

# Continuous Usage Intention of Mobile Payment Platform

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Manuscript submitted July 31, 2019; accepted September 25, 2019.

doi: 10.17706/ijcce.2020.9.1.33-45

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**Abstract:** The prevalence of mobile smart devices, improvements to mobile communication network infrastructure, and development of online financial transaction technology have made mobile payment a key role in e-commerce. Mobile payment's features such as convenience, speed, real-time transfers, and being environmentally friendly have gradually made it a popular method of payment among consumers. Although mobile payment provides numerous benefits to consumers, its payment application and privacy have hidden concerns that deter them. China has the largest number of mobile payment users worldwide; therefore, this study recruited Chinese consumers as research subjects. An online questionnaire was used to examine the perceived benefit (PB), trust (TRU), subjective norm (SN), attitudes toward use (AU), continuous usage intention (CUI), and perceived risk (PR) of consumers related to mobile payments. The questionnaire received 504 responses; 30 were eliminated from participants who did not use mobile payment or that were invalid, leaving 474 valid responses for a valid response rate of 94.05%. The research results showed that: (1) PB, TRU, SN, and AU had significant positive effects on the CUI of consumers; (2) PB, TRU, and SN had significant positive effects on the AU of consumers; (3) AU partially mediated the positive effect of PB on CUI and that of TRU on CUI, and completely mediated the effect of SN on CUI; and (4) PR had significantly and negatively mediated the effects of PB, TRU, SN, and AU on consumers' CUI.

**Key words:** Continuous usage intention, perceived benefit, subjective norm, trust.

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## 1. Introduction

Mobile payment is a derivative of third-party payment whereby a mobile client uses an electronic device such as a smart phone or tablet to conduct electronic money payment. It is a new payment ecosystem that can effectively integrate end devices, the Internet, financial institutions, and application platforms to enable online and offline consumer payment, money transfer, repayment, financial investment, and other account transfers. Following the maturity of third-party payment industry chain and relevant policies, the market size of third-party mobile payment transactions in China reached US\$ 31.75 trillion in 2018; furthermore, 47% of consumers have used mobile payments and the penetration rate is the highest worldwide. Among the available platforms, Alipay has a market share of 54.3% with 400 million users in China and more than 520 million daily active users worldwide. WeChat Pay only has a market share of 39.2% in China but its user base of 600 million is the highest worldwide [1]. Thus, Alipay and WeChat Pay have considerable influence among international mobile payment platforms. However, third-party payment services entail technical risks during online transactions; security loopholes may threaten the safety of consumers' accounts and funds. Additionally, although the processing method and regulations of information and fund flows of such

third-party payment platforms are increasingly stringent, problems such as fraud and privacy breaches continue to emerge. In turn, this affects consumer trust in such platforms, with some being unwilling to continue to use them. Accordingly, this study proposed the following research questions: What are the factors that influence consumers to continue to use mobile payment services? Is perceived risk generated during the use of mobile payment platforms? Does perceived risk affect attitudes toward use to the extent that consumers are unwilling to continue to use mobile payment platforms?

According to the cognition–affect–behavior (CAB) model, the behavioral aspect of consumer attitude is often expressed in terms of purchase intention or usage intention [2], and the behavioral intention of consumers is affected by trust and attitude [3]. Therefore, based on the CAB model, this study examined the continuous usage intention (CUI) of Chinese consumers regarding third-party mobile payment platforms, as well as the effects of perceived benefit (PB), trust (TRU), attitudes toward use (AU), and perceived risk (PR) on CUI, to construct a path model for the continuous usage of mobile payment. This model can serve as a reference for the application and design of mobile payment platforms.

## **2. Literature Review**

### **2.1. The Effect of Perceived Benefit, Trust, Subjective Norm, and Attitudes towards Use on Continuous Usage Intention**

Third-party mobile payment can provide lower transaction costs, faster transaction speeds, more transparent information, 24-hour services, and even extra rewards, such as reward points, cashback, draws with prizes, and discounts. The benefits perceived through the purchase or use of certain products or services are called PBs [4]. Studies have shown that consumers believe that online shopping has more advantages compared with traditional shopping; therefore, PB had significant positive effects on the choice of e-commerce [5]-[7]. CUI refers to a user's willingness to continue to use a certain information system for a relatively long time into the future [8]. This study inferred that when consumers use a third-party mobile payment service, the greater the PB, the stronger their CUI. Therefore, this study proposed the following hypothesis:

H1: Consumer PB has a positive effect on CUI.

TRU represents the willingness or intention to rely on certain things [9]. Reference [10] indicated that when a customer reaches a tacit agreement with a service provider and believes in its service, TRU is generated; the parties will act in a manner that is beneficial to the other and will not exhibit unexpected behavior that would harm the other [11]. Compared with face-to-face interactions in traditional commerce, e-commerce development and new technologies contain more hidden uncertainties; moreover, the online transaction environment lacks the physical presentation of products, causing TRU to be particularly critical in the age of mobile Internet [12], [13]. Reference [14] indicated in their e-commerce research that TRU includes the TRU and TRU-related expectations a consumer has for a shop. Other relevant studies have found that TRU strongly affects consumers' willingness to make online transactions as well as their CUI [6], [15]-[17]; thus, when consumers use a third-party mobile payment platform, this study inferred that the higher their TRU, the stronger their CUI. Accordingly, it proposed the following hypothesis:

H2: Consumer TRU has a positive effect on CUI.

According to the definition of reference [18], subjective norm (SN) is the personal perceived pressure to perform a particular behavior and the motivation to comply; therefore, SN reflects how the behavioral perception of customers is affected by their significant others (i.e., family, friends, and colleagues). The theory of reasoned action and numerous relevant research outcomes have proved that SN and AU are significant determinants of behavioral intention [7], [8], [18]-[20] and generate positive effects on technology usage behavior and CUI [21]. Thus, this study inferred that when a consumer uses a third-party

mobile payment platform, the more positive the perceived SN and AU, the stronger the CUI. Accordingly, it proposed the following hypotheses:

H3: Consumer SN has a positive effect on CUI.

H4: Consumer AU for mobile payment has a positive effect on CUI.

## **2.2. The Effect of PB, TRU, and SN on AU**

Numerous studies have found that PB, TRU, and SN had significant positive effects on AU. Reference [7] explored the influencing factors of using online banking based on the technology acceptance model and the theory of planned behavior; the results showed that PB had a significant positive effect on AU and usage intention, and furthermore, AU and SN had significant positive effects on usage intention. In reference [22], they found that PB had a significant positive effect on attitudes, and attitudes affected behavioral intention on street food. Additionally, because of the high uncertainty and dynamic nature of the Internet, numerous studies have defined user TRU as the direct determinant of attitude; moreover, research results have revealed that TRU had a significant positive effect on attitude [12], [13], [23]. Furthermore, reference [24] was based on the technology acceptance model in addition to SN, studied the AU related to mobile devices; their results showed that SN also had a significant positive effect on AU.

In combination with the aforementioned positive effects of consumer PB, TRU, and SN on AU, and the positive effect of consumer AU on CUI, this study inferred that the stronger the consumer PB, TRU, and SN, the more positive the AU, which in turn would result in a stronger CUI. Accordingly, this study proposed the following hypotheses:

H5: Consumer PB has a positive effect on AU.

H6: Consumer TRU has a positive effect on AU.

H7: Consumer SN has a positive effect on AU.

H8a: Consumer AU has a mediating effect on the relationship between PB and CUI.

H8b: Consumer AU has a mediating effect on the relationship between TRU and CUI.

H8c: Consumer AU has a mediating effect on the relationship between SN and CUI.

## **2.3. The Moderating Effect of PR**

The concept of PR was introduced into the analysis of consumer behavior in 1960. It is the combined effect of probability and involves the expected loss related to purchase and the uncertainties perceived by consumers as a result of negative results from using certain products or services, particularly in the early stage of online purchases. Therefore, such uncertainties were also considered the inhibiting factors of purchasing behavior; they included performance risk, financial risk, time risk, psychological risk, social risk, security risk, privacy risk and overall risk [7], [22], [25]-[28]. Studies have indicated that consumer PR is a significant obstacle to the decision to shop online. Therefore, when consumers perceive that the potential risk of online transactions is greater than that of traditional offline transactions, they would change their mind and have difficulty making transaction decisions [6], [29]. Additionally, some studies have found that PR moderated consumer dissonance in their product evaluation [30]. Furthermore, reference [7] conducted research on the factors of using online banking and indicated that PR (financial risk and security risk) and usage intention were significantly and negatively correlated. Reference [31] found that consumers were highly sensitive to the financial risk of each transaction; they perceived risks when the obtained product benefit was not greater than the investment, which in turn affected their purchase or usage intentions. Therefore, this study inferred that PB, TRU, and AU have positive effects on consumer CUI for third-party mobile payments. However, when consumers have a higher PR regarding mobile payments, the aforementioned relationships would change because of feelings of uncertainty. Accordingly, this study proposed the following hypotheses:

- H9a: PR has a moderating effect on the relationship between PB and CUI.
- H9b: PR has a moderating effect on the relationship between TRU and CUI.
- H9c: PR has a moderating effect on the relationship between SN and CUI.
- H9d: PR has a moderating effect on the relationship between AU and CUI.

In summary, this study considered that in third-party mobile payment, consumer PB, TRU, and SN have positive effects on CUI, and AU has a mediating effect in the aforementioned relationships. Additionally, consumer PR such as privacy breaches and financial loss in mobile payment services have a moderating effect on the aforementioned relationships. Fig. 1 illustrates the research framework.

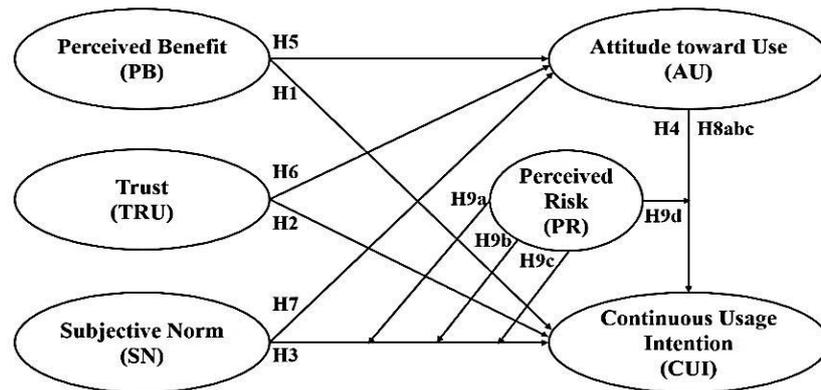


Fig. 1. Research framework.

### 3. Research Methods

The objective of this study was to examine the effects of PB, TRU, AU, CUI, and PR regarding third-party mobile payment platforms on consumers' use of such platforms. This study employed convenience sampling and used an online survey website to collect data regarding Chinese consumers' usage of third-party mobile payment; it posted the survey link on WeChat, which is a social platform that has the largest third-party payment user base. The questionnaire was divided into three parts. Part 1 consisted of five questions related to the usage of third-party mobile payment platforms, including usage experience (filter question), years of experience, brand, purpose, and number of uses per month. Part 2 consisted of questions related to the measurement of the research variables, including four items on PB with reference [29], three items on TRU with reference [32], four items on AU with reference [33], three items on CUI with reference [34], and five items on PR with reference [26]. All the items on variables were adapted from questionnaires that had undergone reliability and validity tests and possessed face validity. In addition, the questions were examined and revised after discussion with expert scholars to conform to the research theme; therefore, the items possessed content validity; all items were rated on a Likert 5-point scale. Part 3 of the questionnaire consisted of three questions on the basic information of the survey participants, including sex, education level, and average monthly spending. SPSS 22.0 was used for descriptive statistical analysis of the survey data, reliability and validity testing, and hypothesis testing.

The questionnaire received 504 responses. Thirty were eliminated either because they were invalid or from participants who did not use third-party mobile payment platforms; 474 valid questionnaires remained for a valid response rate of 94.05%. Data were analyzed using SPSS 22.0, and the analysis results were as follows. Among the participants, 280 were women and 194 were men, accounted for 59.07% and 40.93% of the total participants, respectively. In terms of education level, most participants had a level of university or college, accounting for 97.50%; high school or lower levels of education accounted for 2.32%;

and postgraduate or higher accounted for 0.18%. Regarding average monthly spending through mobile payments, most participants spent in the range of CNY 501–1000 (40.72%); followed by 177 participants who spent less than CNY 500 (37.34%); and 104 participants spent CNY 1001 and more (21.94%). Among the mobile payment users, 235 people had 2–3 years of usage experience (49.58%), followed by 120 people with 4–5 years of usage experience (25.32%); users who had used mobile payment for less than 1 year and more than 6 years accounted for 17.09% and 8.01%, respectively. In terms of mobile payment platform brands, the most popular platform was WeChat Pay (37.19%), followed by Alipay (31.34%) and UnionPay (19.31%); other mobile payment platform brands such as PayPal, Cmpay, and Easy FuBao accounted for 12.16%. The three main reasons for use were shopping (24.23%), money transfer and repayment (23.34%), and bill payment (22.28%); the secondary reasons were recreation and entertainment (14.99%), investment and wealth management (7.13%), and donations to charity (6.24%); and other purposes accounted for 1.79%. In terms of average number of uses per month, 51.90% of participants used mobile payment more than 10 times a month and 48.10% used it fewer than 10 times a month.

## **4. Empirical Results**

### **4.1. Reliability and Validity**

To ensure that the constructs of this study were reliable and valid, Cronbach's  $\alpha$  was employed to verify their reliability, with a minimum  $\alpha$  coefficient of 0.70 for satisfactory reliability [35]. The reliability and validity analysis results in Table 1 show that the Cronbach's  $\alpha$  of the variables PB, TRU, SN, AU, CUI, and PR were in the range of 0.759–0.856. Furthermore, the item-total correlation was  $> 0.50$ , which demonstrated that the scale of the study had satisfactory internal consistency. Additionally, reference [35] proposed that constructs with factor loading  $> 0.70$ , composite reliability (CR)  $> 0.80$ , and average variance extracted (AVE)  $> 0.50$  demonstrate that a measurement has satisfactory convergent validity. Table 1 shows that the factor loadings of the constructs were in the range of 0.733–0.884, CRs were in the range of 0.862–0.904, and AVE ranged from 0.615 to 0.743. All achieved the aforementioned standards, indicating that the convergent validity of the measurements in this study were acceptable.

The correlation analysis results in Table 2 show that except for the correlations of PR with TRU, AU, and CUI being nonsignificant and a significant negative correlation between PR and PB, all correlations between PB, TRU, SN, AU, and CUI were significant and positive. Additionally, this study used the AVE measurement proposed by reference [36] to evaluate the discriminant validity of the scale; the requirement for discriminant validity is met when the square roots of AVE of the constructs are greater than the correlation coefficient between the constructs. The diagonal value in Table 2 is the square root of the AVE of each construct; satisfactory discriminant validity exists when the square root of AVE of a construct was greater than the correlation coefficient between the construct and another construct. For example, the square roots of the AVE of PB and TRU were 0.822 and 0.862, respectively, the values of which were greater than the correlation coefficient of 0.247 of PB and TRU, indicating favorable discriminant validity between the constructs.

### **4.2. Regression Analysis**

#### **4.2.1. Main effect**

Model 1 in Table 3 indicates that PB had a significant positive effect on CUI ( $\beta = 0.516$ ,  $t = 13.071$ ,  $p \leq 0.001$ ), the explanatory power of the model after adjustment was 26.4%, and  $F(1,472) = 170.853$  achieved a significant level ( $p \leq 0.001$ ), indicating that high consumer PB of mobile payment was associated with high CUI. Therefore, H1 was supported. Similarly, Models 2–4 revealed that TRU ( $\beta = 0.332$ ,  $t = 7.655$ ,  $p \leq 0.001$ ), SN ( $\beta = 0.205$ ,  $t = 4.547$ ,  $p \leq 0.001$ ), and AU ( $\beta = 0.341$ ,  $t = 7.654$ ,  $p \leq 0.001$ ) had significant positive effects

on CUI, the explanatory power of the models after adjustment were 10.9%, 4.0%, and 30.0%, respectively, and  $F(1,472) = 58.601, 20.678, \text{ and } 203.472$  achieved significant levels ( $p \leq 0.001$ ). This indicated that strong consumer TRU, SN, and AU toward mobile payment were associated with high CUI. Therefore, H2, H3, and H4 were supported.

Table 1. Reliability and Validity

Construct and item	Internal reliability		Convergent validity			
	Cronbach's $\alpha$	Item-total correlation	Factor loading	APEV	CR	AVE
<i>Perceived Benefit (PB): I find that mobile payment...</i>						
PB1 is easy to use	0.759	0.594	0.825	67.522	0.862	0.675
PB2 enhances payment efficiency		0.599	0.828			
PB3 circumvents the inconvenience of carrying cash		0.576	0.812			
<i>Trust (TRU): I believe this mobile payment platform...</i>						
TRU1 cares for users' best interests	0.827	0.651	0.841	74.357	0.897	0.743
TRU2 provides trustworthy information		0.704	0.874			
TRU3 provides reliable services		0.698	0.871			
<i>Subjective Norm (SN): ...will affect my usage of mobile payment</i>						
SN1 The approval of people around me	0.856	0.619	0.774	70.126	0.904	0.701
SN2 The opinions of people important to me		0.740	0.866			
SN3 The opinions of acquaintances around me		0.710	0.843			
SN4 The opinions of people who have an important influence on me		0.732	0.863			
<i>Attitude towards Use (AU): I ... the use of mobile payment transactions</i>						
AU1 am interested in	0.814	0.554	0.737	64.420	0.879	0.645
AU2 have a positive view of		0.691	0.844			
AU3 make wise decisions concerning		0.611	0.789			
AU4 have a supportive attitude toward		0.681	0.837			
<i>Continuous Usage Intention (CUI): With regard to this mobile payment platform, I...</i>						
CUI1 am willing to use it	0.802	0.689	0.877	72.262	0.886	0.723
CUI2 will continue to use it		0.702	0.884			
CUI3 will use it more frequently		0.565	0.786			
<i>Perceived Risk (PR): I worry that mobile payment may...</i>						
PR1 leak personal information	0.842	0.669	0.808	61.534	0.889	0.615
PR2 leak transaction data		0.696	0.826			
PR3 leak payment passwords		0.652	0.789			
PR4 cause financial loss in case of operation error		0.592	0.733			
PR5 cause financial loss in case of losing mobile device		0.629	0.762			

Note: APEV= accumulation percentage of explained variance; CR= composite reliability; AVE= average variance extracted

Table 2. Discriminant Validity

	MEAN	SD	1	2	3	4	5	6
1. PB	4.140	0.639	0.822					
2. TRU	3.174	0.711	0.247**	0.862				
3. SN	3.278	0.756	0.192**	0.385**	0.837			
4. AU	3.738	0.619	0.519**	0.390**	0.296**	0.803		
5. CUI	3.943	0.621	0.516**	0.332**	0.205**	0.549**	0.850	
6. PR	2.410	0.710	-0.165**	0.053	-0.104*	0.002	-0.040	0.784

Note: \*  $p \leq 0.05$ , \*\*  $p \leq 0.01$ ; the diagonal values represent the square roots of AVE for each construct

Additionally, Models 5–7 indicated that PB ( $\beta = 0.519, t = 13.186, p \leq 0.001$ ), TRU ( $\beta = 0.390, t = 9.197, p \leq 0.001$ ), and SN ( $\beta = 0.295, t = 6.716, p \leq 0.001$ ) had significant positive effects on AU, the explanatory power of the models after adjustment were 26.4%, 15.0%, and 8.5%, respectively, and  $F(1,472) = 173.865, 84.591,$  and  $45.105$  achieved significant levels ( $p \leq 0.001$ ). This indicated that high consumer PB, TRU, and SN toward mobile payment were associated with strong AU. Therefore, H5, H6, and H7 were supported.

Table 3. Result of Hypotheses Tests

Model	$\beta$	$t$	Adjust $R^2$	Result
(1) PB→CUI	0.516***	13.071	0.264	H1 is supported
(2) TRU→CUI	0.332***	7.655	0.109	H2 is supported
(3) SN→CUI	0.205***	4.547	0.040	H3 is supported
(4) AU→CUI	0.341***	7.654	0.300	H4 is supported
(5) PB→AU	0.519***	13.186	0.268	H5 is supported
(6) TRU→AU	0.390***	9.197	0.150	H6 is supported
(7) SN→AU	0.295***	6.716	0.085	H7 is supported
(8) PB→AU→CUI	0.316***	7.405	0.371	H8a is supported
(9) TRU→AU→CUI	0.140***	3.377	0.315	H8b is supported
(10) SN→AU→CUI	0.047	1.164	0.300	H8c is supported
(11) PB*PR→CUI	-0.109**	-2.650	0.274	H9a is supported
(12) TRU*PR→CUI	-0.150***	-3.442	0.130	H9b is supported
(13) SN*PR→CUI	-0.120**	-2.657	0.050	H9c is supported
(14) AU*PR→CUI	-0.109**	-2.825	0.310	H9d is supported

Note: \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$

#### 4.2.2. Mediating effect

H8 inferred that the stronger consumer PB (H8a), TRU (H8b), and SN (H8c) in the use of mobile payment, the stronger the AU, which in turn will positively affect CUI. Therefore, this study referenced the method used by reference [37] to investigate the mediating effect of AU. According to this method, the independent, dependent, and mediator variables must meet the following four requirements: (a) the independent variable must have a significant effect on the mediator variable; (b) the mediator variable must have a significant effect on the dependent variable; (c) the independent variable must have a significant effect on the dependent variable; and (d) after adding the mediator variable to the model, the effect of the independent variable on the dependent variable should become nonsignificant (complete mediation) or attenuated (partial mediation).

In Models 5–7 in Table 3, PB, TRU, and SN are shown to have significant positive effects on AU; that is, they satisfied the first requirement. Furthermore, Models 1–4 showed that PB, TRU, SN, and AU had significant positive effects on CUI; that is, they satisfied the second and third requirements. Therefore, a mediation test had to be conducted on the fourth requirement proposed by reference [37].

Model 8 in Table 3 shows that after the adding the mediator variable AU to the model, the influence coefficient of PB to CUI decreased from  $\beta = 0.516 (p \leq 0.001)$  in Model 1 to  $\beta = 0.316 (p \leq 0.001)$ ; although it still had a high significance level, its coefficient was attenuated. Therefore, AU had partially mediated the effect of PB on CUI. Additionally, the explanatory power of the model after adjustment was 37.1%, with  $F(2,471) = 140.758$  achieving a significant level ( $p \leq 0.001$ ). The variance inflation factors (VIFs) of the variables were in the range of 1.000–1.368, suggesting no multicollinearity ( $VIF < 10$ ; with reference [38]); therefore, the overall model showed that the higher the consumer PB of mobile payment, the stronger the AU, which in turn positively and partially affected CUI. Thus, H8a was supported.

Similarly, Model 9 in Table 3 shows that after adding the mediator variable AU into the model, the influence coefficient of TRU on CUI decreased from  $\beta = 0.332$  ( $p \leq 0.001$ ) in Model 2 to  $\beta = 0.140$  ( $p \leq 0.001$ ); although it still had a high significance level, its coefficient was attenuated. Therefore, AU had a partially mediated the effect of TRU on CUI. Additionally, the explanatory power of the model after adjustment was 31.5%, with  $F(2,471) = 109.682$  achieving a significant level ( $p \leq 0.001$ ). The VIFs of the variables were in the range of 1.000–1.179, suggesting no multicollinearity; therefore, the overall model showed that the higher the consumer TRU toward mobile payment, the stronger the AU, which in turn positively and partially affected CUI. Thus, H8b was supported.

In Model 10 in Table 3, after adding the mediator variable AU into the model, the influence coefficient of SN on CUI decreased from  $\beta = 0.205$  ( $p \leq 0.001$ ) in Model 3 to  $\beta = 0.047$  ( $p > 0.05$ ); not only was the coefficient attenuated but also the effect of the independent variable on the dependent variable became nonsignificant. Therefore, AU had a completely mediated the effect of SN on CUI. Additionally, the explanatory power of the model after adjustment was 30.0%, with  $F(2,471) = 102.490$  achieving a significant level ( $p \leq 0.001$ ). The VIFs of the variables were in the range of 1.000–1.096, suggesting no multicollinearity; therefore, the overall model showed that the higher the consumer SN toward mobile payment, the stronger the AU, which in turn positively and completely affected CUI. Thus, H8c was supported.

#### 4.2.3. Moderating effect

H9 inferred that PR would have a moderating effect on the relationships of consumer PB (H9a), TRU (H9b), SN (H9c), and AU (H9d) with CUI regarding the use of mobile payment. High consumer PB, TRU, SN, and AU of mobile payment resulted in high CUI; however, when the consumer PR toward mobile payment was high, the influential effects of them on CUI were weakened.

In Model 11 in Table 3, the product term of PB and PR had a negative significant correlation with CUI ( $\beta = -0.109$ ,  $t = -2.650$ ,  $p \leq 0.01$ ), indicating that the positive correlations between PB and CUI across different levels of PR were significantly different, as well as demonstrating a negative moderation. Additionally, the explanatory power of the model after adjustment was 27.4%, and  $F(3,470) = 60.507$  achieved a significant level ( $p \leq 0.001$ ). The VIFs of the variables were in the range of 1.028–1.124, indicating no multicollinearity; therefore, the overall model showed that the higher the consumer PB toward mobile payment, the higher the CUI. However, when consumer PR toward mobile payment was high, the influential effect of PB on CUI was weakened. Thus, H9a was supported.

Similarly, in Models 12–14 in Table 3, the product terms of TRU and PR ( $\beta = -0.150$ ,  $t = -3.442$ ,  $p \leq 0.001$ ), of SN and PR ( $\beta = -0.120$ ,  $t = -2.657$ ,  $p \leq 0.01$ ), and of AU and PR ( $\beta = -0.109$ ,  $t = -2.825$ ,  $p \leq 0.01$ ) exhibited negative significant correlations with CUI, revealing that the positive correlations of consumer TRU, SN, and AU with CUI across different levels of PR were significantly different, and demonstrating a negative moderation. Additionally, the explanatory powers of the three models after adjustment were 13.0%, 5.0%, and 31.0%, and the respective  $F(3,470) = 24.572$  ( $p \leq 0.001$ ),  $F(3,470) = 9.382$  ( $p \leq 0.001$ ), and  $F(3,470) = 71.900$  ( $p \leq 0.001$ ) all achieved significant levels. The VIFs of the variables were in the range of 1.002–1.033, indicating no multicollinearity; therefore, the overall model demonstrated that the stronger the consumer TRU, SN, and AU toward mobile payment, the stronger the CUI. However, when the PR of mobile payment was high, the influential effects of TRU, SN, and AU on CUI were weakened. Thus, H9b, H9c, and H9d were supported.

## 5. Conclusions

In the last 10 years, with the prevalence of mobile smart devices and public acceptance and recognition of online-to-offline (O2O) commerce, third-party mobile payment has become a new payment method

worldwide. However, compared with traditional offline transactions, online transactions are more prone to risks in aspects such as product quality, product delivery, aftersales service, payment security, information security, and personal privacy. In particular, failure to receive goods after payment or inconvenient payment methods has affected the purchasing intention of consumers. Third-party mobile payment has developed rapidly in China; therefore, this study recruited Chinese consumers as research subjects to examine the effects of PB, TRU, SN, AU, CUI, and PR in the use of mobile payment.

### **5.1. Perceived Benefit, Trust, and Subject Norm Have Positive Effects on Attitude toward Use of Third-Party Mobile Payment**

The findings revealed that consumer AU of third-party mobile payment was positively affected by PB, TRU, and SN; this research result partly agreed with that of reference [7]. When consumers used third-party mobile payment platform for purchases, bill payment, money transfer, and repayment, their positive view of the platform increased and they held a supportive attitude when they perceived the payment to be easy, efficient, and able to circumvent the inconvenience of carrying cash; when they perceived the service to be reliable, trustworthy, and caring toward its users; and even when people around them expressed approval for the platform. Therefore, in addition to considering product features, businesses pushing mobile platforms must emphasize the perceived value of consumers and provide reliable products and services. Simultaneously, they must pay attention to the significance of SN influences such as social interaction and reference groups.

### **5.2. Attitude toward Use Is an Important Mediator in Third-Party Mobile Payment**

By contrast, this study also found that consumer AU of third-party mobile payment served as a significant mediator variable. Consumer AU was affected by PB, TRU, and SN and also affected the CUI of consumers as a mediator; this research result partially conformed to those of reference [7] and reference [20]. When consumers perceived benefits and TRU when using third-party mobile payment, their positive view of the service grew stronger, which in turn increased their CUI for mobile payment. Therefore, AU partially mediated the positive effect of PB and TRU on CUI. Additionally, when consumers used third-party mobile payment, the opinions and approval of people around them (acquaintances, people important to them, and people with significant influence over them) indirectly affected their CUI completely through their AU. Therefore, AU had a complete mediating effect on the positive effect of SN on CUI. Thus, after businesses develop and promote their mobile payment platform, in addition to paying attention to reference groups, they must follow up on and investigate consumer AU and behavior to provide strong support based on empirical data for future improvement and development of products and services.

### **5.3. Perceived Risk Is an Important Moderator in Third-Party Mobile Payment**

Numerous studies have proved that PR would affect usage intention (reference to [7], [26], [31]). This study also found that consumers using third-party mobile payment worried about the leakage of personal information, transaction data, or payment passwords. Furthermore, they were concerned about financial loss resulting from operation error or loss of mobile devices. With these PRs, the effect of PB, TRU, SN, and AU on CUI would decline, forming a negative moderation effect. Given that consumer PR acted as negative moderator in the use of third-party mobile payment, businesses must be meticulous in their use of privacy and security technology during the design and maintenance of their mobile payment platform, establishing complete risk control and security mechanisms. Businesses with limited resources for improvement of products or services could reduce various potential risks through a collaborative approach, namely strategic alliance; only then can they ensure the CUI of consumers and the sustainable development of their business.

## 6. Future Research

In summary, this study examined the effects of PB, TRU, SN, CUI, and PR of third-party mobile payment from the perspective of Chinese consumers and proposed the following recommendations for future research. First, subsequent research may examine the design and effects of mobile payment platforms from the perspective of business users. The interface and process operations that business users focus on differ from those of consumers; therefore, their PB, PR, and AU may differ. Second, studies can investigate the usage intention and influencing factors of consumers from other countries for other third-party mobile payment platforms. For example, they could examine such usage in mobile-payment-friendly countries such as Norway and the United Kingdom, which also ranked in the top three worldwide in terms of mobile payment usage. Furthermore, future research could study mobile payment platforms such as PayPal, Apple Pay, and Samsung Pay, which ranked in the top five in terms of user base worldwide. Third, this study based its research framework design on the CAB model; future research can verify other theoretical models or extend the research framework of this study. For example, reference [39] found that TRU in mobile commerce can be divided into initial trust and continuous trust, which were affected by numerous factors; moreover, reference [9] indicated in their research on mobile commerce that TRU has a significant effect on customer satisfaction and customer loyalty. Therefore, future studies may employ empirical methodology to improve the related academic theories.

## Conflict of Interest

The authors declare no conflict of interest.

## Author Contributions

The first author, Delphine Ya-Chu Chan, carried out many parts of the article, including abstract, introduction, literature review and hypothesis inference, research methods, questionnaire design, data collection, conclusion and discussion; the second author, Yao Feng, analyzed and interpreted the data, and proofread the whole paper format; all authors had approved the final version.

## Acknowledgment

The authors are grateful for the funding for High-level Talents of University of Electronic Science and Technology of China, Zhongshan Institute (UESTC) for this study, and the project number of this study is 418YKQN16.

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