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Interpreting the evolution of mobile payments: trends, customer adoption and potential risks

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by

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Content

ABSTRACT

In the digital era, mobile payment applications have drawn people's attention. Along with the popularization of mobile phones and the rise of customer demand, the profound, marked, essential changes about payment methods are taking place in the world. However, potential issues have begun to emerge that will affect its long-term development. This thesis aims to interpret the main factors that influence user's willingness and adoption towards mobile payments. To collect the primary data, the author designed an online questionnaire and the sample group contains 150 respondents in WKU. The author applies the modified unified theory of acceptance and use of technology (UTAUT2) to illustrate the relationship between customer behavior adoption and other four factors. The multiple regression model is used to test the hypotheses. The results find that performance expectancy, effort expectancy and social influence have significant relationship with customer behavior adoption; while, perceived technology security has no impact on users' intention. Moreover, the results also show the positive correlation between performance expectancy and effort expectancy. For further researches, this thesis sheds light on the risks of data theft and other security issues of mobile payments happened in recent days. Therefore, developers of mobile payments should consider how to diversify the functions and services provided by this technology to protect their customers in a more secured way.

1. Introduction

With the rapid development and innovation of Fintech, various financial services combined with information technologies have brought impactful changes to people's daily life and the prospect of traditional financial industries. Recent mobile payments, like Alipay, Wechat Pay and Apple Pay, are representative examples to clarify the revolution of Fintech. Nowadays, people live in a highly digitalized era, where the demand of e-commerce markets and the need of simplified payment method are dramatically increasing. As the popularity of smartphones and online shopping platforms continues to grow, the emergency of mobile payments has disrupted the conventional payment ecosystem.

According to Worldpay's 2018 Global Payment Report, the global use of mobile payments is expected to rise approximately by 27%. Especially, due to the market base of Ant Financial and WeChat in China, Mobile payment transaction volume have exceeded $41 trillion per year in 2018, and the active users of Alipay and WechatPay both have surpassed 100 billion in 2019 (Klein, 2019). Cashless payment has consciously changed people's life in a more convenient and efficiency way, supported by the prevalence of high-end mobile devices and other high-tech facilities.

Obviously, mobile payment is a cost-efficient alternative of cash, Credit Card, Debit Card and physical wallets. It provides abundant benefits for people by reducing the overall transaction costs, allowing customers to use their own devices to purchase goods and services by using simple password or secured biology identification. Individual transactions or small amount of money flows through security payments has driven the development of numerous micro economic activities and large retailers. Therefore, mobile payment is generating a large volume of gains in financial markets and the factors and requirements that contribute to its further growth should not be neglected.

However, as the use of mobile payment keeps increasing, it has exposed plenty of potential risks, such as privacy information leakage, data inconsistency and lack of legal regulation or policy. Problems with data error, data theft, authentication security and other technical issues will generate more risks, since personal data contain information that is more important. If the current regulatory system and the relevant law of customer protection are not coherent with the continuous updating Fintech, the disclosure of customer information will cause even greater problems.

This paper mainly focuses on analyzing the indispensable requirements of the future growth of mobile payments in Fintech era from users' view. The author also discusses security challenges posed by mobile payments. It is necessary to point out the potential threats to this payment method and study on how to improve its functions. Besides, the study also classifies characteristics of different mobile payments. Furthermore, it predicts the future trend of the development of this technology and the modification it should consider for the existing regulatory systems. The paper mainly collects data and response from questionnaire as its methodology. It uses a modified model called UTATU2 to address the relationships between different variables. Besides, it analyzes the results by using regression analysis and correlation.

The following parts of the paper discuss and summarize the primary findings of prior research, including the features of Alipay, WechatPay, Apple Pay and Samsung Pay, benefits to customers and traders, security concerns and regulatory challenges. Then, it presents the methodology and data it collected by illustrating tables, charts and reports. Besides, the result and analysis part elaborates on important findings based on questionnaire and

further comments towards the questions posted in survey, including explanation on determination of customer adoption, future trend predictions and recommendations on regulatory system. Finally, the author also draws conclusions and limitations about this study in the last part.

2. Literature Review

2.1 Background Information

2.1.1 Comparison between traditional payments and mobile payments

In general, traditional payments requires carrying cash or physical cards from an individual. Individuals who use cards to purchase product or service need to open an account of the specific financial institutions, such as banks, credit card companies and insurance companies (Hillman & Neustaedter, 2017). If the transaction is done by cash, the payments are settled between the payer and seller simultaneously, and there is no third party involved. While, if the transaction is settled by debit cards or credit cards, it will be more complicated and time-consuming. The transaction value received by the merchants should go through the payer's bank, and initiate identity authentication of the payer. Once the identification is verified, payment information will be provided to payer's bank and the funds are offered to the merchant's bank. The whole settlement of the payment process may need paper documents of users' credit history and negotiable instruments (Iman, 2018). In other words, traditional transactions must rely on the financial institution and policy and regulation systems where the payment is issued. However, based on the existing transaction infrastructure, mobile payments that use smart devices and take the advantage provided from IT companies (Apple, Samsung, Alibaba, Google, etc.) construct an integrated payment agency. Fintech Payment Services works with a variety of financial institutions and digital facilities where user's payment information is registered so that users can enjoy the independent and customized payment services. Besides, users do not need to offer unique services for a financial institution. They can use lots of payment services through a single payment method by connecting with major bans and credit card companies. In other words, users can easily choose a desired transaction option from their smart phones by inputting multiple bank accounts and card information (Kang, 2018). They do not have to take any responsibility for the potential loss of losing a physical card or amount of cash.

2.1.2 Characteristics of different mobile payments

Apple Pay, depended on HW makers, is only accessible on Apple devices and IOS systems. In contrast to Samsung Pay, it only works with Near Field Communication (NFC). Therefore, compared with other mobile payments, it has a low level of compatibility with current payment facilities with few available online stores. It uses biometric authentication by fingerprint or facial identification without unlocking the lock screen. Users' information is not exposed externally and stored in a separate and independent Secure Element (SE) so that the occurrence of privacy issues and data breach is much lower than others is (Kang, 2018).

Samsung Pay is another mobile payment based on HW makers and connected to Android system. Recently, it is working on iris recognition for identification to promote its security. In addition, it collects its sensitive information by utilizing Host Card Emulation (HCE) in the cloud. Moreover, it expands its market size to meet the increasing customer demand by supporting payment methods through both NFC and Magnetic Secure Transmission, which improves its compatibility.

Alipay is exploited by Alibaba, which is the largest E-commerce Group in China. Another essential element of Alipay is the revolution of the QR code. For merchants, it is a more convenient connection to payment systems, which allows them to receive funds off-line by printing the bar code on a piece of paper where customers can easily scan. QR code has decreased the costs with lower threshold, especially for the merchants who have trouble with getting access to telecommunications or affording expensive mobile devices like Apple. Moreover, it also provides platforms for peer-to-peer transactions in few seconds without charging cash face to face (Klein, 2019). Alipay app has also threaten the state of retail banks, since it offers many financial services in Alipay e-wallets, such as wealth management, investment suggestions and petty loans (Lu, 2018). Furthermore, Alipay has generated lots of revenues associated with Taobao, which occupies the major online shopping markets in China. However, Alipay faces challenges about expanding its foreign markets and it needs the users to install the particular app (Harris, Brookshire & Chin, 2016).

2.1.3 Status and Prospect

Due to a large population base, mobile payments have been dominated by China, with more than one-billion active users of Alipay and Wechat Pay. Accordingly, mobile payment continues its remarkable rise and is expected to become the largest common payment method after Debit Card in 2022. The number of merchants who participate in mobile payments also increases with high demand of mobile users. According to surveys conducted in China, almost 70% of people consider Alipay or WeChat pay as their preferred payment method. Tianhong Yuer Bao, as Ant Finance's largest mutual fund, has nearly 600 million investors and more than $168 billion in funds. It offers higher short-term interest rates than traditional banks at more than 2%, which highlights the future strike to bank deposits.

The dominant trend of mobile payment in developing countries is prominent, particularly in China and Africa. Small merchants benefit a lot from person-to-person transfers (P2PTs) and low transaction fees (Iman, 2018). However, mobile payment ecosystem need to build a separate legal regulation and united cooperation. It is still underdeveloped. According to Bezhovski (2016), mobile phone manufacturers, wireless communication, and payment systems should work together to provide a more safety protocol for users. For long-term development and greater popularity, mobile payment should overcome many difficulties, including confidentiality of information, data integrity and consistency, and authentication of users.

2.2 Determinations of Customer Adoption

Studies conducted by Oliveira et al. (2016) apply a model combined extended unified theory of acceptance and use of technology (UTAUT2) with Diffusion of innovation (DOI) theory. The authors conclude that "effort expectancy, facilitating conditions, hedonic motivation and price value" are not significant relevant to customer adoption, however, "performance expectancy, effort expectancy, and social influence" have strong relationship with the intention to use this technology. In addition, customer adoption is also associated with

recommendation through social networks, website or other communication channels. The influence of social marketing campaigns can promote future adoption.

Another research also explores user's attitude towards mobile payment by comparing the differences between users in US and China. In contrast, this study adds trust and perceived security (PS) as variables. It also measures how uncertainty avoidance (UA), security rules and policies (SRP) and security responsibility commitment (SRC) affect PS and trust. Besides, the study finds there is no significant difference between two countries by examining the coefficients of the relationship between different cultural models (Fan et al., 2018).

In Iman's research, the author also concludes several factors that boost the growth of mobile payment from customer perspective, especially in developing countries. The first key factor is socioeconomic conditions. In emerging economy, many developing country users do not have debit cards or credit cards, so mobile payment has become a popular alternative for cash. Another factor is cost efficiency. By using mobile payments, people do not need to open a bank branch, which reduces costs of infrastructure, initial investment and human resources. Moreover, mobile payments charge low transfer fees at 1% for low-value transactions, which attracts low-income families. Besides, convenience is also important for users, since it achieves safe remote payments (Iman, 2018).

2.3 Requirements of Mobile Payments

2.3.1 Regulation system

Dr. Lu (2018) finds that the main barrier of developing mobile payments is seeking regulatory approvals. Massive regulations and restriction should catch up with the speed of technology innovation, Moreover, banks insist on playing a central governmental role in the ecosystem, which also limits further growth. Take Alipay for an example. Since cash flows move within Alipay systems, it designs and monitors the movements itself, which does not open its information to another party and gets out of the governance of central bank (Lu, 2018). Therefore, it is difficult to connect Alipay to monetary policy accommodation, data collection and research analysis. In August 2017, People's Bank of China claims mobile payment companies to operate their business through a centralized clearinghouse, which requires a large amount of capital to complete a complex procedure. Limitation of legislation related to data protection and customer protection will exposure the risk of identity theft and network hacker (Liu, 2015).

2.3.2 Security Challenges

Prior studies have classified main security challenges faced by mobile payment, which is authentication, authorization, integrity, privacy and availability.

Mutual authentication includes two parts: user authentication from mobile payment service providers and transaction origin authentication from financial infrastructures (Kang, 2018). If authentication is not completed before the transaction, false payment may occur if attacker gets the users' identification information. The recent development of IT has allowed biometric authentication using widely. Mobile payments may require users to enter PIN or passport to ensure access control. Cryptographic operations, like encryption lock and number idiographic, are also implemented in mobile payment security system to protect customer's information from being modified and transmitted (Wang, Hahn & Sutrave, 2016).

Only authorized users can get access to mobile payments, others cannot view transaction information even if they are participants involved in the process. Besides, transaction

information can be only provided to people who have password or biometric identification. If the user is not been authorized, hackers can decode and steal the information (Kang, 2018).

Integrity is also another essential factor for mobile payments. Since if external users change the information, authorized user's asset will be filched. Besides, information may leak during the process, so methods as tokens or one-time card that protect users' privacy should be spread (Slade et al., 2015). Finally, if mobile payment provider wants to extend availability for users, it needs to guarantee security simultaneously. However, high level of security may require more regulation and confirming processes, which may reduce the level of convenience (Kang, 2018).

According to research conducted by Wang (2016), the authors concludes recent mobile payment security mechanisms, including Fingerprint, Multi-factor authentication, and SSL/TLS. In order to meet the security requirements, mobile payments providers need to be more rigorous in process construction (Wang, 2016).

3. Methodology

In this section, the author discusses the methodology of the thesis. The author interprets what method used to collect data and what specific model used to answer the research questions.

3.1 Discussion of Data and Sample

In this thesis, primary data is collected using random sampling from a group of undergraduate students in Wenzhou-Kean University, China. The sample group is composed 150 respondents between the ages of 18 and 22. The author conducts a questionnaire to investigate the young generation's attitudes toward adopting mobile payments and opinions about future security risks. Consequently, the author explores and testifies the relationship between different factors and the level of users' adoption. By using Likert Scale Questions, the respondents can select the scores from 1 to 5 to express their opinions (1=strongly disagree, 5=strongly agree).

The questionnaire includes five sections with 19 items in total. Section A focuses on the frequency and intent of using the services provided by mobile payments. Section B captures the feedback of performance expectancy with five-point response format, including efficiency, convenience and other benefits. Section C measures the level of effort expectancy, including compatibility, simplicity and mobility. Section D focuses on the social influences of mobile payments. Section E gathers the responses of perceived technology security.

After the author collects data from questionnaire, Cronbach's alpha reliability coefficient is used to evaluate the internal data consistency and reliability of the results. If the value of alpha is from 0.70 to 1.0, then the items in that construct are similar to each other and the data can be accepted and used for further interpreting.

3.2 Discussion of Methodology & Model

The conceptual model is shown in Fig. 1. The author applies a modified UTATU2 (Unified Theory of Acceptance, and Use of Technology). Based on previous studies, the model also adds the perceived technology security as a factor into consideration. The model illustrates the relationship between users' behavior adoption and four potential determinations

(Performance Expectancy, Effort Expectancy, Social Influences and Security Concerns). There are four hypotheses the author wants to test.

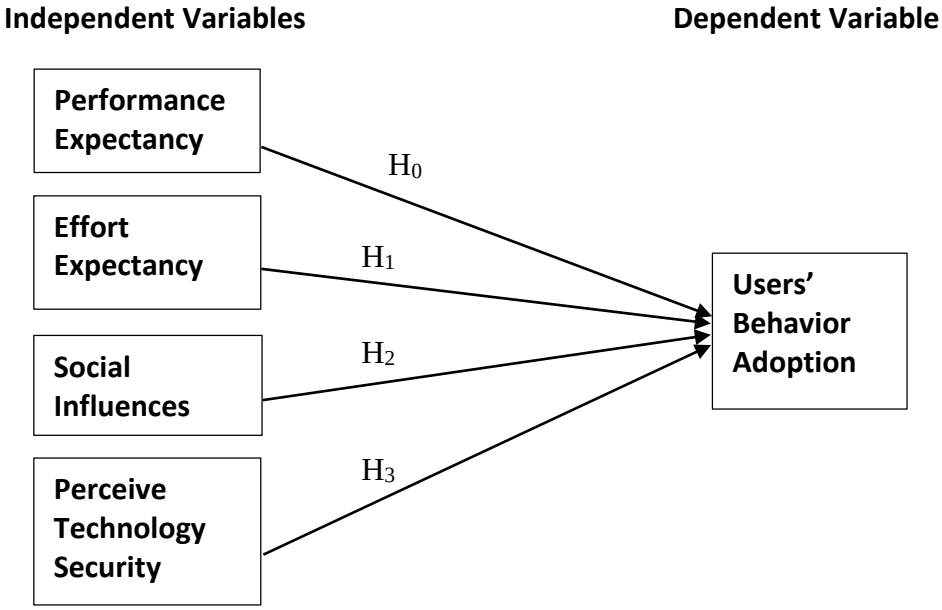

Figure 1: Conceptual Model

Regression Analysis

In order to understand the impact of different determinations on customer adoption of mobile payments, the author addresses the relationship between four factors and user's adoption by conducting a multiple regression model. The regression equation is as follows:

$$\text{Customer Behavior Adoption} = \beta_0 + \beta_1 * \text{Performance Expectancy} + \beta_2 * \text{Effort Expectancy} + \beta_3 * \text{Social Influence} + \beta_4 * \text{Perceived Technology Security} + e_i$$

Dependent Variable

The dependent variable is uses' behavior adoption, referred to customers' frequency of use and willingness to a new technology. In this thesis, the author uses questionnaire to determine the intention of using and recommending mobile payments.

Independent Variables

(1) Performance Expectancy (X_1)

Performance expectancy (PE) is referred to the level of benefits generated by the technology when users evolve in various services or participating activities. In this thesis, the author aims to evaluate the convenience and efficiency of using mobile payments when they encounter peer-to-peer transactions and when they receive suggestion of investment strategies and wealth management provided by the mobile payment facilitations. The null hypothesis is as follows:

H_0: There is no significant relationship between performance expectancy and users' behavior adoption.

(2) Effort Expectancy (X_2)

Effort expectancy (EE) is defined as the ease of using the technology. Mobile payments are simplified transaction processes and have a high-level compatibility. If the user feels easy to complete a transaction using a mobile payment, they will continue to use the method.

Besides, if the mobile payments save plenty of transaction costs and time for users, their intention of adoption will be high.

H_1: There is no significant relationship between effort expectancy and users' behavior adoption.

(3) Social Influence (X_3)

Social influence (SI) is a measure of external impact or events occurred in the environment. The author wants to put insight on external influence of customers' willingness towards this method. For instance, if the user's relatives or friends recommend this payment method to him or her, or if the prevalence promotes in the use's community, these social factors will strongly effect user's choice.

H_2: There is no significant relationship between social influence and users' behavior adoption.

(4) Perceived Technology Security (X_4)

Perceived technology security (PTS) evaluates the uses' attitudes toward safety and potential security issues. Users of mobile payments may think the methods are much safer compared with traditional methods because of advanced biometric authentication. Additionally, they do not need to consider the risk of losing wallets or physical cards.

H3: There is no significant relationship between perceived technology security and users' behavior adoption.

Correlation Analysis

The author analyzes the correlation between Performance Expectancy and Effort Expectancy to explain whether these two factors have impact with each other. If the correlation value is larger than zero, then there is a positive correlation between factors.

4. Data Results and Findings

In this section, the author firstly illustrates the data validity and reliability, and then discusses the multiple regression model results to address the research questions mentioned in previous sections. Moreover, the author also tests the relationship between Performance Expectancy and Effort Expectancy. In addition, the author compares the results with those of prior studies, and interprets its contribution to previous literatures.

4.1 Data Results

To measure the validity and data consistency, the author applies Cronbach's alpha reliability coefficient by using SPSS. Based on the results presented in Table 1, Alpha coefficient value of five different constructs are larger than 0.7 and some of them are close to 1.0, indicating that primary data collected from the questionnaire is acceptable and has a high level of internal consistency in the different scales (Bonett, 2014). Therefore, the validity of data is confirmed and data can be used in further analysis and interpretation.

Construct	Item	Average	Alpha
Customer Behavior Adoption	CBA1	4.01	0.758
	CBA2		
	CBA3		
	CBA4		
Performance Expectancy	PE1	4.05	0.84
	PE2		
	PE3		
	PE4		
Effort Expectancy	EE1	4.10	0.828
	EE2		
	EE3		
	EE4		
Social Influence	SI1	4.02	0.796
	SI2		
	SI3		
Perceived Technology Security	PTS1	2.57	0.911
	PTS2		
	PTS3		
	PTS4		

Table 1: Construct Reliability

4.2 Multiple Regression Model Results

In this thesis, to test the hypotheses, the author uses the follow multiple regression model: Customer Behavior Adoption = $\beta_0 + \beta_1$*Performance Expectancy + β_2*Effort Expectance + β_3*Social Influence + β_4*Perceived Technology Security + e_i. The results are presented in Table 2. Based on the results of regression model, the author rejects the null hypothesis (H_0), which states that there is no significant relationship between customer behavior adoption (CBA) and performance expectancy (PE). Since the P-value of PE is lower than 0.1, the relationship between PE and CBA is significant. This result indicates that PE is an important determination when users choose to use mobile payments as their most frequency payment methods, which is consistent with those of Oliveria (2016). It also has the lowest p-value among all the variables. Therefore, most of the users are satisfied with

the benefits provided by mobile payment applications, including the convenience and efficiency in daily transactions and financial management.

Moreover, p-value of effort expectancy (EE) is also lower than 0.1. H_1 is accepted and verified, implying that user willingness is strongly influenced by effort expectancy. The advantage of mobility and simplicity of mobile payments should be considered as a reason for users' choice. Mobile payments save a plenty of time and transaction costs for users. Furthermore, the majority of users thinks that they can easily understand the services provided on the payment platforms and mastering the functions of this technology is effortless. This result is also corresponding with the result founded by Oliveria (2016). Therefore, compared with traditional payment methods, the most prominent features of mobile payment are its high efficiency, operability and compatibility.

The third independent variable is social influence (SI), which also shows a remarkable relationship with CBA. H_3 is approved. The process of users' decision-making is related to things happened in their environments. Recommendations of relatives and friends should be positively affected their attitudes and intention. Besides, perfect infrastructures and mobile ubiquity make users more willing to use mobile payments. However, young generations are not sensitive to law and regulation support as the other two factors. This result may indicate that young people are less concerned about regulatory changes and law protection, or the existing regulatory system is not in place and need more implementations to build people's trust.

Although, the other three factors have obvious linear relationships, Perceived Technology Security (PES) has a prominent high P-value, which is larger than 0.1. Therefore, H_3 should be rejected and there is no significant relationship between PES and CBA. This result is different from those of previous studies (Oliveria, 2016 & Thakur, 2013). Users are not feeling safe when they are sending sensitive information through mobile payment applications. They are concerned about the risk of information leakage and the security of their personal digital accounts. Besides, they are relatively cautious about the authenticity and reliability of information provided by mobile payment platforms. With the popularity of mobile payments, people pay more attention to the potential risks of data disclosure than in previous years, which is also one of the important determinants hindering its long-term development.

	P-value
X Variable 1 (PE)	0.000178492
X Variable 2 (EE)	0.087034305
X Variable 3 (SI)	0.024704724
X Variable 4 (PTS)	0.829934092
Confidence Level	**95%**

Table 2: P-value of four variables

4.3 Correlation between PE and EE

According to the result of correlation, it is 0.77, which is positive and close to 1.0. There is a significant relationship between PE and EE. This result is also consistent with previous studies (Mallat, 2007). The benefit of using mobile payments is always accompanied by the ease of using this technology. When the functional diversification is improved, users can engage in more financial services to manage their assets. Besides, while users are enjoying the convenience and utility of this technology, they tend to have a higher PE. Therefore, if the mobile payment applications want to generate more revenues in the future, it should develop more wealth management services or small loan investment services to satisfy users' needs.

	PE	EE
PE	1	
EE	0.77	1

Table 3: Correlation between PE and EE

4.4 Contribution to the Previous Studies

The author uses a modified model called UTAUT2, which has also been used by Dr. Oliveria. The model has been simplified and reduced some factors. Besides, the thesis collects the most recent primary data from sample group with high internal consistency, so these data are valuable and worth studying. It also explores young users' perspectives of potential risks and highlights the importance of enhancing security. Since PST is quite low in young groups, and data theft can bring great financial risks to people. Designers of mobile payments should consider how to combine the regulatory system and law protection to give users' a more reliable payment environment.

5. Conclusion

The thesis mainly evaluates user's attitudes towards adopting mobile payments. In contrast to traditional payment methods, the convenience, efficiency, simplicity and low transaction cost brought by mobile payments are reasons why users want to continue to use this technology and recommend to others. While, users are worried about personal information security when they create digital accounts online. This finding suggests that developers should consider the implementation of regulatory systems and law protection, or exploit decentralized digital identity by applying block chain to reduce the occurrence of data disclosure. The thesis still has some limitations. For example, the respondents who did the questionnaire are all from Wenzhou-Kean University. Therefore, the social influence of these respondents maybe has some similarity, and they may have similar reactions towards to changes happening in their daily life. Besides, the respondents were aged between 18 and 22. The author did not get opinions from other age groups, so the results may have some bias. Since different age groups may have different ideas towards the emerging new technology, older user groups are more reluctant to change their payment habits and take a more critical view of information security. Further research should focus on how to build trust on long-term users, how to design a safer transaction environment by technology and what kind of methods that the regulation system need to improve.

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7. TABLES AND FIGURES

Table 1. Construct Reliability

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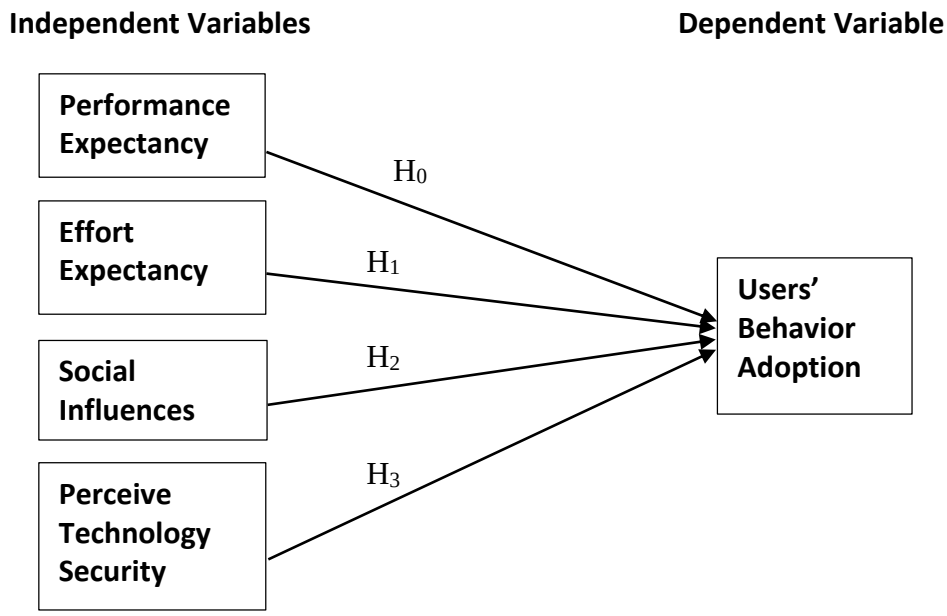
EE	0.77	1

Figure 1. Conceptual Model



8. Appendix

Appendix A (Questionnaire)

SECTION A (Customer Behavior Adoption) 1-->5=strongly disagree-->strongly agree

1. In the future months, I plan to continue use mobile payment applications.
2. In the future months, I will use mobile payment apps frequently.
3. I will recommend mobile payment applications to others.
4. I will not be reluctant when I put my personal information into mobile payment apps.

SECTION B (Performance Expectancy) 1-->5=strongly disagree-->strongly agree

1. Mobile payment can help me complete many tasks in my daily life.
2. Mobile payment can make me do my jobs more quickly.
3. Mobile payment can help me finance and invest my assets in a better way.
4. Mobile payment can help me check my payment details easily.

SECTION C (Effort Expectancy) 1-->5=strongly disagree-->strongly agree

1. I feel easy to use and master mobile payment apps.
2. I think mobile payments are much more convenience than traditional payments.
3. I think that I can easily understand and use financial services provided by mobile payment apps.
4. Mobile payments save me a lot of time compared to traditional methods.

SECTION D (Social Influence) 1-->5=strongly disagree-->strongly agree

1. I tend to choice to use mobile payment apps if someone important recommends to me.
2. I tend to choice to use mobile payment apps if the infrastructure is perfect in my environment.
3. I tend to choice to use mobile payment apps if relevant polices are advocating and promoting.

SECTION E (Perceived Technology Security) 1-->5=strongly disagree-->strongly agree

1. I feel safe when sending sensitive information in the process of using mobile payment apps.
2. I do not think that my personal information has a risk of leakage when using mobile payments.
3. I care little about the security issues when using mobile payments.
4. I think that the information provided by mobile payments apps is reliable.

APPENDIX B (Excel Results)

CBA Average	PE Average	EE Average	SI Average	PTS Average
5.00	5.00	4.50	5.00	4.50
4.25	4.75	4.75	5.00	3.00
4.75	5.00	5.00	5.00	2.75
4.25	5.00	5.00	5.00	3.25
1.50	1.00	1.00	2.33	3.00
4.75	5.00	5.00	5.00	4.00
4.75	4.50	5.00	3.67	3.00
4.50	4.50	4.75	5.00	1.25
3.50	3.75	2.75	3.67	1.50
4.00	4.00	3.75	3.67	2.00
3.75	4.25	5.00	4.33	3.50
4.00	4.00	4.00	4.00	4.00
4.50	5.00	5.00	5.00	2.00
4.50	3.50	4.25	3.00	2.00
4.00	5.00	5.00	4.00	3.00
5.00	5.00	5.00	5.00	2.50
4.50	5.00	4.50	4.33	1.00
4.50	4.50	3.75	3.67	4.00
3.25	3.75	4.00	4.00	1.50
4.25	4.25	4.50	3.67	2.25
4.75	4.50	5.00	5.00	3.00
5.00	4.50	4.75	5.00	2.25
2.50	5.00	5.00	5.00	5.00
4.50	4.00	4.25	4.33	2.75
4.75	5.00	5.00	5.00	3.25
4.50	3.25	4.25	4.00	3.25
3.75	4.00	3.75	4.00	3.25
3.00	3.25	3.75	2.00	1.00
3.75	3.50	3.75	2.33	1.00
3.75	4.00	4.25	4.00	2.00
5.00	5.00	4.00	4.67	5.00
4.50	4.75	4.50	5.00	2.00
4.75	5.00	5.00	5.00	1.75
4.75	5.00	5.00	5.00	1.00
4.50	5.00	4.50	4.67	2.25
4.00	4.25	4.25	3.67	1.75
4.00	1.50	2.00	3.67	3.50
4.00	4.00	4.00	4.00	4.00
4.25	4.00	4.25	4.00	3.75
1.00	1.00	1.50	3.33	4.00
4.50	5.00	3.50	3.33	2.00
4.75	3.50	3.25	3.33	2.25
1.75	5.00	4.00	1.00	1.00
4.00	3.75	4.50	4.00	2.75
4.50	4.25	4.50	4.00	2.25
4.25	4.50	4.75	5.00	2.25
4.00	4.00	4.00	4.00	3.50
4.75	5.00	5.00	4.33	3.25
4.00	3.50	4.00	1.00	1.50
4.25	4.50	4.50	5.00	2.50

5.00	5.00	5.00	5.00	5.00
3.00	3.25	5.00	5.00	1.25
3.25	3.25	4.25	5.00	1.00
3.00	5.00	5.00	5.00	5.00
5.00	5.00	5.00	5.00	5.00
4.25	4.25	4.00	3.33	3.00
3.25	3.00	3.50	3.00	2.75
4.00	3.25	3.00	2.33	3.00
4.25	5.00	5.00	4.33	5.00
3.50	3.50	4.00	3.00	2.00
4.00	4.75	4.75	4.67	1.75
4.75	5.00	5.00	4.67	4.00
4.00	4.75	4.25	4.00	4.50
5.00	5.00	5.00	5.00	5.00
4.50	3.75	3.50	3.67	2.25
3.75	4.75	5.00	5.00	2.75
5.00	5.00	5.00	5.00	5.00
4.25	4.00	3.75	4.33	2.50
3.75	4.00	3.25	4.00	2.25
3.75	3.50	3.50	4.00	2.50
3.50	3.75	3.75	4.33	2.25
3.75	4.00	3.75	4.33	2.00
4.25	4.00	4.25	4.33	2.00
4.00	4.00	4.25	4.33	2.25
3.50	4.00	4.00	3.67	2.25
3.75	4.00	4.00	4.00	1.75
3.50	5.00	2.25	2.67	2.75
2.75	2.50	2.75	3.00	3.75
5.00	5.00	5.00	5.00	5.00
4.00	4.00	4.00	4.00	4.00
1.00	1.00	1.00	1.00	1.00
2.00	2.00	2.00	2.00	2.00
3.00	3.00	3.00	3.00	3.00
4.00	4.00	4.00	4.00	4.00
4.00	3.75	4.00	3.67	2.25
3.50	3.75	3.75	4.33	2.50
3.75	4.25	4.50	4.33	1.75
3.50	4.00	4.00	4.00	2.00
3.75	3.75	3.75	4.00	1.25
3.75	4.00	3.75	4.00	2.00
4.00	3.50	4.00	5.00	1.50
4.25	4.00	4.25	4.00	1.50
4.00	4.00	4.50	4.00	2.25
3.75	4.25	3.75	4.33	2.00
3.50	4.75	4.00	4.00	1.50
2.00	3.00	4.50	4.67	4.50
3.75	3.75	3.75	4.67	1.50
3.75	4.50	4.25	3.33	2.00
2.25	3.00	3.00	3.00	3.00
4.00	3.50	4.25	4.00	4.00
4.00	4.00	4.00	4.00	4.00
4.00	3.75	4.75	3.33	1.75
5.00	4.00	5.00	5.00	5.00
4.25	4.25	4.25	4.00	4.00
3.75	4.50	4.00	3.67	2.00

4.50	3.25	4.25	4.67	4.00
4.25	3.00	4.25	3.33	2.25
3.75	4.25	4.00	4.00	1.50
4.00	4.75	4.00	4.33	2.25
3.75	4.00	4.00	4.00	4.00
3.00	4.00	4.25	4.33	4.50
3.75	3.75	3.75	3.67	1.75
5.00	4.25	5.00	4.00	5.00
4.00	4.25	4.00	3.33	2.00
4.00	3.00	3.00	3.00	3.00
3.75	3.75	3.75	4.33	2.25
3.75	3.75	3.75	4.33	1.25
3.75	4.25	4.00	4.00	1.50
4.00	4.50	5.00	5.00	3.25
3.75	4.25	4.75	4.33	1.50
4.00	4.50	4.00	4.33	1.50
3.00	2.50	2.50	2.33	4.00
4.50	2.75	3.50	4.00	3.25
4.50	4.50	3.75	4.33	2.75
3.00	3.25	4.00	3.33	1.00
4.75	4.25	4.25	3.67	2.50
3.75	4.00	4.00	3.67	1.50
4.00	4.25	4.00	3.67	2.00
3.75	4.25	4.75	3.67	1.50
4.00	3.75	4.25	3.67	2.25
3.75	4.00	3.75	4.00	1.50
4.50	4.50	4.75	4.00	2.25
4.50	3.75	4.00	4.00	1.50
4.75	4.50	4.75	4.67	2.25
4.75	4.25	4.25	4.00	1.75
4.75	4.25	4.75	3.67	1.75
4.75	4.50	3.75	3.67	2.00
4.75	3.75	4.00	3.67	1.75
4.75	4.25	4.00	4.00	1.50
4.75	4.50	4.00	4.00	1.75
4.75	4.50	4.00	4.67	1.75
4.50	4.00	3.75	4.33	1.50
4.25	4.00	3.75	4.00	1.75
4.50	4.00	3.75	4.33	1.50
4.50	4.00	4.25	4.00	1.75
4.25	3.75	3.75	4.33	1.25
4.50	4.00	4.00	4.00	1.25
4.25	4.25	4.00	4.00	2.00
4.25	3.75	4.00	4.33	1.25
4.00	4.00	4.25	4.00	1.75

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.666693022
R Square	0.444479586
Adjusted R Square	0.429154884
Standard Error	0.568954101
Observations	150

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.666693022
R Square	0.444479586
Adjusted R Square	0.429154884
Standard Error	0.568954101
Observations	150

ANOVA

	df	SS	MS	F	Significance F
Regression	4	37.55556178	9.388890445	29.00412758	0.000000000000000010
Residual	145	46.93777155	0.323708769		
Total	149	84.49333333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.087149051	0.283171165	3.839194046	0.000183832	0.527472694	1.646825408	0.527472694	1.646825408
X Variable 1 (PE)	0.360993921	0.093833723	3.84716615	0.000178492	0.175535363	0.54645248	0.175535363	0.54645248
X Variable 2 (EE)	0.185840325	0.107863389	1.7229231	0.087034305	-0.027347302	0.399027951	-0.027347302	0.399027951
X Variable 3 (SF)	0.179471398	0.079075112	2.269631914	0.024704724	0.023182637	0.33576016	0.023182637	0.33576016
X Variable 4 (PTS)	-0.009200627	0.042759028	-0.215173899	0.829934092	-0.093712116	0.075310862	-0.093712116	0.075310862

	Column 1	Column 2
Column 1	1	
Column 2	0.770118549	1