

## **Journal of Economics, Management and Trade**

**21(3): 1-14, 2018; Article no.JEMT.39472**

**ISSN: 2456-9216**

*(Past name: British Journal of Economics, Management & Trade, Past ISSN: 2278-098X)*

# **A Study of Consumer Acceptance of Mobile Payment Services in Hong Kong**

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### **Author's contribution**

*The sole author designed, analyzed and interpreted and prepared the manuscript.*

### **Article Information**

DOI: 10.9734/JEMT/2018/39472

#### Editor(s):

(1) LI, Hui, Professor, School of Economics and Management, Zhejiang Normal University, China.

#### Reviewers:

(1) PC Lai, Help University, Malaysia.

(2) Tsung-Yu Hsieh, MingDao University, Taiwan.

Complete Peer review History: <http://www.sciencedomain.org/review-history/23766>

**Original Research Article**

**Received 6<sup>th</sup> January 2018**

**Accepted 8<sup>th</sup> March 2018**

**Published 21<sup>st</sup> March 2018**

## **ABSTRACT**

Mobile payment (m-payment) has a significant value in a business. It provides one more choice for customers in selecting the payment methods. This m-payment method has been developed in Korea, Japan and China. However, m-payment is a new service and an innovative approach in Hong Kong. Therefore, this study aims to measure the consumer acceptance of m-payment service in Hong Kong. Technology acceptance model (TAM) was adopted in this study. Besides, additional factors have been added to the model for further exploration. As a result, the research model of this study consists of seven constructs including an intention to use, attitude towards use, perceived ease of use, perceived usefulness, innovativeness, initial trust and trust propensity, and eight hypotheses are proposed to study. The empirical results of this study support the usual relationship among attitude toward use, perceived ease of use, perceived usefulness and innovativeness, which drive the consumer intention to adopt new technology. Six hypotheses are supported and two hypotheses had found to have no significant relationship in this study. Managerial implications in the development of m-payment were discussed and suggestions about the implementation strategy to the service provider for enhancing the Hong Kong consumers' intention to use them-payment service were discussed as well.

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*Keywords: Intention to use; attitude towards use; perceived ease of use; perceive usefulness; innovativeness; initial trust; trust propensity and mobile payment.*

## 1. INTRODUCTION

As the mobility has grown symbolically in today's society, telephony industry has developed significantly that the number of mobile phone accounts has risen sharply in recent years. Thus, mobile service becomes a crucial part of our life [1]. Hong Kong is one of the cities with the highest penetration rate of mobile service in the world, and 16.72 million people here are using mobile service [2].

Near Field Communications (NFC) has become a standard specification of many smartphones and this technology enables payment through a mobile application [3,4]. Explained that NFC could transfer the data through a short-range high-frequency wireless communication technology either in active or passive modes. Thus, mobile payment (m-payment) is enabled by NFC technology. NFC technology for using mobile phone for payment has already been used in Japan, South Korea and other Asian countries successfully [5]. Recently this technology is being applied in Hong Kong. On 4th November 2016, Hong Kong Monetary Authority granted stored value facilities (SVF) licenses to 13 organizations [6] in order to satisfy the enormous demand of m-payment. According to the data from [7], the user penetration rate of m-payment by using mobile phones in Hong Kong in the year 2016 is 13%.

Although a variety of m-payment studies are conducted in different countries, such as Korea [8] and Malaysia [9,10], there is a lack of research studying NFC m-payment in Hong Kong. Thereby, this study aims to measure the acceptance of m-payment service by consumers in Hong Kong.

Technology acceptance model (TAM) [11] the popular used research model in measuring acceptance of new technology, would be adopted in this study. The field of electronic commerce is being widely explored by this model [12,13,14,15]. TAM provides the core and general structure for constructing the model of this study including four constructs which are perceived usefulness, perceived ease of use, attitude towards use and intention to use. After the review of the literature regarding TAM, consumer behavioural intention in m-payment with similar contexts, this study adds three

constructs as an extension of the TAM, including innovativeness, trust propensity and initial trust. Those constructs are expected to have influences to the consumer behavioural intention in m-payment service in Hong Kong.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

To study the factors which affect users' acceptance of m-payment methods, it would be rational to adopt an already examined and well-developed model. There are some famous models broadly used in investigating behavioural intention, including theory of reasoned action (TRA) [16] theory of planned behaviour (TPB) [17] as well as technology acceptance model (TAM) [11].

### 2.1 Technology Acceptance Model

[18] specify that TAM is superior to TRA and TPB, as technology acceptance and adoption can be investigated more specifically through TAM. Moreover, TAM is the most widely adopted research model in the field related to adoption of mobile transaction services [19]. Therefore, TAM would be the most suitable model to be used in this study. Actually, there are a variety of researches adopting TAM to test the user acceptance of up-to-date technology, including SMS payment systems [20] internet banking [18] business intelligence [21] m-learning [22] app-based mobile tour guide [23] tablet PCs [24] e-textbooks [25] mobile banking apps [26] and ERP systems [27]. Among the studies mentioned, different external variables are inserted into TAM so as to adapt specialties in specific fields, which allows more space for the addition of external variables based on the original TAM (Fig. 1) in this m-payment study.

### 2.2 Intention to Use and Attitude towards Use

In TAM research, the result of [28] research indicated that attitude towards use positively affects intention to use. The result from a recent research by [29] on e-learning provided empirical support on the positive relationship between attitude towards use and intentions to use. Meanwhile, the positive relationship is also supported in a research investigating wearable instrumented vest [30]. Therefore, the first hypothesis is proposed.

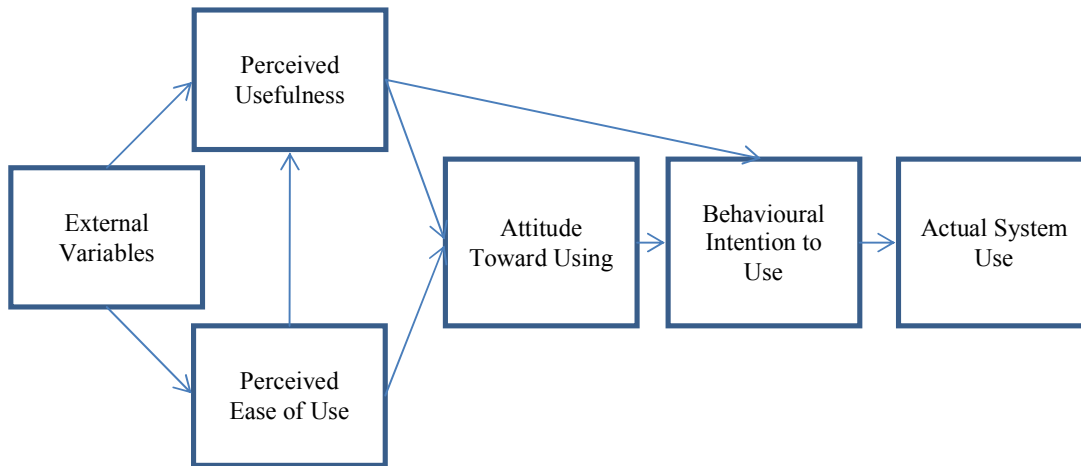


Fig. 1. TAM [11]

Hypothesis H1: Attitude towards use has a positive effect on intentions to use.

Hypothesis H4: Perceived ease of use has a positive effect on perceived usefulness.

### 2.3 Perceived Usefulness and Perceived Ease of Use

[11] defined the perceived usefulness as the person's perceived that "using a particular system would enhance his or her job performance." and perceived ease of use is defined as the person's perceived that "using a particular system would be free of effort." [11] also provided empirical evidence that both perceived usefulness and perceived ease of use have a significant and positive effect on attitude towards use.

Recent research in internet banking had consistently supported that both perceived usefulness and perceived ease of use have positive effect on behavioural intentions [31]. Researchers studied the adoption of Building Information Modeling (BIM) technology in Hong Kong and their results supported that perceived ease of use affects intention to use [32,33] also found that perceived ease of use is one of the significant factors facilitating the adoption of BIM technology in Hong Kong. Based on the above studies, the following hypotheses are formed.

Hypothesis H2: Perceived usefulness has a positive effect on attitude towards use.

Hypothesis H3: Perceived ease of use has a positive effect on attitude towards use.

### 2.4 Initial Trust

Initial trust is proposed as an external variable of TAM in this study. In a mobile banking research, initial trust is noteworthy that affects perceived usefulness [34]. Therefore, this variable is considered in this study to further investigate the relationship in another field, m-payment. Initial trust refers to the trust formation between people and provider relationship where people have no any credible information or no any kind of first-hand knowledge [35]. The meaning of initial trust is people first encounter and within a short amount of time for the object, initial trust can be powerful and make the individual vulnerable [36]. Thus, the following hypothesis is proposed for this study.

Hypothesis H5: Initial trust has a positive effect on perceived usefulness.

### 2.5 Trust Propensity

Trust propensity is another external variable proposed in this study. [34] found that high trust propensity will be easier in building initial trust in mobile banking. With the aim of testing the effect in m-payment, this variable is included in this research. Trust propensity is not equal to trust, [37] argued that trust is not depending on past experience only but also on dispositional factors such as personality. These lead the worthiness to propose the following hypothesis.

Hypothesis H6: Trust propensity has a positive effect on initial trust.

### 2.6 Innovativeness

Innovativeness is regarded as an external variable in this study. Actually, various researchers support this factor. The recent research studying TAM extension indicated that innovativeness affects both of the perceived ease of use and use intention positively [38]. Innovativeness has also been examined as a factor influencing the use of NFC Mobile Credit Card (MCC). [10] discussed that innovativeness has a significant relationship in intention to use MCC in Malaysia. In order to check whether the relationship is supported in m-payment, innovativeness is added to the model of this research. Innovativeness is the construct of “willingness of an individual to try out any new information technology” [39]. Motivated and intrigued is the people’s primary nature to adopt new technologies. Innovativeness significantly measures that in order to understand personal attitudes for innovative technologies [15]. Hence, the following hypotheses are set.

Hypothesis H7: Innovativeness has a positive effect on perceived usefulness.

Hypothesis H8: Innovativeness has a positive effect on perceived ease of use.

### 2.7 Research Model

After the development of hypotheses based on the literature review, a model of this study has been developed. Fig. 2 identifies the framework of the proposed hypotheses among the constructs in this study. Four core and basic constructs of TAM [11] were integrated in this model, which are perceived usefulness, perceived ease of use, attitude towards use and intention to use. In addition, this model proposed three constructs including innovativeness, trust propensity and initial trust which would have influences to the consumer behavioral intention through perceived usefulness and perceived ease of use. As a result, there are eight hypotheses and seven constructs in this model, which attempts to study the user acceptance of m-payment services in Hong Kong.

## 3. METHODOLOGY

### 3.1 Sampling

People aged over 20 and the ability of using m-payment technology were surveyed by various researchers who studied in the context of mobile commerce and m-payment, their findings exhibited significant and meaningful results [40,41,42].

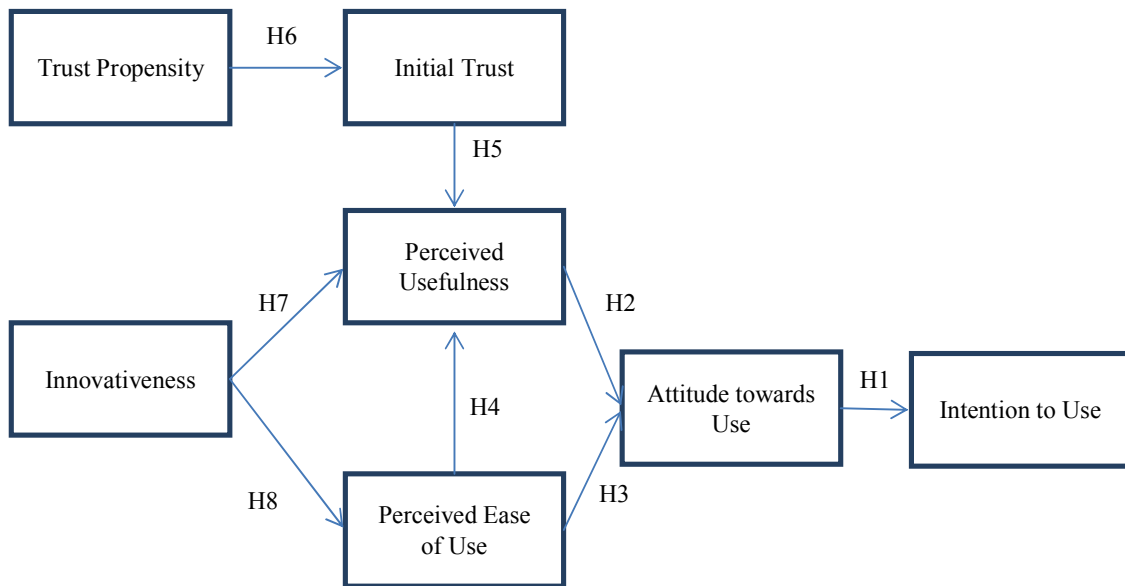


Fig. 2. Research model

Convenience sampling technique facilitated this study to collect the empirical data and reached this population with short period of time. Hence, convenience sampling technique was applied to this study for the respondent selection. In applying this technique, samples were obtained through distributing the paper or electronic form questionnaires to the social networks, workplaces and public association. Besides, this study invited people in person for the survey, so as to enhance the chance in collecting the valid responses.

### 3.2 Data Collection

300 completed questionnaires were collected in this study. However, 23 respondents gave incomplete answers to the survey or gave same rating for all items. Therefore, those 23 questionnaires were considered invalid and being eliminated from this study. As a result, a total number of valid responses was 277. In respect of the valid responses, 200 responses were obtained by completing the questionnaires in paper form through a face to face method, and 77 responses were obtained by the questionnaires in electronic format distributed through electronic communication channel such as instant messaging platform, email and social media, considering the respondents' convenience. The sample size of this study (n=277) is within the range of the usual sample size (i.e. 220 – 380) of similar researches in m-payment context [43,44].

### 3.3 Questionnaire Design

Based on the proposed research model by a detail review of literatures related to technology

acceptance model, items of the constructs (intention to use, attitude towards use, perceived usefulness, perceived ease of use, innovativeness, initial trust and trust propensity) were adopted or adapted from the established instruments used in previous studies investigating m-payment service [10,15,34, 42,45]. Among the studies mentioned, scale points applied to questionnaires vary, including 5 points and 7 points. [46] indicated that resultant data remains comparable when 5- and 7- point scale are rescaled. Meanwhile [47] supported that 7-point Likert items are possible to give a more accurate measure of participants' real evaluation. As a result, a seven-point Likert-type scale was adopted in the questionnaire for answering all questions concerning the seven constructs in this study. The range of the scale is from (1) "Strongly disagree" to (7) "Strongly agree".

### 3.4 Measurement Items

Table 1 provides all the measurement items and the corresponding sources for this study. Slightly modifications had been made for some wordings in few measurement items including perceived ease of use, innovativeness and initial trust. For example, the measurement items of initial trust were adapted from the research of [45] and their research studied the online store. Their questionnaires then were adopted because of the similarity but with slightly modification had been made (i.e. the word "online store" was amended to "mobile payment") in order to make the measurement items in line with the focus of this study, as well as to keep the original meaning.

**Table 1. Measurement items**

<b>Constructs</b>		<b>Measurement items</b>	<b>References</b>
<b>Intention to use</b>	<b>IU1</b>	Given the opportunity, I will use mobile payment services	[42]
	<b>IU2</b>	I am likely to use mobile payment services in the near future	
	<b>IU3</b>	I am willing to use mobile payment services in the near future	
	<b>IU4</b>	I intend to use mobile payment services when the opportunity arises	
<b>Attitude towards use</b>	<b>ATU1</b>	Using mobile payment services is a good idea	[42]
	<b>ATU2</b>	Using mobile payment services is wise	
	<b>ATU3</b>	Using mobile payment services is beneficial	
	<b>ATU4</b>	Using mobile payment services is interesting	

Constructs	Measurement items	References	
<b>Perceived usefulness</b>	<b>PU1</b>	Mobile payment services are a useful mode of payment	[42]
	<b>PU2</b>	Using mobile payment services makes the handling of payments easier	
	<b>PU3</b>	Mobile payment services allow for a faster usage of mobile applications (e.g., ticket purchase)	
	<b>PU4</b>	By using mobile payment services, my choices as a consumer are improved (e.g., flexibility, speed)	
<b>Perceived ease of use</b>	<b>PEU1</b>	Learning to use mobile payment will be easy for me	[10]
	<b>PEU2</b>	Using mobile payment does not require a lot of mental efforts	
	<b>PEU3</b>	It would be easy for me to become skillful at using mobile payment	
	<b>PEU4</b>	Since mobile payment uses my mobile phone, hence a mobile phone credit card is easy to use	
<b>Innovativeness</b>	<b>INN1</b>	I am usually among the first to try m-services	[15]
	<b>INN2</b>	I am eager to learn about new technologies	
	<b>INN3</b>	I am eager to try new technologies	
	<b>INN4</b>	My friends and neighbours often come to me for advice about new technologies and innovation	
<b>Initial trust</b>	<b>IT1</b>	I feel that this mobile payment is reliable.	[45]
	<b>IT2</b>	I think this mobile payment will keep its promise.	
	<b>IT3</b>	I believe this mobile payment will use my information reasonably.	
<b>Trust propensity</b>	<b>TP1</b>	It is easy for me to trust a person/thing.	[34]
	<b>TP2</b>	I tend to trust a person/thing, even though I have little knowledge of it.	
	<b>TP3</b>	My tendency to trust a person/thing is high.	

### 3.5 Statistical Analysis Methods

Partial Least Squares (PLS), the structural equation modeling (SEM) technique [48] has been applied for analyzing the data and testing the hypotheses of this study. PLS is applicable for measuring the formative and reflective construct [49]. Furthermore, SEM supports in studying the relationships among a model with multiple independent and dependent constructs simultaneously [50]. In view of this study, measurement of the reflective construct, multiple independent and dependent variable are required. Thus, PLS-SEM is an appropriate approach for this study and the corresponding software, SmartPLS 2.0, has been used for analyzing the empirical data.

Prior to the hypotheses path testing, reliability and validity test had been performed. Regarding the reliability test, coefficient alphas ( $\alpha$ ), composite reliability (CR) and average variances

extracted (AVE) had been assessed according to the recommendations from various researchers [51,52,53]. In respect of the validity test, this study followed the criteria set by [54] to evaluate the convergent and discriminant validity of the constructs of this study.

## 4. RESULTS OF ANALYSIS

### 4.1 Sample Characteristics

Table 2 summarized the sample characteristics of the respondents. From the 277 valid responses, 143 respondents are male; 134 are female. As for the age, 59% respondents are in age 20-29. 19.6% and 10.5% respondents are in age 30-39 and 40-49 respectively. Besides, there are 8.3% and 2.5% respondents are in age 50-59 and 60 or above respectively. In terms of education level, there are 20.3% respondents are in secondary or below level. 6.9% respondents are in matriculated level and 21.7% are in non-

**Table 2. Characteristics of sample**

<b>Profile of survey respondents (n=277)</b>		
<b>Category</b>	<b>Quantity</b>	<b>%</b>
<b>Gender</b>		
Male	143	51.6%
Female	134	48.4%
<b>Total</b>	<b>277</b>	<b>100%</b>
<b>Age</b>		
20 - 29	164	59%
30 - 39	54	19.6%
40 - 49	29	10.5%
50 - 59	23	8.3%
60 or above	7	2.5%
<b>Total</b>	<b>277</b>	<b>100%</b>
<b>Education level</b>		
Secondary or below	56	20.3%
Matriculate	19	6.9%
Non-degree tertiary	60	21.7%
Bachelor's Degree	126	45.5%
Master's Degree	15	5.4%
Doctor's Degree	1	0.3%
<b>Total</b>	<b>277</b>	<b>100%</b>

degree tertiary level. Bachelor's degree holders are the majority (45.5%). Meanwhile, master's degree holders (5.4%) and doctor's degree holders (0.3%) also gave their responses to this study.

#### **4.2 Reliability and Validity**

In the first stage, coefficient alphas ( $\alpha$ ), composite reliability (CR) and average variances extracted (AVE) were calculated for assessing the scale reliability. As shown in Table 3, all coefficient alphas in this study exceed the threshold of 0.7 as recommended by [51], the internal consistent has been reached. Besides, all composite reliabilities were more than 0.7 and average variances extracted were greater than the value of 0.5, those results surpass the reference thresholds as recommended by [52] and [53]. Each of the factor values in this study indicates a reliable measurement for the individual factors.

#### **4.3 Convergent and Discriminant Validity**

Subsequently, the constructs validity had been evaluated by convergent and discriminant validity based on the criteria set by [54] and described as follows.

##### **4.3.1 Convergent validity criteria**

As shown in Table 4, the values of composite reliability were greater than 0.7 and the average

variances extracted exceed 0.5. Furthermore, Table 5 shows that all the factor loadings were statistically significant and exceed 0.5. Those values achieved [54] suggested criteria. Hence, the convergent validity has been achieved.

##### **4.3.2 Discriminant validity criteria**

Table 4 indicates that all constructs had reached the criteria of discriminant validity. According to [54], composite reliability should exceed 0.7 and square root of AVE must be larger than the correlation of the construct with all other constructs. Also, as shown in Table 5, the highest value of factor loading for each indicator belongs to the associated construct, achieving the last criterion from [54] and the validity of the empirical data had been supported.

#### **4.4 Hypotheses Path Testing**

Once the appropriateness of the measurement was assessed, an empirical measure of the hypotheses effects among the constructs was examined through SmartPLS 2.0. The estimations indicate that six hypotheses were supported and two hypotheses were not supported. Fig. 3 and Table 6 illustrate the standardized path coefficient ( $\beta$ ), coefficients of determination ( $R^2$ ) and t-values (t) of the latent variables.

**Table 3. Reliability and validity**

Constructs	AVE	CR	$\alpha$
Attitude Towards Use	0.8098	0.9445	0.9216
Initial Trust	0.8557	0.9468	0.9157
Innovativeness	0.7438	0.9204	0.8842
Intention to Use	0.9188	0.9784	0.9705
Perceived Ease of Use	0.8266	0.9501	0.9298
Perceived Usefulness	0.7435	0.9204	0.8849
Trust Propensity	0.8988	0.9638	0.9437

**Table 4. Convergent & discriminant validity**

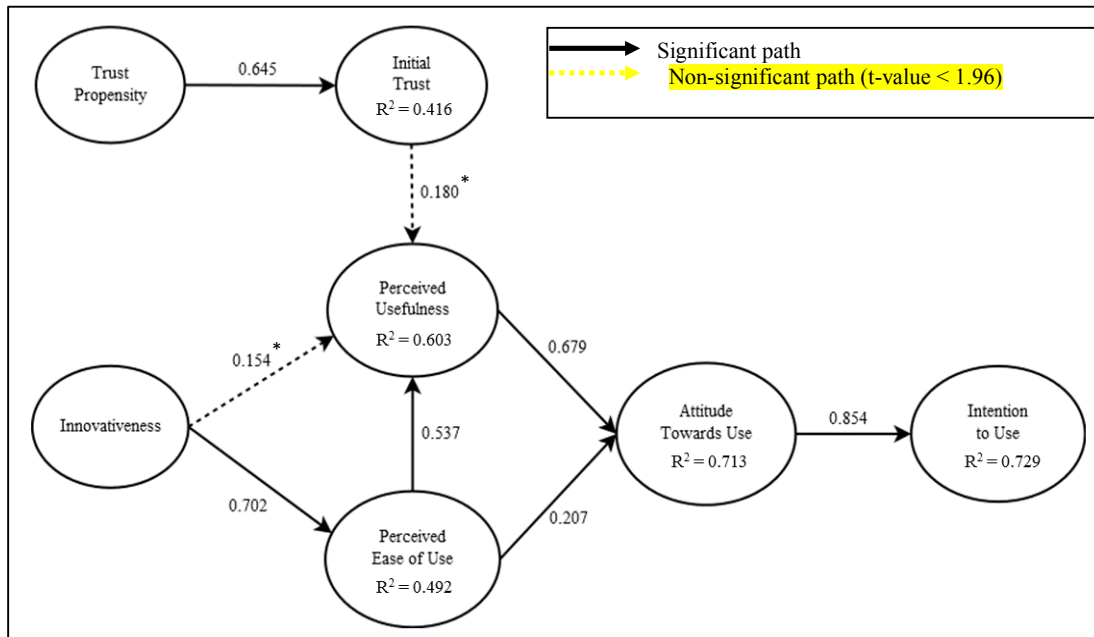
	CR	AVE	ATU	IT	INN	IU	PEU	PU	TP
<b>ATU</b>	0.9445	0.8098	<b>0.8999</b>						
<b>IT</b>	0.9468	0.8557	0.6435	<b>0.9250</b>					
<b>INN</b>	0.9204	0.7438	0.6926	0.6424	<b>0.8624</b>				
<b>IU</b>	0.9784	0.9188	0.854	0.6593	0.6731	<b>0.9585</b>			
<b>PEU</b>	0.9501	0.8266	0.7125	0.5471	0.7017	0.6961	<b>0.9092</b>		
<b>PU</b>	0.9204	0.7435	0.8332	0.5733	0.647	0.7527	0.744	<b>0.8623</b>	
<b>TP</b>	0.9638	0.8988	0.4652	0.6448	0.5298	0.4302	0.406	0.4454	<b>0.9481</b>

NOTE: Square root of AVE on diagonal

**Table 5. Cross loadings**

	ATU	IT	INN	IU	PEU	PU	TP
<b>ATU1</b>	0.9203	-	-	-	-	-	-
<b>ATU2</b>	0.9018	-	-	-	-	-	-
<b>ATU3</b>	0.8992	-	-	-	-	-	-
<b>ATU4</b>	0.8778	-	-	-	-	-	-
<b>INN1</b>	-	-	0.8398	-	-	-	-
<b>INN2</b>	-	-	0.9133	-	-	-	-
<b>INN3</b>	-	-	0.9069	-	-	-	-
<b>INN4</b>	-	-	0.7831	-	-	-	-
<b>IT1</b>	-	0.9176	-	-	-	-	-
<b>IT2</b>	-	0.9258	-	-	-	-	-
<b>IT3</b>	-	0.9317	-	-	-	-	-
<b>IU1</b>	-	-	-	0.9508	-	-	-
<b>IU2</b>	-	-	-	0.9555	-	-	-
<b>IU3</b>	-	-	-	0.9723	-	-	-
<b>IU4</b>	-	-	-	0.9555	-	-	-
<b>PEU1</b>	-	-	-	-	0.8767	-	-
<b>PEU2</b>	-	-	-	-	0.9156	-	-
<b>PEU3</b>	-	-	-	-	0.9474	-	-
<b>PEU4</b>	-	-	-	-	0.8954	-	-
<b>PU1</b>	-	-	-	-	-	0.9106	-
<b>PU2</b>	-	-	-	-	-	0.8901	-
<b>PU3</b>	-	-	-	-	-	0.8413	-
<b>PU4</b>	-	-	-	-	-	0.8029	-
<b>TP1</b>	-	-	-	-	-	-	0.9393
<b>TP2</b>	-	-	-	-	-	-	0.9547
<b>TP3</b>	-	-	-	-	-	-	0.9501





**Fig. 3. Results of the model**

As shown in Table 6, the relationship proposed in hypothesis H1 has strongly supported by the result, a statistically significant and strong positive relationship between attitude towards use and intention to use has been found ( $\beta = 0.854$ ;  $t = 29.205 > 1.96$ ). Moreover, results indicate that the perceived usefulness ( $\beta = 0.679$ ;  $t = 8.10 > 1.96$ ) and perceived ease of use ( $\beta = 0.207$ ;  $t = 2.22 > 1.96$ ) had statistically significant and positive relationship with attitude towards use. Thus, hypotheses H2 and H3 were supported. In addition, the relationship between perceived ease of use and perceived usefulness was statistically significant and positive as shown by the result ( $\beta = 0.537$ ;  $t = 4.42 > 1.96$ ). Hence, hypothesis H4 was supported.

In contrast, initial trust was found to have no significant relationship with perceived usefulness ( $\beta = 0.180$ ;  $t = 1.94 < 1.96$ ). Therefore, hypothesis H5 was not supported. However, the result provides evidence that the relationship between trust propensity and initial trust was statistically significant and positive ( $\beta = 0.645$ ;  $t = 8.44 > 1.96$ ), supporting hypothesis H6.

On the other hand, the effect of innovativeness on perceived usefulness was not significant ( $\beta = 0.154$ ;  $t = 1.39 < 1.96$ ). Hence, hypothesis H7 was not supported. However, innovativeness

was exerted a statistically significant and strong positive impact on perceived ease of use ( $\beta = 0.702$ ;  $t = 10.80 > 1.96$ ), supporting the relationship proposed in hypothesis H8.

As indicated in Fig. 3, the high  $R^2$  of perceived usefulness ( $R^2 = 0.603$ ), attitude towards use ( $R^2 = 0.713$ ) and intention to use ( $R^2 = 0.729$ ) indicates that more than 60% of variances of those constructs were being explained. On the other hand, 42% variance of initial trust ( $R^2 = 0.416$ ) and 49% variance of perceived ease of use ( $R^2 = 0.492$ ) were being explained, such variances being explained were medium. Finally, Table 7 summarized the path relationships for each of the hypotheses.

## 5. DISCUSSION

The relationship between trust propensity and initial trust has a significant effect, it is consistent with the argument of [34] who described that higher trust propensity tend to more easily build up the initial trust in e-payment context.

Moreover, the result of the perceived usefulness has no significant relationship with initial trust ( $t < 1.96$ ). It means perceived usefulness would not be influenced by the level of first-hand knowledge or reliable information in consumer perception on m-payment service.

**Table 6. Path Coefficients ( $\beta$ ) & t-value (t) of Hypotheses**

Hypotheses	Path	Standardized coefficient ( $\beta$ )	t-value (t)
H1	Attitude towards use $\rightarrow$ Intention to use	0.854	29.21
H2	Perceived usefulness $\rightarrow$ Attitude towards use	0.679	8.10
H3	Perceived ease of use $\rightarrow$ Attitude towards use	0.207	2.22
H4	Perceived ease of use $\rightarrow$ Perceived usefulness	0.537	4.42
H5	Initial trust $\rightarrow$ Perceived usefulness	0.180	1.94 #
H6	Trust propensity $\rightarrow$ Initial trust	0.645	8.44
H7	Innovativeness $\rightarrow$ Perceived usefulness	0.154	1.39 #
H8	Innovativeness $\rightarrow$ Perceived ease of use	0.702	10.80

Note: # Not Significant ( $t$ -value  $<$  1.96)

**Table 7. Summary of Path Relationships**

Hypotheses	Path	Results
H1	Attitude towards use $\rightarrow$ Intention to use	Supported
H2	Perceived usefulness $\rightarrow$ Attitude towards use	Supported
H3	Perceived ease of use $\rightarrow$ Attitude towards use	Supported
H4	Perceived ease of use $\rightarrow$ Perceived usefulness	Supported
H5	Initial trust $\rightarrow$ Perceived usefulness	Not Supported ( $t < 1.96$ )
H6	Trust propensity $\rightarrow$ Initial trust	Supported
H7	Innovativeness $\rightarrow$ Perceived usefulness	Not Supported ( $t < 1.96$ )
H8	Innovativeness $\rightarrow$ Perceived ease of use	Supported

This result is consistent with a previous research studied the online credit card and online octopus card payment system [13]. They indicated the same relationship among perceived usefulness and initial trust. E-payment saved sensitive personal information might be one of the possible reasons to cause this result, since the knowledgeable Hong Kong people would not only rely on the market information to trust a financial tool in mature financial city.

While only perceived ease of use has a statistically significant and positive relationship with perceived usefulness ( $t > 1.96$ ). There are many TAM researchers observed the same result, if m-payment is providing user-friendly payment process for using, individual will perceive the method as useful [55]. This result also echoes with the findings by [56] and [9] in studying electronic payment. Because traditional transaction involved several steps and could be complicated, perceived ease of use becomes one of the important concerns for most customers [10].

Contrary to the relationship proposed in hypothesis H7 regarding the positive effect between innovativeness and perceived usefulness, innovativeness had found to have no

significant relationship with perceived usefulness. This fact indicates that, although the degree of willingness of an individual to try m-payment may be high, individual will not perceive m-payment as useful. This result contradicts to the past empirical evidence provided by [15] who studied the users' acceptance of m-payment service in Greece. However, this result is actually consistent with the findings of [14], who studied the behavioral intention to use 3G mobile value added service in Taiwan. One possible explanation is the cultural differences between individual living in southeastern Europe and Asia.

On the other hand, innovativeness had found to have a great impact ( $\beta = 0.702$ ) on perceived ease of use. This is in line with the findings of previous studies [10,57]. It implies that if the motivation and intrigue to use a new technology is high for an individual, an individual will tend to perceive that there is less effort required to put in learning to use the m-payment service.

Regarding the results for the core constructs: perceived usefulness, perceived ease of use, attitude towards use and intention to use m-payment service, positive and significant effects had been found among all of those constructs. This result is consistent with other researches

which used the TAM model developed by [58] to study the user acceptance within the similar context, the researchers studied the information technology area including the 3G mobile value added services, internet banking, mobile services and credit card [12,13,14,15]. The studies by [56] and [9] also show similar results as in this study that perceived usefulness has positive effect on intention to use. These results provide empirical evidence to support the use of TAM, which is significant for studying the m-payment service in Hong Kong. Besides, the consistent result indicates that m-payment is not an exception in the field of information technology. Hence, consumers are having the same attitude on the adoption of m-payment service in Hong Kong, comparing with the other services within information technology area.

Moreover, this study provides implications in practical and managerial aspect. First, initial trust seems to have no critical effect in the adoption of m-payment as it involves sensitive personal information. Therefore, steady quality for duration might be needed so as to prove the reliability and safety of m-payment service.

M-payment is a new service being developed in Hong Kong, customers might be accustomed to traditional payment method. This might be one of the possible reasons to explain that perceived usefulness has no relationship with innovativeness and initial trust. Thus, additional advantages and value added services might be needed in order to attract customer in trying new service.

Perceived ease of use tends to be important for most customers in considering the usefulness of a new technology. Therefore, handling of payment easier, allowing for efficient usage and flexibility might be needed to put into concern while developing the m-payment service, because those factors might help in enhancing the feeling of convenience and make the m-payment to become more user-friendly and easy to use.

Finally, when marketer launched innovative service in Hong Kong market, they might need to initially target the segment with high innovativeness, since this segment perceived less difficulties in using the features and functions of an innovative product. Besides, they are highly likely to become the transmitter to influence the consumer adoption of the new service in the market.

## 6. CONCLUSION

The study had examined the consumer acceptance of mobile payment services in Hong Kong. Four constructs of TAM have been used as the core structure of the model for this study, which includes perceived usefulness, perceived ease of use, attitude towards use and intention to use. Besides, additional constructs including innovativeness, initial trust and trust propensity have been used as the extension of the model.

The analytical results of this study provide insights into the consumer behavioral intention in the adoption of m-payment service. Six hypotheses are supported and two hypotheses has found to be not significant. In addition, the statistical significant results in this study give empirical evidence to the relationships among intention to use, attitude toward use, perceived ease of use and perceived usefulness. Hence, it supports the significance of the use of TAM for studying the m-payment service in Hong Kong.

Scholars might be inspired by this study and perform further research of TAM regarding the m-payment service in Hong Kong. Finally, this study contributes to significant managerial implications in m-payment service provider in developing and polishing up the service they provided.

## COMPETING INTERESTS

Author has declared that no competing interests exist.

## REFERENCES

1. Hwang RJ, Shiao SH, Jan DF. A new mobile payment scheme for roaming services. *Electronic Commerce Research and Applications*. 2007;6(2):184–191.
2. Office of the Communication Authority. *Telecommunications*; 2016. Available: [http://www.gov.hk/en/about/about\\_hk/factsheets/docs/telecommunications.pdf](http://www.gov.hk/en/about/about_hk/factsheets/docs/telecommunications.pdf).
3. Smart Card Alliance. *NFC Resources*; 2016. Available: <http://www.smartcardalliance.org/smart-cards-applications-nfc/>.
4. Ruijun G, Yao J. Comparison and tendency of main mobile payment technologies in China. In: *International Conference on Future Information Technology and Management Engineering*, IEEE, 2016:434–437.
5. Ondrus J, Pigneur Y. An assessment of NFC for future mobile payment systems. In

- Management of Mobile Business, 2007. ICMB 2007. International Conference on the IEEE. 2007:43-43.
6. Hong Kong Monetary Authority. Granting of stored value facilities licences. Retrieved; 2016.  
Available:<http://www.hkma.gov.hk/eng/key-information/press-releases/2016/20161104-3.shtml>
  7. Statista. The Statistics Portal. Retrieved; 2016.  
Available:<https://www.statista.com/outlook/331/118/mobile-payments/hong-kong#takeaway>
  8. Shin S, Lee W. The effects of technology readiness and technology acceptance on NFC mobile payment services in Korea. *The Journal of Applied Business Research*. 2014;30(6):1615-1626.
  9. Lai PC. Design and security impact on consumers' intention to use single platform e-payment. *Interdisciplinary Information Sciences*. 2016;22(1):111-122.
  10. Tan GWH, Ooi KB, Chong SC, Hew TS. NFC mobile credit card: The next frontier of mobile payment? *Telematics and Informatics*. 2014;31(2):292-307.
  11. Davis FD, Bagozzi RP, Warshaw PR. User acceptance of computer technology: A comparison of two theoretical models. *Management Science*. 1989;35(8):982-1003.
  12. Chau PY, Lai VS. An empirical investigation of the determinants of user acceptance of internet banking. *Journal of Organizational Computing and Electronic Commerce*. 2003;13(2):123-145.
  13. Ho KK, See-To EWK. An exploratory study on the impact of trust on different e-payment gateways: Octopus Card Vs. credit card; 2010.
  14. Kuo YF, Yen SN. Towards an understanding of the behavioral intention to use 3G mobile value added services. *Computers in Human Behaviour*. 2009;25(1):103-110.
  15. Zarpou T, Saprikis V, Markos A, Vlachopoulou M. Modeling users' acceptance of mobile services. *Electronic Commerce Research*. 2012;12(2):225-248.
  16. Fishbein M, Ajzen I. *Belief, Attitude, Intention, and Behaviour: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley; 1975.
  17. Ajzen I. Theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991;50(2):179-211.
  18. Hou SK, Gergi G. Internet banking adoption in Sweden: An exploratory case study of Internet banking adoption among senior citizens; 2015.
  19. Wei G, Xinyan Z, Yue M. Literature review on consumer adoption behavior of mobile commerce services. In 2011 International conference on e-business and e-government (ICEE). New York: IEEE. 2011:1-5.
  20. Francisco LC, Francisco ML, Juan SF. Payment systems in new electronic environments: Consumer behavior in payment systems via SMS. *International Journal of Information Technology & Decision Making*. 2015;14(02):421-449.
  21. Lindskoog P, Westfeldt J. *Drilling down into Business Intelligence: A study of implementation obstacles*; 2017.
  22. Cheng YM. Towards an understanding of the factors affecting m-learning acceptance: Roles of technological characteristics and compatibility. *Asia Pacific Management Review*. 2015;20(3):109-119.
  23. Lai IK. Traveler acceptance of an app-based mobile tour guide. *Journal of Hospitality & Tourism Research*. 2015;39(3):401-432.
  24. Ifenthaler D, Schweinbenz V. Students' acceptance of tablet pcs in the classroom. *Journal of Research on Technology in Education*. 2016;48(4):306-321.
  25. Ngafeeson MN, Sun J. The effects of technology innovativeness and system exposure on student acceptance of E-textbooks. *Journal of Information Technology Education: Research*. 2015;14.
  26. Muñoz-Leiva F, Climent-Climent S, Liébana-Cabanillas F. Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. *Spanish Journal of Marketing-ESIC*; 2017.
  27. Escobar-Rodríguez T, Bartual-Sopena L. Impact of cultural factors on attitude toward using ERP systems in public hospitals. *Revista de Contabilidad*. 2015;18(2):127-137.
  28. Davis FD. User acceptance of information technology: System characteristics, user perceptions and behavioral impacts; 1993.
  29. Hussein Z. Explicating students' behaviours of E-learning: A viewpoint of the extended technology acceptance. *International Journal of Management and Applied Science*. 2015; 1(10):68-73.
  30. Lin WY, Chou WC, Tsai TH, Lin CC, Lee MY. Development of a wearable instrumented vest for posture monitoring and system usability verification based on the technology

- acceptance model. *Sensors*. 2016;16(12): 2172.
31. Josefsson T. Internet banking and the Technology Acceptance Model: The role of trust; 2017.
  32. Lee W, Wong A, Ton, C. A qualitative study of the software adoption of building information modelling technology in the Hong Kong construction industry. *Business and Economic Research*. 2014;4(2):222-236.
  33. Tong C, Wong A, Lee W. Barriers to software adoption: A study of building information modelling (BIM) technology in the Hong Kong construction industry. *International Journal of Advanced Multidisciplinary Research*. 2015;2(4):XXX.
  34. Zhou T. An empirical examination of initial trust in mobile banking. *School of Management*. 2011;21(5):527-540.
  35. McKnight DH, Choudhury V, Kacmar C. Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research*. 2002;13(3):334-59.
  36. McKnight DH, Cummings LL, Chervany NL. Initial trust formation in new organizational relationships. *Academy of Management Review*. 1998;23(3):473-490.
  37. Kee HW, Knox RE. Conceptual and methodological considerations in the study of trust and suspicion. *Journal of Conflict Resolution*. 1970;14:357-366.
  38. Koivisto K, Makkonen M, Frank L, Riekkinen J. Extending the technology acceptance model with personal innovativeness and technology readiness: A comparison of three models. *BLED 2016: Proceedings of the 29th Bled eConference "Digital Economy"*, ISBN 978-961-232-287-8.
  39. Flynn L, Goldsmith R. A validation of the Goldsmith and Hofacker innovativeness scale. *Educational and Psychological Measurement*. 1993;53(4):1105-1116.
  40. Wu JH, Wang SC. What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model. *Information & management*. 2005;42(5):719-729.
  41. Yang S, Lu Y, Gupta S, Cao Y, Zhang R. Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits. *Computers in Human Behavior*. 2012;28(1):129-142.
  42. Schierz PG, Schilke O, Wirtz BW. Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*. 2010;9(3):209-216.
  43. Ting H, Yacob Y, Liew L, Lau WM. Intention to use mobile payment system: A case of developing market by ethnicity. *Procedia-Social and Behavioral Sciences*. 2016;224: 368-375.
  44. Xin H, Techatassanasoontorn AA, Tan FB. Exploring the influence of trust on mobile payment adoption; 2013.
  45. Yaobin L, Tao Z. A research of consumers' initial trust in online stores in China. *Journal of Research and Practice in Information Technology*. 2007;39(3):167-180.
  46. Dawes JG. Do data characteristics change according to the number of scale points used? An experiment using 5 point, 7 point and 10 point scales; 2012.
  47. Finstad K. Response interpolation and scale sensitivity: Evidence against 5-point scales. *Journal of Usability Studies*. 2010;5(3):104-110.
  48. Bagozzi RP, Fornell C. theoretical concepts, measurement, and meaning. *A Second Generation of Multivariate Analysis*: Praeger. 1982;2:5-23.
  49. Hair JF, Hult GTM, Ringle C, Sarstedt M. A primer on partial least squares structural equation modeling (PLS+SEM). Sage Publications; 2013.
  50. Gerbing DW, Anderson JC. An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*. 1988;25:186-192.
  51. Hair JF, Jr, Anderson RE, Tatham RL, Black WC. *Multivariate data analysis with reading*. Upper Saddle River, NJ: Prentice-Hall; 1998.
  52. Kline RB. *Principles and practice of structural equation modeling*, second ed. The Guilford Press, New York; 2005.
  53. Bagozzi RP, Yi Y. On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*. 1988;16(1): 74-94.
  54. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*. 1981;18(1):39-50.
  55. Saxena A, Das ML, Gupta A. MMPS: A versatile mobile-to-mobile payment system.

- In: Proceedings of the International Conference on Mobile Business (ICMB), IEEE, Australia. 2005;400–405.
56. Lai PC; Scheela W. In book: Global Entrepreneurship and New Venture Creation in the Sharing Economy, Chapter: Convergence of Technology in the E-Commerce World and Venture Capital Landscape in South East Asia. 2017:149-168.
57. Lu J, Yao JE, Yu CS. Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. The Journal of Strategic Information Systems. 2005;14(3):245-268.
58. Davis F. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. 1989; 13(3):319-340.  
DOI:10.2307/249008

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