

Factors Influencing Acceptance and Usage of Mobile Payment in China and Thailand

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ABSTRACT

With the rapid growth of the e-commerce market during the past decade, mobile payment has become the primary choice for most customers in many e-commerce websites and applications. Customers can directly and efficiently use payment applications to complete online and offline transactions. Alipay and WeChat are the two most used payment platforms (scan QR code) for mobile payment users in China, whereas bank applications and QR code payments of bank applications are the most used mobile payment channels in Thailand. Thus, this study aims to compare the acceptance levels of mobile payment technology (scan QR code) between Chinese and Thai consumers and determine the factors influencing their decision to accept and use mobile payment channels. The study used the Theory of Reasoned Action, Technology Acceptance Model, and Network Externality to construct a conceptual framework. Data were observed using a stratified random sampling technique and analyzed using Structural Equations Model. All results confirmed the study's hypotheses, indicating that all factors significantly impacted the acceptance and usage of the mobile payment application.

Keywords: QR Code Payment, Theory of Reasoned Action (TRA), Technology Acceptance, Model (TAM), Network Externality.

1. INTRODUCTION

The development of payment history is an account of the business model change. Given the continuous advancement of smartphones and the Internet, electronic payment technology is rapidly progressing, making mobile payment the most convenient and fastest-growing payment method after cash, credit cards, and Internet banking.

China's mobile payment is developing rapidly, with mobile payment penetration rate and market scale ranking first in the world. The two major mobile payment software, Alipay and WeChat Pay, have become essential tools for Chinese people's daily life. Mobile payment has become the primary payment method for Chinese e-commerce websites. Consumers can purchase their items online using mobile payment by scanning QR codes, and they also can be paid for by scanning QR codes at the point of sale. The mobile payment security report (2022) by China UnionPay had claimed that Alipay and WeChat Pay have over 90% of the mobile payment market share in China. Therefore, Alipay and WeChat Pay are chosen as the representatives of China's mobile payment platforms in this study.

The COVID-19 pandemic has been claimed as the significant factor driving the growth of Fintech digital payments (Nandy & Susan, 2022). Accordingly, the popularity

of mobile banking has helped reduce banks' costs and expenses, which significantly impact the profitability of the banks in Thailand. As a result, Thailand banks have continuously promoted their electronic payment services aggressively. The accessibility of online banking impacts the profitability of banks (Pham, 2022). Thailand's payment environment has then changed because more people are using smartphones, the financial infrastructure is improving, the COVID-19 epidemic continuously impacts electronic payments, and Thai people's purchasing habits have become increasingly inclined to cashless payment.

A consumer attitudes study (2022) by Visa shows that after the COVID-19 epidemic stabilized, Thai consumer behavior has changed dramatically, especially in payment methods, with cashless mobile scan QR code payment becoming the primary payment method. The report indicated that Thais are also well ahead of other countries in Southeast Asia in the proportion of cashless payments, which is as high as 89% in frequency. This high frequency is attributed to the Thai government's introduction of policies to promote the development of electronic payments in recent years. It is also attributed to the launch of the electronic payment platform PromptPay (QR code payment) in 2017, which led to the rapid development of QR code payments, making Thailand the second country in Southeast Asia with QR code payment users (Visa, 2022). As bank-based QR code payments have a market share of over 70% of the mobile payment market in Thailand, thus bank-based QR code payments are employed in this study to examine mobile payments in Thailand.

Given that the development of mobile payment in China and Thailand is representative of developing countries, the usage intention and acceptance of Chinese and Thai consumers are interesting to examine. The study sets the following two objectives: to compare the acceptance levels of mobile payment technology (scan QR code) between Chinese and Thai consumers and examine the factors influencing the decision to accept and use mobile payment channels. The present study uses a questionnaire survey to investigate the attributes, usage preferences, and acceptance of mobile payment platforms among Chinese and Thai users.

2. CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

2.1 Conceptual Framework

(1) Theory of Reasons Action (TRA): This theory was introduced by Ajzen and Fishbein in 1975. The basic assumption is that people are rational and will synthesize various information to consider the benefit and effects of their behavior before they act. The theory states that attitudes to behavior and subjective norms determine an individual's behavioral intentions and that the people around them influence subjective norms. However, the factors mentioned above generate behavioral intentions, which ultimately affect behavior.

(2) Theory of Planned Behavior (TPB): TRA theory states that a person's intentions and attitudes influence human behavior, but human behavior is also affected when the person's ability to control behavior is limited (e.g., the individual does not have sufficient ability and knowledge to perform this behavior). Thus, Ajzen (1985) introduced the variable of perceived behavioral control and proposed the TPB. Perceived behavioral control refers to the ability of an individual to perform a behavior. The theory claims that an individual's behavior is determined by attitudes and subjective norms and influenced by perceived behavioral control.

(3) Technology Acceptance Model (TAM): This model is Davis's (1989) proposed extension of TRA theory. It studies user behavior in accepting new information technologies or products, which claims that attitudes and usage intentions' main determinants are perceived usefulness (PU) and perceived ease of use.

(4) Network Externalities: Network externalities refer to the effect or value users obtain from a service or product that brings about more customer value as users, complementary products, or services increase. It can be classified into direct and indirect network externalities (Katz & Shapiro, 1985). Direct network externalities refer to the number of users within the network, which can directly affect the benefits to existing users. In other words, the existing user base will receive more benefits when the new users increase (Zhang et al., 2016). Indirect network externalities refer to the benefits of increased participants; the more the number of complementary products or services, the more benefits users will receive (Chiu et al., 2013, Lin & Bhattacharjee, 2008).

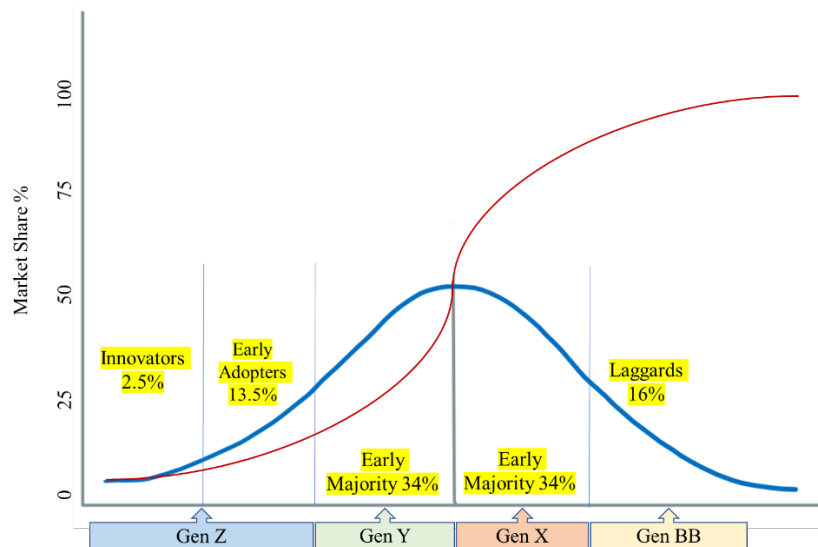
(5) Diffusion of Innovation (DOI): The diffusion of the innovation model examines various categories of people who adopt innovations. Its theory indicates that people confronted with innovation may avoid or reject it, whereas others may be open-minded and more willing to adopt it. The process of adoption and diffusion of an innovative idea or technology is shown in Figure 2. The yellow line shows the diffusion of the innovation process in the figure below. In the first stages of innovation diffusion, the adopters are few, and diffusion is slow; as the innovation spreads to the next stage and the number of adopters expands, the diffusion index rises rapidly and maintains this trend; finally, diffusion slows down again near the saturation point (Rogers, 2003; Jantarakolica, 2021).

According to Rogers (2003), in the diffusion of innovation theory, people can be divided into five groups: innovators, early adopters, early majority, later majority, and laggards. This study can also define the categories of people in its diffusion of innovation theory based on their acceptance stage of mobile payments. For example, users of mobile payments also start with early innovators, followed by early adopters who are willing to try new things, the early and late majority, and, finally, the laggards who are not willing to accept new things (usually older people).

This theoretical framework starts by explaining the TRA of people's actions. People act when they see something good or bad. It starts as the behavior of a few people, which is similar to when people first start using mobile payments; they start using them when they are perceived favorable, creating a subjective norm.

However, TPB further explained that knowledge and ability differ between individuals. Despite mobile payment being an excellent payment platform, people cannot use it when they do not have sufficient capacity and knowledge, a phenomenon called perceived behavioral control. It reveals that subjective norms do not occur when people cannot use mobile payment technology.

Figure 1: Diffusion of Innovation and Adopter Categories by Generation



Source: Author adjusted from Roger (2003).

Finally, TAM theory was developed on the concepts of TRA and TPB, which explain one's acceptance of the technology. It states that subjective norms could not be justified because some people cannot use mobile payments. Thus, TAM divided perceived behavior control into the following types: PU and perceived ease of use. Mobile payments must be good and easy to use. If the payment method is suitable, people will tell others to use it. Accordingly, it leads to network externalities. If other networks and cross-platforms are between mobile payments, they will be more beneficial.

In addition to the network externalities mentioned earlier, mobile payment is also a financial innovation. Thus, consumers' diffusion and acceptance of this financial innovation are essential in adopting the technology. Rogers' (2003) innovation diffusion theory and innovation adoption process can explain consumers' decision to adopt financial innovations.

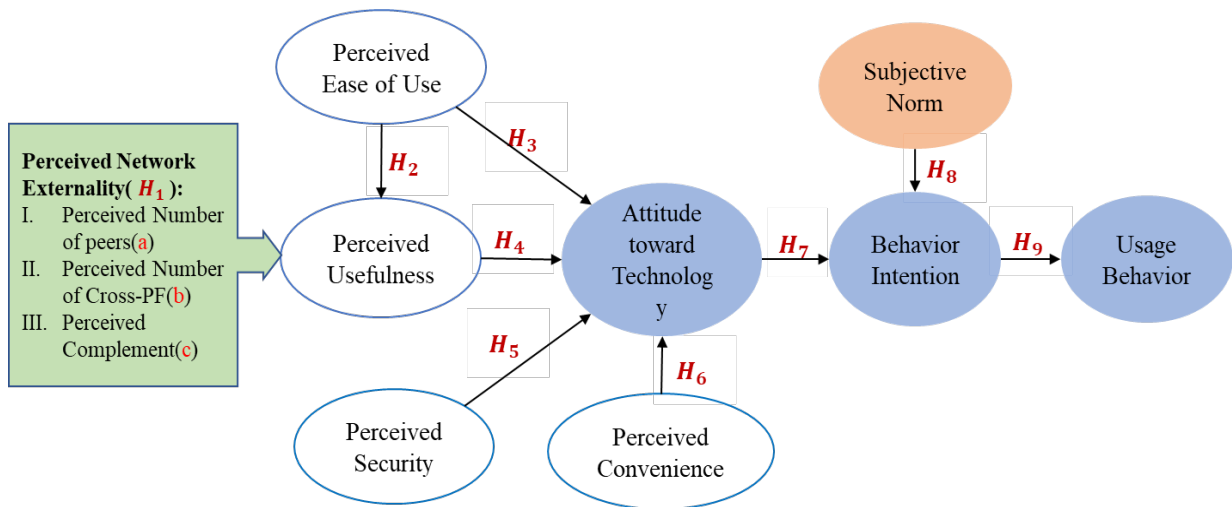
2.2 Hypothesis development

Based on the conceptual framework above and the study of Bardey et al. (2014), the present study combines TRA, TAM, network externalities, and diffusion of innovation theory to explain attitudes toward and intentions to accept and use the mobile payment channel. Thus, the proposed model (Figure 2) presents 10 hypotheses involving four theories. Each hypothesis is explained as follows:

Network externalities explain changes in a person's behavior toward the use of a product or service because of changes in the number of other new users (Economides, 1996; Katz & Shapiro, 1985). When a mobile payment platform has many merchants and customers, it can make payments near cash in terms of liquidity. Moreover, when a mobile payment platform achieves cash liquidity, the application of a mobile payment platform should have several cross-platform products or services and other services in addition to payment capabilities. Therefore, this study sets the hypotheses for mobile payment regarding perceived network externalities (H1), including perceived number of peers (PNP; **a**),

perceived number of cross-platforms (PNCP; **b**), and perceived complement (PCom; **c**) of mobile payment platforms.

Figure 2: The Proposed Model



H1: *Perceived network externality will positively affect the perceived usefulness of mobile payments.*

According to TAM theory, users' perceived ease of use and perceived usefulness of mobile payment affect the attitude of users toward the use of mobile payment. Study of Chen and Lai (2023) confirmed that consumers' perceived usefulness and perceived ease of use of mobile payments affect the adoption rate of mobile payment services in Taiwan. Moreover, when users perceive that using mobile payments will be more convenient, they will use it more often. However, perceived security is fundamental to whether users adopt a new technology; when customers perceive a new technology or service as reliable and secure, they will accept and adopt it. Perceived security of users that trust in mobile payment system impacts attitude, subjective norms, and perceived behavior control, which influences the intention of using mobile payment. Therefore, perceived security and perceived convenience of mobile payment are added to the model to predict attitude toward and behavior intention using mobile payments.

H2: *Perceived ease of use of mobile payment will positively affect perceived usefulness of mobile payments.*

H3: *Perceived ease of use of mobile payment will positively affect attitude toward using mobile payments.*

H4: *Perceived usefulness of mobile payment will positively affect attitude toward using mobile payments.*

H5: *Perceived security of mobile payment will positively affect attitude toward using mobile payments.*

H6: *Perceived convenience of mobile payment will positively affect attitude toward using mobile payments.*

H7: *Attitude toward technology using mobile payments will positively affect behaviors intention to adopt mobile payments.*

According to TRA theory, people's subjective norms refer to the expectations of the social environment on users' behavior (Fishbein & Ajzen, 1975), which is another fundamental factor in determining attitudes toward mobile payment by users. The subjective norm in this study refers to the degree of pressure perceived by the reference group (e.g., relatives, friends, or contacts) on the respondents' use of mobile payment.

H8: *Subjective norms will positively affect behavior intention to adopt mobile payments.*

H9: *Behavior intention to adopt mobile payments will positively affect the usage behaviors of mobile payments.*

Based on the conceptual framework of the above study, examining the use of mobile payments in China and Thailand would be worthwhile. Given that the platforms will bring China to a cashless society in just 10 years, Thailand is also moving toward a cashless society after the COVID-19 epidemic. Mobile payments play an important intermediary between merchants and consumers, demonstrating that network externalities are obvious. The first objective set for this study is to compare the level of technology acceptance of mobile payments among consumers in China and Thailand, which is used to compare which country has a higher acceptance of mobile payments. Moreover, the researcher wanted to investigate the reasons that influence the acceptance and thus set the second objective: to examine the factors influencing the decision to accept and use a mobile payment channel.

3. DATA AND RESEARCH METHODOLOGY

3.1 Sample

This study used an online questionnaire to collect 892 samples, including 661 Chinese and 231 Thai samples. The questionnaire was administered to a random sample of respondents using a Likert scale. Each Chinese respondent was required to complete two questionnaires (i.e., Alipay and WeChat Pay), collecting 673 samples. However, the valid sample in China is 661 samples, 340 samples for Alipay, and 321 samples for WeChat Pay, respectively; the valid sample in Thailand is 231.

3.2 Data Collection

(1) Thailand's Survey: The Thai survey was conducted online through Google Forms. The respondents received the link via Line and Facebook.

(2) China's Survey: In China, data were collected online via the WeChat app and a questionnaire website (www.wjx.cn). Respondents received and completed the questionnaire through the WeChat app.

This study categorized respondents by mobile payment application and generation to obtain different usage behaviors of mobile payment applications by different age groups. These age groups included Gen Z (less than 25 years old), Gen Y (25–39 years old), Gen X (40–55 years old), and Gen BB (more than 55 years old). Table I shows the composition of respondents classified by mobile payment application and generation.

Table 1: Respondents Categorized by Application and Generation

Application	GenZ	GenY	GenX&BB	Total
Alipay (China)	140 41.2%	143 42.1%	57 16.8%	340 100.0%
WeChat (China)	141 43.9%	112 34.9%	68 21.2%	321 100.0%
QR-Code (Thailand)	36 15.6%	107 46.3%	88 38.1%	231 100.0%
Total	317 35.5%	362 40.6%	213 23.9%	892 100.0%

The following table is a data summary of respondents categorized by the characteristics of Chinese and Thai consumers.

Table 2: Respondents categorized by the characteristics of Chinese and Thai consumers

Characteristics	Items	N		
		China	Thailand	Total
Age	(Gen Z) Less than 25 years old	281 42.5%	36 15.6%	317 35.5%
	(Gen Y) 25-39 years old	255 38.6%	107 46.3%	362 40.6%
	(Gen X) 40-54 years old	86 13.0%	72 31.2%	158 17.7%
	(Gen BB) more than 55 years old	39 5.9%	16 6.9%	55 6.2%
Education	Low than undergraduate	185 28.0%	18 7.8%	203 22.8%
	undergraduate	373 56.4%	112 48.5%	485 54.4%
	postgraduate	94 14.2%	86 37.2%	180 20.2%
	PHD	9 1.4%	15 6.5%	24 2.7%
Income	Less than 15,000 Baht	187 28.3%	41 17.7%	228 25.6%
	15,000-30,000 Baht	197 29.8%	59 25.5%	256 28.7%
	30,000-50,000 Baht	171 25.9%	51 22.1%	222 24.9%
	50,000-100,000 Baht	81 12.3%	57 24.7%	138 15.5%
	more 100,000 Baht	25 3.8%	23 10.0%	48 5.4%
Total		661 100%	231 100%	892 100%

3.3 Instrument

Validity and reliability are two important factors to consider when testing the soundness of an instrument for research (such as a questionnaire). Therefore, these two factors help to test the validity of the questionnaire measurement and the reliability of the data. They can help the researcher determine whether the questionnaire is sufficiently good.

(1) Cronbach's Alpha: Reliability analysis determines the degree of consistency of results obtained from repeated measurements of the same item or factor using the same method. In this study, reliability analysis was conducted using Cronbach's Alpha coefficient, which

has a value between 0 and 1. The scale's reliability indicates great satisfaction when Cronbach's Alpha coefficient is greater than 0.7.

(2) Factor Analysis: The validity of questionnaires is estimated using factor analysis. The factors being measured should be partially or highly correlated; thus, factor analysis measures the validity of the questionnaire through this correlation between the factors. Factor analysis is the analysis of a single factor in the questionnaire, and all factors should result in a value of 0.7 or higher, indicating the questionnaire's great validity (Rattanawalee, 2019).

Table 3 shows the factor analysis results and the Likert scale questions for all the perception factors in the questionnaire. The results show that the percentage of the total variance, factor loading, and Cronbach's alpha for all factors are more than 0.7, which means that all the factors used for measurement are reliable and valid.

3.4 Data Analysis

3.4.1 Independent sample t-test

The independent sample t-test tests whether there is a significant difference between two independent data samples. It analyses and examines the relationship between two variables through bivariate variables. The results show a preliminary analysis of the variables, including application name, age, gender, occupation, education, monthly income, and frequency of use. The results use to analyze Objective I, which compares the level of technology acceptance between Chinese and Thai consumers for mobile payment.

Table 3: Cronbach Alpha and Factor Analysis (China and Thailand)

Items	Factor Loading	% Total Variance	Cronbach Alpha
1. Perceived Number of Peers		0.9104	0.9507
b1. The number is large enough.	0.9611		
b2. It has a high coverage area.	0.9376		
b3. The supporting facilities are more complete.	0.9636		
2. Perceived Number of Cross-platforms		0.8487	0.9106
b4. The number is large enough.	0.8977		
b5. Sufficiency in my daily needs.	0.9194		
b6. Can be linked to a good payment application.	0.9460		
3. Perceived Compliments		0.8514	0.9114
b7. There are useful functions.	0.9009		
b8. It has fully functional and sufficient for my current needs.	0.9585		
b9. It has a lot of promotions.	0.9078		
4. Perceived Ease of Use		0.9629	0.9804
b10. Easy to use	0.9802		
b11. Simple function to use.	0.9838		
b12. Simple steps to use.	0.9798		
5. Perceived Usefulness		0.8385	0.9027
b13. Easier to pay.	0.9277		
b14. Faster to pay.	0.9238		
b15. useful and appropriate in daily life	0.8952		
6. Perceived Security		0.8899	0.9379
b16. It has a certain level of security (cash is not lost)	0.9221		
b17. It can be trusted to a certain extent(e.g.identity verification)	0.9478		
b18. It helps reduce the cost problems caused by paying in cash	0.9598		

Table 3 Continued

Items	Factor Loading	% Total Variance	Cronbach Alpha
7. Perceived Convenience		0.9147	0.9526
b19. It is convenient compared to carrying cash or credit cards.	0.9436		
b20. Improves payment efficiency (e.g. no need to wait for change)	0.9682		
b21. Save time and reduce the process of doing various transactions.	0.9571		
8. Attitude toward Application		0.8256	0.9274
b22. A good idea	0.8487		
b23. A smart idea	0.9319		
b24. Very helpful	0.9374		
b25. Interested in this payment method	0.9137		
9. Subjective Norm		0.8671	0.9203
b26. Most of my family and friends around me use mobile payment.	0.9413		
b27. Most of the people I meet use mobile payment.	0.9476		
b28. Most of the people I contact use mobile payment.	0.9040		
10. Behavior Intention		0.9136	0.9522
b29. I intend to use the application	0.9476		
b30. I would use mobile payment as a common payment method.	0.9586		
b31. If having to pay for service fees, I will use the application	0.9612		
11. Usage Behavior		0.8808	0.8646
b32. I use mobile payment to pay for various living expenses.	0.9385		
b33. I use the application regularly.	0.9385		
12. Satisfaction		0.7908	0.8659
b34. I prefer mobile payment to other payment methods.	0.8157		
b35. Compare to other payment methods has more convenient to use.	0.9172		
b36. Compare other payment methods has more comprehensive to use.	0.9304		

3.4.2 Structure equation model (SEM)

The structural equation model (SEM) is a multivariate statistical technique incorporating factor and path analyses. This model can be used for user acceptance and adoption of mobile payments. The aim is to explore the causal relationships between variables by which these relationships can be expressed in the form of causal models and path diagrams. Moreover, the relationship between the variables can be calculated to produce a parameter value. The magnitude of the value of this parameter is an important factor in explaining the extent to which this indicator influences the adoption of mobile payments by users and in determining whether users adopt mobile payments.

Therefore, this study used this model to analyze Objective II, which examines the factors influencing the decision to accept and use mobile payment channels. The researcher analyzed the proposed model (see figure 2) in this study, using factor analysis to examine the correlation between the variables.

4. EMPIRICAL RESULT

As mentioned in Section 2, this study used questionnaires to collect the data and a Likert Scale for measurement analysis, which was categorized by the scope of the study into mobile payments in China (Alipay and WeChat pay) and Thailand (QR code payment). Moreover, this section analyzed the data based on the objective of this study.

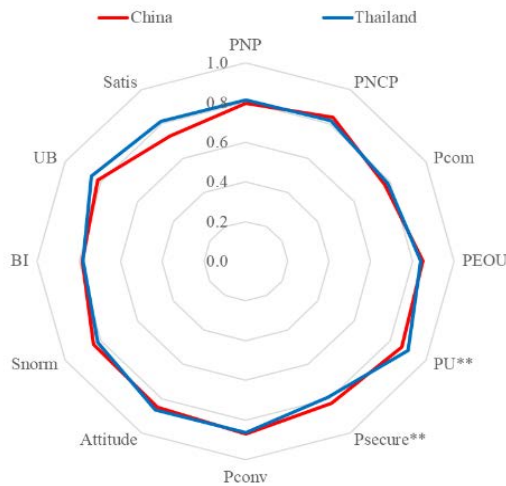
4.1 Objective I: To compare the level of technology acceptance of mobile payment between Chinese consumers and Thai consumers

In this study, when looking at China and Thailand’s mobile payment (scan QR code) variables, the independent sample t-test value shows that the attitudes toward each application and other aspects are different. We used the sample t-test through bivariate analysis to achieve the above objective.

Table 4: Bivariate Analysis of All Variables for China and Thailand (PNP – Satisfaction)

Obs.	Variable	PNP	PNCP	Pcom	PEOU	PU**	PSecure**	PConv	Attitude	SNorm	BI	UB	Satisfaction
661	China	0.7970	0.8364	0.7726	0.8505	0.8630	0.8259	0.8718	0.8488	0.8409	0.7850	0.8194	0.7272
231	Thailand	0.8135	0.8181	0.7853	0.8405	0.8995	0.7904	0.8632	0.8647	0.8204	0.7785	0.8558	0.8139
	t-test	1.0073	1.2444	0.8044	0.6726	2.5402	2.2947	0.6138	1.1130	1.0073	1.2444	0.8044	0.6726
	p-value	0.3140	0.2137	0.4214	0.5014	0.0112	0.0220	0.5395	0.2660	0.3140	0.2137	0.4214	0.5014

Graph 1: Levels of Acceptance Scores of Chinese vs. Thailand Respondents



The results show no significant difference between Chinese and Thai’s acceptance of mobile payment but slight differences in acceptance in various aspects. Nevertheless, PU (P=0.0112**) and P Security (P=0.0220**) significantly differ because mobile payments in China are based on third-party payment platforms (non-bank based). However, in Thailand, mobile banking is bank based, which significantly affects the usefulness and security of the application for users.

Consequently, bivariate variable analyses help to explain the first objective of this study, which is to compare the level of technology acceptance of mobile payment (QR code payment) between China and Thailand consumers.

4.2 Objective II: To study the factors influencing the decision to accept and use a mobile payment (scan QR Code) channel

For Objective II: To study the factors influencing the decision to accept and use the mobile payment channel, the Structure Equation Model (SEM) is used for analysis. The SEM shows that the overall test’s rule, such as CD, CFI, and TLI values, should be around 0.95. In other words, the error of the results should be less than 0.05. Although each perception results in this study are slightly different, they are still in the same direction. Consequently,

the results of this model present robustness. Then, sub-sample analyses are brought. If China and Thailand are split, the regression result will be as follows.

Table 5: Estimated Results of SEM - Subsample (China vs. Thailand) (Generation)

Variable	China	Thailand	China			Thailand	
	All	All	Gen.Z	Gen.Y	X&BB	Z&Y	X&BB
PNP <--Network	1.000	1.000	1.000	1.000	-	1.000	1.000
PNCP<--Network	0.897 ***	-	0.975 ***	0.858 ***	-	-	-
PCom <--Network	0.947 ***	-	0.943 ***	0.959 ***	1.000	-	-
PU<--							
PEOU	0.702 ***	0.515 ***	0.693 ***	0.758 ***	0.584 ***	0.561 ***	0.356 ***
Network	0.265 ***	0.119 *	0.300 ***	0.227 ***	0.194 *	0.142 **	0.087 *
Attitude<--							
PU	0.146 ***	0.274 ***	0.106 *	0.229 ***	0.139 **	0.323 **	0.143 *
PEOU	0.009	0.068	0.029	0.043	-0.032	0.092	0.080
Security	0.354 ***	0.168 **	0.343 ***	0.267 ***	0.407 ***	0.116	0.189
Convenience	0.476 ***	0.381 ***	0.544 ***	0.458 ***	0.354 ***	0.345 ***	0.529 ***
BI<--							
Attitude	0.688 ***	0.558 ***	0.514 ***	0.829 ***	0.814 ***	0.421 ***	0.695 ***
SNorm	0.344 ***	0.511 ***	0.493 ***	0.197 ***	0.273 ***	0.728 ***	0.238 **
UB<--							
BI	0.920 ***	0.957 ***	0.920 ***	0.895 ***	0.988 ***	0.919 ***	0.989 ***
Satisfaction<--							
UB	0.932 ***	0.875 ***	0.962 ***	0.946 ***	0.854 ***	0.927 ***	0.750 ***
Respondents	661	231	281	255	125	143	88
Loglikelihood	-17257.2	-4716.1	-6948.9	-6714.2	-4590.8	-2900.0	-1692.9
Chi-square BS	32257.5 ***	6353.5 ***	15206.5 ***	12619.1 ***	8432.3 ***	4214.6 ***	3258.1 ***
Chi-square MS	3687.0 ***	1196.6 ***	2265.8 ***	2092.9 ***	1626.8 ***	960.3 ***	1142.3 ***
CFI	0.902	0.864	0.884	0.874	0.846	0.850	0.735
TLI	0.893	0.850	0.874	0.863	0.829	0.834	0.706
CD	0.999	0.999	0.999	0.999	0.999	0.999	0.999
RMSEA	0.090	0.094	0.102	0.101	0.121	0.100	0.147
AIC	34760.3	9636.2	14143.8	13674.5	9385.6	6003.9	3589.7
BIC	35313.1	9987.4	14591.3	14110.1	9728.4	6306.1	3842.4

For the factor influencing analysis, the result is presented as follows:

Perceived Network Externalities: The network to a perceived number of peers (PNP), perceived number of cross-platform (PNCP), and perceived convenience (PCom) have significant in China, which indicates the high number and high coverage areas of merchants in China's mobile payment applications and the functionality of mobile payment applications to satisfy consumers' needs. However, no results were found for Thailand, which indicates that the Thai bank-based mobile payment application does not have sufficient functionality and comprehensiveness to cover consumer needs, which may be because mobile payments in Thailand are made through mobile banking mobile payment applications.

Perceived Usefulness: The results for perceived ease of usefulness (PEOU) to perceived usefulness (PU) and network to perceived usefulness (PU) are more significant in China than in Thailand, which indicates that the adoption of mobile payment in China is better than that in Thailand in terms of ease of use and network. Regarding mobile payment usage based on age, Gen Z and Y mobile payment users in Thailand and China are higher than Gen X and BB users, indicating that younger users are more likely to accept and use mobile payment technology than older users.

Attitude: Overall, most results are greater in China than in Thailand, except for perceived usefulness (PU) to attitude results, which may be because third-party platforms dominate mobile payment in China, and users' perceived security is higher than that of Thai users who mainly use mobile banking. Thus, the perceived convenience of mobile payment applications is also higher. Moreover, the perceived ease of usefulness (PEOU) to attitude results are insignificant in both countries. For perceived convenience to attitude, the Gen Z and Y values for perceived convenience to attitude in China are higher than Gen X and BB values. However, Thailand's Gen X and BB values are higher than the Gen Z and Y values. Mobile payment application in Thailand is based on mobile banking, where most users are middle-aged people with bank accounts. However, mobile payment in China is based on a third-party platform with young users.

Behavior Intention: Overall, the value of attitude to behavior intention is higher in China than in Thailand, whereas the subjective norm to behavior intention is higher in Thailand than in China. For a subjective norm to behavior intention, the value of Gen Z and Y is higher than Gen X and BB in China and Thailand, which indicates that the use of mobile payment at a younger age is more likely to be influenced by relatives, friends, and contacts around.

Usage Behavior: All the results of behavior intention (BI) to usage behavior (UB) in China and Thailand are higher than 0.9, which indicates that UB has a significant effect on BI in China and Thailand.

Satisfaction: The satisfaction factor for mobile payment surveys means consumers prefer mobile payment more than other payment methods. The result overall show that the value of China is higher than Thailand. That as China's mobile payment is a third-party payment platform, it has other functions other than payment, including social and online shopping integration, which is more satisfying to users' life needs; however, mobile payment in Thailand is mobile banking, which has relatively fewer functions other than payment. Regarding mobile payment usage based on age, mobile payment development tends to be younger, showing that by the result of Gen Z and Y in China and Thailand.

Therefore, if China with Thailand is compared, although magnitudes are slightly different, directions remain in the same trend. However, the difference regarding the behavior of mobile payment users in China and Thailand is mainly because of the difference in the type of mobile payment applications. Mobile payment applications in China are based on third-party payment platforms. In contrast, mobile payment in Thailand is based on mobile banking applications.

Despite the differences in the case of mobile payments in China and Thailand, the results' direction is consistent, representing robustness. The model will contribute to answering the second objective of this study, which is to examine the determinants that influence the acceptance and use of mobile payment channels.

5. DISCUSSION AND CONCLUSION

5.1 Study Results

The above methods are all robust, indicating that the questionnaires are adequate and reliable, and that the data collected are reliable and valid. Thus, the results of all models

used for the analysis follow the same trend and are well justified. Despite slight differences in magnitude, these results well explain this study's objectives.

Objective I: To compare the level of technology acceptance for mobile payments (QR code) between China and Thailand.

Results: Chinese and Thais have slightly different acceptance levels of mobile payment technology (scan QR code) in various aspects. However, overall, there is no significant difference between Chinese and Thais levels of acceptance of mobile payment, except for perceived usefulness and perceived security, which show a considerable difference.

Objective II: To study the factors influencing the decision to accept and use mobile payment channels.

Results: All values of China and Thailand indicate that China's mobile payment applications play an important role as an intermediary between merchants and consumers and can fully satisfy the needs of consumers' life other than payment. Moreover, China's mobile payment applications are well suited to satisfy the needs of consumers in terms of functional mobile payment applications. However, Thailand's mobile payment is bank based; thus, cooperation with merchants and the functionality of mobile payment applications are lacking. Nevertheless, regarding the perceived security factor of mobile payments, Thai consumers trust the mobile payment applications used more than Chinese consumers, which may be because mobile payments in Thailand are based on bank-based mobile payments, which have a higher level of security. Finally, the results for China and Thailand show that mobile payment technology is more youthful, with a generally higher acceptance of mobile payments among young people in both countries.

The results above thus indicate that all the factors in this study can influence the acceptance and adoption of mobile payments by Chinese and Thai consumers. The model for the findings has been tested and shown to be robust. The results for the factors influencing Chinese and Thai consumers' decision to use mobile payments follow the same trend, with only slight differences in the magnitude of the values.

5.2 Conclusion

Despite the differences between China and Thailand, non-bank third-party payment platforms (Alipay and WeChat Pay) in China and bank-based mobile banking in Thailand have grown rapidly in the short term and have captured a major share of the mobile payment market. First, the Alipay and WeChat Pay-dominated mobile payment markets in China and the bank-dominated mobile payment market in Thailand have developed businesses based on private enterprise business models (most of the commercial banks in China are state-owned enterprises), which can be adapted flexibly to market development strategies according to market demands. Second, the government has introduced corresponding policies to promote the development of mobile payments.

The following is an analysis of the main reasons for their success.

(1) First, the origin of the user base. Alipay and WeChat Pay in China already had a large customer base before the development of mobile payments. When Alipay started with e-commerce (Alibaba and Taobao), it had many merchants and consumers. In contrast,

WeChat started with social applications, with the largest number of users on social media platforms in China. Thailand's commercial banks already have a large user base, which is a precondition that other payment platforms do not have.

(2) Second, enterprises can adapt their business strategies to market demands. Given that most commercial banks in China are state-owned, banks are restricted from developing their business in response to market demand. However, commercial banks in Thailand are based on private-owned shareholding; enterprises can develop or adapt their business strategies in response to market demand. For example, Kasikorn bank, which has the largest market share in the Thai banking industry and whose mobile payment K Plus is the first commercial bank in Thailand to cooperate with China's Alipay, has a business model similar to Alipay's.

(3) Another important reason for the rapid development of mobile payments in Thailand and China is e-commerce. Given the large territory of China, where regional differences are more obvious, consumers have a high demand for commodities from different places, which has greatly contributed to e-commerce development. Meanwhile, in Thailand, the COVID-19 epidemic has also greatly contributed to the development of e-commerce and a cashless society.

(4) Finally, the government has introduced related policies to promote the development of mobile payment. Alipay and WeChat have deep cooperation with the government in China. For example, the government launched a policy benefiting farmers, which has played a role in developing Alipay's e-commerce in rural areas. Moreover, the Thai government launched Promptpay in 2015, in which the government, financial institutions, and the Bank of Thailand jointly launched a national e-payment program. It formally kick-started Thailand's move toward a cashless society. During the subsequent COVID-19 epidemic, the government introduced the "Paotang" subsidy policy, which enabled Thai commercial banks to capture the payments market with their mobile payments rapidly.

Limitation: The limitation of the study could be inferred as an inadequacy in data collection because of the small sample size collected for Gen X and BB. Furthermore, Thailand's relatively small sample size may result in biased results. Moreover, this study only examined the most used mobile payment (scan QR Code) methods in China and Thailand, which is somewhat biased in studying the overall mobile payment situation in both countries. This study did not conduct a cross-country comparison by non-bank and bank payment methods, which may cause bias in the results. Nevertheless, a cross-country comparative study of bank and non-bank payment methods may provide a research direction for studying mobile research.

Recommendation: For a recommendation for the application of mobile payment usage, although using mobile payments is convenient and cost-saving, our research data show that Gen X and BB people do not have this recognition. Therefore, mobile payment application providers could develop easier features for this group and help them accept and adopt mobile payments more quickly. Moreover, the security of mobile payment influences attitudes and builds confidence in usage in China. The system's protection of users' privacy should be improved because it is an important factor influencing the use of mobile payment applications. In Thailand, to improve application performance, various features should be added, and usability should be increased.

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REFERENCES

- [1] Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In *Action control* (pp. 11-39). Springer.
- [2] Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- [3] Ajzen, I., & Fishbein, M. (1975). A Bayesian analysis of attribution processes. *Psychological bulletin*, 82(2), 261.
- [4] Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European review of social psychology*, 11(1), 1-33.
- [5] Arango, C., Huynh, K. P., & Sabeti, L. (2015). Consumer payment choice: Merchant card acceptance versus pricing incentives. *Journal of Banking & Finance*, 55, 130-141.
- [6] Au, Y. A., & Kauffman, R. J. (2008). The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application. *Electronic commerce research and applications*, 7(2), 141-164.
- [7] Bank of Thailand. (2016). *Payment Systems Annual Report 2016*. https://www.bot.or.th/English/PaymentSystems/Publication/PS_Annually_Report/Documents/Payment_2016_E.pdf
- [8] Bank of Thailand. (2019). *Payment Systems Annual Report 2019*. https://www.bot.or.th/English/PaymentSystems/Publication/PS_Annually_Report/Documents/Payment_2019_E.pdf
- [9] Bank of Thailand. (2021). *Payment Systems Annual Report 2021*. https://www.bot.or.th/Thai/PaymentSystems/Publication/PS_Annually_Report/Pages/default.aspx
- [10] Bardey, D., Cremer, H., & Lozachmeur, J.-M. (2014). Competition in two-sided markets with common network externalities. *Review of Industrial Organization*, 44(4), 327-345.
- [11] Bátiz-Lazo, B., Haigh, T., & Stearns, D. L. (2014). How the future shaped the past: The case of the cashless society. *Enterprise & Society*, 15(1), 103-131.
- [12] Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Sage publications.
- [13] Chen, C.-L., & Lai, W.-H. (2023). Exploring the Impact of Perceived Risk on User's Mobile Payment Adoption. *Review of Integrative Business and Economics Research*, Vol. 12, Issue 1, 1-20.
- [14] China: A digital payments revolution. (2019, Sep). <https://www.cgap.org/research/publication/china-digital-payments-revolution>

- [15] China: Number of mobile payment transactions 2019. (2019, 2020, April 30). https://www.statista.com/statistics/244538/number-of-mobile_payment-transactions-in-china
- [16] Chiu, I. M., Heesters, B. A., Ghasemlou, N., Von Hehn, C. A., Zhao, F., Tran, J., Wainger, B., Strominger, A., Muralidharan, S., & Horswill, A. R. (2013). Bacteria activate sensory neurons that modulate pain and inflammation. *Nature*, 501(7465), 52-57.
- [17] Dahlberg, T., & Mallat, N. (2002). Mobile payment service development-managerial implications of consumer value perceptions. *ECIS 2002 Proceedings*, 139.
- [18] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management science*, 35(8), 982-1003.
- [19] Economides, N. (1996). The economics of networks. *International journal of industrial organization*, 14(6), 673-699.
- [20] Ewe, S. Y., Yap, S. F., & Lee, C. K. C. (2015). Network externalities and the perception of innovation characteristics: mobile banking. *Marketing Intelligence & Planning*.
- [21] Garcia-Swartz, D. D., Hahn, R. W., & Layne-Farrar, A. (2006). The move toward a cashless society: a closer look at payment instrument economics. *Review of network economics*, 5(2).
- [22] Gupta, S., & Mela, C. (2008). What is a free customer worth? Armchair calculations of nonpaying customers' value can lead to flawed strategies. *Harvard business review*, 86, 102-109, 138.
- [23] Haruvy, E., & Prasad, A. (1998). Optimal product strategies in the presence of network externalities. *Information Economics and Policy*, 10(4), 489-499.
- [24] Huang, Y., Wang, X., & Wang, X. (2020). Mobile Payment in China: Practice and Its Effects*. *Asian Economic Papers*, 19(3), 1-18. https://doi.org/10.1162/asep_a_00779
- [25] Huck, K. A., & Malony, A. D. (2005). Perfexplorer: A performance data mining framework for large-scale parallel computing. SC'05: Proceedings of the 2005 ACM/IEEE conference on Supercomputing,
- [26] Jantarakolica, K., & Jantarakolica, T. (2018). Acceptance of Financial Technology in Thailand: Case Study of Algorithm Trading. In *Banking and Finance Issues in Emerging Markets* (Vol. 25, pp. 255-277). Emerald Publishing Limited. <https://doi.org/10.1108/S1571-038620180000025011>
- [27] Katz, M. L., & Shapiro, C. (1985). Network externalities, competition, and compatibility. *The American Economic Review*, 75(3), 424-440.
- [28] Kraemer, M. U., Yang, C.-H., Gutierrez, B., Wu, C.-H., Klein, B., Pigott, D. M., Group†, O. C.-D. W., Du Plessis, L., Faria, N. R., & Li, R. (2020). The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*, 368(6490), 493-497.
- [29] Krivosheya, E., & Korolev, A. (2016). Benefits of the retail payments card market: Russian cardholders' evidence. *Journal of Business Research*, 69(11), 5034-5039.
- [30] Lee, M.-C. (2009). Predicting and explaining the adoption of online trading: An empirical study in Taiwan. *Decision support systems*, 47(2), 133-142.
- [31] Li, B. G., McAndrews, J., & Wang, Z. (2019). *Two-Sided Market, R&D and Payments System Evolution*. International Monetary Fund.

- [32] Lin, C.-P., & Bhattacharjee, A. (2008). Elucidating individual intention to use interactive information technologies: The role of network externalities. *International Journal of Electronic Commerce*, 13(1), 85-108.
- [33] Lu, L. (2018). Decoding Alipay: Mobile Payments, a Cashless Society and Regulatory Challenges. *Law & Society: Private Law - Financial Law eJournal*.
- [34] Mallat, N. (2007). Exploring consumer adoption of mobile payments—A qualitative study. *The Journal of Strategic Information Systems*, 16(4), 413-432.
- [35] Moser, C. A., & Kalton, G. (2017). *Survey methods in social investigation*. Routledge.
- [36] Nandy, S., & Sussan, F. (2022). COVID Emergency Declaration and Fintech Digital Payment Companies' Performance. *Review of Integrative Business and Economics Research*, 11(1), 51-62.
- [37] Pham, D. J., Wentz, B., Nguyen, T., & Pham, T. (2022). The decline of branch banking and the transformation of bank accessibility. *Review of Integrative Business and Economics Research*, 11(3), 1-19.
- [38] Qu, Y., Rong, W., Chen, H., Ouyang, Y., & Xiong, Z. (2018). Influencing Factors Analysis for a Social Network Web Based Payment Service in China. *Journal of Theoretical and Applied Electronic Commerce Research*, 13(3), 99-113.
- [39] Rattanawalee, P. (2019). *Financial innovation: modern method of payment in China* [Text]. Thammasat University.
<https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=ir01518a&AN=tldc.176277&authtype=sso&custid=s4775581&site=eds-live&scope=site&custid=s4775581>
http://digital.library.tu.ac.th/tu_dc/frontend/Info/item/dc:176277
- [40] Rivis, A., & Sheeran, P. (2003). Social influences and the theory of planned behaviour: Evidence for a direct relationship between prototypes and young people's exercise behaviour. *Psychology and Health*, 18(5), 567-583.
- [41] Robinson, I. S. (2004). *Measuring the oceans from space: the principles and methods of satellite oceanography*. Springer Science & Business Media.
- [42] Roca, J. C., García, J. J., & De La Vega, J. J. (2009). The importance of perceived trust, Security and privacy in online trading systems. *Information Management & Computer Security*.
- [43] Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research. *Journal of Consumer Research*, 15(3), 325-343.
<https://doi.org/10.1086/209170>
- [44] Shimp, T. A., & Kavas, A. (1984). The theory of reasoned action applied to coupon usage. *Journal of Consumer Research*, 11(3), 795-809.
- [45] Taylor, S., & Todd, P. (1995a). Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intentions. *International journal of research in marketing*, 12(2), 137-155.
- [46] Taylor, S., & Todd, P. (1995b). An integrated model of waste management behavior: A test of household recycling and composting intentions. *Environment and behavior*, 27(5), 603-630.
- [47] Thomas, H. (2013). Measuring progress toward a cashless society.
<https://newsroom.mastercard.com/wp-content/uploads/2014/08/MasterCardAdvisors-CashlessSociety-July-20146.pdf>
- [48] Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision sciences*, 27(3), 451-481.

- [49] Visa Consumer Attitude Study 2022. Retrieved 2023 from <https://www.visa.co.th/dam/VCOM/regional/ap/documents/visa-cpa-report-smt-2022.pdf>
- [50] Wei, P.-S., & Lu, H.-P. (2014). Why do people play mobile social games? An examination of network externalities and of uses and gratifications. *Internet research*.
- [51] Whitley, E., & Ball, J. (2002). Statistics review 3: hypothesis testing and P values. *Critical Care*, 6(3), 1-4.
- [52] Wu, P.-C., Liu, S.-Y., & Huang, C.-W. (2022). The Impact of FinTech Index on P2P Lending Rate. *Review of Integrative Business and Economics Research*, 11(2), 79-94.
- [53] Zhang, C.-B., Li, Y.-N., Wu, B., & Li, D.-J. (2017). How WeChat can retain users: Roles of network externalities, social interaction ties, and perceived values in building continuance intention. *Computers in Human Behavior*, 69, 284-293. <https://doi.org/https://doi.org/10.1016/j.chb.2016.11.069>