Factors That Influence Consumer Satisfaction with Mobile Payment: The China Mobile Payment Market

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ABSTRACT

The purpose of this study was to investigate the key factors that influence consumers’ preference for mobile payment in China. China has been quietly experiencing a third technological revolution that has markedly changed the way of life for its people. We used the structural equation modeling with 573 Chinese people to investigate the mobile-payment system in China based on the technology acceptance model. We found that factors such as value of service, security, convenience, and perceived usefulness have an impact on consumer satisfaction, and that satisfaction supports consumer purchasing. Also, it is possible to conclude that this proven instrument will assist researchers to further develop and refine mobile-payment research models.

Key words: Mobile Payment, Technology Acceptance Model, Structural Equation Model, Consumer Purchase, Consumer Satisfaction.

1. INTRODUCTION

Currently, mobile payment transactions have been rapidly increasing throughout the world. Through the advancement of information technology, smart phone payment methods have changed, leading more and more consumers to use mobile payments. A mobile payment refers to making payments for goods, services, and bills in a variety of areas using smart phones and personal digital assistants [1], [2]. According to the Nielsen study survey (Feb, 2014), “Global Payment Gateways of the Future,” experts claim that mobile payment smart phone apps powered by near-field communication technology are being adopted at a quick pace [3].

Especially in China, mobile payments have been quickly increasing every year since 2010 despite some barriers, such as interface system and familiarity. Chinese consumers regard mobile payment as the preferred payment method in everyday life.

From 2012 to 2017, the number of mobile users in China has grown significantly. By 2012, the number of mobile internet users directly counted 420 million people. As of June 2017, mobile payment dissemination has reached 751 million consumers [4]. Drawing on these results, we predict that consumers employ mobile payments in various aspects of the consumer life style, including purchase channels, transaction patterns, and public transport such as taxis, subways, airplanes, and more. Consumers frequently use mobile payment services due to their convenience and ease of use in addition to the environment, which means non-materialization in the social perspective compared to the credit card system [5].

Companies can not only reduce the material cost of cards but also look to the environment of the society, which seems to call for corporate social responsibility where in companies provide consumers with an effective mobile payment
transaction. We expect that the practice of mobile payment has
a promising trend and large market in China, because
customers enjoy the usefulness and convenience of mobile
payment [6]. In addition, each mobile payment provider has
aided in developing the system, involving government, public
service agencies, and communities. Consumers enjoy online
payment systems everywhere, including services network fees,
medical reservation, traffic violation fees, taxi fares, water fees,
and more. Simultaneously, the establishment of an automatic
deduction system makes mobile payment more convenient,
more intelligent, and also greatly improved inefficiency,
particularly for public service agencies [7].

More specifically, e-commerce sites in China—such as
taobao.com, Tmall.com, and JD.com—have begun to accept
mobile payments. The development of online shopping has
accelerated the use of mobile payments [8]. Consumers in
China feel that the mobile payment system is easier than debt
or credit cards, because customers need to get more services
from credit card companies, and consumers are skeptical
regarding bank security. This special status for banks
contributed to their expansion and abuse of bank rights [9]. The
Chinese government’s banking regulatory commission and
other institutions have not yet set up independent consumer
protection of basic payment methods outside of banks.
Therefore, consumer protection remains a frequent problem
when consumers use the bank’s payment methods.

This study investigates the Chinese market as a research
topic for the following reasons. To start, China has one of the
world’s largest and most promising mobile payment markets,
making the credibility of the study relatively high. For China’s
existing mobile payment providers, some key issues can be
found to facilitate the improvement of mobile payment
services. Moreover, with the arrival of the artificial intelligence
revolution, currency trading has not been perceived as
revolutionizing the way people live and think, which may cause
people to think that currency trading is the safest and most
reliable way to pay in the future. This study’s sections include
the theoretical background and research hypothesis, the
methodology and findings, and the conclusions and
implications.

2. THEORETICAL BACKGROUND AND RESEARCH
HYPOTHESIS

2.1 Theoretical background

The research design is based on the technology acceptance
model (TAM) [10]. The TAM is a theory of reasoned action
(TRA) adopted and established by Fishbein and Ajzen
(1975) that explains the relationship between attitudes and
behaviors in human action [11]. The theory suggests that
behavioral intentions are influenced by attitudes and subjective
norms and that behavioral intentions will affect behavior.

The TAM sees perceived usefulness and perceived ease of
use as the determining factors that affect consumer acceptance
of new technologies. Perceived usefulness is defined as a
person considers a actual system would improve job
performance. Also, the perceived ease of use can be defined as
a person regards a specific system as free from effort [2], [10].

Even though the TAM has been tried and used in numerous
studies, this study is the first to use this theory to explain
Chinese consumer adoption behavior of mobile payment.

This study modifies some part of the variables and
incorporates additional constructs in order to extend the
original theory. Those factors that affect consumers’ use of
mobile payment intentions will be discussed in the context of
past research.

2.2 Research hypothesis

2.2.1 Security of mobile payment

Reference [10] demonstrated that consumers must
undertake uncertainties and risks associated with adoption
decision. In the mobile payment system, most consumers lack
prior experience regarding this system [12]. Even though
consumers feel that mobile payment is fast, easy, and
convenient, they still worry about the security, which means
perceived risk. In general, fewer experiences regarding mobile
payment services increase consumers’ perceived risk. Under the
traditional framework, the negative effects associated with
service adoption are reflected by perceived risk, regardless of
the monetary costs incurred using mobile payment services
[13].

In this way, if the perceived risk of mobile payment
services negatively affects the intention to adopt them, then
consumers recognize perceived security as an important factor
of their use of the electronic payment system [14]. Security
requirements include privacy, anonymity, trustworthiness, and
the scope of the payment system to support the regulatory
framework. The more security provided by third-party
companies, the more increased consumer satisfaction. If
consumers can experience good security with mobile payment
experience, it will greatly increase consumer satisfaction.

H1: Security has a positive effect on consumer satisfaction.

2.2.2 Value of service

Perceived service quality is defined as the customer’s
assessment of the overall excellence or superiority of the
service. Overall service quality is evaluated by five underlying
dimensions: tangibles, reliability, responsiveness, assurance,
and empathy [15]. Service quality directly affects customer
satisfaction [16]. Service quality also impacts satisfaction and
service value [17]. Self-service technologies can change
customer satisfaction or dissatisfaction [18], [19].

In this case, the signaling and screening concept can be
applied to service providers and consumers. Service providers
are signaled, and consumers are screened. When consumers
encounter quality services, service providers send a good signal
regarding their products, while consumers judge service
providers as competent and friendly. Thus, if service providers
present reliable services and timely responses to users, users’
satisfaction will be directly affected [20]. Much previous
research has discussed the quality of service as indicated by
technical quality and functional quality. Service quality can
also be used, as customers can form expectations by the
perception of service quality [21], [22].

H2: Value of service has a positive effect on consumer satisfaction.

2.2.3 Convenience

Consumers’ perceptions of service convenience involve assessing the time and effort required to use a service. Time and effort are nonmonetary costs that consumers must bear in order to receive the service. The degree of cost varies, but the investment of some amount of time and effort is inherent [23], [24]. In general, the more time and effort associated with a service, the lower the consumers’ perception of service convenience. Convenience is integrated into the marketing of both goods and services. All types of convenience that provide good quality of products—such as time-saving, cost-effective, and easy approaches that reduce consumers’ time or effort in shopping—belong to the domain of service convenience. Demand for convenience continues to rise [24], [25]. Many current studies support the relationship between convenience and the value of time. In general, the longer the amount of time associated with a service, the lower the consumers’ perceptions of the service convenience [26]. In addition, in a study on mobile transactions, convenience was considered to be one of the most important factors affecting the success of mobile payment use [27]. Convenience features are related to the elements of user-generated time and location utility [28]. When the convenience of mobile payment is improved, the satisfaction of the user experience is positively influenced.

H3: Convenience has a positive effect on consumer satisfaction.

2.2.4 Perceived usefulness

According to literature, the perceived usefulness is the central premise of attitudes towards the use of a certain technology. In general, the definition of perceived usefulness is a particular system that improves task performance [10]. A number of empirical studies in the mobile technology literature found that perceived usefulness increased mobile transaction times and volumes due to consumer awareness [29]. Mobile payment is still considered an emerging area of payment technology; if consumers can perceive its usefulness, this technology will strongly and positively affect consumer attitudes and intent.

H4: Perceived usefulness has a positive effect on consumer satisfaction.

2.2.5 Satisfaction and consumer purchase

Satisfaction has a significant impact on customer purchase [2], [30]-[32]. Consumer satisfaction is related to the overall attitude of the customer during or after the purchase of the service [2], [30], [32], [33]. It also reflects the cumulative feelings developed in multiple interactions with a service provider [34]. Satisfaction is an assessment of the customer experience of interacting between service providers [35].

Satisfaction is a result of the customer’s judgment on the issue and the extent to which the characteristics of the product or service meet the expectations of the customer [36]. Thus, we predict that if the consumers have positive experiences in their use of mobile payment, their overall satisfaction will increase. Since consumer satisfaction reflects the degree of a customer’s positive feelings concerning a service provider in a mobile commerce context, it is important for service providers to understand the customer’s view of their services [37]. Thus, we make satisfaction to be a significant determinant of behavior.

H5: Consumer satisfaction has a positive effect on the customer purchase.

Figure 1 describes the research model. We investigate five variables such as security, value of service, convenience, usefulness and satisfaction to consumer purchase.

3. METHODOLOGY

3.1 Data and Descriptive Statistics

This study uses the structure equation model (SEM) in focusing on Chinese consumer factors for mobile payment systems. Furthermore, we consider certain socioeconomic variables and psychological factors. All the items are measured on 7-point Likert scales, with anchors ranging from 1(strongly disagree) to 7(strongly agree).

The questionnaire is aimed at consumers who use mobile payment systems in China. The questionnaire was distributed on the Chinese professional survey site Sojump. A total of 760 questionnaires were distributed, and 573 valid answers were returned. We used judgment sampling because all respondents live in China and also use mobile payment. We also obtained some demographic information, including gender, age, monthly income, education, occupation, location, and marital status. Table 1 shows the descriptive statistics of the sample.

In terms of gender, male and female participants were 49.2% and 50.8% of the sample, respectively. In terms of age, the distribution of the age is relatively wide. More specifically, 20 -24 years old (15.3%) and 25-29 years old (29.8%) accounted for larger proportions. 20-29 years old (41.2%) group is larger than 30-39 years old group.

As for monthly income, 1500-4500 Chinese yuan group is around 50% in the income. With regard to education, the
majority had graduated from technical college (41.9%) or with a bachelor’s degree (32.8%). Around 80% had graduated above the community college degree. In terms of occupation case, about half of the sample(55.7%) were company salaried employees, and others. In terms of living area, about 43.5% came from a big city and 56.5% come from a small city. According to the Chinese city classification system, the first cities are Beijing, Shanghai and Guangzhou; more than 20 employees, and others. In terms of occupation case, about half of the sample(55.7%) were company salaried employees. The rest were students, public officers, education employees, and others. In terms of living area, about 43.5% come from a big city and 56.5% come from a small city. According to the Chinese city classification system, the first cities are Beijing, Shanghai and Guangzhou; more than 20 cities are classified as big cities. The rest are considered small cities. Finally, the marital status is evenly distributed.

Table 1. Descriptive Statistics Results

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Category</th>
<th>Sample</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>282</td>
<td>49.2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>291</td>
<td>50.8</td>
</tr>
<tr>
<td>Age</td>
<td>10–19</td>
<td>15</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>20–24</td>
<td>88</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>25–29</td>
<td>171</td>
<td>29.8</td>
</tr>
<tr>
<td></td>
<td>30–34</td>
<td>114</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>35–39</td>
<td>91</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>40–49</td>
<td>60</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>50–59</td>
<td>58</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>above 60</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Income(CNY )</td>
<td>below 1500</td>
<td>80</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>1500–4500</td>
<td>292</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>4500–9000</td>
<td>157</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>9000–35000</td>
<td>36</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>above 35000</td>
<td>8</td>
<td>1.4</td>
</tr>
<tr>
<td>Education</td>
<td>high school or before high school</td>
<td>117</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>technical college</td>
<td>240</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>bachelor degree</td>
<td>188</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>after master degree</td>
<td>28</td>
<td>5</td>
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<tr>
<td>Occupation</td>
<td>company salaried employee</td>
<td>319</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>public servant</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>education</td>
<td>58</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>student</td>
<td>48</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>self-employed</td>
<td>35</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>housewife</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>City</td>
<td>big</td>
<td>249</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>small</td>
<td>324</td>
<td>57</td>
</tr>
<tr>
<td>Marital</td>
<td>single</td>
<td>181</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>married</td>
<td>245</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>married and had children</td>
<td>147</td>
<td>26</td>
</tr>
</tbody>
</table>

4. RESULTS

We conducted a confirmatory factor analysis to further examine the measurement models including Cronbach’s alpha, composite reliability and average variance extracted (AVE). As Table 2 shows below, the average variance extracted (AVE) for every construct was well above 0.5, the composite reliability exceeded 0.7. From the Nunnally(1978)’s research that he advocated the score of each structure should be greater than 0.6 to be reliable [38]. Due to the overall reliability of the measurement above 0.7, the measuring instruments show sufficient internal consistency. And the square root of AVE is greater than the corresponding correlation coefficient, indicating acceptable discriminate validity.

In order to test the validity of discriminant, this study compared square roots of average variance extracted of each construct and completes the correlation with other constructs.

Table 2. Inter construct correlation

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security &lt;--&gt; Service</td>
<td>.699</td>
<td>.062</td>
<td>10.772</td>
<td>***</td>
</tr>
<tr>
<td>Service &lt;--&gt; Usefulness</td>
<td>.888</td>
<td>.069</td>
<td>12.917</td>
<td>***</td>
</tr>
<tr>
<td>Usefulness &lt;--&gt; Convenience</td>
<td>.832</td>
<td>.067</td>
<td>12.344</td>
<td>***</td>
</tr>
<tr>
<td>Security &lt;--&gt; Usefulness</td>
<td>.640</td>
<td>.062</td>
<td>10.317</td>
<td>***</td>
</tr>
<tr>
<td>Service &lt;--&gt; Convenience</td>
<td>.692</td>
<td>.060</td>
<td>11.483</td>
<td>***</td>
</tr>
</tbody>
</table>

We examined the SEM with the Amos software to test hypotheses. The model includes 17 items describing 6 latent constructs which are security, value of service, perceived usefulness, convenience, satisfaction and consumer repurchase. The overall goodness of fit of the research model is affected by sample size and model complexity. In general, the structural model fit indices obtained: RMR=0.085, GFI=0.883, IFL=0.905, CFI=0.905, TLI=0.897, RMSEA=0.082 indicated satisfactory model. Comparison of all fit indices with their corresponding recommended values provided evidence of acceptable model fit. Thus, we move to the final step.

The final step in model estimation is to explore the significance of each causal relationship for hypotheses in the model. Table 3 shows the test results. Hypotheses 1, 2, 3, and 4 examined the impact of satisfaction and hypothesis 5 tested consumer satisfaction and customer purchase. Hypotheses from 1 to 4 are significant effect on satisfaction and hypothesis 5 have a positive impact on customer purchase at p=0.000. The outcome demonstrated that satisfaction has a positive effect on consumer repurchase at p=0.000. Thus, the results show that these assumptions are fully supported.

Table 3. The result of hypothesis

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security--&gt;Satisfaction</td>
<td>.177</td>
<td>.051</td>
<td>3.465</td>
<td>***</td>
</tr>
<tr>
<td>Value of Service--&gt;Satisfaction</td>
<td>.318</td>
<td>.049</td>
<td>6.488</td>
<td>***</td>
</tr>
<tr>
<td>Convenience--&gt;Satisfaction</td>
<td>.443</td>
<td>.050</td>
<td>8.905</td>
<td>***</td>
</tr>
</tbody>
</table>
consumers continue to use it. Positive impact on consumer purchase behavior, which means satisfaction is a very important factor that has a direct and follows. First, in the mobile payment system, customer satisfaction is a very important factor that has a direct and positive impact on consumer purchase behavior, which means consumers continue to use it.

Second, in terms of mobile payment as a service involving technical products, the usefulness of the product, security and convenience is key factors. Compared with others, the perception of usefulness has a greater impact on consumer satisfaction. Moreover, this study confirms the adjusted TAM (1989) theory, which presented perceived usefulness as having a decisive influence on consumer repurchase even if the study incorporates other variables. Although some of the variables in the original model assumptions were not valid, other relationships were found.

In this study, we found from our survey data that the age group 20-40 years is the largest age group using mobile payment systems. Combined with China's specific situation analysis, people in this age group have some special features. Most of these individuals were born in China between the 1980s and1990s, under the Chinese one-child policy. This means that they are born with greater financial support and economic purchasing power. Therefore, in the mobile payment market in China, we cannot ignore or underestimate the characteristics and needs of this age group of consumers. Furthermore, it is possible to conclude that this proven instrument will help researchers further develop and refine mobile payment research models. In the future, we will try to study various age groups to generate more research in this area. Moreover, we will try to investigate mobile payment for other countries such as Japan, Korea and U.S. to consumer satisfaction. Through further studies, we will be able to find the ways to increase the effect of consumer purchase strategies for both practitioner and academic researcher.

### 5. CONCLUSIONS AND IMPLICATIONS

The main purpose of this study was to determine the factors that affect consumers’ preference for mobile payment. In order to achieve this goal, the current study proposed a research model consisting of seven exogenous latent variables and three endogenous latent variables.

Based on the results of study, the main contributions are as follows. First, in the mobile payment system, customer satisfaction is a very important factor that has a direct and positive impact on consumer purchase behavior, which means consumers continue to use it.

Second, in terms of mobile payment as a service involving technical products, the usefulness of the product, security and convenience is key factors. Compared with others, the perception of usefulness has a greater impact on consumer satisfaction. Moreover, this study confirms the adjusted TAM (1989) theory, which presented perceived usefulness as having a decisive influence on consumer repurchase even if the study incorporates other variables. Although some of the variables in the original model assumptions were not valid, other relationships were found.

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### ACKNOWLEDGEMENT

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### REFERENCES


<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>Satisfaction</th>
<th>Consumer purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>--&gt;Satisfaction</td>
<td>0.809</td>
<td>1.035</td>
</tr>
<tr>
<td></td>
<td>0.097</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td>8.331</td>
<td>12.498</td>
</tr>
</tbody>
</table>

<Note>***, **, and * are statistically significant at 0.01, 0.05 and 0.1, respectively.


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