ISSN : 0974 - 7435 Volume 10 Issue 15

2014

BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(15), 2014 [8558-8564]

Innovation risk research of China mobile payment business model

Yanhong Wang
Henan Polytechnic, Zhengzhou, 450006, (CHINA)

ABSTRACT

As a new electronic cash payment industry, mobile payment has been at the stage of explosively growth in recent years. Its business model has been greatly innovated and developed, and it has created a huge wealth for the society. In order to ensure the healthy and orderly development of mobile payment industry, this paper establishes the risk index system that influences business model innovation of mobile payment, and uses analytic hierarchy process (AHP) to determine the influence weightiness of various risk factors. Hope it can provide some reference opinions for management's decision-making.

KEYWORDS

Mobile payment; Business model; Risk; Analytic hierarchy process.

INTRODUCTION

Shuai Qinghong (2011) argues that mobile payment realizes transferring money to pay off debts relations through wireless terminal and the use of wireless communication technology. It is the most important form of electronic money payment. As an emerging industry, its development scale and the application form is unprecedented. In terms of development scale, "China banking service improvement report" released by China banking service improvement report on March 15, 2014 showed that the mobile payment business in 2013 reached a total of 1.674 billion, increased by 212.86% from a year earlier; mobile payment amount is 9.64 trillion RMB, increased by 317.56% from a year earlier. In terms of development form, there are forms like NFC wearable devices, taxis payment, Qr code scanning payment, we-chat envelopes and online payment offline store pickup form, etc.

The development of mobile payment is undoubtedly ever-changing, and associated with business model innovation. There are mainly three kinds of mature business model currently, that is: One, payment dominated by third-party payment, such as: alipay payment, we-chat payment and unionpay payment, etc.; Two, payment dominated by financial institutions, such as: unionpay card payment, online banking payment, etc.; Three, payment dominated by operators, such as communications payment, wireless data fee payment and music on demand, etc. Of course this does not include payment like NCF wearable devices, electronic chip card. As time goes on, the mobile payment business model innovation will be more and more diversified, and finally tends to be stable.

Accompanied with the emergence of business model innovation, more and more security risks exposure to be solved, such as: the low price competition to seize market share, government supervision lag behind the industry development, the market acceptance of new technology, the security of electronic information etc., If these potential risks are mishandled, that will cause lethal damage to mobile payment industry and even the whole national economy. So in the face of these difficulties, what measures regulators should take to control, in order to achieve a goal that neither hinder its development, nor minimize the risk? What kind of management decisions Enterprises should make to ensure rapid development? This paper will weight analyze the risks affecting the mobile payment business model innovation based on the analytic hierarchy process (AHP), aimed at providing some suggestions to the authorities' appropriate effective control and management decision-making, hoping to help the healthy development of mobile payment industry.

LITERATURE REVIEW

As a new electronic cash payment industry, risk research of mobile payment is a vast research both at home and abroad. In studies abroad, Shon and Swatman (1998) studied the related questions of the Internet payment system (IPS), and analyze the influencing factors through the Delphi expert investigation, and thinks security and reliability are very important influential factors[2]. Hans van der Heijden (2002) studied the influential factors in the success of the mobile payment system from the perspective of risk, and combined with interviews with 13 senior executives; he found that factors like cost, usability, security, technical feasibility, user acceptance, have influence on system[3]. Xiao Linzheng (2003) analyzed mobile payment technology and the application itself in detail, and designed a low cost, high technology, high scalability and high safety new mobile payment procedures[4]. Based on a large number of literature study, Dahlberg, Mallat Ondrus, Zmijewska (2008) thought that the important factors that affect mobile payment service system are: culture environment, technology environment, the changing rule of the law, payment standard, customers, markets and suppliers, the degree of commercialization, etc.[5].

At present our country is mainly on the theoretical research on mobile payment, and empirical studies have focused on the electronic payment. Shuai Qunchang, Shuai Qinghong (2009) analyzed the typical mode of mobile payment, and connecting with the foreign literature, put forward the main factors that influence its development, and by using theoretical model based on weight, analyze China's current situation and future development trend of mobile payment[6]. Dai Hong (2010) analyzed the risk index start from the main body of mobile payment model, and used the analytic hierarchy process and fuzzy comprehensive evaluation method to make weight assessment for the risk of mobile payment mode index, determined which link has relatively large risk, provided theoretical basis for the healthy and orderly development of the industry[7]. He Sijie (2012) designed the evaluation index of enterprise business model innovation from enterprise business model innovation, performance, and sustainable design. using rough theory and analytic hierarchy process and fuzzy comprehensive evaluation method to evaluate each index[8]. Zhao Yuting (2012) built the risk evaluation system for B2C e-commerce mode innovation, and put forward the analytic hierarchy process method and risk management strategy[9].

From the studies before, we can see that out study of current mobile payment business model innovation is still in the theoretical research stage, with few empirical studies. Based on this, this article researches risk problems in the process of mobile payment business model innovation from the perspective of the analytic hierarchy process, and calculates the risk factors for the impact of mobile payment business model innovation, hoping to provide some references for the authorities and management.

ASSESSMENT METHODS OF MOBILE PAYMENT BUSINESS MODEL INNOVATION RISK

Index system of risk evaluation

In the previous literature, we can sum up the index system that influences mobile payment business model innovation risk. Risk evaluation index system is divided into two levels. The primary index includes five kinds, respectively

is law, technology, operation risk, market, policy; secondary indicators are detailed division to primary index. As shown in TABLE 1:

TABLE 1 : Assessment methods of mobile payment business model innovation risk

Objective level	Primary index	Secondary indicators
Mobile payment business model innovation risk A	legal risk B_1	Intellectual property right risk
		Privacy risk
		Information asymmetry risk
	Technical Risk B_2	Security risk
		Development risk
		Technology risk
	Operation risk B_3	Customer risk
		Partner risk
		Strategy and risk management
		Financial risk
		HR risk
	Market risk B_4	Competitive risk
		Price risk
		Liquidity risk
		Credit Risk
	Policy risk B_5	Policy risk

Note: 1)Development risk refers to the risk of difficulty of technology development and the development cycle; 2)Technology risk refers to the risk of advanced technology itself, the maturity and development prospect.

Risk assessment methods

This article uses the analytic hierarchy process (AHP) to evaluate the risk. Analytic hierarchy process judges the assignment in the role of the target through the weight of each indicator, its basic idea is to divide the study target into several levels, compare all factors in each level to judge matrix, then the judgment matrix will be normalized processing, characteristic vector and maximum characteristic value is obtained. Finally it is concluded that the weight of each element in each layer through a hierarchical weighted. For each element comparing, the standard used is 1 ~ 9 scaling method, as shown in TABLE 2.

TABLE 2 : 1~9 Scale value and its meaning

Scale	Meaning
1	Equally important
3	A little important
5	Obviously important
7	Very important
9	Absolutely important
2,4,6,8	Between the above adjacent judgment scale
Countdown	Compare in turn

Step 1: According to chart 2, ask an expert to pair wise compare all the elements in various levels, and get the judgment matrix M.

$$M=\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1(n-1)} & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2(n-1)} & a_{2n} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ a_{(n-1)1} & a_{(n-1)2} & \cdots & a_{(n-1)(n-1)} & a_{(n-1)n} \\ a_{n1} & a_{n2} & \cdots & a_{n(n-1)} & a_{nn} \end{bmatrix}$$

Step 2: Matrix A makes normalized processing by column, get $B = (b_{ij})_{n\times n}$

$$b_{ij} = a_{ij} \Big/ \sum_{k=1}^{n} a \quad i = (1,2,\cdots,n)$$

Step 3: Plus matrix B by column and make normalized processing, get feature vector W

$$W = (W_1, W_2, \cdots, W_n)$$

Step 4: Get maximum eigenvalue $\lambda_{\max}$.

$$\lambda_{\max} = \frac{1}{n}\sum_{i=1}^{n} \frac{(AW)_i}{W_i}$$

Step 5: Check the consistency of matrix A and calculate the consistency ratio CR

$$CR = CI / RI$$

Among them, CI is consistency index. The calculation formula is $CI = (\lambda_{\max} - n)/n - 1$. RI is random consistency index, and it is obtained through the random consistency index table, as shown in TABLE 3. When $CR < 0.1$, the consistency inspection of matrix is passed. Weight value can reflect the importance degree of index.

TABLE 3 : Random consistency index chart

n	1	2	3	4	5	6	7	8	9
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45

Step 6: Calculate comprehensive weighting of each level factors to target layer, we can get the importance weights of lowest level element to the highest level Using the analytic hierarchy process, we can get the weight of all levels to the target, thus to guide the decision-making behavior of enterprise decision-makers.

CASE ANALYSIS OF MOBILE PAYMENT BUSINESS MODEL INNOVATION RISK ASSESSMENT

Case selection

Mobile payment business model mainly includes: dominated by third-party payment, dominated by Banks and dominated by operators. This article selects representative enterprise to a third party as the leading mobile payment--- Alipay to evaluate risk analysis, to assess the influence degree of each index to the system risk.

Alipay was set up on October 18, 2003; it is the third-party payment mechanism of alibaba platform. From establishment till now, alipay is not only a payment security tool connecting the sale of two parties, but also create a precedent for combination of traditional banking and Internet financial. The most representative is the two savings and loan business as balance, ali small loan. Alipay laid a solid foundation for the rise of Alibaba Empire, and it is the blood of alibaba platform. But as a new thing, alipay will meet many problems in the process of our development, such as: as the middle of the receiving platform, belonging problem for a large amount of precipitation funds alipay owns; As deposit and lending platform, its legal status problem; As a company, it faces such problems as market competition, customer orientation. To some degree, the existence of these problems is the potential risk.

Therefore, judging the influence degree of the different risk source to the system can provide some guidance to business model innovation of alipay.

Case analysis

First of all, according to the mobile payment business model innovation risk index system concluded in the third chapter, ask an expert to determine pair wise comparison scale on the basis of 1 ~ 9 scaling method, to determine judgment matrix of different levels.

$$A=\begin{bmatrix}1 & 1/4 & 1/5 & 1/3 & 1/7\\ 4 & 1 & 1/3 & 3 & 1/4\\ 5 & 3 & 1 & 4 & 1/2\\ 3 & 1/3 & 1/4 & 1 & 1/5\\ 7 & 4 & 2 & 5 & 1\end{bmatrix};$$

$$B_1=\begin{bmatrix}1 & 1/3 & 1/2 & 1/5\\ 3 & 1 & 3 & 1/3\\ 2 & 1/3 & 1 & 1/4\\ 5 & 3 & 4 & 1\end{bmatrix};\ B_2=\begin{bmatrix}1 & 1/2\\ 2 & 1\end{bmatrix};$$

$$B_3=\begin{bmatrix}1 & 2 & 1/5 & 1/4 & 3\\ 1/2 & 1 & 1/7 & 1/5 & 3\\ 5 & 7 & 1 & 3 & 8\\ 4 & 5 & 1/3 & 1 & 7\\ 1/3 & 1/3 & 1/8 & 1/7 & 1\end{bmatrix};\ B_4=\begin{bmatrix}1 & 1/2 & 1/7 & 1/5\\ 2 & 1 & 1/3 & 1/3\\ 7 & 5 & 1 & 3\\ 5 & 3 & 1/3 & 1\end{bmatrix}。$$

Secondly, according to the model built in the third chapter, respectively, get characteristic vector W of the judgment matrix, and carries on the consistency check, it is concluded that the weight of each index.

For primary index judgment matrix A, its feature vector is $W_A=[0.04,0.18,0.282,0.1,0.398]^T$ and its eigenvalue $\lambda_{\max}$ is:

$$AW_A=\begin{bmatrix}1 & 1/4 & 1/5 & 1/3 & 1/7\\ 4 & 1 & 1/3 & 3 & 1/4\\ 5 & 3 & 1 & 4 & 1/2\\ 3 & 1/3 & 1/4 & 1 & 1/5\\ 7 & 4 & 2 & 5 & 1\end{bmatrix}\begin{bmatrix}0.04\\ 0.18\\ 0.282\\ 0.1\\ 0.398\end{bmatrix}=\begin{bmatrix}0.232\\ 0.834\\ 1.621\\ 0.43\\ 2.462\end{bmatrix}$$

$$\lambda_{\max}=\frac{1}{n}\sum_{i=1}^{n}\frac{(AW)_i}{W_i}=\frac{1}{5}\left(\frac{0.232}{0.04}+\frac{0.834}{0.18}+\frac{1.621}{0.282}+\frac{0.43}{0.1}+\frac{2.462}{0.398}\right)=5.333$$

So:

$$CR=\frac{CI}{RI}=\frac{(\lambda_{\max}-n)\div(n-1)}{RI}=\frac{0.333\div 4}{1.12}=0.074$$

Due to $CR=0.074<0.1$, the consistency of the judgment matrix is satisfied and the data is available. Then for target layer A, the weights of first indicators, respectively, are: 0.04, 0.18, 0.282, 0.1, 0.398.

For solving secondary index layer:

$$W_{B_1}=[0.078,0.283,0.138,0.501]^T;\ B_1W_{B_1}=[0.342,1.098,0.514,2.292]^T$$

$$\lambda_{\max}=4.141\ ;\ CR=0.052<0.1$$

So the weights of secondary index under B_1 respectively, are: 0.078, 0.283, 0.138, 0.501

$W_{B_2} = [0.33, 0.67]^T$, because of B_2 is secondary matrix, and doesn't need to check the consistency, the weights of secondary index under B_2, respectively, are: 0.33, 0.67

$W_{B_3} = [0.118, 0.089, 0.44, 0.318, 0.035]^T$; $B_3 W_{B_3} = [0.569, 0.379, 2.887, 1.627, 0.204]^T$

$\lambda_{\max} = 5.317$; $CR = 0.071 < 0.1$

So the weights of secondary index under B_3, respectively, are: 0.118, 0.089, 0.44, 0.318, 0.035

$W_{B_4} = [0.06, 0.115, 0.521, 0.304]^T$; $B_4 W_{B_4} = [0.253, 0.441, 2.428, 1.123]^T$

$\lambda_{\max} = 4.101$; $CR = 0.038 < 0.1$

So the weights of secondary index under B_4, respectively, are: 0.06, 0.115, 0.521, 0.304

Finally, according to the above requested data, calculate synthesis weights of each index to target layer, as is shown in TABLE 3.

TABLE 3 : Weight of mobile payment business model innovation risk index

Objective level	Primary index	Weight	Secondary indicators	Weight
Mobile payment business model innovation risk A	legal risk B_1	0.04	Intellectual property right risk	0.003
			Privacy risk	0.011
			Information asymmetry risk	0.006
	Technical Risk B_2	0.18	Security risk	0.02
			Development risk	0.059
			Technology risk	0.121
	Operation risk B_3	0.282	Customer risk	0.033
			Partner risk	0.025
			Strategy and risk management	0.124
			Financial risk	0.09
			HR risk	0.01
	Market risk B_4	0.1	Competitive risk	0.024
			Price risk	0.046
			Liquidity risk	0.208
			Credit Risk	0.12
	Policy risk B_5	0.398	Policy risk	0.398

From TABLE 3, first of all, we can see that the biggest weights in primary index is policy risk, and it proves that policy influences mobile payment business model innovation most. As to its reason, on the one hand, as a new thing, mobile payment like alipay is also feeling the stones across the river. Once problem appears, the government will strictly limit its development and innovation in order to protect the social public interests; on the other hand, because the mobile payment such as alipay is engaged in the business for foundation of the national economy business capital, the government will carry on the strict regulation. The second is operational risk. This is because as a self-sustaining enterprise, operating quality directly relates the enterprise's survival. Although legal risk weighting comes in the last, that doesn't mean the legal risks should not be paid seriously attention. On the contrary, we should strengthen the attention, to prevent accidentally touch the red line of law, thereby causing the fault loss.

Second, policy risk still has the greatest influence on the target stratum in secondary index, and then is liquidity risk, technology risk and strategic management risk; the bottom is the risk of intellectual property rights. Money business requires strict attention to the condition of liquidity, because it's related with enterprise's normal operation. Good liquidity has the effect of increasing purchasing power, and the balance payment quickly absorbed a large amount of demand deposits with strong liquidity and high interest rates. The kind of mobile payments companies like Alipay engage in the combination of Internet and financial work. It values the technology very much, because only with perfect technology, safety of fund and information can be guaranteed.

Finally, as an emerging industry, engaged in money business related to the national economy, mobile payment should be under strict regulation control in the development process, but not excessive and hinder its development. This requires regulators properly control and the enterprise reasonably control itself. Therefore, regulators and the enterprises can

have a difference management and control according to the different extent of risk source to the system, pay highly attention to the high risk factors, in order to use limited resources in the most appropriate location and ensure the healthy and rapid development of mobile payment.

CONCLUSION

As a high quality enterprise in mobile payment industry, Alipay has a relatively more mature business model, and is the template for other enterprises to learn from. But from the analysis can be concluded that there are still many potential risks for alipay, and that needs to be overcome and improved in the process of innovation and development.

First of all, in the face of the biggest weights, policy risk, alipay need self-abnegation and obey the law. In the process of operation, provision shall comply with the relevant laws, regulations and rules, and guarantee it is allowed to operate within the scope of the current system. in the face of the vacant system, it should be communicate and coordinate with relevant government departments actively, not to go with the funds of the illegal or with fuzzy belongings, protect the healthy development of their own. In the process of innovation and development, it should adhere to the principle of "external positive effect". in the principle of social benefit greater than or equal to the private benefit, bold innovation and development profit model, the main structure and operation mode, etc., really benefit the masses and the whole society.

Secondly, facing the sweeping operational risk, alipay need to make self-improvement. In personnel management, strengthen the staff's professional knowledge skills training; improve the staff's overall moral quality, such as: strengthen the information security training for technical personnel, strengthen risk control personnel management comprehensive knowledge training. In financial management, adhere to the principle of caution, seeking truth from facts, and do not omission, not false, make finance reaction enterprise's actual situation.

Thirdly, facing the technology risk, alipay needs to analyze customers' needs, research and develop products that are more suitable for the real life, make the customers actively use the product. In face of market risk, alipay should enhance the penetration of market segments. Through discriminating, expand its influence and influence customers' habits, increase market share. In face of the legal risk,alipay should insist on prior prevention, process control, remedial idea, to avoid or mitigate the loss legal risk brings.

Finally, mobile payment enterprises, represented by alipay, should give full attention to national policy, their own operating conditions in business model innovation; at the same time, pay attention to the legal risk factors, control their own liquidity, ensure smooth operation and profitability of the project. In the process of supervision, at the same time, regulators should pay attention to prevent policies repressed and hinder the development of the company, some rigid rules and regulations on liquidity and electronic information security should be formulated to ensure safety and flow of capital ability, promote the healthy and orderly development of the industry. In short, in the face of the mobile payment business model innovation risk factors, managers should take differential measures, to use limited resources on those most in need.

ACKNOWLEDGEMENT

This article is the phased research results of zheshe planning project in 2013 in sichuan "innovation and development trend of mobile payment research in Sichuan"(project number SC13JR07).

REFERENCES

[1] Xie Ping; Research on Internet Financial Model [J], Financial Research, 12 **(2012)**.

[2] Tae-Hwan, Shon,Paula, M.C.Swatman; Identifying Effectiveness Criteria for Internet Payment Systems[J]Internet Rasearch, **8**, 202-218 **(1998)**.

[3] Hans van, Der Heijden; Factors Affecting the Successful Introduction of Mobile Payment Systems[J] 15th Bled Electronic Commerce Conference eReality: Constructing the eEconomy, **6**, 17-19 **(2002)**.

[4] Xiaolin Zheng; Study of Mobile Payments System[J]E-commerce, **6**, 24-27 **(2003)**.

[5] Tomi Dahlberg, Niina Mallat, Jan Ondrus, Agnieszka Zmijewska; Past, Present and Future of Mobile Payments Researchu :A literature review[J] Electronic Commerce Research and Applications, **7**, 165-181 **(2008)**.

[6] Shuai Qunchang, Shuai Qinghong; Analysis of Mobile Payment and its Development in China [J] E-commerce, 02 **(2009)**.

[7] Dai Hong; Evaluation of Mobile Payment System Security [D] Beijing Jiaotong University, 12-17 **(2009)**.

[8] He Sijie; Evaluation Research based on Rough Business Model Innovation of the Enterprise [D] Dong Hua University, 1-4 **(2012)**.

[9] Zhao Yuting; Risk Management Research of B2C E-Commerce Business model Innovation in China [D] Ocean University of China, 6 **(2012)**.

[10] Xiang Weimin, Feng Mei, Shi Qin; Fuzzy Comprehensive Evaluation of Enterprise Technology Innovation Risk [D] Journal of Chongqing University (JCR Science Edition), 12 **(2003)**.