Mobile Payment Services Adoption: An Empirical Investigation of the Effects of Customer Perceived Value and Customer Satisfaction on Adoption Intention

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Abstract
Considering the way for enhancing intention to adopt new products and services in the highly competitive market, customer perceived value and customer satisfaction are two imperative factors in the marketing context. This paper therefore aims primarily at investigating the relationships among customer perceived value, customer satisfaction and behavioral intention in adopting mobile payment service in new developing country, particularly in China. Questionnaire survey method was employed and distributed to respondents who have had experience using mobile payment service such as Questionnaire Star, QQ, Alipay and Wechat payment websites. 376 valid questionnaires from mobile users in China were collected from Shanghai, Hangzhou and Guangzhou. Descriptive analysis and Structure Equation Model (SEM) were adopted to investigate the relationships of all variables in the research conceptual model. The results indicate that customer perceived value has a direct effect towards customer satisfaction, and indirect effect on intention through customer satisfaction in the mobile payment services of China.

Keywords: Customer perceived value; customer satisfaction; behavioral intention; mobile payment; China.

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1. Introduction
Considering the advancement of wireless communication technologies, mobile phone became more imperative as part of everyone life. Driven by the increasing mobility of this modern society, the number of mobile phone accounts has increased rapidly in recent years and the mobile telephony industry has grown significantly. In line with these developments, mobile services have increasingly become a part of everyday life (Hwang et al., 2007). Practitioners and researchers have studied the emergence of mobile commerce (m-commerce) due to the high potential impact on the future business in this digital era (Chu & Pan, 2008). As part critical enabler of successful mobile commerce, mobile payment will continue to facilitate secure electronic commercial transaction between organizations or individuals. Understand the intention to adopt mobile payment is therefore of interest in further development of m commerce industry.

In recent decades, the research related to mobile payment adoption have been studied by a number of researchers and made a great achievements (Dahlberg et al., 2008; Chen, 2008). Even though there are some extant number of studies on mobile payment adoption, mobile payment is still an early stage since 2000s, however, this research area is now developing rapidly and widely disseminated in the scholarly literature. Particularly in China, mobile payment adoption studies still lag behind, concerning the reasons that this mobile payment services has become widely adopted recently. Therefore, there are few empirical studies focusing on factors influencing the adoption of mobile payment from customers’ point of view in China. Furthermore, the studies of factors affecting the adoption of mobile payment is not well explored and established, whereas Western scholars have done a lot of research about technology acceptance. These provided valuable references related to the adoption and development of information technology industry, in which is imperative for business arena. The relevant research about mobile payment in China, however, is still in the early stage and needed for further empirical study for investigating the extent to which the conclusion drawn from western scholars is suitable for China context.

According to a report from iResearch China, China’s third-party mobile payments GMV (gross
merchandise volume) could grow from 6.0 trillion yuan in 2014 to 18.3 trillion yuan in 2018, representing the annual growth rate of 32%. However, although the mobile payment has been developed in China, the development of the mobile payment business in China has not yet reached the expected level. Additionally, the previous literature indicated that China has the largest potential mobile payment market in the world, the mobile payment technology has been achieved, and customer adoption intention is the key matter which hindered the development of mobile payment (Luo et al., 2010). In order to investigate customer intention, customer perceived value and customer satisfaction are considered the most imperative driver; and have a strong predictive power to the adoption intention. Although, customer perceived value and customer satisfaction have been widely studied in many related research, assessing these concepts in mobile payment service is still in the early stage (Zhu, 2011). Hence, it is of particular interest in assessing the effects of customer perceived value and customer satisfaction on intention to adopt mobile payment in China for contributing to scholarly literature and practice.

Therefore, the objectives of this study are (1) To investigate the relationship between customer perceived value and customer satisfaction of mobile payment service in China; (2) To investigate the relationship between customer satisfaction and intention to adopt mobile payment service in China; (3) To investigate the relationship between customer perceived value and intention to adopt mobile payment service in China.

2. Literature Review

Mobile payment is one kind of service refers to the user using mobile phone to finish payment on the consumption of goods and service. However, various researchers and institutions have defined this term from different perspectives. China’s scholar defines that mobile payment as the transaction activity which is the communication way such as short message service, wireless application protocol by means of mobile communication devices such as mobile phone, PDA and
laptop (Chen et al., 2006). In this paper, a broader definition of Wang & Chou (2012) is adopted, which specifies that mobile payment as “a form of payment where the user uses a mobile device to realize information exchange and complete fund transfer from the payer to the payee for the purpose of payment by way of accessing communication networks or using short-range communication technologies”. Mobile payment can be used in a variety of payment scenarios such as payment for digital content (e.g. ring tones, logos, news, music, or games), concert or flight tickets, parking fees, and transportation such as bus, underground, train, and taxi fares (Dahlberg et al., 2006). As the mobile payment is considered as fast moving and growing services, understanding factors affecting intention to adopt this technology is therefore imperative in providing scholarly literature with new perspective.

In order to investigate factor affecting intention to adopted mobile payment service, literature related to technology adoption was reviewed. Besides the widely adopted Technology acceptance model (TAM), Venkatesh et al. (2003) developed UTAUT model to explain technology acceptance and intention to use. UTAUT is developed based on eight prominent user adoption models. Some key constructs were derived: effort expectancy is similar to subjective norm in TPB and DOI’s image; performance expectancy which is similar to perceived usefulness in TAM and relative advantage in DOI; facilitating condition which is similar to compatibility in DOI and perceived behavioral control in TPB. Later on, based on a review of the extent literature, Venkatesh et al. (2012) identified UTAUT 2 model which consists of 7 factors: performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit. According to Venkatesh et al. (2003), performance expectancy is the degree to which using the system will improve their job performance; Effort expectancy is the degree of ease associated with the use of the system; Social influence refers to an individual’s perception that significant others believe the individual should adopt the information system; Facilitating conditions is the perception of an individual believes that an organizational and technical infrastructure exists to support the use of the technology system; Hedonic motivation is defined
as the fun or pleasure derived from using a technology; Price value refers to the consumer's cognitive trade-off between the cost of using the technology and the perceived benefits; Habit is the extent that individuals tend to execute behaviors automatically. UTAUT 2 is more substantial improvement in explaining variance of behavioral intention. Therefore, UTAUT 2 represents a comprehensive theoretical framework and has enjoyed high popularity and strong empirical validation in a variety of discipline and task environment (Baptista & Oliveira, 2015). UTAUT 2 as a new model, the studies used this to examine acceptance of mobile payment are still much limited. In this study, the author therefore developed the research conceptual model considering the customer perceived value as the antecedent of intention to use mobile payment service, by integrating some variables from UTAUT 2 model, which accorded to perceived value (Zhu, 2011). According to Kim et al. (2010) and Zhu (2010), costs include price value and facilitation condition, benefits included performance expectancy, effort expectancy and hedonic motivation.

Woodruff (1997) proposed that “customer perceived value is a customer’s perceived performance for an evaluation of those product attributes, attribute performances and consequences arising from use that facilitate (or block) achieving the customer’s goals and purpose in use intention. The method to measure customer perceived value normally use single dimension and an item based the single dimension but some researchers also develop a multidimensional scale for the measurement of perceived value of a service (Sweeney & Soutar, 2001; Petrick, 2002). The customer perceived value is considered as important antecedents of customer satisfaction (Cronin et al., 2000)

The concept of consumer satisfaction occupies a central position in marketing thought and practice. Churchill & Surprenant (1982) defined customer satisfaction as an outcome of marketing activity and serves to link processes culminating in purchase and consumption with post-purchase phenomena. It also can be defined as the degree to which one believes that an
experience evokes positive feelings (Oliver & Rust, 1994). Satisfaction refers to the perceived discrepancy between prior expectation and perceived performance after consumption (Oliver, 1980).

Behavioral intention is the tendency that customer take some action and a statement linking customer own and action to be happen in the future. Ajzen & Fishbein (1977) pointed out that the most direct method to forecast customer’s action is to understand customer’s intention to do decision. In this study, behavioral intention was divided to three kinds: repurchase intention; word of mouth and price premium. Repurchase intention refers to the possibility of repurchase and choice, it is very important for company because customer repurchase is the best way to keep market share for company (Bolton et al., 2000). After 1994, it was formed two different conceptual framework of customer behavioral intention which was satisfactory dominant theory and value dominant theory. Cronin et al. (2000) thought which conceptual is reasonable depend on the character of the study. There are four different model developed by previous researchers. The value model treated perceived value as the most important factor which affects behavioral intention directly. And the results from this model showed that perceived value affect behavioral intention directly and satisfaction affect behavioral intention indirectly through perceived value (Sweeney et al., 2001). The satisfaction model thought that satisfaction has a direct impact on behavioral intention and perceived value affect behavioral intention indirectly (Lapierre, Filiatrault & Chebat, 1999). The indirect model pointed out that perceived value and satisfaction affect behavioral intention together and perceived value also have a impact on behavioral intention (Patterson & Spreng, 1997). The last one is research model, research model explain the relationship between each variables and put them into a comprehensive framework (Cronin, 2000).

According to these studies, most of the studies examined the customer perceived value affect behavior intention through customer satisfaction. Ruy et al.(2008) explained the relationship
among overall quick-casual restaurant image, perceived value, customer satisfaction, and behavioral intentions in the quick-casual restaurant industry and the findings showed that customer satisfaction can act as a partial mediator in the relationship between overall quick-casual restaurant image/perceived value and behavioral intentions. Furthermore, Kuo et al. (2009) founded perceived value positively influenced post-purchase intention in mobile value-added services by analyzing the data collect from college and graduate students of 15 major universities in Taiwan.

Based on the previous researches about the relationship among customer perceived value, customer satisfaction and behavior intention, Kim et al. (2010) developed a Value-based Adoption Model (VAM) to examine the adoption of Mobile Internet (M-Internet) as a new Information and Communication Technology (ICT) from the value perspective and found consumers’ perception of the value of M-Internet is a principal determinant of adoption intention, and the other beliefs are mediated through perceived value. Zhu (2011) constructed theoretical model of continued use intention of mobile internet based on the theory of continued use, combining with theory of customer perceived value, customer satisfaction and social cognitive, integrating theoretical model of ECT and TPB. According to above researches and mobile payment is a service similar with the mobile internet service, this study developed the research conceptual framework by considering the UTAUT 2 model to explain the intention to adopt mobile payment service from the customer perceived value perspective, and put it into the original model of relationship among customer perceived value, customer satisfaction and behavior intention to examine whether perceived value affect behavior intention of adopt mobile payment service directly.
Considering the research conceptual developed for this study, there main hypotheses are proposed as follows:

**H1**: *Customer perceived value directly affects customer satisfaction in mobile payment service.*

**H2**: *Customer satisfaction directly affects customer behavioral intention to use mobile payment service.*

**H3**: *Customer perceived value directly affects customer behavioral intention to use mobile payment service.*

### 3. Research Methodology

To achieve the objective of this research, literature review was conducted for developing the research conceptual framework to investigate the intention to adopt mobile payment service. Considering the research conceptual model proposed in the previous section, the quantitative research approach is considered appropriate for examining the relationship among perceived value, customer satisfaction, and behavioral intention to adopt the mobile payment service. In this section, the research methodology is explained to understand how this research is conducted to achieve the objectives of this study.

Questionnaire survey instrument is developed considering literature review for collecting
empirical data for testing research conceptual model. The instrument is designed and tested to ensure the reliability and validity. Descriptive statistics analysis and SEM analysis were conducted to investigating the relationships among proposed variables

An online questionnaire was distributed to collect empirical data in Eastern China. The questionnaire consists of four parts. Part 1 is designed with screening question in order to find the suitable respondents; Part 2 are questions related to customer perceived value; Part 3 are questions related customer satisfaction in using mobile payment service; Part 4 behavioral intention questions were asked as the last section. Overall, cronbach’s alpha value must be above 0.8 and each dimension’s Cronbach’s alpha value should be above 0.7.

Based on the questionnaire design, the author used descriptive statistics to summarize the demographic characteristics and the measurement scale of items. Structure Equation Model (SEM) was used to explore the relationship between the variables and hypothesis. The author used exploratory factor analysis (EFA) and Confirmation factor analysis (CFA) to remove some low loading items. In term of multiple the linear regressions where there are intermediate variables and indirect effects to each variable, the author used Path analysis to do the test.

The Bartlett’s test and KMO test are used to examine the appropriateness of data in factor analysis performance. The KMO of the questionnaire was 0.861(>0.6), and the Bartlett’s Test of Sphericity also get a significant level with 0.000 (<0.01) in the result. Hence, the questionnaire has good common variance, which is suitable for factor analysis. Data analysis results will be explained in the next following section

4. Data analysis results

In this research, descriptive statistics was analysed to explain the demographic data of respondents. Exploratory factor analysis (EFA), Confirmatory factor analysis (CFA) and structural equation model (SEM) were employed to test model fit and relationships between
independent and dependent variables of the proposed model. Hypotheses were tested based on SEM analysis. Detailed analysis results are as follows.

Exploratory factor analysis (EFA) is a statistical method to identify the underlying relationship between measured variables which can be removed some loading items. The results of EFA showed that the factor loading of all items were high than 0.50 except PE4, FC3, HM4, CS5, BI2. “PE4= Using mobile payment service makes the handling of payments simple and easier”; “FC3= Using mobile payment service fits into my life style”; “HM4= The actual process of mobile payment would be pleasant”; “CS5= Customer service in mobile payment service is professional” and “BI2= I will use mobile payment service even the cost increasing” are removed due to them have performance in other components.

Confirmation factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs (Brown, 2014). The results of CFA indicated that there were 4 items should be removed from the model structure with the loadings less than 0.5. They are FC4 (0.08), HM5 (0.39), CS4 (0.45) and BI5 (0.41), respectively. After finished factor analysis, the remained factors would be used in path analysis. In statistics, path analysis is used to describe the directed dependencies among a set of variables (Hair, Black, Babin, Anderson & Tatham, 2006).

Figure 1 Standardized estimate of path analysis
In structural equation model, the main model fitting evaluation was summarized as follows: every index got the good evaluation index except RMESA value was 0.043 (< 0.08) with an acceptable index. Hence, the model’s overall fitting effect is good.

Parameter estimation is a method for estimating the total distribution of the sample. The results of this study are presented in the table 1 below:

**Table 1 Regression weight**

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>&lt; ------</td>
<td>Customer perceived value</td>
<td>0.570</td>
<td>1.669</td>
</tr>
<tr>
<td>Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral</td>
<td>&lt; ------</td>
<td>Customer satisfaction</td>
<td>0.320</td>
<td>.076</td>
</tr>
<tr>
<td>Intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral</td>
<td>&lt; ------</td>
<td>Customer perceived value</td>
<td>0.183</td>
<td>.503</td>
</tr>
<tr>
<td>Intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: *<p<0.05, **<p<0.01, ***<p<0.001
S.E. = Standard error, C.R. = Critical ratio.

For the default model, the direct effect, indirect effect and total effect of the latent variables in Amos shown as the following table 2:

**Table 2 the Standard Effect of Model**

<table>
<thead>
<tr>
<th></th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV—CS</td>
<td>0.570</td>
<td>0</td>
<td>0.570</td>
</tr>
<tr>
<td>CS----BI</td>
<td>0.320</td>
<td>0</td>
<td>0.320</td>
</tr>
<tr>
<td>CPV—BI</td>
<td>0.183</td>
<td>0.182</td>
<td>0.365</td>
</tr>
</tbody>
</table>
Table 3 Summary of hypothesis testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Customer perceived value directly affects customer satisfaction in</td>
<td>Accepted</td>
</tr>
<tr>
<td>mobile payment service.</td>
<td></td>
</tr>
<tr>
<td>H2: Customer satisfaction directly affects customer behavioral intention</td>
<td>Accepted</td>
</tr>
<tr>
<td>to use mobile payment service.</td>
<td></td>
</tr>
<tr>
<td>H3: Customer perceived value directly affects customer behavioral</td>
<td>Rejected</td>
</tr>
<tr>
<td>intention to use mobile payment service.</td>
<td></td>
</tr>
</tbody>
</table>

5. Discussion and conclusion

In this research, the hypothesis testing results indicated that customer perceived value directly affect customer satisfaction. With this regards, perceived value of mobile payment service included performance expectancy, effort expectancy, facilitating conditions, hedonic motivation and price value. However, the analysis results showed that some relationship testing of these factors are not accepted.

According to the related literature review, many previous researches founded that perceived value is the important antecedent of customer satisfaction (Brady & Cronin, 2001; Cronin et al., 2000). In this research, performance expectancy has a linear relationship with customer perceived value with estimate score of 0.12. Mobile payment service as a new method to achieve payment which seems not giving more helpful to customer than internet based devices. In realistic, most customers believed that mobile payment service brings more convenience than ease of usefulness. This research presented that effort expectancy and facilitating condition have no relationships with customer perceived value in using mobile payment service. The result of this research also supported the prior research conducted by Kim et al., (2010). This means that if customer can get high enjoyment, they will be more satisfied with the mobile payment service. However, there is no significant relationship between price and perceived value of mobile payment service which is different from the result suggested by Zhu (2011). Based on the real situation, the price value in mobile internet refers to the network traffic charge and it refers to the commission charge in mobile payment service. Network traffic fee depends on how much net access in mobile phone and most of the mobile payment service do not have commission charge,
even it exist, it is very low. Hence, price value play different role in different industry and it seems no much relationship with customer satisfaction in mobile payment service.

According to the related literature review, Anderson & Sullivan (1993) found that level of customer satisfaction on perceived benefits of service provider affect customer repurchase intentions positively. Oliver (1997) also indicated that customer satisfaction is considered have a positive impact on customer behavior. Soderlund & Ohman (2005) also found that customer satisfaction is significantly related to two specific intention constructs: intentions as expectations and intentions as wants. Li & Zhang (2016) found that customer perceived value affect behavioral intention through customer satisfaction on the electronic market in China. The result of hypothesis 2 highlighted the importance that when customer satisfaction level is higher, the behavioral intention to adopt mobile payment service will be increasing.

Both satisfaction and customer perceived value appears to be the direct antecedents of behavior intention (Mcdougall & Lewesque, 2000). However, some researches showed that perceived value affect behavioral intention directly and satisfaction affect behavioral intention indirectly through perceived value (Sweeney et al., 2001). Kuo et al. (2009) founded perceived value positively influenced post-purchase intention in mobile value-added services. The result of hypothesis 3 indicated that customer perceived value indirectly affect customer behavioral intention through customer satisfaction. As mobile payment service was a new and rapidly developed industry, customer’s perceived value involved more aspects from customer perspectives. On the other hand, customer perceived value could directly affect customer satisfaction, however, customer perceived value consist of five dimensions were not significance as the antecedence of behavioral intention.

Overall, this research has been proved with three main hypotheses which are; customer perceived value directly affect customer satisfaction in mobile payment service; customer satisfaction
directly affect customer behavioral intention in mobile payment service and customer satisfaction act as a mediator in the relationship between customer perceived value and customer behavioral intention; whereas there appears to be no direct relationship between customer perceived value and behavioral intention as shown in the following model.

The findings of this study also provide managerial implications for Mobile payment service providers. Considering the statistical results that indicated that customer perceived value is the antecedent of customer satisfaction; and customer perceived value depends on the perceived benefit and perceived sacrifice. Therefore, service providers should increase customer’s perceived benefit and decrease their perceived sacrifice for enhancing the satisfaction of mobile payment service users. For example, service provider can highlight value of mobile payment services against traditional payment services; and emphasize more functional advantages and behavioral compatibility of mobile payment services; and design the reasonable fee package for using mobile payment to lower the sacrifice. Service provider also can focus on improving internet speed to make the mobile payment more efficient. Though mobile payment is easy and low risk, service providers still need to focus on presenting easy-to-use mobile payment systems with well-designed interfaces and good security system to enhance user satisfaction. The hedonic and habit aspect should be taken in to consideration, besides creating apps that enhance enjoyment and excitement, service providers should try to constantly reinforce users’ habit with value added services. For the social influence aspect, service providers and marketers can expand user bases and their sources of revenue by leveraging the effects of social influences. Even the price value of mobile payment service had no significant effect on customer satisfaction, the service providers could take some promotion or activities to encourage customer to use mobile payment service.
Concerning the limitation of this research study, there are some recommendations for future research. Firstly, future research can use different measurement model to explain customer perceived value of mobile payment in China. More factors should be explored and incorporated into the research conceptual model such as perceived service quality, perceived risk to examine factors affecting intention to use mobile payment services. Secondly, the future research may adjust the scope of study by focusing on the payment systems provided by Alipay, Wechat pay, Baidu which are considered major mobile payment service providers in China. Lastly, this research investigated effects of perceived value and customer satisfaction on behavioral intention in mobile payment service in eastern area of China where is considered the most developed section, future study should therefore adopting this model to investigate in other areas for generalization purpose.

Reference


