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**The growth of payment apps like Alipay, Apple Pay and Samsung Pay, the risks and the  
benefits, and the problems these create**

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by

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## ABSTRACT

The third party mobile payments have grown rapidly since 2010s and an increasing number of people in China start to choose third party mobile payment such as Alipay for their payment. Previous studies suggested that the convenience of using, the high security level and the using habit influence customers' choice of mobile payment apps in China. This thesis tries to examine the relationship between the convenience of using, high popularity and the discount offered by Alipay to discover the factors influence Alipay's rapid growth. Similar to previous studies, the convenience of using and high popularity have positive significant impact on consumers' preference for Alipay. However, discount offered by Alipay do not has significant effect on preference for using Alipay in my research. Then, since Alipay developed its diversified functions to satisfy users' needs and expand its market, this thesis also discovers the effect of the diversified functions of Alipay. I choose three of the diversified functions in Alipay that are Ant Forest, Yu'E Bao and Huabei and examine the impact of them on people's using intention of Alipay. The result indicates that Yu'E Bao and Huabei have significant impact whereas Ant Forest does not have significant impact on the using intention of Alipay. Finally, in contrast to Alipay, this thesis discovers the comparative disadvantages of Apple Pay and Samsung Pay to develop in China. I attempt to test whether the limitation of closed system, low utilization rate and lack of knowledge has significant influence on people's unwillingness of using Apple Pay and Samsung Pay. Based on the result, I find that it's consistent with the previous literature review that the limitation of closed system and low utilization rate positively influenced people's unwillingness of using Apple Pay. However, in my study, the lack of knowledge does not have significant impact on people's unwillingness of using Apple Pay and Samsung Pay. I build three multiple regression models and null hypothesizes to test these relationships in this thesis and utilize SPSS analysis.

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## **1.INTRODUCTION**

Mobile payment apps are growing repeatedly in recent years. As refer to the China's third-party mobile payment industry research report in 2018 released by iResearch (2019), the transaction volume of third-party payments increased by 391.3%, 103.5%, 381.9% and 104.7% in 2014, 2015, 2016 and 2017 respectively. The volume keeps steady growth with a rate of 38.6% and 25.5% in the recent two years. Among the mobile payment apps, Alipay acquired the largest market of 54.3% in China in 2018. Alipay makes efforts to become and maintain its leader position in mobile payment market. At the same time, other mobile payments such as Tenpay also grow quickly. To explore the new market in China, foreign payment apps like Apple Pay and Samsung Pay also entered the Chinese market in 2016 and tried to develop.

The emergence of mobile payments provides people with a large number of benefits as well as some problems. Due to the rapid development of mobile payment apps, people nowadays do not need to bring much cash with themselves, and they can complete lots of financial activities like paying and investing just with a mobile phone. However, the mobile payment apps also bring some risks such as the leakage of personal privacy. In addition, some people still do not trust mobile payments and have their own preference for different mobile payments.

All things considered, this paper will try to discover the specific business background in China for Alipay to grow, and analyze why mobile payments become popular and widely accepted in China but not in foreign countries like United States by comparing the different business

backgrounds. This paper will figure out how customers' choice of payment apps can be affected by conducting a survey through different group of people, and thereby found the factors influence people's trust and preference. Then the study will also determine how Alipay, Apple Pay and Samsung Pay do to help them develop in China, found the security methods applied by these three mobile payment apps and the potential problems behind the security methods by collecting the existing information and data. Further, since Alipay gained a market share that was much larger than Apple and Samsung Pay in the past years, this paper will compare Alipay with Apple Pay and Samsung Pay and thus discover reasons why Alipay can be more successful than the other two mobile payments.

## **2. LITERATURE REVIEW**

Mobile Payments like Alipay, Apple Pay and Samsung Pay are new technology which started to grow in the recent ten years, thus there are not a substantial volume of research in relation to these areas. However, there are still some research that discovered the growth factors of mobile payments, factors influence consumers' choice of between different mobile payments, how these mobile payments developed in the Chinese market, the security issue behind the mobile payments and reasons why Alipay become the market leader in mobile payment apps. This paper will discuss these content in this literature review part.

### **2.1 Factors for Alipay to grow**

Multiple factors make contribution to the growth of Alipay, while several researches have been conducted to examine the factors and figured out the specific background in China for third-party mobile payments to grow. Firstly, Mao and Chen (Mao & Chen, 2015) suggested that the technology innovation was the most remarkable factor in causing the growth of mobile

payment market. Except for technology, other factors also made contribution. As declared in China's third party payment market monitoring Report in 2017 released by iResearch (2017), the functions utilized by the Alipay such as virtual transfer meet customers' needs and the Chinese customers' payment habits in turn help Alipay expand its market. In addition, iResearch also revealed that unlike United State whose traditional financial institutions has a significant influence on ordinary users, China has more opportunities to explore its market and meet customers' demand because the traditional financial institutions in China pay little attention to their users. In this way, Alipay found its breakthrough point and surpassed the traditional financial institutions. Compared with the financial environment of United States, China has more chances and freedom to develop its mobile payment market. According to Wang and Lim (Wang & Lim 2011), customers in China were once worried about the risk of ineffective payment transaction and failure of goods delivery reduced, but Alipay make use of these drawbacks and help reduce the risk.

Alipay utilized the characteristics of Chinese market and developed the growth strategies that are suitable in Chinese market. The Economist (2017) stated that when Chinese customers accumulated wealth but had few ways to investment, and when firms had difficulty in obtaining loans, Alipay utilized this opportunity as well as the new technology to meet the market demand. In conclusion, as Dong (Dong, 2019) published in his article that the success of China's mobile payment market results from "the complete unique financial system of China and the establishment of a series of financial infrastructure".

## **2.2 Consumers' choice of payment method in China**

Up to now, several studies have been conducted to find out the factors that influence consumer's choice of mobile payment methods in China. Choi and Sun (Choi, Sun 2016) used the direct and indirect model in their study to test the relationship between the characteristics of Alipay and the reuse intention of its users. In their study, they found that usefulness, convenience, security, responsiveness and economy all have a positive influence on consumers' purchase intention. Most importantly, they discovered that among all the factors, convenience and security have the largest effect on users' reuse intention. Shao and Zhang (Shao & Zhang, 2018) also pointed out that security is the most significant factors in consumers' trust, while they stated that mobility and customization characteristics also add weight to consumers' trust in mobile payment platforms. Xie and Lin (Xie & Lin, 2014) explored factors that affect the users' acceptance of Alipay and found that consumers will be more acceptable for Alipay if they have a positive experience on using it. In addition, positive social influence also influence consumers' choice.

## **2.3 Methods applied by Alipay, Apple Pay and Samsung Pay to develop in China**

### **2.3.1 Alipay**

Currently, many different third-party mobile payments start to enter and grow in the Chinese market, while Alipay, Apple Pay and Samsung Pay all applied different methods to help them develop in China. For Alipay, according to the 44<sup>th</sup> China Statistical Report on Internet Development published by China Internet Information Center (2019), Alipay took advantage of technology innovation and developed its online business. Alipay also diversify its functions to meet customers' need. For instance, as iResearch (2019) reported in China's third party mobile payment industry research report in 2018, Alipay improved its monetary fund product Yu'E Bao that drove its purchase volume to increase rapidly in the second half of 2018. The report also

revealed that the development of offline code scanning also supported Alipay's growth in 2018. Xu (Xu, 2017) stated in her paper that since Alipay cooperated with Taobao and other firms, it expanded its field and the user groups. Xu also considered that Alipay paid more attention to building themselves into a financial instrument. In this way, Alipay could have a wide range of customer group.

### **2.3.2 Apple Pay and Samsung Pay**

For Apple Pay, XZ Palmer (XZ Palmer, 2016) showed how this payment worked in China in his article. XZ Palmer declared that Apply Pay started to enter Chinese market and develop in China by building a partnership with Union Pay. Apple Pay tried to attract more users by charging no transaction fee, no QR codes. According to Palmer, Apply Pay also offered advantages like it can work faster than Alipay and even work without an Internet connection. However, the writer also admitted that it was still not clear that whether the methods applied by Apply Pay can work well in China.

Like Apply Pay, Samsung Pay also entered the Chinese market by cooperating with China Union Pay, as the Samsung Newsroom claimed (2016). Samsung Newsroom also asserted that Samsung Pay can work on Quick Pass POS terminal with NFC technology as well as the POS terminal without NFC. Therefore, Samsung Newsroom believed that Samsung payment is more acceptable than other similar mobile payments which can only be used with NFC technology.

### **2.4 Security issueS behind mobile payment apps**

Studies have already found that mobile payments like Alipay, Apple Pay and Samsung Pay have utilized some security methods to help them ensure security, but these mobile payments still have many security problems.

### **2.4.1 Alipay**

To and Lai (To & Lai) declared that Alipay have already built the China Third-Party Payment Security Union in 2012 that improved information sharing and thus reduced the risks of online transactions. When examining security factors of mobile payment, Li (Li, 2018) took Alipay as a specific example and found that Alipay has continuously been improving its security system. As Li stated, Alipay currently can process different complicated tasks like warning and detecting risks in 0.1s and it also utilized lots of security service and identification programs.

Consequently, Li's study discovered that security function and transaction platform had a quite positive effect on Alipay. Unfortunately, Xu (Xu, 2017) argued in her study that Alipay now faces many problems such as network risks and financial risks.

### **2.4.2 Apple Pay and Samsung Pay**

Similar situations exist in Apple Pay and Samsung Pay. Based on the information provided by Samsung Newsroom (2016), Samsung Pay had "three-layer protection, which are fingerprint authentication, tokenization and KNOX". Jawale and Park (Jawale & Park, 2017) pointed out that Apple Pay applied "AR value and private security keys in the compliant devices". The mechanisms used by Apple Pay assisted it in protecting users' card data; however, Jawale and Park also admitted that the mechanisms applied by Apple Pay "make it easier for fraudsters to use misappropriated cards". Wang, Hahn and Sutrave (Wang, Hahn & Sutrave, 2016) stated that both Apple Pay and Samsung Pay use NFC technology to ensure security while Samsung Pay also applied the magnetic secure transmission (MST), however; malware and data leakage still affect the safety.

## **2.5 Comparative advantages and disadvantages of mobile payment apps**

### **2.5.1 Comparative advantages of Alipay**

As shown in the China's third-party payment market monitoring Report in 2018 by iResearch (2018), Alipay had a market share of 54.3% in 2018 that is larger than other third-party payment in China. Compared with Apple Pay and Samsung Pay, Alipay has its comparative advantages to develop in China.

After their research, Choi and Sun (Choi & Sun, 2016) revealed in their paper that convenience and security are the key sustainable factors for Alipay to grow. The two writers stated that Alipay "provides guarantee for transactions and enhances online payment through integrated diverse functions". As a result, Alipay is attractive to users due to its security and user-friendly service. Lu (Lu, 2017) discussed in his paper that Alipay is now a comprehensive fintech payment apps involving functions such as payment, financial management, banking and making loans. It's not a simple payment tool any more. Due to its comprehensive features, Alipay has been accepted by a wide range of customers including the retailers and shops, thus making it the largest digital payment system in China. Alipay also made full use of the Chinese market, as described by Xu (Xu, 2017), Alipay tries to cooperate with Taobao and other big firms in China that help it expand its area and the users' group.

### **2.5.2 Comparative disadvantages of Apple Pay and Samsung Pay**

Apple Pay faced many difficulties after entering the Chinese market. Lee (Lee, 2017) once listed the problems Apple Pay faced in China in her paper such as the technology challenges brought by NFC, Chinese customers' behavior preference in QR code and the limitations of closed payment platform. Currently, there are still few people in China using Apple Pay. A large

proportion of people even do not recognize the characteristics of Apple Pay. Huh and other five authors (Huh, et al., 2017) showed that their study found that lots of Apple Pay non-users have common misconception about Apple Pay's security, whereas only about 15% knew the secure storage mechanisms used by Apple Pay. Choi and Sun argued that in contrast to the multiple security functions developed by Alipay, Samsung Pay only offers flexible payment services. As a result, Alipay is relatively more attractive. While Apple Pay can only be used in IOS system and Samsung Pay can only be used in Android system, as Lu claimed (Lu, 2018), Alipay established its app on both IOS and Android platform. Consequently, Alipay can be used in more equipment. Lu also stated that Alipay used QR code to perform its payment function that make it cheaper and easier to enter the Chinese market and become popular. Instead, Lu said that Apple Pay and Samsung Pay are based in the NFC technology that has a higher infrastructure requirement. Therefore, technology also limit Apple Pay and Samsung Pay's growth.

### **3.DATA & METHODOLOGY**

#### **3.1 Data and Sample**

##### **3.1.1 Discussion and explanation of dataset:**

Several factors can influence Chinese customers' choice of different payment apps. Based on the previous literature, this thesis will examine whether the convenience of using, popularity and the red packet offered by Alipay have positive significant influence on the people's preference for Alipay as a payment method. I will assign one to five point to different level of agreements and preference.

Through the literature review part, we have already known that some diversified functions in Alipay affect users' using intention of mobile payment. Therefore, I want to test the influence

of these diversified functions. This thesis chooses three of the diversified functions in Alipay that are Yu'E Bao, Huabei and Ant Forest to discover whether these diversified functions increase people's using intention of Alipay and thus promote its growth. One to five points will be assigned to different level of agreements and using intention.

During the previous literature review, I learned that factors such as limitation of closed system, low utilization rate, lack of knowledge and high infrastructure requirement limit the growth of Apple Pay and Samsung Pay. However, I did not see the models to test these factors. To discover why Alipay can gain a larger market share than Samsung Pay and Apple Pay, this thesis will choose the limitation of closed system, low utilization rate and lack of knowledge about the payment apps as variables and test whether these variables have significant influence on people's willingness of using Apple Pay and Samsung Pay. In this thesis, I will use all the data from questionnaire to analyze. Similar to the previous measure of variables and dependent value, I will attribute one to five points to different levels of variables and dependent value.

### **3.1.2 Discussion of sample**

I will use questionnaire to collect data. In this survey, I expect that the respondents of the survey are Chinese users of mobile payments. The respondents include WKU students, their parents, relatives and friends. Therefore, the respondents in this survey include a wide age range and occupation kinds. The sample size is expected to be more than 60. After the finishing the survey, I received 82 effective respondents. In my sample, 71.95% are female and 28.05% are male. In addition, 35.75% people are among 18-30 years old, 31.71% people are among 41-50 years old and 20.73% are among 31-40 years old.

## 3.2 Methodology and model

### 3.2.1 Discussion and Explanation of Methodology

This thesis will use a multiple regression analysis to examine factors that would influence the using intention of Alipay and try to find that whether the influence of these variables is positive or negative. This thesis also uses multiple regression to test whether Yu'E Bao, Huabei and Ant Forest in Alipay promote people's using intention of Alipay. The multiple regression model will again be used to discover whether the limitation in third-party payment, low utilization rate and lack of knowledge about the Apple Pay and Samsung Pay have significant impact on the development of Apple Pay and Samsung Pay. In this way, thesis develops null hypothesis to determine whether to reject the null hypothesis based on the F value and P value.

### 3.2.2 Discussion and explanation of model and hypothesis:

Model 1:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + e_i$$

y = Preference for using Alipay as a payment method

x1= The convenience of using

x2 = Popularity

x3 = The discount offered by Alipay

H0: The convenience of using, popularity, diversified functions and the red packet offered by Alipay have no significant influence on people's preference for using Alipay as a payment method.

Model 2:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + e_i$$

y= using intention of Alipay as a payment method

x1 = using intention of Yu'E Bao

x2 = using intention of Huabei

x3 = using intention of Ant Forest

H0: Using intention of Yu'E Bao, Huabei and Ant Forest have no significant impact on using intention of Alipay.

Model 3:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + e_i$$

y= Unwillingness of using Apple Pay and Samsung Pay

x1 = Limitation in closed system

x2 = Low utilization rate

x3 = Lack of knowledge about Apple Pay and Samsung Pay

H0: The limitation in third-party payment, low utilization rate and lack of knowledge about the payment apps have no significant impact on Unwillingness of using Apple Pay and Samsung Pay.

## 4. ANALYSIS&FINDINGS

### 4.1 Business opportunities in China

Through the literature review section, we have already discovered that China has a specific business background that promotes Alipay to grow in China. America has a well-developed financial market, and the traditional financial institutions such as the central bank, commercial bank take important role in the American financial market. Therefore, it's difficult for third party mobile payment in USA to have a significant effect on the ordinary customers of

traditional financial market. Whereas in China, since the traditional financial institution did not focus on the needs of customers, it's easier for the third-party mobile payment to explore the developing market and influence people's payment habits. For instance, Alipay develop different functions in addition to payment to satisfy customers' need such as investment and wealth management. In this way, Alipay drives its user to develop preference to it. This thesis will discuss how different factors influence customers' choice and the growth of Alipay in the next section.

#### **4.2. Factors influence consumers' preference for Alipay in China**

Choi and Sun (Choi, Sun 2016) have already discovered that convenience and security have the most significant impact on the reuse intention on third-party mobile payment. Therefore, this thesis will examine the impact of convenience on peoples' preference for Alipay. This thesis also adds two variables which are popularity and the discount offered by Alipay based on literature review and makes a null hypothesis that the convenience of using, popularity, diversified functions and the red packet offered by Alipay have no significant influence on the using intention of Alipay as a payment method. Eighty-two questionnaires are collected during the data collection process. After using SPSS analysis, the result of analysis shows that the multiply regression model has passed the F test, because F is equal to 54.770 which is larger than 0.1. It thus also indicates that at least one of the three variables would have an impact on the dependent value. As a result, this thesis rejects the null hypothesis. The  $R^2$  of the model is equal to 0.678, meaning that the three variables can account for 67.8% of the reasons of preference for Alipay. For variable 1, the convenience of using, P is equal to 0.025. For variable 2, the high popularity of Alipay, P is equal to 0.007. Since both the p-value of the two variables are less than 0.1 and the Beta of the variables are positive, this thesis concludes that the

convenience and high popularity of Alipay have significant positive impact on the preference of using Alipay. This result of the impact of convenience factor is consistent with the research result provided by Choi and Sun. The survey also shows that 86.59% candidates use Alipay to make offline payment and 67.07% usually deal with payment amount less than 200 RMB. People prefer for to use mobile payment for they do not need to bring too much money along them. The mobile payment can allow they to free from bringing small changes and can pay only with their mobile phone. This explanation can also be seen in our survey that 67.07% of candidates usually pay less than 200RMB in a single transaction. In addition, high popularity is also positively influence the preference of using Alipay. People in China may prefer to use Alipay because Alipay can be used in most stores and areas in China and people nearby are all using Alipay. The high popularity variable reveals a new research direction and we can study this variable in depth in the future. In contrast, variable 3, the discount offered by Alipay, has P-value equal to 0.115. As the P value of variable 3 are larger than 0.1, it does not have significant impact on the preference of using Alipay. This result shows that candidates are indifferent to the discount offered by Alipay.

$$y = 0.309 + 0.326x_1 + 0.413x_2 + 0.123x_3$$

y = Preference for using Alipay as a payment method

x1= The convenience of using Alipay

x2 = High Popularity

x3 = The red packet and discount offered by Alipay

### **4.3 The effect of diversified functions in Alipay**

Alipay firstly tried to develop itself by cooperating with other firms and platforms. Based on the survey, 79.27% participants began to know Alipay through online shopping on Taobao. The

cooperation between Alipay and other platforms promotes Alipay to become more popular in the users' group. Through the previous literature review, we knew that Alipay has diversified its functions to satisfy customers' needs to help it develop and expand the market. In addition to its payment function, Alipay also developed other functions like investment and wealth management. Although through the survey this thesis finds that most candidates use Alipay mainly dealing with its payment functions, 30.49% and 34.15% candidates also frequently use Alipay to manage their wealth and use third-party service. In this section, this thesis chooses three of the diversified products in Alipay and tests whether these diversified functions have significant impact on the using intention of Alipay through multiply regression. The three diversified products are Ant Forest, Yu'E Bao and Huabei that are served for environmental protection, wealth management and credit functions. The null hypothesis is that Ant Forest, Yu'E Bao and Huabei do not have significant impact on the using intention of Alipay. Through SPSS analysis, I knew that the R square of the model is equal to 0.609, indicating that the three independent variables used in the model can explain for 60.9% of the reasons for people's using intention of Alipay. The model built is meaningful and at least one of the independent values can be responsible for the dependent value, for F is equal to 40.411 that is larger than 0.1. Based on the F value, this thesis does not accept the null hypothesis. The first variable, ant forest, has a p-value equal to 0.840 that is larger than 0.1, so it does not have significant effect on the using intention of Alipay. According to the survey, young participants are more interested in Ant Forest, they like collecting the energy produced by their payment and stealing their friends' energy to compete with friends and plant more trees. However, people over 40 years old do not concern about the Ant Forest in Alipay. Some even do not know about it. These reasons may explain why Ant Forest cannot have significant impact on using intention of Alipay. In addition, the environmental protection function may be less attractive than other

monetary functions like wealth management, banking and loans. Whereas the second variable, Yu'E Bao, has a p-value equal to 0.012 and the third variable, Huabei, has a p-value equal to 0.006. These two variables have p-value less than 0.1, the maximum acceptable significance level. Since the p-values of Yu'E Bao and Huabei are less than 0.1 and the Beta of the two variables are larger than 0, Yu'E Bao and Huabei have significant positive impacts on the using intention of Alipay. In other word, the wealth management and credit functions in Alipay positively influence people's using intention of Alipay. This result is consistent with the report released by China Internet Information Center and the finding by iResearch. However, according to this testing, not all diversified functions in Alipay have significant impacts on using intention of Alipay. We can thus discover that why Ant Forest cannot have a significant influence on the preference for Alipay in details in the future.

$$y = 1.039 + 0.022x_1 + 0.355x_2 + 0.493x_3$$

y= Using intention of Alipay

x1 = Using intention of Yu'E Bao

x2 = Using intention of Huabei

x3 = Using intention of Ant Forest

For Apple Pay and Samsung Pay, since they have started to develop in China in 2016, they both do not have many developing methods right now. This thesis has already discussed the current developing strategies taken by these two third-party mobile payments on the literature review section, so we will not talk about more in the analysis part.

#### **4.4 Concern over security issues of mobile payments**

Based on literature review, we recognized that Alipay has already established an excellent security system, and we also learned that Apple Pay and Samsung Pay both have provided security protection in their service and products. The survey also claims that 17.07% participants keep neutral on the mobile payments, 63.41% participants trust the mobile payments, and 14.63% participants strongly trust the third-party mobile payments. The result of the questionnaires reveals that most participants keep positive attitude towards the third-party mobile payments. However, there're still some security concerns over the third-party mobile payments. During the survey, I found that 85.37% of participants are concerned about the problems of personal information leakage as the literature showed. Some people are also worried about some other problems such as account fund stolen and network malware.

#### **4.5 Comparative disadvantages of Apple Pay and Samsung Pay in Chinese market**

Right now, this thesis has already discussed the comparative advantages of Alipay such as the factors drive people to choose Alipay, the method applied by Alipay to develop and grow in China in the previous analysis. This thesis has already discovered that why Alipay can gain a large market share. Consequently, in this section, this thesis will try to find why Apple Pay and Samsung Pay do not achieve a good performance in China as expected.

In the survey, none of the candidates choose to prefer Apple Pay and Samsung Pay over other payment methods. Previous studies have discovered that the limitation of closed payment platform, low utilization rate and lack of knowledge about Apple pay and Samsung Pay all limited the growth of Apple Pay and Samsung Pay. In this way, this thesis builds a null hypothesis that Limitations in third-party payment, low utilization rate and lack of knowledge about the payment apps have no significant impact on the unwillingness of using Apple Pay and

Samsung Pay. The result of the SPSS analysis shows a F value larger than 0.1, meaning that the null hypothesis cannot be accepted. The R square of 0.902 that indicates the three independent values are responsible for 90.2% of the reasons for people's unwillingness of using Apple Pay and Samsung Pay and at least one of the variables can have an impact on the dependent value. Variable 1 and 2, the limitation of the closed system and the low utilization rate have p-values less than 0.1, and they also have a beta larger than 0. Therefore, the limitation of closed payment platform and low utilization rate have significant positive impact on the unwillingness of using Apple Pay and Samsung Pay. Since Apple Pay can only be used in IOS system, people who do not have iPhone will not choose Apple Pay. Similarly, Samsung Pay can only be used in Samsung mobile phone, so people who do not have a Samsung mobile phone will not choose to use Samsung Pay. Currently, Apple Pay and Samsung Pay can only be used in few areas and store in China. As a result, people may feel uncomfortable and thus become unwilling to use these two mobile payments. The influence of these two variables have the similar results with prior studies. However, in this model, variable 3, the lack of knowledge about Apple pay and Samsung Pay has a p-value equal to 0.140. As a result, the lack of knowledge about Apple pay and Samsung Pay does not have significant effect on unwillingness of using Apple Pay and Samsung Pay. This result is different from the previous study, and it can be a new direction of future research.

$$y = 0.069 + 0.429x_1 + 0.621x_2 - 0.092x_3$$

y= Unwillingness of using Apple Pay and Samsung Pay

x1 = Limitation of closed system

x2 = Low utilization rate

x3 = Lack of knowledge about Apple Pay and Samsung Pay

In addition to the variables listed above, time length of using Alipay and the familiarity with Alipay can also account for people's preference for Alipay and unwillingness of using Apple Pay and Samsung Pay. As shown in the survey, 87.8% of the candidates have used Alipay for more than 3 years. However, Apple Pay and Samsung Pay just entered the Chinese market 3 years ago. Since Alipay developed much earlier in China than Apple Pay and Samsung Pay, people have already built their using habit in Alipay at the time when Apple Pay and Samsung Pay entered in China. As a result, people in China may not be willing to use a new payment apps when they are familiar with Alipay. All things considered, Apple Pay and Samsung Pay have comparative disadvantages in Chinese market that limit their growth and development. In future studies, we can build a new model and test whether the time length of using Alipay and familiarity with Alipay have significant effect on people's unwillingness of using Apple Pay and Samsung Pay.

## **5. CONCLUSION**

In this thesis, I use multiple regression to analyze the factors influence people's preference and using intention of Alipay, and I also attempt to discover factors limit Apple Pay and Samsung Pay in Chinese market. Based on the multiple regression, this thesis discovers that the convenience of using and high popularity have a significant positive impact on people's preference for Alipay, but the discount offered by Alipay does not have such effect. For Alipay's diversified functions, not all functions have significant positive effect on the using intention of Alipay. During the analysis, this thesis found that Yu'E Bao and Huabei have positive significant effect on the using intention of Alipay, indicating that the wealth management and credit functions increase people's using intention of Alipay. Unfortunately, Ant Forest, a program in Alipay targeting at environment protection does not have such effect as Yu'E Bao and Huabei.

When discovering the limitation factors of Apple Pay and Samsung Pay, this thesis found that the limitation of closed system and low utilization rate have positive significant impact on people's unwillingness of using Apple Pay and Samsung Pay. However, lack of knowledge does not have significant impact on people's unwillingness of using Apple Pay and Samsung Pay, which is different from the previous study.

Based on the results, in the future, I want to discover which factors promote and which factors limit the using intention and willingness of Apple Pay and Samsung Pay after these two mobile payments launched in China for a longer time. Finally, I would also like to improve the third model in this thesis. I need to revise the measure of the dependent value. In my questionnaire, I measure the dependent value in a negative way. Since I assume people are unwilling to use Apple Pay and Samsung Pay in the survey, this assumption can cause misunderstanding and thus leads to errors in the results.

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## 7. APPENDIX

### Appendix A: Results for regression analysis

Table 1: Regression analysis for preference of using Alipay

Result of regression analysis (n=82)									
	Non-standardized Coefficients		Standardized Coefficients	t	p	VIF	R <sup>2</sup>	Adjusted R <sup>2</sup>	F
	B	Standard Error	Beta						
Intercept	0.309	0.28	-	1.104	0.273	-	0.678	0.666	F(3,78)=54.770,P=0.000**
Convenience of using	0.326	0.143	0.351	2.285	0.025*	5.733			
High Popularity	0.413	0.15	0.416	2.752	0.007**	5.546			
Discount	0.123	0.077	0.123	1.594	0.115	1.442			
Dependent Value : Preference of using Alipay									
D-W Value : 1.786									

Table 2: Regress analysis for using intention of Alipay

Result of regression analysis (n=82)									
	Non-standardized Coefficients		Standardized Coefficients	t	p	VIF	R <sup>2</sup>	Adjusted R <sup>2</sup>	F
	B	Standard Error	Beta						
Intercept	1.039	0.26	-	3.999	0.000**	-	0.609	0.593	F(3,78)=40.411,P=0.000**
Using intention of ant forest	0.022	0.11	0.021	0.203	0.84	2.186			
Using intention of Yu'E Bao	0.355	0.139	0.352	2.558	0.012*	3.762			
Using intention of Huabei	0.439	0.122	0.45	3.607	0.001**	3.099			
Dependent value: Using intention of Alipay									
D-W Value : 2.078									

Table 3: Regression analysis for unwillingness of using Samsung Pay and Apple Pay

Result of regression analysis (n=82)									
	Non-standardized Coefficients		Standardized Coefficients	t	p	VIF	R <sup>2</sup>	Adjusted R <sup>2</sup>	F
	B	Standard Error	Beta						
Intercept	0.069	0.123	-	0.563	0.575	-	0.902	0.898	F(3,78)=238.238,P=0.000**
Limatation of closeed system	0.429	0.087	0.423	4.939	0.000**	5.819			
Low utilization rate	0.621	0.081	0.629	7.649	0.000**	5.355			
Lack of knowledge	-0.092	0.062	-0.094	-1.49	0.14	3.124			
Dependent Value: unwillingness of using Samsung Pay and Apple Pay									
D-W Value : 1.753									

### Appendix B: Survey

#### Third-party Mobile Payment 第三方移动支付

I am a finance senior in Wenzhou-Kean University. I am carrying a study about the growth of payment apps like Alipay, Apple Pay and Samsung Pay, the risks and the benefits, and the problems these create. All responds will be strictly confidentiality. Your identity will be anonymous. Thanks for participating. 您好，这是一个关于第三方支付的调查问卷，您的信息将全程匿名，问卷数据仅用于研究分析，感谢您的参与。

您的性别 Your gender: [单选题] \*

男 Male

女 Female

您的年龄段是 Your age: [单选题] \*

18 以下 Under 18

18-30

31-40

41-50

51-60

60 以上 Over 60

您每周使用移动支付的频率是 Your frequency of using mobile payment is [单选题] \*

0-3 次

4-7 次

8-11 次

12-15 次

16 以上 more than 16

您更倾向于使用哪种支付方式 Which payment method do you prefer to [单选题] \*

支付宝钱包 Alipay

现金支付 Cash payment

三星支付 Samsung Pay

苹果支付 Apple Pay

其他 Others

您已经使用支付宝多久了 How long have you used Alipay? [单选题] \*

1 年 One year

1-2 年 One to two years

3 年以上 More than three years

您是如何了解到支付宝的 How did you know Alipay? [多选题] \*

- 淘宝购物 Do online shopping through Taobao
- 余额宝理财 Wealth management by Yu'E Bao
- 红包活动 Red packet
- 蚂蚁森林 Ant Forest
- 他人介绍 Introduced by others
- 广告 Advertisement
- 其他 Others

我使用支付宝因为 I choose to use Alipay because : 1-->5 表示非常不同意 Strongly Disagree -->非常同意 Strongly Agree[矩阵量表题] \*

	1	2	3	4	5
使用方便快捷 Convenience	<input type="radio"/>				
普及率高 High Popularity	<input type="radio"/>				
红包优惠活动 Red Packets and Discount Activity	<input type="radio"/>				

7.您平常经常使用支付宝的哪些功能 The functions you often used with Alipay: [多选题] \*

- 线下扫码收付款 Offline code scanning to receive and pay money
- 转账 Transfer Account
- 线上消费支付 Online consumption Payment
- 交通出行 Public transportation
- 理财管理 Wealth Management

第三方服务 Third-party service

其他 Others

您使用支付宝交易的单笔数额一般在 The amount in your single transaction payment is always: [单选题] \*

1~200 元

201~500 元

501~1000 元

1001~2000 元

2001~5000 元

5000 元以上

对于支付宝的偏爱程度 Preference for Alipay : 1-->5 表示非常不同意 Strongly Disagree-->非常同意 Strongly Agree[矩阵量表题] \*

	1	2	3	4	5
我偏爱使用 支付宝 I prefer to use Alipay	<input type="radio"/>				
支付宝中的 蚂蚁森林促 使我更多地 使用支付宝 The ant forest in Alipay promotes me to use Alipay more frequently:	<input type="radio"/>				

支付宝中的 余额宝功能 促使我更多 地使用支付 宝 The Yu'E Bao in Alipay promotes me to use Alipay more frequently	<input type="radio"/>				
支付宝中的 花呗功能促 使我更多地 使用支付宝 The Huabei in Alipay promotes me to use Alipay more frequently:	<input type="radio"/>				

您对移动支付的信任程度 What's your trust level for mobile payment? [单选题] \*

- 非常不信任 Strongly Distrust
- 不信任 Distrust
- 中立 Neutrality
- 信任 Trust
- 非常信任 Strongly Trust

对于支付宝的安全问题，您有哪些担忧 What's your concern over the security issue of mobile payment? [多选题] \*

- 个人信息泄漏 Personal Information Leakage

□账户资金盗取 Account Fund Stolen

□其他 Others

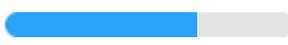
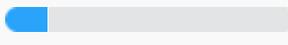
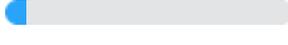
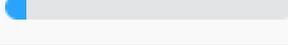
对于三星支付和苹果支付存在的问题 Problems for Samsung Pay and Alipay: 1-->5 表示非常不同意 Strongly Disagree>非常同意 Strongly Agree[矩阵量表题] \*

	1	2	3	4	5
我不愿意使用三星和苹果支付 I am unwilling to use Samsung Pay and Alipay:	<input type="radio"/>				
我不愿意使用三星和苹果支付因为它们只能在特定系统和设备上使用 I am unwilling to use Samsung Pay and Apple Pay because they can only be used in a specified system and equipment.	<input type="radio"/>				
我不愿意使用三星和苹果支付因为	<input type="radio"/>				

能够使用它们的地方很少 I am unwilling to use Samsung Pay and Alipay because they can only be used in few places:					
我不愿意使用三星和苹果支付因为我对它们不了解 I am unwilling to use Samsung Pay and Apple Pay because I have little knowledge about them:	○	○	○	○	○

### Appendix C: Survey results

Table 1: The amount in a single transaction payment

选项	小计	比例
1~200 元	55	 67.07%
201~500 元	12	 14.63%
501~1000 元	6	 7.32%
1001~2000 元	6	 7.32%

2001~5000 元	2	2.44%
5000 元以上	1	1.22%
本题有效填写人次	82	

Table 2: Ways people know about Alipay

选项	小计	比例
淘宝购物 Do online shopping through Taobao	65	79.27%
余额宝理财 Wealth management by Yu'E Bao	22	26.83%
红包活动 Red packet	17	20.73%
蚂蚁森林 Ant Forest	11	13.41%
他人介绍 Introduced by others	12	14.63%
广告 Advertisement	1	1.22%
其他 Others	12	14.63%
本题有效填写人次	82	

Table 3: Payment method preferred by people

选项	小计	比例
支付宝钱包 Alipay	72	87.8%
现金支付 Cash payment	2	2.44%
三星支付 Samsung Pay	0	0%
苹果支付 Apple Pay	0	0%
其他 Others	8	9.76%
本题有效填写人次	82	

Table 4: Time length people have used Alipay

选项	小计	比例
1 年 One year	5	6.1%
1-2 年 One to two years	5	6.1%

3 年以上 More than three years	72	 87.8%
本题有效填写人次	82	

Table 5: People's trust level for mobile payment

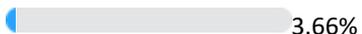
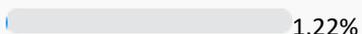
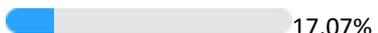
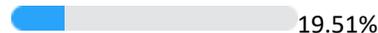
选项	小计	比例
非常不信任 Strongly Distrust	3	 3.66%
不信任 Distrust	1	 1.22%
中立 Neutrality	14	 17.07%
信任 Trust	52	 63.41%
非常信任 Strongly Trust	12	 14.63%
本题有效填写人次	82	

Table 6: People's concern over the security issue of mobile payment?

选项	小计	比例
个人信息泄漏 Personal Information Leakage	70	 85.37%
账户资金盗取 Account Fund Stolen	50	 60.98%
其他 Others	16	 19.51%
本题有效填写人次	82	