

An empirical examination of continuance intention of mobile payment services

Tao Zhou

School of Management, Hangzhou Dianzi University, Hangzhou, 310018, PR China

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ABSTRACT

Retaining users and facilitating their continuance usage are crucial for mobile payment service providers. Drawing on the information systems success model and flow theory, this research identified the factors affecting continuance intention of mobile payment. We conducted data analysis with structural equation modeling. The results indicated that service quality is the main factor affecting trust, whereas system quality is the main factor affecting satisfaction. Information quality and service quality affect flow. Trust, flow and satisfaction determine continuance intention of mobile payment. The results imply that service providers need to offer quality system, information and services in order to facilitate users' continuance usage of mobile payment.

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1. Introduction

Mobile internet has been developing rapidly in the world. According to a report issued by China Internet Network Information Center (CNNIC), the number of mobile internet users in China has reached 356 million, accounting for 69% of its internet population (513 million) [11]. Attracted by the great market, service providers have released a variety of mobile services, such as mobile instant messaging, mobile games and mobile payment. Among them, mobile payment as a critical service supporting mobile business has received great attention from enterprises. For example, Alipay, the largest online payment service provider in China, has released its mobile payment product: *Shouji Zhifubao*. Telecommunication service providers such as China Mobile and China Unicom have also provided mobile payment services, which allow users to pay bus and subway fees with their mobile phones. However, mobile payment services have not received wide adoption among users. The CNNIC report [11] indicates that only 8.6% of mobile internet users have ever used mobile payment. Thus, it is necessary to facilitate user adoption and usage of mobile payment.

Mobile payment means that users adopt mobile terminals such as mobile phones to conduct payment for bills, goods and services [13]. Compared to traditional and online payment, the main advantage of mobile payment is ubiquity. That is, with the help of mobile networks and terminals, users can conduct payment at anytime from anywhere. This may promote user adoption of mobile payment. However, mobile terminals have their constraints, such as small screens, inconvenient input and slow responses. These constraints may negatively affect users' experience and impede their continuance usage. In addition, service providers have invested great effort and resources on releasing mobile payment services. If they cannot retain users and facilitate users'

continuance usage, they will not recover these costs and achieve success. Further, there exists intense competition among mobile payment service providers and the switching cost is low for users. If users are unsatisfied with a service provider, they may switch to another one.

Extant research has drawn on information technology theories such as technology acceptance model (TAM) and innovation diffusion theory (IDT) to examine initial adoption and usage of mobile payment [32,42,50]. Factors such as perceived usefulness, perceived ease of use and compatibility are identified to affect initial usage [32,50]. Trust is also found to be a significant determinant of mobile payment usage [7]. However, the post-adoption usage of mobile payment has seldom been examined. Considering the significance of retaining users, it is necessary to identify the factors affecting continuance usage. This is the purpose of this research. We used the information systems success model proposed by DeLone and McLean [15] as the theoretical base. System quality, information quality and service quality are proposed to affect continuance intention. Trust, flow and satisfaction are included as the mediators.

The rest of this paper is organized as follows. We present literature review in the next section. Then we develop research model and hypotheses in Section 3. Section 4 reports instrument development and data collection. Section 5 presents results, followed by a discussion of these results in Section 6. Section 7 presents theoretical and managerial implications. We conclude the paper in Section 8.

2. Literature review

2.1. Mobile payment

As a basic service supporting mobile business, mobile payment has great market potential. It is estimated that the number of mobile payment users in China will reach 480 million and the transaction volume via mobile payment exceeds 218.6 billion RMB Yuan (about

E-mail address: zhoutao@hdu.edu.cn.

34.4 billion US dollars) in 2013 [25]. Faced with the great opportunity, many enterprises have stepped into mobile payment market and released their products.

The earliest mobile payment is short-messages based. For example, when users download color ring tones, service providers send a short message to inform them about the charge. If users confirmed the message, the fees will be charged from their accounts. Later, users can conduct mobile payment via wireless application protocol (WAP) sites and client-end applications. On the whole, mobile payment includes two types: remote payment and proximity payment [7]. Remote payment means that users need to connect to remote payment servers in order to conduct payment. It includes mobile banking and mobile internet payment services. Proximity payment means that users conduct payment via their mobile phones on the spot. It is often based on technologies such as radio frequency identification (RFID) and near field communication (NFC). Through proximity payment, users can pay public bus fees, subway fees and bills.

Compared to offline payment and online payment, a main advantage of mobile payment is ubiquity. Users can conduct payment via their mobile terminals conveniently. Offline payment requires users to carry cash and credit cards through wallets. Online payment requires users to sit before a computer and connect to internet. Both offline payment and online payment pose temporal and spatial constraints to users. In comparison, mobile payment frees users from such constraints and enables them to conduct ubiquitous payment. Nevertheless, compared to offline and online payment, mobile payment may also involve greater uncertainty and risk because of vulnerable mobile networks. In addition, users' experience may be affected due to the constraints of mobile terminals such as small screens and inconvenient input. Thus, users may need to engender enough trust and obtain a compelling experience in order to facilitate their usage.

2.2. Mobile payment user adoption

As an emerging service, mobile payment has not received wide adoption among users. Thus, researchers have been concerned with mobile payment user behavior and tried to identify the factors affecting user adoption of mobile payment. Most research focuses on initial adoption and TAM is often used as the theoretical base. Schierz et al. [50] noted that perceived security, perceived usefulness, perceived ease of use and mobility affect user attitude, which in turn affects usage intention. Kim et al. [32] argued that individual differences and system characteristics affect the intention to use mobile payment through perceived usefulness and perceived ease of use. Individual differences include innovativeness and mobile payment knowledge, whereas system characteristics include mobility, reachability, compatibility and convenience.

Trust is also integrated with TAM to examine mobile payment user behavior. Chandra et al. [7] suggested that mobile service provider characteristics and mobile technology characteristics affect user trust, which further affects perceived usefulness, perceived ease of use and user adoption. Mobile service provider characteristics include perceived reputation and perceived opportunism, whereas mobile technology characteristics include perceived environmental risk and structural assurance. Shin [51] found that user adoption of mobile payment system is affected by perceived usefulness, perceived ease of use, perceived risk and trust.

In addition, IDT is also used to explore mobile payment user behavior. Mallat [42] noted that relative advantage, compatibility, complexity, costs, trust and perceived risk affect user adoption of mobile payment. Chen [9] integrated TAM and IDT to examine the factors affecting mobile payment user adoption.

2.3. Post-adoption of mobile services

As users' post-adoption usage is critical to the success of mobile service providers, extant research has paid much attention to identify

the factors affecting post-adoption behavior. Kuo et al. [33] suggested that service quality, perceived value and satisfaction predict post-purchase intention of mobile value-added services. Shin et al. [52] found that perceived usefulness, cost rationality and perceived ease of use significantly affect post-adoption usage of mobile internet. Hong et al. [24] argued that attitudinal beliefs, normative beliefs and perceived behavioral control determine the continuance intention of mobile data services. Lee et al. [38] drew on two-factor theory to examine the effects of system quality and information quality on post-adoption usage of mobile data services. Liu et al. [39] noted that relationship quality (including satisfaction and trust) and switching barrier affect mobile phone user loyalty.

From these studies, we can find that although users' post-adoption behavior has been examined in the contexts of mobile internet, mobile data services and mobile purchase, it has seldom been tested in the context of mobile payment, which involves great uncertainty and risk that may inhibit users' continuance usage. Thus, it is necessary to conduct an empirical research to identify the factors affecting continuance usage of mobile payment.

2.4. Information systems success model

DeLone and McLean [14] proposed an information systems success model, which argues that system quality and information quality affect use and user satisfaction, both of which further lead to individual impact and organizational impact. Later, they developed an updated model and included service quality into the model [15].

Since its inception, the information systems success model has been widely used to examine user adoption of various information systems. Song and Zahedi [53] examined the effects of system quality and information quality on user trust in health informatories. Kim et al. [27] compared the effects of system quality, information quality and service quality on initial trust and repeat trust building. Chen and Cheng [10] applied information systems success model to predict user intention to conduct online shopping. Teo et al. [55] integrated trust and information systems success model to examine electronic government success.

Recently, information systems success model has been used to understand mobile user behavior. Kim et al. [30] adopted information systems success model to examine ubiquitous computing use and u-business value. Chatterjee et al. [8] conducted a qualitative study to identify the success factors for mobile work in healthcare. Lee and Chung [36] noted that system quality, information quality and interface design quality affect user trust in and satisfaction with mobile banking.

As evidenced by these studies, although information systems success model has been widely used to examine user behavior, it has seldom been tested in the context of mobile payment, which represents an emerging information technology. Thus, it is necessary to generalize information systems success model to mobile payment. On the other hand, we focused on user satisfaction and continuance intention in this research. The information systems success model also includes satisfaction as a dependent variable. Thus, it is appropriate to use information systems success model as our theoretical base.

3. Research model and hypotheses

3.1. Trust

Trust reflects a willingness to be in vulnerability based on the positive expectation toward another party's future behavior [43]. Trust includes three beliefs: ability, integrity and benevolence [29,44]. Ability means that service providers have knowledge and skills necessary to fulfill their tasks. Integrity means that service providers keep their promises and do not deceive users. Benevolence means that service providers care users' interests, not just their own benefits.

Built on mobile networks and terminals, mobile payment involves great uncertainty and risk. For example, mobile networks are vulnerable

to hacker attack and information interception. Mobile terminals may be also infected by viruses and Trojan horses. These security problems will increase users' perceived risk and uncertainty. They need to build trust in order to mitigate perceived risk and facilitate their continuance usage. Trust has been identified to be a significant factor facilitating user behavior [3,4,40]. As it is relatively difficult to measure actual continuance usage, we tested continuance intention as a substitute. Thus, we suggest,

H1. Trust is positively related to continuance intention.

3.2. Flow

Flow represents a holistic sensation that people feel when they act with total involvement [12]. Hoffman and Novak [22] defined flow as a state that is characterized by: (1) a seamless sequence of responses facilitated by machine interactivity; (2) intrinsic enjoyment; (3) a loss of self-consciousness; and (4) self-reinforcement. Flow reflects a balance between users' skills and challenges [23]. When skills exceed challenges, users feel bored. In contrast, when challenges exceed skills, users feel anxious. When both skills and challenges are lower than the threshold values, users feel apathy. Only when skills and challenges exceed the threshold values and have a good match will users experience flow. When users plan to adopt mobile payment, they need to have basic knowledge and skills on mobile internet and payment. They may also face challenges such as operation difficulty and worry on payment security, which represents a main challenge compared to usage of other kinds of mobile services. Users need to balance both skills and challenges to obtain flow, such as a fluid operation, an immersive and enjoyable experience.

When users experience flow that represents an optimal experience, they may feel great enjoyment and expect to obtain this experience again. Thus, they will continue their usage. Extant research has identified the effect of flow on users' continuance behavior. For example, O'Cass and Carlson [47] noted that flow affects user loyalty toward sporting team websites. Hausman and Siekpe [21] found that flow predicts user intention to return to online shopping sites. Consistent with these findings, we suggest,

H2. Flow is positively related to continuance intention.

3.3. Satisfaction

Satisfaction reflects cumulative feelings that are developed among multiple interactions with a service provider [48]. If users are not satisfied with mobile payment systems, they may discontinue their usage. Extant research has found that satisfaction is a strong determinant of continuance behavior [31,33,39]. Thus,

H3. Satisfaction is positively related to continuance intention.

3.4. Relationship between trust, flow and satisfaction

Trust provides a subjective guarantee that users obtain a good experience in future as they believe that mobile payment service providers have ability, integrity and benevolence to present quality services to them. If they do not build trust in service providers, they cannot expect to acquire a compelling experience. For example, due to lack of trust, they may perceive low control over mobile payment systems. This may undermine their experience. Wu and Chang [58] stated that trust affects flow in using online travel community. Zhou et al. [60] found that trust influences flow experience of using mobile social network services. Thus,

H4. Trust is positively related to flow.

Flow may affect user satisfaction. Users may expect to obtain a compelling experience from using mobile payment. When this expectation is confirmed, users will be satisfied. Lee et al. [37] suggested that flow affects user satisfaction with online banking. O'Cass and Carlson [47] noted that flow affects user satisfaction with professional sporting team websites.

H5. Flow is positively related to satisfaction.

3.5. System quality

System quality reflects the access speed, ease of use, navigation and visual appeal. If mobile payment systems are difficult to use and have poor interface design, users may feel that service providers lack ability and integrity necessary to offer quality services. Thus, system quality may affect user trust. Vance et al. [56] also noted that system quality affects user trust in mobile commerce technologies.

In addition, a poor system quality may undermine users' experience as it increases their difficulty of using mobile payment systems. Guo and Poole [20] found that perceived complexity affects flow in conducting online shopping. A poor system quality cannot lead to users' satisfaction as they always expect to adopt a quality mobile payment system. Thus, we suggest,

H6.1. System quality is positively related to trust.

H6.2. System quality is positively related to flow.

H6.3. System quality is positively related to satisfaction.

3.6. Information quality

Information quality reflects information relevance, sufficiency, accuracy and timeliness. Users expect to use mobile payments to pay bills and acquire their payment information at anytime from anywhere. If this information is irrelevant, inaccurate or out-of-date, users may doubt service providers' ability and integrity to present quality mobile payment services. This may affect their trust in service providers. Information quality has been identified to affect user trust in health intermediaries [59] and inter-organizational data exchange [45].

Poor information quality may undermine user experience as users need to spend much effort on information scrutinizing. This increases their operation difficulty. Jung et al. [26] noted that content quality affects mobile TV user experience. Poor information quality may also decrease users' satisfaction as they expect to obtain quality information from using mobile payment services.

H7.1. Information quality is positively related to trust.

H7.2. Information quality is positively related to flow.

H7.3. Information quality is positively related to satisfaction.

3.7. Service quality

Service quality reflects reliability, responsiveness, assurance and personalization. Providing quality services will signal service providers' ability and benevolence. In contrast, if service providers present unreliable services and slow responses to users, users cannot build trust in them. Thus, service quality may affect user trust. Extant research has disclosed the effect of service quality on user trust in online vendors [18] and mobile service providers [39].

Service quality may also affect user experience as unreliable connection and slow responses will decrease users' perceived enjoyment and control over mobile payment systems. For example, when users are paying bills, they may be annoyed if mobile payment systems are

unreachable or unstable. In addition, service quality has been identified to affect user satisfaction with mobile instant messaging [16], and mobile value-added services [33].

H8.1. Service quality is positively related to trust.

H8.2. Service quality is positively related to flow.

H8.3. Service quality is positively related to satisfaction.

Fig. 1 presents the research model.

4. Method

The research model includes seven factors. Each factor was measured with multiple items. All items were adapted from extant research to improve content validity [54]. These items were first translated into Chinese by a researcher. Then another researcher translated them back into English to ensure consistency. When the instrument was developed, it was tested among five users that had mobile payment usage experience. Then according to their comments, we revised some items to improve the clarity and understandability. The final items and their sources are listed in Appendix A.

Items of system quality, information quality and service quality were adapted from Kim et al. [27]. Items of system quality reflect the access speed, ease-of-use, navigation and visual appeal. Items of information quality reflect information relevance, sufficiency, accuracy and timeliness. Items of service quality reflect reliability, responsiveness, assurance and personalization. Items of trust and flow were adapted from Lee et al. [37]. Items of trust measure service providers' ability, integrity and benevolence. Items of flow reflect perceived enjoyment, perceived control and concentration. Items of satisfaction and continuance intention were adapted from Bhattacharjee [5]. Items of satisfaction reflect satisfaction, contentment and pleasure. Items of continuance intention reflect user intention to continue using mobile payment.

Data were collected at the service outlets of China Mobile and China Unicom, which represent two main telecommunication operators in China. These service outlets were located in an eastern China city, where mobile business is relatively developed than other regions. There were plenty of mobile users at these places and this will expedite our data collection process. We contacted users and inquired whether they had mobile payment usage experience. Then we asked those with positive answers to fill the questionnaire based on their usage experience. We scrutinized all responses (200) and dropped five responses that had too many missing values. As a result, we obtained 195 valid responses. Among them, 52.8% were males and 47.2% were females. A majority of them (65.1%) were between twenty and twenty-nine years old. About half of them (48.2%) had received university education. The frequently used mobile payment services include *Shouji Zhifubao* and China Mobile Payment. The statistics indicated that users mainly adopted *Shouji Zhifubao* to pay for their goods and services purchased in Taobao, which is the largest online store in China. On the other hand, users mainly used China Mobile Payment to pay public bus fees and buy movie tickets.

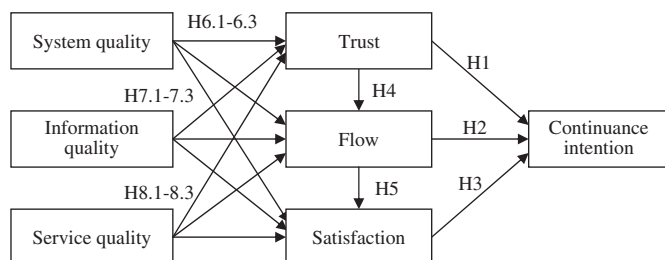


Fig. 1. Research model.

We conducted two tests to examine the common method variance (CMV). First, we conducted a Harman's single-factor test [49]. The results indicated that the largest variance explained by individual factor is 11.038%. Thus, none of the factors can explain the majority of the variance. Second, we modeled all items as the indicators of a factor representing the method effect, and re-estimated the model [41]. The results indicated a poor fitness. For example, the Goodness of Fit Index (GFI) is 0.508 (<0.90) and the Root Mean Square Error of Approximation (RMSEA) is 0.12 (>0.08). With both tests, we feel that CMV is not a significant problem in this research.

5. Results

Following the two-step approach recommended by Anderson and Gerbing [1], we first examined the measurement model to test reliability and validity. Then we examined the structural model to test research hypotheses and model fitness.

First, we adopted structural equation modeling software LISREL to conduct a confirmatory factor analysis (CFA) and examine the validity. Validity includes convergent validity and discriminant validity. Convergent validity measures whether items can effectively reflect their corresponding factor, whereas discriminant validity measures whether two factors are statistically different. Table 1 lists the standardized item loadings, the average variance extracted (AVE), the composite reliability (CR) and the Cronbach Alpha values. As listed in the table, most item loadings are larger than 0.7 and T values indicate that all loadings are significant at 0.001. All AVEs and CRs exceed 0.5 and 0.7, respectively. Thus, the scale has a good convergent validity [2,19]. In addition, all Alpha values are larger than 0.7, suggesting a good reliability [46].

To examine the discriminant validity, we compared the square root of AVE and factor correlation coefficients. As listed in Table 2, for each factor, the square root of AVE is significantly larger than its correlation coefficients with other factors. This indicates a good discriminant validity [17,19].

Second, we estimated the structural model. Fig. 2 presents the results. Table 3 lists the recommended and actual values of some fit indices for both CFA and structural model. Except GFI, other fit indices have better actual values than the recommended values. This indicates a

Table 1
Standardized item loadings, AVE, CR and Alpha values.

Factor	Item	Standardized item loading	AVE	CR	Alpha value
System quality (SYS)	SYS1	0.686	0.52	0.81	0.81
	SYS2	0.816			
	SYS3	0.701			
	SYS4	0.661			
Information quality (INF)	INF1	0.802	0.52	0.81	0.81
	INF2	0.653			
	INF3	0.730			
	INF4	0.681			
Service quality (SER)	SER1	0.753	0.53	0.82	0.81
	SER2	0.765			
	SER3	0.677			
	SER4	0.713			
Trust (TRU)	TRU1	0.757	0.56	0.79	0.79
	TRU2	0.772			
	TRU3	0.721			
	TRU4	0.721			
Flow (FLOW)	FLOW1	0.656	0.52	0.76	0.76
	FLOW2	0.730			
	FLOW3	0.772			
	FLOW4	0.772			
Satisfaction (SAT)	SAT1	0.856	0.62	0.83	0.83
	SAT2	0.757			
	SAT3	0.750			
	SAT4	0.750			
Continuance intention (USE)	USE1	0.808	0.56	0.79	0.79
	USE2	0.717			
	USE3	0.716			
	USE4	0.716			

good fitness [19]. The explained variance of trust, flow, satisfaction and continuance intention is 55.9%, 38.1%, 35.6% and 58.4%, respectively.

6. Discussion

As shown in Fig. 2, except H6.2, H7.3 and H8.3, other hypotheses are supported. System quality has significant effects on trust and satisfaction, but has no effect on flow. Both information quality and service quality affect trust and flow, but do not affect satisfaction. Trust, flow and satisfaction predict continuance intention.

Among the factors affecting trust, service quality has the largest effect ($\gamma=0.39$). Providing quality services to users entails service providers' continuous effort and resource investment [6]. Thus, service quality may act as a strong trust signal. If service providers cannot ensure service reliability, promptness and personalization, users may doubt service providers' ability and integrity to present quality mobile payment services to them, which will decrease their trust. Service providers can adopt encryption and certificates to ensure mobile payment security and reliability. Otherwise, users may perceive great risk and drop their usage of mobile payment. In addition, they can present personalized services to users. For example, they can use location-based services to acquire user location. Then they push context-related information such as nearby banks and automated teller machines to the user. This personalized service may help increase user trust [34].

We found that in addition to service quality, information quality also affects flow. This is consistent with Jung et al. [26], which found the effect of content quality on flow in using mobile TV. Users need to obtain accurate, relevant and up-to-date information to conduct mobile payment. If this information is inaccurate or out-of-date, users may feel annoyed and lack of control. This will undermine their experience. For example, mobile payment accounts need to be synchronized with online payment accounts. Otherwise, when users have actually made online payment, they may get inaccurate information on account balance by inquiring mobile payment. In addition, it is relatively difficult for users to search for information on mobile internet. Thus, service providers should present the information relevant to user demand. This may help improve user experience. We did not find the direct effect of system quality on flow. However, it indirectly affects flow through trust. Thus, users may rely on their perceptions of system quality to engender trust, which further leads to their flow experience.

The results indicate that system quality has a significant effect ($\gamma=0.32$) on satisfaction. This result is consistent with extant findings [55,57]. The constraints of mobile terminals highlight the necessity to present a well-designed interface to users [35]. If mobile payment systems are of poor interface and difficult to use, users cannot be satisfied. Thus, service providers need to improve system quality in order to enhance user satisfaction. They can emulate the interface design of reputable companies in their industry and improve their system quality. They also need to develop different mobile payment systems catering to various mobile phone operation systems, such as Symbian, Android, Apple IOS and Windows Phone. This presents a challenge to service providers. Nevertheless, this is worthwhile as satisfied users will continue their usage. In addition, service providers can use propaganda and online help to familiarize users with mobile payment system

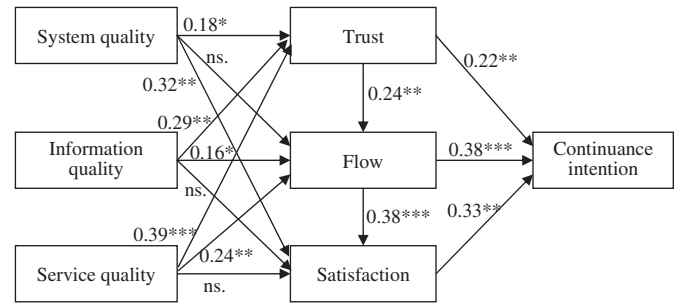


Fig. 2. Results estimated by LISREL. (Note: *, $P<0.05$; **, $P<0.01$; ***, $P<0.001$; ns, not significant).

operation. This may improve their perceived ease of use. We did not find the effect of information quality and service quality on satisfaction. However, both factors affect satisfaction through trust and flow. This suggests that trust and flow mediate the effect of information quality and service quality on satisfaction.

Trust affects flow, which in turn affects satisfaction. These three factors together affect continuance intention. Mobile payment built on wireless networks involves great uncertainty and risk. Users need to build trust to ensure secure payment and good usage experience. The effect of flow on continuance intention deserves further attention. Users are not only utilitarian-oriented, but also concerned with an enjoyable experience [28]. Service providers can improve information quality and service quality to improve users' experience, further promoting their continuance usage.

7. Theoretical and managerial implications

From a theoretical perspective, this research identified the factors affecting continuance intention of mobile payment. As noted earlier, extant research has focused on initial adoption and usage of mobile payment, and has seldom considered post-adoption usage, which is critical to mobile service providers' success. This research tries to fill the gap. Integrating both information systems success model and flow theory, we examined continuance intention of mobile payment. On the other hand, extant research has mainly used TAM and IDT as theoretical bases and identified the effects of instrumental beliefs such as perceived usefulness on mobile payment user behavior. However, user behavior may not only receive influence from perceived usefulness, which is an extrinsic motivation that emphasizes usage outcomes, but also receive influence from flow, which is an intrinsic motivation that emphasizes usage process. Especially, the constraints of mobile terminals highlight the need to improve user experience in order to facilitate his or her usage behavior. Our results indicate that flow as an optimal experience has a significant effect on continuance intention. Information quality, service quality and trust affect flow. These results advance our understanding of mobile payment user behavior. Future research needs to pay more attention to user experience when examining mobile user behavior.

Table 2

The square root of AVE (shown as bold at diagonal) and factor correlation coefficients.

	SYS	INF	SEV	TRU	FLOW	SAT	USE
SYS	0.718						
INF	0.587	0.719					
SEV	0.633	0.616	0.728				
TRU	0.580	0.638	0.582	0.750			
FLOW	0.461	0.494	0.540	0.544	0.721		
SAT	0.485	0.348	0.408	0.500	0.507	0.789	
USE	0.479	0.489	0.519	0.574	0.653	0.623	0.748

Table 3

The recommended and actual values of fit indices.

Fit indices	χ^2/df	GFI	AGFI	CFI	NFI	NNFI	RMSEA
Recommended value	<3	>0.90	>0.80	>0.90	>0.90	>0.90	<0.08
CFA	1.55	0.867	0.827	0.966	0.917	0.959	0.053
Structural model	1.53	0.866	0.829	0.966	0.916	0.960	0.052

Note: χ^2/df is the ratio between Chi-square and degrees of freedom, GFI is the Goodness of Fit Index, AGFI is the Adjusted Goodness of Fit Index, CFI is the Comparative Fit Index, NFI is the Normed Fit Index, NNFI is the Non-Normed Fit Index, and RMSEA is the Root Mean Square Error of Approximation.

In addition, this research generalizes information systems success model to an emerging service: mobile payment. This also enriches extant research on information systems success model, which has been examined in the contexts of e-commerce [15], electronic government [55], and mobile healthcare [8].

From a managerial perspective, our results imply that service providers need to improve system quality, information quality and service quality to facilitate users' post-adoption usage of mobile payment. They should emphasize different aspects when promoting user behavior. For example, they need to focus on presenting reliable and personalized services in order to engender user trust. On the other hand, they need to focus on presenting easy-to-use mobile payment systems with well-designed interfaces to enhance user satisfaction. They also cannot neglect the role of flow experience in user behavior. Without a compelling experience, users may discontinue their usage of mobile payment.

8. Conclusion

Retaining users and facilitating their continuance usage are crucial for mobile payment service providers. Drawing on the information systems success model, this research identified the factors affecting continuance intention of mobile payment. The results indicated that system quality, information quality and service quality affect continuance intention through trust, flow and satisfaction. In addition, trust affects flow, which in turn affects satisfaction. The results imply that service providers need to deliver quality system, information and services in order to facilitate users' post-adoption usage of mobile payment.

This research has the following limitations. First, we conducted this research in an eastern China city. Whether these results can be generalized to other regions of China, such as those middle and western cities needs further research. In addition, mobile business in China is developing rapidly but still in its early stage. Thus, our results also need to be generalized to other countries that had developed mobile business. Second, besides trust, flow and satisfaction, there may exist other factors affecting continuance usage, such as perceived usefulness and switching costs. Future research can examine their effects. Third, we mainly conducted a cross-sectional study. However, user behavior is dynamic. Thus, a longitudinal research may provide more insights on user behavior development.

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Appendix A. Measurement scales and items

System quality (SYS) (adapted from Kim et al. [32])

- SYS1: Mobile payment quickly loads all the text and graphics.
- SYS2: Mobile payment is easy to use.
- SYS3: Mobile payment is easy to navigate.
- SYS4: Mobile payment is visually attractive.

Information quality (INF) (adapted from Kim et al. [32])

- INF1: Mobile payment provides me with information relevant to my needs.
- INF2: Mobile payment provides me with sufficient information.

- INF3: Mobile payment provides me with accurate information.
- INF4: Mobile payment provides me with up-to-date information.

Service quality (SER) (adapted from Kim et al. [32])

- SER1: Mobile payment provides on-time services.
- SER2: Mobile payment provides prompt responses.
- SER3: Mobile payment provides professional services.
- SER4: Mobile payment provides personalized services.

Trust (TRU) (adapted from Lee et al. [35])

- TRU1: This service provider is trustworthy.
- TRU2: This service provider keeps its promise.
- TRU3: This service provider keeps customers' interests in mind.

Flow (FLOW) (adapted from Lee et al. [35])

- FLOW1: When using mobile payment, my attention was focused on the activity.
- FLOW2: When using mobile payment, I felt in control.
- FLOW3: When using mobile payment, I found a lot of pleasure.

Satisfaction (SAT) (adapted from Bhattacharjee [5])

- SAT1: I feel satisfied with using mobile payment.
- SAT2: I feel contented with using mobile payment.
- SAT3: I feel pleased with using mobile payment.

Continuance intention (USE) (adapted from Bhattacharjee [5])

- USE1: I intend to continue using mobile payment rather than discontinue its use.
- USE2: My intentions are to continue using mobile payment than use any alternative means.
- USE3: If I could, I would like to discontinue my use of mobile payment (reversed item).

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Tao Zhou is an associate professor at the School of Management, Hangzhou Dianzi University. He has published in *Information Systems Management*, *Information Technology and Management*, *Internet Research*, *Journal of Electronic Commerce in Organizations*, *Behavior & Information Technology*, *Computers in Human Behavior*, and several other journals. His research interests include online trust and mobile user behavior.