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How do online payment applications change consumption?

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by

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ABSTRACT

Combined with technology innovation, online payment develops very well and expands its offline market step by step, in order to achieve to further coverage of people's lives. Going out without wallet is gradually becoming people's normal habits. Online payment applications continue to show their characteristics of small amount but high frequency, and the convenient services. The coexistence of online payment and cash is still the major phenomenon. The conflicts between commercial banks and online payment indicate that the current online payment is still a dynamic market. These situations can change immediately due to variable factors which are related to consumers. This paper investigates several variables that can lead to the increase in consumption and also finds out differences and similarities between NFC and QR-Code payment, which are helpful to explain reasons why different countries have their different focuses and show the high popularity in China. Also, this research aims to discover several perceived risks and the relationship between them and consumers' trusts or attitudes. This paper finds that both higher trust degree and perceived convenience of usage have significant influence on the increase in consumption. Economic, function and privacy risks are three important risks and there is an negative relationship between perceived risks and consumers' trust. Consumers' attitudes towards payment come from both those applications' security guarantees and institutions' and governments' reactions. The growth of applications have made up for traditional financial services and it's useful for clients to increase credits.

Key words: online payment applications, NFC payment, QR-Code payment, perceived risks, regulations, traditional commercial banks, increase in consumption, positive consumption psychology higher trust degree, perceived convenience of usage, TAM

1 INTRODUCTION

With the development of technology innovation, mobile payment gradually plays a very important role in the modern world. The new payment method changes people's daily lives in many areas, speeds up fund transactions and it also stimulates the whole economic tendency. The popularity of smart phones makes online payment applications a kind of basic access to pay.

Online payment platforms have various payment methods, such as NFC, QR code, and online banking. NFC payment means that the transaction is done by NFC, which is a basic hardware requirement with the limitation of four inches. The typical NFC payments are Apple Pay, Samsung Pay, Google Wallet and so on. Nowadays NFC payment is a major payment all over the world, especially Apple Pay. Another important payment method is QR-Code payment, which is quite popular in China. Alipay and Wechat Pay is the two significant applications used by most people. Alipay even spread around the world because of the Chinese large population. QR-Code is a new generation of wireless payment access that can be printed in many places and make transactions become more convenient than ever before. There is also another payment way named online banking. It is the Internet version of commercial banks' businesses, which provides financial services by using the application of those banks. So using these applications or websites, clients can do many basic banking businesses safely and quickly at home, such as depositing and investing. This method reduces banks' operating costs and clients' waiting time, also largely improves banks' profits.

But there are many differences between QR-Code and NFC. Take Alipay as an example, it services as the third-party payment, which not only has fast payment, but also provides many other collateral financial transactions to increase profits.

The objective of this paper is to do a survey to research the question that how do the online payment applications change consumption. Besides the major question, this paper also aims to figure out similarities and differences between those NFC and QR-Code payments. With the increasing number of users, the growth of online payment applications also creates and reduces many types of risks. Moreover, this research tries to find out the current regulatory policies towards mobile payments, policies made by financial institutions and government, and what additional efforts that those parties should do to improve regulations. Those findings are helpful to discover online payment's influences. In addition, online banking is another pattern of manifestation of commercial banks. There are many conflicts and benefits between mobile payment and traditional commercial banks. Another research question is to study influences that the growth of payment applications have on commercial banks' development. It shows another point that online payment can impact the economy.

2 LITERATURE REVIEW

In terms of the question that how do online payment applications change consumption, survey was done by delivering questionnaires. Also, case study promotes the comparisons between NFC and QR-Code payment. Because of the sample of survey is limited in WKU students, so it is hard to get objective results about consumers' perceived risks, governments and financial institutions' regulatory reactions, the impact of online payment applications on consumption, and the relationship between Internet finance and traditional commercial banks. So those questions are figured out in Literature Review.

2.1 Risk Perception

In 1964, the concept of perceived risk was firstly proposed by Raymond A. Bauer in his customer behavior research to study several phenomena such as brand loyalty, reference groups, information seeking, opinion leaders and so on (Ho & Ng, 1994). The definition has slightly differences among many latter researchers in their studying areas. Bauer held the view that perceived risk is a kind of combination of uncertainty with unpleasant consequences. Later it is regarded as an expectation of consumption losses and it impedes the purchasing process in the e-commerce area. For online payment, more specifically, perceived risks are the possible losses during the ideal outcome pursuing by using mobile payments (Yang, Pang, Liu, Yen & Tarn, 2015).

2.1.1 Types of perceived risk

The sorting methods are variable and depend on different perspectives with different focuses. Combining many antecedent articles, Yang et al. (2015) proposed suitable hypotheses that online payment have the following facets of risks: economic, functional, security, social, service, physical, psychological, and privacy risk. Among them, economic, function and privacy risks are far more important than other facets.

Also, the nature of perceived risks results in different customer reactions. Consumers are sensitive to transaction risks. The more money involved in online transactions, the higher risks that consumers can perceive.

2.1.2 Trust

Given by Mayer et al. (1995), in online payments, consumer trust is a kind of trusting beliefs and attitudes with the hope of entire obligation fulfillment by payment platform even without serious regulations. The relationship between trust and perceived risk is complicated. Some authors think that the relationship is parallel, others argue that there is a direct cause-effect relationship between the two factors (Yang et al., 2015).

2.1.3 Risk analysis of third-party payment by PEST Model

PEST Model is a business model to analyze a company's environment, which consists of political, economic, social and technological elements (Lao & Jiang, 2009). In political elements, there are several related risks such as qualification for market access, legal status of payment platform, limitation of payment and legal responsibility. From the economic perspective, risks are related with competition in market and customers' credits. With regard to technological prospect, security systems play an very important role in the development of online payment tendency. Also, there are plenty of solutions from the four perspectives. For example, in the social area, strengthening business cooperation is helpful to reduce risks.

2.2 Regulation

To sum up, instead of interfering with innovation competition in the mobile payment area, the objective of regulation is to stimulate a more complete payments regime, control financial stability, monitor risks and finish an efficient online payment process. Many efforts have been paid to improve the safety and integrity of online payment systems. Many new

regulations have started revising or publishing protection issues to develop risk management and immediate credit capabilities (Liu, Kauffman & Ma, 2015).

2.2.1 Existing regulations

Federal regulators state that the current financial services regulations are suitable to mobile payments, which means no more extensive regulation is needed. The consumer protections depend on payment instrument rather than the payment method. So the author holds the view that both offline payment and online payment consumers are granted the same regulations for fraud and unauthorized payments (Khan, Olanrewaju, Baba, Langoo & Assad, 2017).

On the contrary, the separate regulatory law is likely to cause confusion because the paying process is same. He doesn't think that digital wallets like Apple Pay and Google Wallet have higher risks than credit or debit card. So this kind of payment mechanisms should be treated like normal payments because transactions are based on the card. Till now, there is no federal laws specifically regulate mobile payments. But in order to prevent consumers from being frauded by third parties, several laws are set to achieve it, such as Electronic Funds Transfer Act (EFTA) and The Truth in Lending Act (TILA) (Lowry, 2016).

2.2.2 Technology companies' freedom

Those technical companies which involve in mobile payments are not necessary to be supervised by CFPB. They are not responsible for unfair or fraud transactions which come from financial institutions' mistakes. Otherwise, it can be a kind of regulatory burden. Besides, even without existing regulations, those online payment applications have their own strong security system to protect consumers' information and each transaction (Lowry, 2016).

2.2.3 Supervisions for money laundering in online payments

With the development of information technology, the online payment has stimulated the money circulation speed, promoted the economic activities and transactions. On the other hand, it also provide convenience to criminal behaviors such as money laundering. Money laundering makes use of electronic currency's characteristics such as invisible, high speed and concealment in order to transfer money laundering activities from real world into virtual world. (Peng, 2011) So it is necessary to improve the anti-money laundering work to keep safety environment.

The aim of regulators is to identify money launderers as accurate as possible. So it is important to analyze available information first, pick suitable money-laundering recognition algorithm, then screen those abnormal transaction data and conduct a survey about them. At last, according to the survey result and public reactions, regulators need to adjust the current regulatory policies and also recognition algorithm (Feng, Yan, Yang & Zhang, 2008). Feng et al. (2008) also state that behaviors of money-launderers, recognition algorithm, and sentencing capacity have influences on regulatory effects in different perspectives. So several improvements should be done to achieve better results, like strengthening the standardization and strictness of the registration and approval of e-commerce and third-party online payment accounts, verifying users' information, making regulators more sensitive to public pressure, increasing the proportion of fines and so on.

2.3 Third-party payment VS traditional commercial banks

In today's world, E-commerce gradually plays a more important role between consumers and merchants. But till now the laws and regulations are not perfect. At the same time, the risk of

third-party payment can be transferred easily to traditional banks. So it is quite significant to figure out the impact of online payments on commercial banks, which is useful for both sides to balance the Internet finance and traditional banks.

2.3.1 Comparison between them

To some extent, third-party payment plays a role similar to the central bank's payment and clearing, as well as the function of credit guarantee. Both platforms provide individual financial accounts, which can achieve the multi-directional development.

The online payments have different financial commodity attributes, which also increase the difficulty of currency control, but become attractive at the same time. Many kinds of transaction costs, handling fees, and differences between currency conversion made by online payments are quite lower than traditional banks (Lai & Chuah, 2010). Also, compared with traditional banks, the online payments provide better user experience because of lower cost, shorter time, easier payment process and more opportunities to meet individualized needs. (Yang & Liang, 2018). With continuous technology innovation, it is expected that third-party platforms can provide more convenient and efficient trading process. In addition, take China as an example, due to the issue of licenses to third-party payment agencies by the people's Bank of China, strong credit guarantee allows the same protection to transactions.

2.3.2 Third-party payment's Influences on traditional financial industries

It has both positive and negative influences on different areas.

For negative parts, firstly, it decreases commercial banks' intermediate income. Income from payment business is the major profit in banks. However, because of electronic

payments' expansion and credit guarantee, more customers choose to pay online.

Additionally, with the opening of more financial transactions held by online payment applications, the functions of online banks become less important among users. Secondly, there is an obvious replacement of multilateral businesses by third-party payment such as payment of gas and electricity fees, financial commodity and fund product sales. Thirdly, as mentioned above, its better experience occupied the most market of offline banking system (Yang & Liang, 2018).

For positive parts, Yao, Di, Zheng & Xu (2018) indicate that third-party payments have had an obvious and positive correlation, which can keep stable in the long term, with the traditional financial industries' abilities to create value by promoting the economic value added to financial institutions and the whole industry because of indirect benefits that third-party payment has. There is a primary symbiotic relationship as well as industry synergy effect to prove (Yao et al., 2018). First, the necessity for users to open their bank accounts before the usage of third-party payment increases banks' incomes. Secondly, the many types of fees such as gateway fee and custody fee to banks also increase banks' incomes. Thirdly, the wide usage of online payment applications improve liquidity in the financial sectors and help them absorb scattered funds. To sum up, the payment technology innovation acts as an industry synergist.

2.3.3 Commercial banks' responses

First of all, it is indispensable for banks to improve their security system and user experience by learning the success of third-party payment applications and thinking from users' perspectives (Huang, 2017). Also, the big problem between online and offline parties is the lack of trust. So cooperating with third-party payment enterprises to develop B2B, B2C and

C2C market is a useful way to achieve the win-win result. What's more, in order to improve innovation and combine Internet finance with bank systems, it is helpful to absorb domestic and foreign financial industry professionals (Yang & Liang, 2018).

2.3.4 Internet finance, monetary policy & bank risk preferences

Bank risk-taking is increasingly impacted by a loose monetary policy, and this policy prevents banks from building risk perception and disgust, which may lead to more risks than thought. Also, the weakening effect of Internet finance development maybe be caused by changes in risk susceptibility to monetary policy and it finally increase the possibility to market fluctuations (Qiao, Chen & Xia, 2018). The initial development of Internet finance has the positive influence on commercial banks because it can decrease management cost and risk-taking. However, later it can have negative influence due to the effect of capital cost increase, which exacerbates banks' risk-taking ability. So the relationship or the effect with each other between internet finance and commercial banks is complicated (Guo & Shen, 2016)

2.4 Consumer behaviors

2.4.1 Theory of Reasoned Action (TRA)

According to Ajzen & Fishbein (1980), TRA supposes that consumers are rational and not impacted by unconscious factors, so that they can entirely control their behaviors. Personal Attitudes in terms of subjective norm and behaviors have an influence on behavior intention, which leads to Actual Behavior. But the biggest shortcoming of this theory is the lack of

objective constraint variables from outside environment. Later in 1991, Ajzen added perceived behavioral control (PBC), the extrinsic variable, into TRA to show the perception of interest in resources and needs by consumers. It impacts behavior intention indirectly and leads to Theory of Planned Behavior (TPB).

2.4.2 Technology Acceptance Model (TAM)

This theory indicates that consumers' behavioral intention is decided by the attitude of using, which is changed by innovation features such as both perceived usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989). He deleted the participation of subjective norm and TRA's beliefs and motivations. But he kept the construction perceived behavior control in TPB.

2.4.3 Different effects of consumer beliefs, social influence, personality traits

All those factors show different effects on intention between initial accepters and current users, which is the very important clue for online payment application innovators to keep a long-term relationship or build application loyalty. They need to contribute more energy to solve customers' problems about perceptions of relative advantages and risks (Yang, Lu, Gupta, Cao & Zhang, 2012).

3 METHODOLOGY AND DATA

This thesis have four research questions in total. Two of them are solved in literature review. The other two are studied by case study and survey. Both qualitative and quantitative methodologies and models or analytical methods are used to this research.

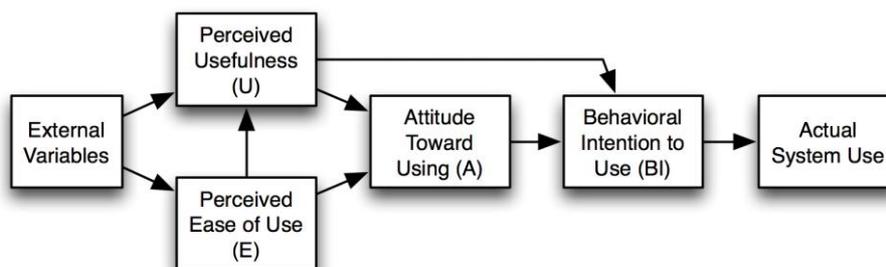
3.1 Quantitative methodology

Survey was used as a quantitative methodology to research the question that how do online payment applications change consumption. A questionnaire was made and delivered among WKU students in order to find how do online payment applications change consumption. It includes respondents' basic information, usage habits and attitudes towards online payment applications.

3.1.1 Technology Acceptance Model & Variables

The questionnaire focuses on three major variables that may have positive influences on consumption and Technology Acceptance Model is the key method to consider those important variables.

Figure 1. Technology Acceptance Model, version 1. (Davis, 1989)



As introduced in Literature Review, TAM is a significant method to determine several possible variables that can change consumptions by impacting peoples' attitudes toward using through perceived usefulness and perceived ease of use, and then lead to determine behavioral intention at last.

The three variables are: positive consumer psychology (PCP) of avoiding cash-loss feeling and satisfaction from consumption, higher trust degree (HTD) due to the reduction of lower perceived risks and the increasing quality of service, and perceived convenience of usage (PCOU). All three are independent variables and the increase in consumption is the dependent variable. Likert scale was used to calculate the dataset results. Five degrees of answer numbered 1 to 5 representing willingness was set for respondents to choose. At last, 107 respondents were collected to do the multiple Regression Analysis, which analyzed the relationship between independent variables and the dependent variable. The sample of questionnaire is WKU students. There are several advantages to choose this sample. Firstly, they are easy to connect and be delivered the questionnaire, which means results of survey can be more reliable and real compared with those data from larger students range such as Wenzhou students. Secondly, WKU students can also represent a kind of groups of Chinese students' attitudes and choices. To some extent it has its meaning for the research.

3.1.2 Multiple Regression Analysis

After collecting data, multiple regression analysis was applied to get results by using the excel function of data analysis. Here is the formula form of regression equation:

$$\textit{Increase in consumption} = \alpha + \beta_1\textit{PCP} + \beta_2\textit{HTD} + \beta_3\textit{PCOU} + \varepsilon$$

Before conducting the survey, null hypotheses are established that all three independent variables (PCP, HTD and PCOU) have no significant influence on the increase

in consumption, and alternative hypotheses are all three independent variables (PCP, HTD and PCOU) have significant influence on the increase in consumption.

3.2 Qualitative methodology

Case study is another qualitative methodology which is helpful for researchers to select one or more targets as objects and systematically collect data and resources to get more comprehensive results. The dataset is two major categories consisting of NFC Payment and QR-Code payment. Apple Pay and Google Pay are two examples of NFC Payment, Wechat Pay and Alipay are two representatives that can be used to figure out functions of QR-Code Payment. Several different perspectives such as payment processes, functions, conveniences and their shortcomings were compared to analysis those payment applications.

4 ANALYSIS AND FINDINGS

This research figures out the four research questions by using different methodologies and results are showed in variable ways.

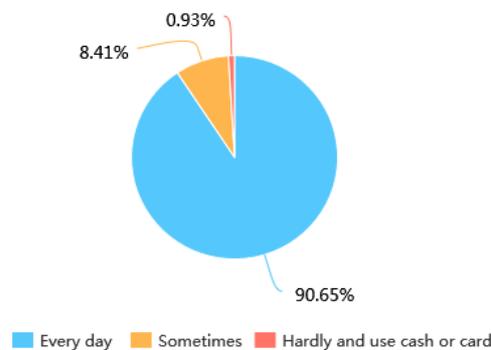
4.1 Survey Result

4.1.1 Basic Information

There are 107 valid respondents in total, the sex ratio of female to male is 67: 33, senior students occupy the most part, which accounts for 60.75%, junior students rank second, sophomore students rank third and the number of freshmen is fewest, which is only 5. Most students get their monthly incomes from families, the percentage of incomes that from scholarship and part-time jobs are equal to 21.5%, and the majority monthly incomes range from 1500 – 3000 RMB.

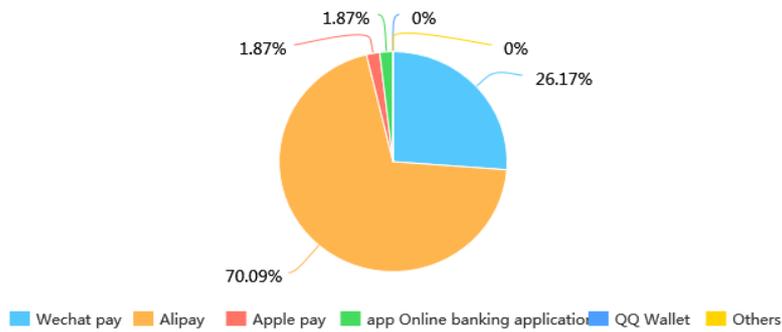
From the survey's 107 valid data, most students, up to 90.65%, in WKU use online payment applications every day, 8.41% of students sometimes use them and nearly almost no students use cash or other offline payment methods in their daily lives.

Figure 2. Proportions of Usage Frequency



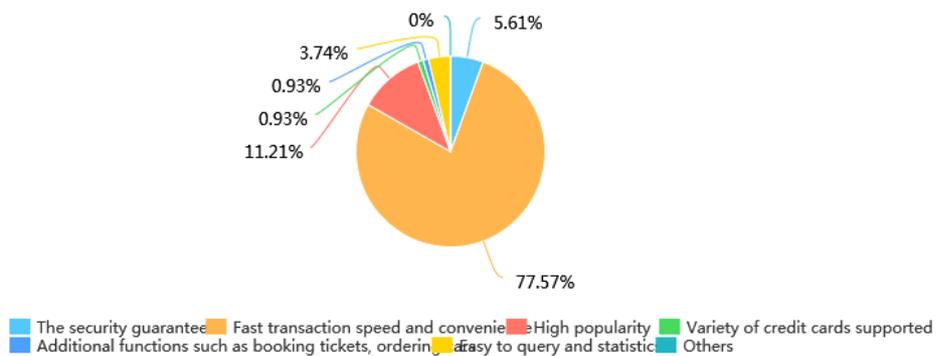
Among students who use online payment applications frequently, Alipay is the most popular choice for them, and Wechat Pay ranked second. The percentage ratio between the two major payment methods in China is almost 7:3.

Figure 3. Proportions of Different Platforms



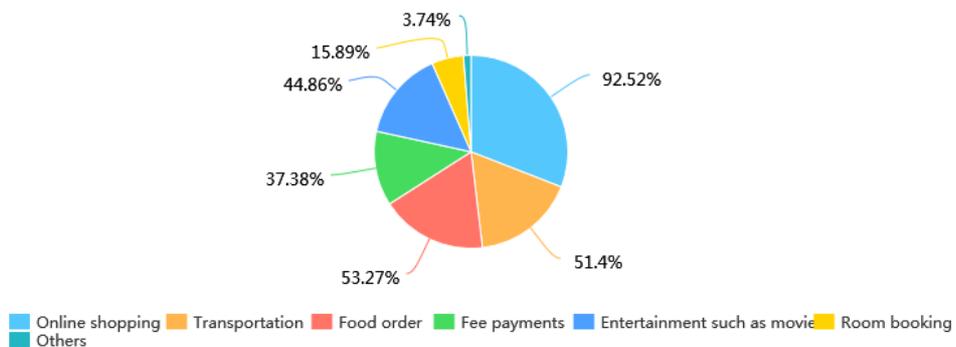
Fast transaction speed and convenience are the major reason why 77.57% WKU students choose to use online payment applications. The security guarantee and high popularity also account for some percentages but the number is small.

Figure 4. Proportions of Using Reasons



According to the data, conclusions can be drawn that most students pay more in online shopping, transportation and food order payment have similar proportion at around 52%, entertainment ranks fourth and fee payments rank fifth.

Figure 5. Proportions of Consumption Distribution



4.1.2 Likert Scale & Multiple Regression Analysis Result

The other questions' results using Likert Scale are analyzed by multiple regression analysis. Before the analysis, three null hypothesis are made by referring to Technology Acceptance Model, which determines the important independent variables. Those hypothesis are: Positive consumption psychology, higher true degree and perceived convenience of usage have no significant influence on the increase in consumption. Table 1 and 2 show the overall dataset and the complete result of multiple regression analysis. After reading the P-value of each independent variable, which are 0.2336551, 0.0001375 and 0.0024612, and comparing those numbers with $\alpha=0.1$, the final results are: Positive consumption psychology has no significant influence on increase in consumption, but both higher true degree and perceived convenience of usage have significant influence. And the formula can be written as following:

$$\text{Increase in consumption} = 1.0731 + 0.0839PCP + 0.2775HTD + 0.2398PCOU$$

Here is the simple result of P-value of each independent variables:

Table 1. Multiple Regression Analysis (Part)

	Coefficients	P-value
Intercept	1.97310998	4.945E-08
Positive consumption psychology	0.08386818	0.23365512
Higher trust degree	0.277544	0.00013751
Perceived convenience of usage	0.23979499	0.00246124
Total observations	107	

4.1.3 Related Concepts in Previous Researches

Based on the study which focuses on the relationship between consumer trust and perceived trust by Yang et al. (2015), consumers' perceived risks can impact negatively their trust degrees on online payment development. Those perceived risks are influenced by PU (perceived usefulness) and PEOU (perceived ease of use), which are two important factors in Technology Acceptance Model (Davis, 1989). Also, Yang et al. (2015) draw conclusions that

consumer perceived risks are able to have negative influence on their intentions to pay by online payment applications through attitudes and trusts and intentions can finally make changes.

Their conclusions are similar with some of my research's findings that higher trust degree and perceived convenience of usage have significant influences on the increase in consumption. But an inverse result is that, from Yang et al.' perspective, compared with traditional payment methods, online payment will be preferable for consumers when their trusts towards online payment are high.

However, results from this survey show that most respondents use online payment applications frequently so that this frequency leads to their higher trusts. It means that it is high frequency of usage leads to higher trusts, not higher trusts result in high frequency of usage.

4.2 Case Study Result

From the table made through case study, several conclusions can be drawn. Comparisons have been done between NPC payment and QR-Code Payment (Huang, 2017). The results show that in China, QR-code payment is the major method and it occupies the largest proportion of users, which closes to 90%. But both payment methods have their advantages and disadvantages. For NFC, it has faster payment speed, easier payment process and it supports no-network payment, but it is limited within short distance transmission and only support mobile phones which contain NFC chips. On the contrary, QR-code payment has unlimited transmission distance and supports any smartphones with network access license, but it's speed relies on Internet speed and process seems a little bit longer than NFC payment.

Here is the result of case study:

Table 2. Case Study Result

		NFC Payment (Apple Pay, Google Pay)	QR-Code Payment (Wechat Pay, Alipay)
characteristics	Hardware cost	\$3-4	\$0
	Platform compatibility	NFC-Supported mobile phones	any smartphones
	Transmission distance	<10km	unlimited
	Technology	NFC short distance communication technology	Web (remote payment)
	data storage	built-in chip in mobile phone	Store in the cloud
	payment speed	Fast	depend on Internet speed
	no-network payment	Support	Nonsupport
	data transmission	encryption	unknown
	Payment verification	Touch ID, Face ID, PIN	Touch ID, Face ID, PIN
security		High	Medium
market percentage	In 2018, 89.5% of users said they most often used QR-Code to make payment. NFC payment on terminal devices ranked second, accounting for 27.2% . 23.7% of users choose to pay from merchant client to third-party client, ranking third. Another 8.4% of users use other payment methods, such as mobile web payment, reply to text message payment and call hotline payment.		
payment process & time usage	Apple Pay (4 steps): Directly approach the POS machine, the phone sense and call out the interface of card cutting - fingerprint verification/Face ID - (non-small secret requires payment password)- Sign the bill (complete payment)	Alipay (6 steps): unlock the screen - find the app - open the app - payment icon - scan the code - (non-small secret requires payment password) - complete payment. WeChat (8 steps): unlock the screen - find the app - open the app - click "+" in the upper right corner - payment or wallet entry - payment icon - scan code - (non-small secret requires payment password) - complete payment	

4.3 Research Questions Summary

All four research questions have been solved by survey, case study and literature review. In literature review, questions of different types of perceived risks, related regulations from government, banks and financial institutions have been figured out. Economic, function and privacy risks are three most important ones that online payment have and are necessary to decrease even eliminate. Because risk perception has the negative relationship with consumer trusts and it is also regarded as a basic requirement before online payment is applied into every daily situations, such as sharing bicycle fees, supermarket checkout and so on. Consumers' suspicious

attitudes towards online payment come from both the security guarantee those applications themselves, and also government and institutions' reactions or solutions such as strict regulation. Consumers' trusts are much higher than in China than foreign countries. So putting emphasis on risk awareness and its reduction, adjusting regulations is quite important in those countries to achieve zero marginal cost of payment.

Also, the impact of third-party payment (Alipay as an example) on commercial banks and the relationship between internet finance and traditional commercial banks are studied. From functions of financial system's perspective, online payment growth and its emerging market have filled the blank of traditional finance services, expanded the boundaries, and have also become a key method for individuals and enterprises to increase credits.

Differences and similarities among different online payment applications are discovered by case study and the question of how online payment change consumption is researched through survey. With the coming of 5G era, combing QR-code or NFC payment with traditional payment devices and using artificial intelligence to achieve better interactive experience with buyers and sellers are quite important to think about.

4.4 Contributions

To sum up, although the establishment of the survey and case study is based on previous theory (TAM) and the results have some similar points as other studies', this research has some contributions. For example, it builds up the connection among

perceived risks, trust and consumers' attitudes and behavior intentions. Also the influences of online payment on commercial banks provide explanations of consequences about widespread usage of online payment nowadays. Those findings are helpful for further studies aim to figure out commercial banks' transition ways, the possibility of eliminating perceived risks, and achieve to final smooth and convenient checkout experience that converts potential customers into real buyers and fosters long-term, loyal buying and selling relationships among local and cross-border consumption groups.

5 CONCLUSION

This paper finds that higher trust degree and perceived convenience of usage have significant influence on the increase in consumption. But consumers' positive consumption psychology has no influence.

Also, compared with NFC payment, QR-Code payment is the major method in China. However, both two payments have their own pros and cons. And the phenomenon of two payments' usage is different in other countries. Those differences are related with the popularity of different online payment applications and consumers' trusts, as well as using habits.

Previous literatures indicates and evaluates many different types of perceived risks using several analyzing models such as PEST Model, especially for risks came from third-party payments, and the negative relationship between trust and perceived risks. To reduce risks, regulations are quite important and many existing regulations

examples are showed to illustrate that those governments indeed did some efforts. For example, supervisions which are made to reduce money laundering got many attentions because of the serious situation. At the same time, the freedom is technology companies is also a key concept to avoid too many regulations by each organization.

Moreover, online payment applications and traditional commercial banks have influences on each other. Online payment applications are created because of large demand to faster and more convenience financial transactions and businesses. Those applications also have both positive and negative impacts on offline commercial banks and these influences result in banks' responses to improve clients' trusts and using frequencies towards their services. To deep content, online payment or third-party payment belongs to Internet finance, and the relationship between it and commercial banks is quite complex.

There are some theories supporting the reasons behind consumers' behaviors, such as Technology Acceptance Model and Theory of Reasoned Action. In the determination of several independent variables in the survey design, those theories are quite important to explain consumers' attitudes and intentions.

But there are some limitations that can more or less impact the accuracy of research findings. Firstly, the sample of survey is WKU students and according to results, it is obvious that the percentage ratio of each grade students is not balanced. The sample is a little bit small and the ratio may has a few influences on conclusions because with age, students' attitudes and intentions can change a lot.

Secondly, in order to get specific data, some range of the case study is limited in China such as the market percentage. For further study, if want to achieve the more accurate results, the sample of survey can be enlarged on Wenzhou students or

extended to other respondent groups such as senior citizens, teenagers and middle-aged crowd. Under the diversification of different categories of ages, the results can prove more reliable information. In addition, for the case study, with the purpose of comparing different situations in both China and foreign countries, it's better to do more case studies focus on market percentages and payment processes overseas.

Those findings will be helpful to answer the question that why the popularity of QR-Code payment is not widely accepted by foreign consumers even if its high convenience.

REFERENCES

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- Guo, P., & Shen, Y. (2016). The impact of Internet finance on commercial banks' risk taking: evidence from China. *China Finance and Economic Review*, 4(1), 16.
- Heredia Salazar, R. (2017). Apple Pay & Digital Wallets in Mexico and the United States: Illusion or Financial Revolution?. *Mexican law review*, 9(2), 29-70.
- Ho, S. S., & Ng, V. T. (1994). Customers' risk perceptions of electronic payment systems. *International Journal of Bank Marketing*, 12(8), 26-38.
- Huang, Jin, "How Mobile Payment Is Changing The World" (2017). Student Theses, Papers and Projects (Computer Science). 5.
https://digitalcommons.wou.edu/computerscience_studentpubs/5
- Jawale, A. S., & Park, J. S. (2016, August). A security analysis on apple pay. In *2016 European Intelligence and Security Informatics Conference (EISIC)* (pp. 160-163). IEEE.
- Kang, J. (2018). Mobile payment in Fintech environment: trends, security challenges, and services. *Human-centric Computing and Information Sciences*, 8(1), 32.
- Kazan, E. (2015, December). The Innovative Capabilities Of Digital Payment Platforms: A Comparative Study Of Apple Pay & Google Wallet. In ICMB (p. 4).
- Khan, B. U. I., Olanrewaju, R. F., Baba, A. M., Langoo, A. A., & Assad, S. (2017). A compendious study of online payment systems: Past developments, present impact, and future considerations. *International journal of advanced computer science and applications*, 8(5), 256-271.
- Lai, P. M., & Chuah, K. B. (2010, October). Developing an analytical framework for mobile payments adoption in retailing: a supply-side perspective. In *2010 International Conference on Management of e-Commerce and e-Government* (pp. 356-361). IEEE.
- Lao, G., & Jiang, S. (2009, September). Risk analysis of third-party online payment based on PEST model. In *2009 International Conference on Management and Service Science* (pp. 1-5). IEEE.
- Liu, J., Kauffman, R. J., & Ma, D. (2015). Competition, cooperation, and regulation: Understanding the evolution of the mobile payments technology ecosystem. *Electronic Commerce Research and Applications*, 14(5), 372-391.
- Lowry, C. (2016). What's in your mobile wallet: An analysis of trends in mobile payments and regulation. *Federal Communications Law Journal*, 68(2), 353-384.

-
- Lu, L. (2018). Decoding Alipay: mobile payments, a cashless society and regulatory challenges. *Butterworths Journal of International Banking and Financial Law*, 40-43.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20, 709–734.
- Pal, D., Vanijja, V., & Papasratorn, B. (2015). An empirical analysis towards the adoption of NFC mobile payment system by the end user. *Procedia Computer Science*, 69, 13-25.
- Qiao, H., Chen, M., & Xia, Y. (2018). The Effects of the Sharing Economy: How Does Internet Finance Influence Commercial Bank Risk Preferences?. *Emerging Markets Finance and Trade*, 54(13), 3013-3029.
- Wang, J., & Gu, L. (2017). Why is wechat pay so popular?. *Issues in Information Systems*, 18(4), 1-8.
- Wang, Y., Hahn, C., & Sutrave, K. (2016, February). Mobile payment security, threats, and challenges. In *2016 second international conference on mobile and secure services (MobiSecServ)* (pp. 1-5). IEEE.
- Weibing, P. (2011). Research on money laundering crime under electronic payment background. *J. Comput*, 6(1).
- Yang, L. H., & Liang, X. T. (2018, May). The Impact of Third Party Payment on Commercial Banks. In *4th Annual International Conference on Management, Economics and Social Development (ICMESD 2018)*. Atlantis Press.
- Yang, Q., Pang, C., Liu, L., Yen, D. C., & Tarn, J. M. (2015). Exploring consumer perceived risk and trust for online payments: An empirical study in China's younger generation. *Computers in Human Behavior*, 50, 9-24.
- Yang, S., Lu, Y., Gupta, S., Cao, Y., & Zhang, R. (2012). Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits. *Computers in Human Behavior*, 28(1), 129-142.
- Yao, M., Di, H., Zheng, X., & Xu, X. (2018). Impact of payment technology innovations on the traditional financial industry: A focus on China. *Technological Forecasting and Social Change*, 135, 199-207.
- Yun, F. E. N. G., Chang, Y. A. N., Dong-mei, Y. A. N. G., & Jing-jing, Z. H. A. N. G. (2008). Detection and supervision for money laundering in e-commerce based on third party online payment [J]. *Systems Engineering-Theory & Practice*, 12.

APPENDIX

Appendix A Questionnaire

In this section, I will ask you some questions about your personal information. Your response is very important and I ensure you of the complete anonymity of your response.

1. What is your gender?
 - a) Male
 - b) Female
2. What is your year level in college year?
 - a) Freshman
 - b) Sophomore
 - c) Junior
 - d) Senior
3. Where does your monthly income come from?
 - a) Parents or other family members
 - b) Part-time jobs
 - c) Scholarships
 - d) Others_____
4. What is your monthly income (RMB) ?
 - a) 0-1500
 - b) 1500-2000
 - c) 2000-2500
 - d) 2500-3000
 - e) 3000-3500
 - f) 3500-4000
 - g) 4000 and above
5. What is the frequency for you to use online payment applications?
 - a) Every day
 - b) Sometimes
 - c) Hardly and use cash or card
6. What is your favorite online payment applications?
 - a) Wechat pay
 - b) Alipay
 - c) Apple pay
 - d) Online banking applications
 - e) QQ Wallet
 - f) Others_____
7. The percentage of online payment in your monthly income
 - a) 0-20%
 - b) 20-40%
 - c) 40-60%
 - d) 60-80%
 - e) 80-100%
8. Why do you choose online payment applications? (MultiSelect)
 - a) The security guarantee

-
- b) Fast transaction speed and convenience
 - c) High popularity
 - d) Variety of credit cards supported
 - e) Additional functions such as booking tickets, ordering cars
 - f) Easy to query and statistics
9. What parts do you pay more?
- a) Online shopping
 - b) Transportation
 - c) Food order
 - d) Fee payments
 - e) Entertainment such as movies
 - f) Room booking
 - g) Others_____

Now I want to investigate what is your attitudes that online payment applications can change consumption.

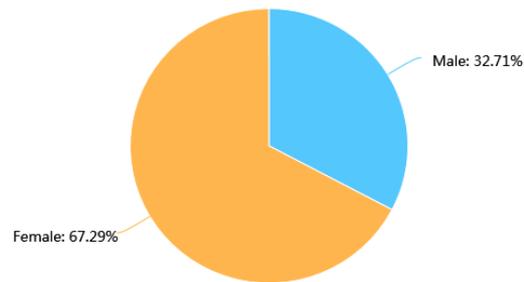
Direction: Please choose a score in the column that best describe your answer. The scores range from 1 to 5, from strongly disagree to strongly agree.

1. The frequent usage or the widespread popularity of online payment applications can increase the consumption amount.
 - a) Strongly disagree
 - b) Disagree
 - c) Normal
 - d) Agree
 - e) Strong agree
2. Consumer psychology of avoiding cash-loss feeling and satisfaction from consumption can change the consumption amount by stimulating.
 - a) Strongly disagree
 - b) Disagree
 - c) Normal
 - d) Agree
 - e) Strong agree
3. Higher trust due to the reduction of lower perceived risks and the increasing quality of service can change the consumption amount by showing the familiar level towards those platforms and concerning about social group environment.
 - a) Strongly disagree
 - b) Disagree
 - c) Normal
 - d) Agree
 - e) Strong agree
4. Perceived convenience of usage can change the consumption amount, so that more transactions can occur during some periods.
 - a) Strongly disagree
 - b) Disagree
 - c) Normal
 - d) Agree
 - e) Strong agree

Appendix B Dataset of Questionnaire

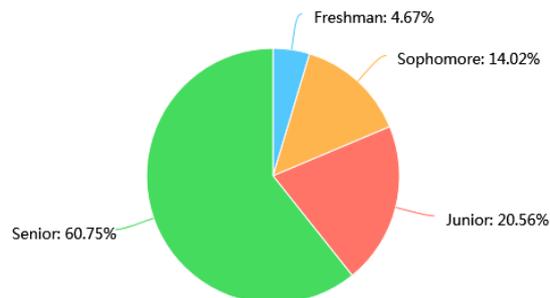
1. What is your gender?

Male	35	32.71%
Female	72	67.29%
Total	107	



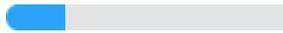
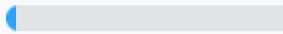
2. What is your year level in college year?

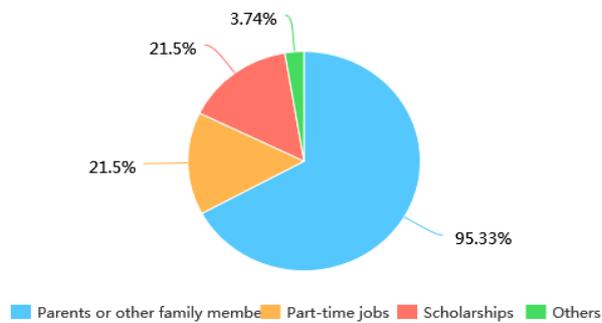
Freshman	5	4.67%
Sophomore	15	14.02%
Junior	22	20.56%
Senior	65	60.75%
Total	107	



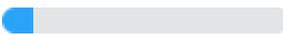
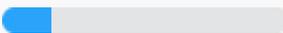
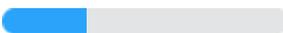
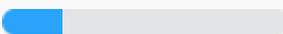
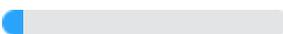
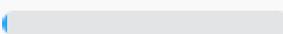
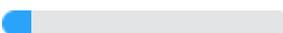
3. Where does your monthly income come from?

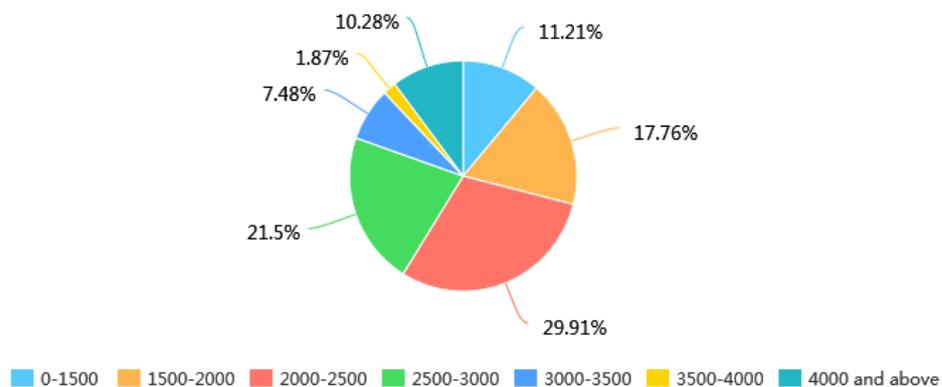
Parents or other family members	102	95.33%
Part-time jobs	23	21.5%

Scholarships	23	 21.5%
Others	4	 3.74%
Total	107	

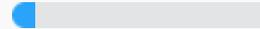
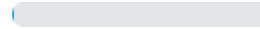


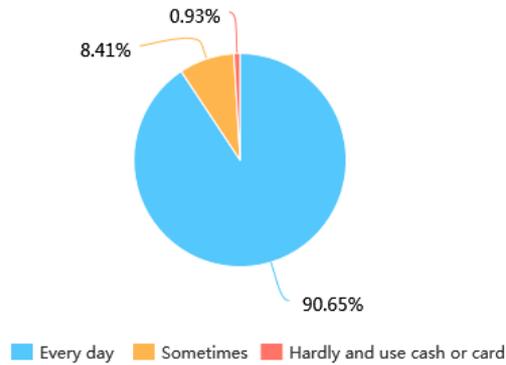
4. What is your monthly income (RMB) ?

0-1500	12	 11.21%
1500-2000	19	 17.76%
2000-2500	32	 29.91%
2500-3000	23	 21.5%
3000-3500	8	 7.48%
3500-4000	2	 1.87%
4000 and above	11	 10.28%
Total	107	

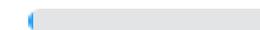
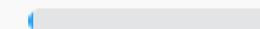
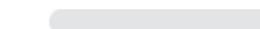
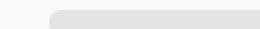


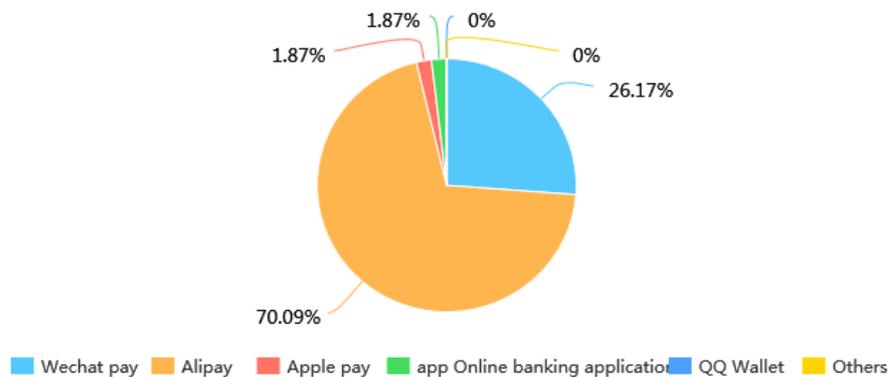
5. What is the frequency for you to use online payment applications?

Every day	97	 90.65%
Sometimes	9	 8.41%
Hardly and use cash or card	1	 0.93%
Total	107	

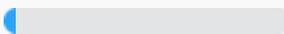
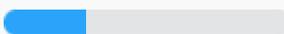


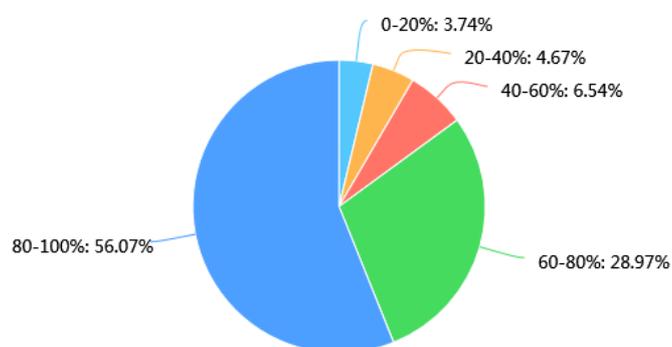
6. What is your favorite online payment applications?

Wechat pay	28	 26.17%
Alipay	75	 70.09%
Apple pay	2	 1.87%
app Online banking applications	2	 1.87%
QQ Wallet	0	 0%
Others	0	 0%
Total	107	

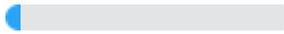
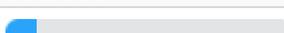
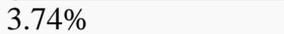


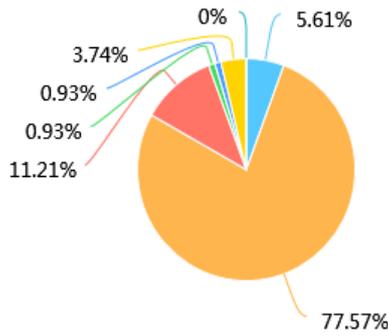
7. What is the percentage of online payment in your monthly income?

0-20%	4	 3.74%
20-40%	5	 4.67%
40-60%	7	 6.54%
60-80%	31	 28.97%
80-100%	60	 56.07%
Total	107	



8. Why do you choose online payment applications?

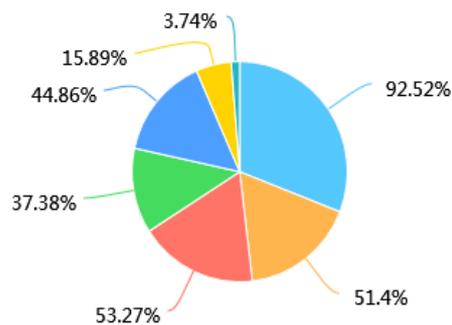
The security guarantee	6	 5.61%
Fast transaction speed and convenience	83	 77.57%
High popularity	12	 11.21%
Variety of credit cards supported	1	 0.93%
Additional functions such as booking tickets, ordering cars	1	 0.93%
Easy to query and statistics	4	 3.74%
Others	0	 0%
Total	107	



■ The security guarantee
 ■ Fast transaction speed and convenience
 ■ High popularity
 ■ Variety of credit cards supported
 ■ Additional functions such as booking tickets, ordering
 ■ Easy to query and statistic
 ■ Others

9. What parts do you pay more?

Online shopping	99	<div style="width: 92.52%;"><div style="width: 92.52%;"></div></div> 92.52%
Transportation	55	<div style="width: 51.4%;"><div style="width: 51.4%;"></div></div> 51.4%
Food order	57	<div style="width: 53.27%;"><div style="width: 53.27%;"></div></div> 53.27%
Fee payments	40	<div style="width: 37.38%;"><div style="width: 37.38%;"></div></div> 37.38%
Entertainment such as movies	48	<div style="width: 44.86%;"><div style="width: 44.86%;"></div></div> 44.86%
Room booking	17	<div style="width: 15.89%;"><div style="width: 15.89%;"></div></div> 15.89%
Others	4	<div style="width: 3.74%;"><div style="width: 3.74%;"></div></div> 3.74%
Total	107	



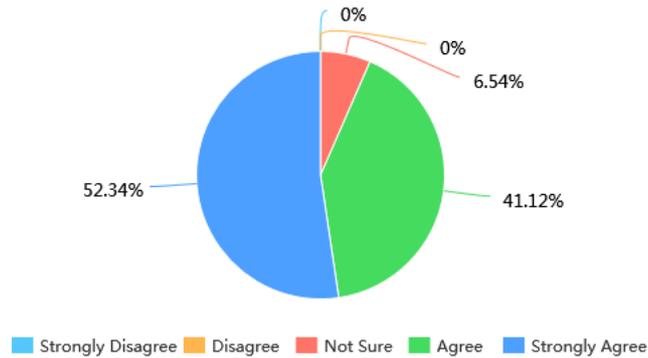
■ Online shopping
 ■ Transportation
 ■ Food order
 ■ Fee payments
 ■ Entertainment such as movie
 ■ Room booking
 ■ Others

10. The frequent usage or the widespread popularity of online payment applications can increase consumption.

Average: 4.46

Strongly Disagree	0	<div style="width: 0%;"><div style="width: 0%;"></div></div> 0%
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Disagree	0	0%
Not Sure	7	6.54%
Agree	44	41.12%
Strongly Agree	56	52.34%
Total	107	



11. I think the following factors have positive influence on the increase in consumption/can stimulate consumption.

Average: 4.12

Questions	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Average
Positive Consumer psychology	1(0.93%)	6(5.61%)	13(12.15%)	57(53.27%)	30(28.04%)	4.02
Higher trust degree	0(0%)	7(6.54%)	13(12.15%)	60(56.07%)	27(25.23%)	4
Perceived convenience of usage	0(0%)	3(2.8%)	7(6.54%)	49(45.79%)	48(44.86%)	4.33
Total	1(0.31%)	16(4.98%)	33(10.28%)	166(51.71%)	105(32.71%)	4.12

Appendix C Dataset Using Likert Scale

Increase in consumption	Positive consumption psychology	Higher trust degree	Perceived convinence of usage				
				4	4	4	5
				4	4	5	3
				5	4	4	4
				5	5	5	5
5	5	4	5	4	2	3	4
4	4	4	4	5	5	5	5
5	4	4	4	4	4	4	4
5	3	3	5	5	4	4	4
4	2	2	4	5	4	4	4
5	5	5	5	4	4	4	4
4	4	4	4	5	5	5	5
5	5	5	5	5	5	4	5
4	3	3	4	5	5	5	5
5	5	5	5	5	5	5	5
5	5	4	5	5	4	5	5
4	2	3	5	5	4	5	5
3	4	2	2	5	4	4	4
4	4	3	5	4	4	4	4
5	5	5	5	3	2	4	5
5	4	4	4	5	5	5	5
4	2	5	2	5	5	5	5
5	4	4	4	5	5	4	5
4	5	5	5	5	5	5	5
4	4	4	4	4	4	4	4
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4	4	4	4	3	4	2	5
3	2	3	2	3	4	3	5
5	4	5	5	4	4	4	4
5	4	2	3	3	3	3	3
5	4	4	4	4	4	4	4
4	4	4	4	4	3	4	4
4	4	4	4	5	3	4	5
5	1	4	4	5	4	4	4
3	4	2	4	5	5	5	5
4	4	4	4	5	5	5	5
5	4	4	5	4	4	4	4
4	4	4	5	5	5	5	5
4	3	4	4	4	3	4	4
5	4	4	5	5	4	4	4
5	4	3	3	4	5	3	5
4	4	4	4	5	3	2	5
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5	5	5	5	4	5	2	5
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4	4	4	4	5	5	5	5
5	3	4	4	4	3	4	4
5	4	4	5	4	4	4	4
4	3	3	4	5	4	4	5
5	5	4	5	4	4	4	4
5	4	4	5	5	4	4	4
5	5	5	5	4	3	4	4
5	5	5	5	5	4	4	4

Appendix D Multiple Regression Analysis

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.60198157							
R Square	0.36238181							
Adjusted R Square	0.34381041							
Standard Error	0.50108882							
Observations	107							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	3	14.69847713	4.89949238	19.5128929	4.30E-10			
Residual	103	25.86227053	0.25109001					
Total	106	40.56074766						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.97310998	0.335126041	5.88766536	4.945E-08	1.308466521	2.63775344	1.308466521	2.637753444
positive consumption psychology	0.08386818	0.070005118	1.19802931	0.23365512	-0.054970457	0.22270682	-0.054970457	0.222706823
higher trust degree	0.277544	0.070063199	3.96133782	0.00013751	0.138590169	0.41649783	0.138590169	0.416497829
perceived convinence of usage	0.23979499	0.077240326	3.1045311	0.00246124	0.086607024	0.39298296	0.086607024	0.392982961