	0.80	20.67
							D12	0.59	13.82

Table 3. Estimation of Model

FI	chi square statistics	Fitting index				Alternative indicators	
	χ^2/df	GFI	AGFI	NFI	IFI	CFI	RMSEA
Reference value	<3	>0.80	>0.80	>0.90	>0.90	>0.90	<0.08
Innovation diffusion	1.850	0.992	0.931	0.990	0.992	0.996	0.04
Perceived behavioral control	2.45	0.970	0.912	0.980	0.978	0.988	0.052
Subjective norm	1.743	0.997	0.938	0.994	0.967	0.997	0.039
System security	3.028	0.992	0.943	0.982	0.935	0.995	0.098
attitude	3.028	0.992	0.943	0.982	0.935	0.995	0.098
Adoption intention	2.421	0.962	0.921	0.986	0.992	0.998	0.052

4.3 Parameter Estimation

This study used AMOS20.0 software to estimate parameter value for mobile payment integration model. Result is shown in Table 4.

No.	Hypothesis	Standard path value	T value	P	Whether to support the hypothesis
H1	attitude->adoption intention	0.531	8.359	***	yes
H2	subjective-> adoption intention	0.246	7.029	***	yes
H3	Perceived behavior control-> adoption intention	0.423	8.997	***	yes
H4	Perceived usefulness-> adoption intention	0.069	1.531	0.123	no
H5	Perceived usefulness->attitude	0.349	6.932	***	yes
H6	Perceived of ease of use->attitude	0.069	1.732	0.065	no
H7	System secure->attitude	0.656	8.968	***	yes
H8	Compatibility -> attitude	0.041	1.103	***	yes
H9	individual>attitude	0.778	8.983	***	yes
H10	Perceived ease of use-> Perceived usefulness	0.072	1.349	***	yes
H11	Compatibility -> Perceived usefulness	0.036	5.463	***	yes
H12	Number of businessman-> Perceived usefulness	0.274	5.117	***	yes
H13	Business scope-> Perceived	0.259	4.934	***	yes

	usefulness				
H14	trust-> adoption intention	0.591	6.776	***	yes
H15	brand-> adoption intention	0.031	1.006	0.232	no
H16	Number of businessman -> adoption intention	0.542	6.347	***	yes
H17	Business scope -> adoption intention	0.497	5.779	***	yes
H18	Cost of use-> adoption intention	-0.465	5.763	***	yes
H19	Situation of use-> adoption intention	0.123	4.612	***	yes
goodness of fit index : $\chi^2 = 2735.615$ d f = 1208 p=0.000 RMSEA=0.051 GFI=0.908 AGFI=0.895 CFI=0.875 NFI=0.907					

Modified model shown as Figure 4.

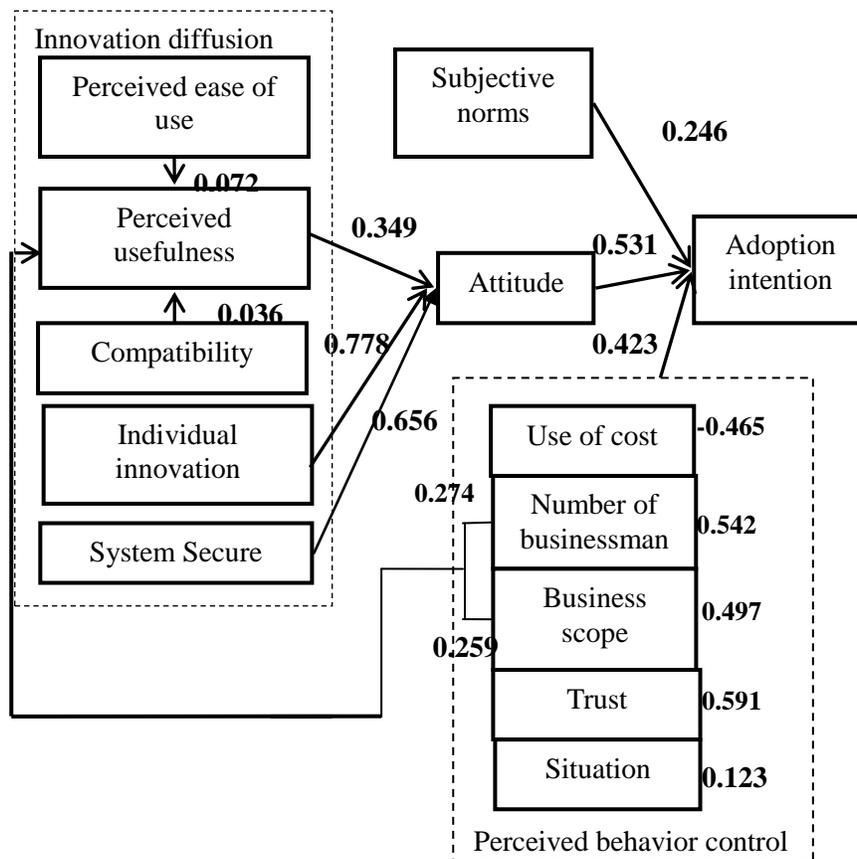


Figure 4. Modified Mobile Payment Adoption Model

4.4. Effect of Demographic Variables on Mobile-payment Adoption Intention

In this study, the population mean T test and the AVON variance analysis were adopted to analyze different influence of three demographic variables, namely gender, age and income on mobile payment intention, as detailed below.

4.4.1. Effect of Gender Variable on Purchase Intention

The Table 5 gives the mean test result of two gender-oriented independent-sample T tests for mobile payment service. In the homogeneity test of variance, $p=0.197$ (greater than the significance level $\alpha=0.05$), meaning that the variance is homogeneous. In the two-sided test, $p=0.217$ (greater than the significance level $\alpha=0.05$), meaning that there is no significant difference between male and female in terms of their willingness to purchase through the mobile payment.

Table 5. T-test of Gender Variable

		F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval	
						Upper Lower		
Adoption intention	Equal variances assumed	1.67	.197	1.235	824	.217	-.0431	.1895
	Equal variances not assumed			1.235	821.64	.217	-.0431	.1895

4.4.2. Effect of Age Variable on Purchase Intention

For the age variable, the F test in the one-way analysis of variance is adopted, as shown in Table 6 and 7. In the homogeneity test of variance, $p=0.622$ (greater than the significance level $\alpha=0.05$), meaning that the variance is homogeneous. In the significance test of difference, p is lower than the significance level α , indicating that people at different ages have different willingness to purchase through the mobile payment service.

Table 6. Test of Homogeneity of Variance

Levene Statistic	df1	df2	Sig.
.703	5	820	.622

Table 7. ANOVA of Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.905	5	3.381	4.760	.000
Within Groups	582.450	820	.710		
Total	599.355	825			

4.4.3 Effect of income variable on purchase intention

For the income variable, the F test in the one-way analysis of variance is adopted, as shown in the Tables 8 and 9. In the homogeneity test of variance, $p=0.357$ (greater than the significance level $\alpha=0.05$), meaning that the variance is homogeneous. In the significance test of difference, p is lower than the significance level α (0.05), meaning that the people at different income segments have different willingness to use the mobile payment service.

Tables 8. Test of Homogeneity of Variance

Levene Statistic	df1	df2	Sig.
.703	5	820	.357

Tables 9. ANOVA of Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.905	5	3.176	4.463	.001
Within Groups	582.450	820	.712		
Total	599.355	825			

4.5. Conclusion of Data Analysis

It can be seen from Table 4 that the factors directly influencing the consumer's willingness to use the mobile payment are ranked as follows according to their influence: altitude, consumer's trust in the operator, number of merchants, scope of service, cost to use, subjective normalization and operation scenario. The factors influencing the mobile payment attitude and their influences are ranked as follows: personal innovativeness, system safety and perceived usefulness. The number of merchants, the scope of service, the perceived ease of use and the compatibility have a significant influence on the perceived usefulness. The people at different ages and with different incomes have significant difference in their willingness to purchase through the mobile-phone payment. In the empirical analysis of this study, the influences of the perceived ease of use and the compatibility are insignificant, for the most prominent features of near-field mobile payment are simple operation and strong compatibility. Compared with a traditional mode of payment, such as credit card, the near-field mobile payment is only different in payment medium, and therefore will neither influence the consumer's payment habit nor increase his/her payment complexity. For this reason, in the near-field mobile payment, the influences of the perceived ease of use and the compatibility are insignificant. According to the cue utilization theory, brand is one of the important cues that influence the consumer's judgment. However, in this study, the influence of brand isn't significant. This has something to do with the fact that there are only three telecom operators in China, which are all large state-owned enterprises. These telecom brands are perceived by the consumers as being no difference in operating the mobile payment service.

5. Management Suggestion

The ultimate aim of studying the factors that influence Chinese consumer's mobile payment intention and the action mechanism of these factors is to explore, from the operator's perspective, how to improve this purchase intention. Among these influencing factors, consumer innovation and operation scenario are consumer-dependent and hard to change by the operator. Whereas the factors such as system safety, consumer's confidence, number of merchants, scope of service, cost to use, subjective norm cognition and perceived usefulness may be changed by the operator's effort, and then influence the consumer's willingness to use the mobile payment. As a result, based on the above analysis, this study has made the following suggestions from the operator's perspective:

(1) Enhance the safety of mobile payment system. The empirical analysis shows that, in addition to consumer's personal characteristics, the factor with the most significant influence on Chinese consumer's mobile payment intention is system safety. Therefore, keeping the mobile payment system safe is one of the key factors to increase the consumer's mobile payment use. As far as the major operators providing the mobile payment service are concerned, they shall, on one hand, establish an improved technical support system for this service, which is mainly composed of identity authentication, encryption technique, identity management and other information safety technologies. These technologies jointly act on the mobile payment system to ensure the safety of trade information and the confidentiality, integrity, availability, ID identifiability and un-deniability of mobile payment service, thus keeping the mobile payment transactions safe. On the other hand, the operators shall implement and safeguard the internal control & risk prevention measures of mobile payment service, including a trade-information confidentiality mechanism, a fraud monitoring mechanism, an improved password protection mechanism, an exception warning mechanism and an independent payment operation team.

(2) Improve the consumer's confidence. The confidence in operator plays a vital role in influencing Chinese consumer's mobile payment intention. The whole transaction process will be unfolded on the operator's trading platform. As a non-financial institution lacking both experience and expertise in financial service operation, the operator's ability to provide the mobile payment service may be questioned by the consumers to some extent. Meanwhile, various product harm crisis events are emerging on Chinese market due to incompleteness of China's regulatory systems, and Chinese consumer's perceived risk is very high. Hence, in addition to improving its service power, the operator can introduce a financial intermediate club to increase the consumer's confidence and to reduce the risk perceived by the consumer. The operator can cooperate with one or more banks to promote the mobile payment service. As a financial intermediary, banks can build a new confidence chain between consumers and operators, helping them reestablish the trust relationship and thus facilitating the completion of transaction.

(3) Increase the consumer's earnings from mobile payment. The number of merchants and the scope of mobile payment service – the two ways to reduce the consumer's perceived risk and to improve the convenience of mobile payment – can be expanded through the operator's self-development and its cooperation with a bank. For an operator, to develop the alliance with merchants is basically to start from scratch. But for a card issuing institution, a large scale of alliance with merchants has been developed in the earlier stage. In this case, the operator's cooperation with these merchants will bring down the network hardware cost of merchants.

(4) Reduce the consumer's cost of using the mobile payment. This is mainly achieved by further developing the industrial chain of mobile payment terminal. On one hand, the operator shall actively promote the development of mobile terminal industry, reducing the card cost through large-scale production and requiring the handset manufacturer to produce a mobile terminal with the appearance demanded by mobile payment service. On the other hand, at the beginning of service promotion, the operator shall charge the users less function fee and procedure fee, which can be charged appropriately after achieving the maturity and mass production of products.

Acknowledgements

This research was financially supported by Tianjin University of Technology and Education Doctoral Foundation project (KYQD13014) and Tianjin University of Technology and Education Research Foundation project (SK13-11).

References

- [1] Jupiter Research, Mobile Payment markets Strategies & forecast (2008-2013), Jupiter Research Limited, September 1.
- [2] The Ministry of industry and information technology, Communication industry monthly statistics, (2012) July.
- [3] B. Anckar and D. D'Incau, "Value creation in mobile commerce: Findings from a consumer survey", *Journal of Information Technology Theory and Application*, vol. 4, (2002), pp. 43-64.
- [4] E. R. Hernan and E. R. Rosa, "The moderating effect of gender in the adoption of mobile banking", *International Journal of Bank marketing*, vol. 28, (2010), pp. 328-341.
- [5] K.-L. Nicole, P. Adrian and M. Alexander, "Predicting young consumers' take up of mobile banking service", *International Journal of Bank Marketing*, vol. 28, (2011), pp. 410-432.
- [6] L. M. Matthew, J. B. Mary, L. O. Amy and W. B. Stephen, "Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies", *Journal of Marketing*, vol. 69, (2005), pp. 61-83.
- [7] L. Tommi and P. Mika, "Mobile banking innovators and early adopters: how they differ from other online users?", *Journal of Financial Service Marketing*, vol. 13, (2008), pp. 86-94.

- [8] Z. Junwei, "Mobile banking technology supporting multiple accessing", telecom network technology, (2009).
- [9] G. Jihua, "Based on J2ME mobile bank application system development and design", Taiyuan University of Technology, (2010).
- [10] Z. Hao, "Administrative mechanism study of application", micro-computer world, (2006).
- [11] Edgar Dunn & Company, "Technology acceptance model for wireless Internet Research", vol. 3, (2007), pp. 206-222.
- [12] T. Dahlberg, N. Mallat, J. Ondrus and A. Zmijewska, "Electronic Commerce Research and Application", vol. 7, (2008), pp. 165-181.
- [13] C. Heaping, "Study of users and behavior of mobile payment", Management science, vol. 12, (2006).
- [14] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology", MIS Quarterly, vol. 1, (1989), pp. 319-340.
- [15] I. Ajzen and T. J. Madden, "Prediction of Goal-Directed Behavior: Attitudes, Intentions, and Perceived Behavioral Control", Journal of Experimental Social Psychology, vol. 22, (1986), pp. 453-474.
- [16] E. M. Rogers, "Diffusion of innovations", New York, Free Press, (1995).
- [17] I. Szmigin and H. Bourne, "Electronic cash: a qualitative assessment of its adoption", International Journal of Bank Marketing, vol. 4, (1999), pp. 192-202.
- [18] T. Zhou, "Examining mobile instant messaging user loyalty from the perspectives of network externalities and flow experience", Computers in Human Behavior, vol. 27, no. 2, (2011), pp. 883-889.
- [19] K. Chong-Sun Hwang, "Applying the analytic hierarchy process to the evaluation of customer-oriented success factors in mobile commerce services Systems and Services Management", Proceedings of ICSSSM 2005 International Conference, Kyoto, Japan, (2007) June 69-74.
- [20] H. H. Lin, W. Ang. Y. S., "An examination of the determinants of customer loyalty in mobile commerce contexts", Information & Management, vol. 3, (2006), pp. 271-282.
- [21] S. Djamasbi and D. M. Strong, "Affect and acceptance: Examining the effects of Positive mood on the technology acceptance model", Decision Support Systems, vol. 48, (2010), pp. 383-394.

Authors



Jing Li, she received her PhD in Technical Science (2011) from Beijing University of Posts and Telecommunications. Now she is full lecturer of electronic commercial Department, Tian jin University of technology and education. Her current research interests include internet marketing and consumer behavior.



Jialuo Liu, he received his PhD in Technology Science (2011) from Beijing University of Posts and Telecommunications. Now he is an analyst of Investment Department, NAN YUE Bank. His current research interests include credit management.



Huanyong Ji, he received his Master Degree in Technology Science (2011) from Hong Kong Baptist University. Now he is a PhD candidate of Beijing University of Posts and Telecommunications, His current research interests include internet marketing and consumer behavior.