

FACTORS THAT INFLUENCE USER'S CONTINUANCE INTENTION ON NEAR FIELD COMMUNICATION (NFC) MOBILE PAYMENT

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ABSTRACT

The purpose of this research paper is to determine the influence of factors on continuance intention to use NFC mobile payment. The factors are perceived usefulness, confirmation, satisfaction, trust and perceived risk. The research is based on data collected through online questionnaires which were filled by 410 respondents from China. The data was collected by using convenience sampling and snowball sampling of non-probability sampling method. The data was analyzed by using Multiple Linear Regression (MLR) in order to find out the level of significance and relationship between independent and dependent variables. The result of analysis revealed that all the independent variables have a significant relationship with continuance intention to use NFC mobile payment except perceived usefulness. And trust directly and indirectly impacted continuance intention significantly. The results and findings of the study implies NFC mobile payment product companies or service providers can improve trust in order to improve user's continuance intention on adoption of NFC mobile payment.

Keywords: *Continuance Intention, Confirmation, Perceive Usefulness, Perceived Risk, NFC, Mobile Payment.*

Introduction

With development and innovations on mobile phone and telecommunication network, there are more useful functions empowered to mobile phone, which makes mobile phone to be like portable computer, besides the basic function of mobile phone aiming to communicate with each other. One important function is to use mobile phone to make financial payments, which is called mobile payment. Mobile payment (MP), refers to a kind of payment method by using mobile devices to trigger/initiate and confirm a financial transaction. Several factors are driving the growth in mobile payment, including global spread of smartphones. Many of the brand smartphone suppliers are providing mobile wallets and near field communication (NFC) function to support mobile payment. The growing adoption of ride-sharing and other services also boosts mobile payment.

China has turned to be the largest mobile payment market. It is also the world's largest mobile payment market, in terms of mobile payment users' scale, transaction volume, and mobile payment penetration rate. By the first half of the year 2018, mobile payment users in China was about 890 million, and the penetration rate of mobile payment - which is the proportion used in the past three months - among mobile phone users was as high as 92.4%. In terms of transaction volume, according to the announcement of the payment system issued by the People's Bank of China, Payment and Settlement Department in 2018, banking financial institutions processed a total of 60.531 billion mobile payment services, with a transaction amount of RMB 277.39 trillion, an increase of 61.19% and 36.69% respectively. Data from China Internet Network Information Center show that there are 621 million mobile payment users in China by the end of July 2019, which is 73.4% of total mobile phone users. And the population of mobile payment users increased to 37.88 million compared to the end of year 2018.

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Compared with QR code mobile payment and NFC mobile payment, technology of NFC was adopted in payment industry earlier than QR code, moreover the convenience of NFC payment is more than QR code. Under the same condition, for example, the merchant supports both QR code payment and NFC payment, on the other hand user's mobile phone supports both QR code payment and NFC payment, which means that user may use both of these two payment methods. However, user prefers to use QR code payment rather than NFC payment again. Convenience is not the only factor that affects user's decision on payment method. There are many factors that impact user's decision.

Literature Review

Expectation Disconfirmation Theory (EDT), or expectation confirmation model (ECM) is a basic model in the consumer behavior and marketing literature to explain consumers' satisfaction and post-consumption behavior (Churchill & Surprenant, 1982); (Oliver, 1980).

According to the EDT, the degree of disconfirmation towards a payment behavior influences users' satisfaction (Oliver, 1980). The more satisfaction users have, the more probability that users keep continuance intention or usage adoption, while the more dissatisfaction consumers perceived, the more probability that users will avoid reusing the same products or adopting to services again in the future (Susanto, Chang, & Ha, 2015).

- **Continuance intention** is the intention to continually use a product or service. It reflects users' willingness to continue using services or continue consuming products, which was measured by Bhattacharjee(2001) using three items. It's found (Veeramootoo, Nunkoo, & Dwivedi, 2018) continuous intention had supported by the critical relationship between confirmation and user satisfaction.
- **Confirmation** refers to the degree that the post-adoption performance of technology-driven services after usage reflects the expectation before usage of that technology. According to Bhattacharjee(2001), when there is an incompatibility between pre-expected perceptions and post-adoption experience, cognitive dissonance and dissatisfaction takes place. And subsequently, users adjust their perceptions to minimize this dissonance. When perceived performance is equal to or greater than expected performance, it will lead to higher customer satisfaction and loyalty(Patterson, Johnson, & Spreng, 1997).
- **Perceived usefulness** is "the degree to which a person believes that using a particular system would enhance his or her job performance"(Davis, 1989). By using an information system, users get benefit in various ways such as ensuring more accuracy, efficiency, and quickness in job completion (Yang, Motohashi, & Chen, 2009). A direct relationship between perceived usefulness and user satisfaction, perceived usefulness and continuance usage intention had been established (Weng, Zailani, Iranmanesh, & Hyun, 2017).
- **Satisfaction** refers to the feelings of users that are formed through interactions with merchants or service providers (Oliver, 1980). Satisfaction plays a significant role in building and retaining loyalty (Chuah, Rauschnabel, Marimuthu, Thurasamy, & Nguyen, 2017). This is also applicable in information system where users satisfaction increases so that to strengthen users' intention towards continuous usage (Veeramootoo, Nunkoo, & Dwivedi, 2018).Liao et al.(2009) found a positive and significant relationship between perceived usefulness and user satisfaction and perceived usefulness and the continuance usage intention in Taiwan.
- **Trust** is a common antecedent in study of satisfaction and loyalty (Schaupp & Bélanger, 2005). Trust is extremely important in online business, which is characterized by low or even zero interaction (Chen & He, 2003).
- **Perceived risk** was defined as "a consumer's perception about the uncertainty and the adverse consequences of a transaction performed by a seller" (Gupta and Kim, 2010, p. 19). It's found that satisfaction and perceived risk have the strongest total effect (0.237 and 0.323, respectively). Moreover, the impact of perceived risk was stronger in men(Yuan, Liu, & Yao, 2016).

Conceptual Framework

In this research, the conceptual framework was structured based on the studies of those two literatures from "*Drivers of continuance intention with mobile banking apps*" (Chayawan, Peter, Kannika, & Simon, 2019), and "*The continuance usage intention of Alipay Integrating context-awareness and technology continuance theory (TCT)*" (Abul & Bao, 2019).

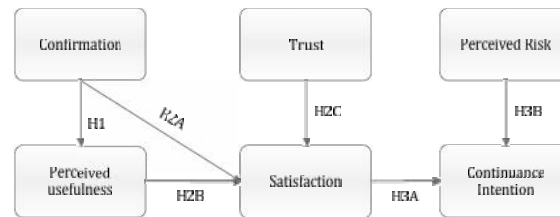


Figure 1 Conceptual framework

Research Hypothesis

In this research, hypothesis are listed as below:

- H₁₀:** Confirmation doesn’t have influence on perceived usefulness.
- H_{1a}:** Confirmation has an influence on perceived usefulness.
- H_{2A0}:** Confirmation doesn’t have influence on user’s satisfaction.
- H_{2Aa}:** Confirmation has an influence on user’s satisfaction.
- H_{2B0}:** Perceived usefulness doesn’t have influence on user’s satisfaction.
- H_{2Ba}:** Perceived usefulness has an influence on user’s satisfaction.
- H_{2C0}:** Trust doesn’t have influence on use’s satisfaction.
- H_{2Ca}:** Trust has an influence on use’s satisfaction.
- H_{3A0}:** User’s satisfaction doesn’t have influence on continuance intention.
- H_{3Aa}:** User’s satisfaction has an influence on continuance intention.
- H_{3B0}:** Perceived risk doesn’t have influence on continuance intention.
- H_{3Ba}:** Perceived risk has an influence on continuance intention.

Research Methodology

A self-administrated online questionnaire was used in this research. The questions were derived from previous studies with working modified to fit this research. The target population of this study was users who had used NFC mobile payment in China. Non-probability sampling technique including convenient sampling and snowball sampling were applied in this research. The total respondents are 410, which is greater than 385. Then Cronbach’s Alpha test was applied to test the reliability of the questionnaire by doing the pilot test with 40 samples.

Results

Table 1: Demographic information

Demographic Factors	Characteristic	Frequency	Percent
Gender	Male	252	61.46%
Age	19 - 29	169	41.22
Educational Level	Bachelor degree	252	61.46

There are 252 male respondents out of total 410 respondents (61.46%) of the sample size. While there are 158 female respondents out of total 410 respondents (38.54%) of the sample size. Most of respondents are from 30 to 39 years old, which is 177 persons with 43.17%. Followed by age from 19 to 29 years old, that is 169 persons with 41.22%. And the smallest group is age over than 50 years old, which is 10 persons with 2.44%. The educational level of respondents. Most of the respondents are bachelor degree with the number of 252 and 61.46%. The smallest group is doctoral degree or above which is 5 persons with 1.22%. In this research, a pretest or pilot test was conducted among a small group of 40 respondents to find out problems before the questionnaire is used to massive samples. The researcher conducted the Cronbach’s Alpha Coefficient test using the acceptance criteria of = 0.6 for the entire sample size to help to ensure suitability and consistency of the research instrument (Peterson, 1994).

Table 2: Summary of Cronbach’s Alpha

Variables	Cronbach’s Alpha	Number of Items	Result
Confirmation	0.941	3	Pass
Perceived Usefulness	0.915	4	Pass
Satisfaction	0.938	3	Pass
Trust	0.955	4	Pass
Perceived Risk	0.774	3	Pass
Continuance Intention	0.888	3	Pass

From Table2, it shows that seven variables including confirmation, perceived usefulness, satisfaction, trust, perceived risk and continuance intention were tested according to the Cronbach's Alpha Coefficient and all seven of the variables were found to be reliable and acceptable (> 0.6) for this study.

Table 3: MLR result of hypothesis 1

Variable	Standardized Coefficients	Sig.	VIF	Result
Confirmation	0.832	0	1	Support H1
R Square		0.692		
Adjusted R Square		0.691		

From table 3, adjusted R square value is 0.691, it means perceived usefulness (PU) can be explained 69.1% by confirmation (CON). The values of significance of confirmation is less than 0.05, which indicate that null hypothesis H1 is rejected. In other words, confirmation has significant impact on perceived usefulness.

Table 4: MLR result of hypothesis 2

Variable	Standardized Coefficients	Sig.	VIF	Result
Confirmation	0.134	.000	3.526	Support H2
Perceived usefulness	0.360	.000	4.225	
Trust	0.506	.000	3.147	
R Square		0.882		
Adjusted R Square		0.881		

From table 4, adjusted R square value is 0.881, it means users' satisfaction (SAT) can be explained 88.1% by trust (TRU), confirmation (CON), and perceived usefulness (PU). The values of significance of four independent variables, confirmation (CON), perceived usefulness (PU), and trust (TRU) are all less than 0.05, which indicate that null hypothesis H2A, H2B, and H2Care rejected. In other words, confirmation, perceived usefulness, and trust have significant impact on dependent variable that is satisfaction (SAT). The highest value of standardized coefficient as well as is TRU at 0.506. Followed by PU value at 0.360. The lowest value of standardized coefficient is CON at 0.134. The higher of standardized coefficient value, the more influence on dependent variable. In summary, trust has most influence on users' satisfaction than other three independent variables. And confirmation has least influence on users' satisfaction.

Table 5: MLR result of Hypothesis 3

Variable	Standardized Coefficients	Sig.	VIF	Result
Satisfaction	0.762	.000	1.118	Support H3
Perceived Risk	0.131	.000	1.118	
R ²		0.663		
Adjusted R ²		0.661		

From table 5, adjusted R square value is 0.661, it means users' continuance intention can be explained 66.1% by perceived risk (PR), and satisfaction (SAT). The values of significance of two independent variables, satisfaction (SAT), and perceived risk (PR) are less than 0.05, which indicate that null hypothesis H3A, and H3B are rejected. In other words, satisfaction, and perceived risk have significant impact on dependent variable that is continuance intention (CI). The highest value of standardized coefficient as well as is satisfaction at 0.762. Followed by PR value at 0.131. The higher of standardized coefficient value, the more influence on dependent variable. In summary, satisfaction has more influence on users' continuance intention than other three independent variables. And perceived risk has least influence on users' continuance intention.

Table 6: Hypotheses Summary

	Hypothesis	Significance	Beta	Result
H ₁	Confirmation has influence on perceived usefulness.	0.000	0.832	Supported
H _{2A}	Confirmation has influence on user's satisfaction.	0.000	0.134	Supported
H _{2B}	Perceived usefulness has influence on user's satisfaction.	0.000	0.360	Supported
H _{2C}	Trust has influence on use's satisfaction.	0.000	0.506	Supported
H _{3A0}	User's satisfaction has influence on continuance intention.	0.000	0.762	Supported
H _{3B0}	Perceived risk has influence on continuance intention.	0.000	0.131	Supported

Discussion and Conclusion

The result of this study highlighted that confirmation, perceived usefulness, and trust had a significant positive impact on continuance intention of using NFC mobile payment through user's satisfaction. It also implied that user's satisfaction and perceived risk influenced continuance intention toward NFC mobile payment directly. Users will continue to use NFC mobile payment when they have more trust on NFC mobile payment. The most significant impact factor on continuance intention is satisfaction. The more satisfaction on NFC mobile payment, the more continuance intention that users will use it again. Meanwhile, there are several factors that will impact users' satisfaction on NFC mobile payment. These factors are confirmation, perceived usefulness, and trust. For users' satisfaction, the most significant influence factor is still trust. Followed by the perceived usefulness and confirmation. The result supported the findings by previous research (Liao, Palvia, & Chen, 2009) that there is a positive and significant relationship between the perceived usefulness and user satisfaction. As well, confirmation has significant impact on satisfaction. Prior studies on continuous usage behavior have supported the significant relationship between confirmation and user satisfaction (Veeramootoo, Nunkoo, & Dwivedi, 2018).

The perceived risk is also an important factor that impact users' continuance intention of the usage of NFC mobile payment. When users feel unsafe about NFC mobile payment, they will increase the intention to continue to use it. It contradicts to the previous research. In another research (Hyun-Sun, 2017), it showed perceived risk had negative effect on Fintech continuance intention.

Recommendations

The research showed that users' continuance intention on usage of NFC payment was affected by users' trust, perceived usefulness, confirmation, perceived risk, and users' satisfaction on the product or service. Among them, the users' trust on NFC mobile payment product or service has the highest influence on user's satisfaction. Moreover, user's satisfaction has highest influence on user's continuance intention toward NFC mobile payment. In order to improve users' continuance intention of using NFC payment, companies and service providers of NFC payment can take the following steps. First, improve users' trust on NFC mobile payment product and service. Previous conclusion showed, trust not only impacted users' continuance intention directly, but also impacted users' continuance intention through users' satisfaction indirectly. NFC mobile payment service providers can improve users' trust by keeping their promises and commitments to users. As well NFC mobile payment service providers can improve users' trust by keeping users' interests best in mind. With more trust on NFC mobile payment, the more possibility of users to continue using NFC mobile payment.

Second, in order to increase users' continuance intention on usage of NFC mobile payment, companies and service providers should improve users' satisfaction. When the NFC mobile payment product or service satisfy users, they will continue using the same product and service. If users feel unsatisfied with NFC mobile payment, they would turn to alternative when they have other choices. There are many ways to improve users' satisfaction. This study implies that trust, perceived usefulness and confirmation have positive impact on users' satisfaction. Hence NFC mobile payment companies and service providers should focus on these factors to improve users' satisfaction. The most important factor is trust, as explained previously, NFC mobile payment companies and service providers should keep users' interest best in mind, and keep promises and commitments to users. The second important factor is perceived usefulness. Companies and service providers should make NFC mobile payment to be quick and effective to utilize. And the third factor is confirmation. Companies and service providers should make product service to match user's expectations. Only users' experience is equal to or greater than expectation, will satisfaction be built and accumulated. As a result, users will continue using NFC mobile payment.

Further Study

The data of this study was from mainland China, theoretically the result of this research can be applied to other countries. However, mobile payment with QR code is dominant in China. Users prefer to use QR code rather than NFC during payment as a habitual behavior. This is different from some other countries, that users are familiar with tap and go payment by using credit card which is the same technology to NFC mobile payment. Research in these countries is necessary. On the other hand, this study had some limitations which may lead to further research. Firstly, although this study has taken into account the relevant constructs to continuance usage of mobile payment, it omits some important constructs such as social influence, self-efficacy and so forth, which could potentially explain continuance usage behavior. Future research can be conducted by using cross-country longitudinal data. Finally, this study has applied the MLR approach, which is linear in nature. Further research can be conducted using structural equation model (SEM) to evaluate the model and generate more insights about NFC mobile payment.

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