AN EMPIRICAL STUDY ON ACCEPTANCE OF MOBILE PAYMENT AND ITS COMPETITIVE ADVANTAGE IN MALAYSIA

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Abstract:

Mobile payment refers to a payment method by which a consumer pays a bill for goods or services through a mobile terminal. mobile payment users can send payment instructions directly or indirectly to a bank financial enterprise via mobile devices or proximity sensing devices, thereby enabling currency payments and funds transfers. It realizes the integration of terminal equipment, Internet, application providers and financial institutions, and completes financial business such as currency payment. However, the adoption rates of this payment method are relatively low in Malaysia. This research aims to identify and explore key factors that affect the decision of whether to use mobile payments. Qualitative and quantitative research are the main methodology in this research. The well-established theories, Technology Acceptance Model (TAM), the theory of Perceived Risk, the Compass Acceptance Model for the analysis and evaluation of mobile service (CAM) are applied to investigate user acceptance of mobile payments. An empirical model for acceptance of mobile payment in Malaysia is established in this paper. Survey data from mobile payments users are used to test the proposed hypothesis and the model. The result of data analysis shows that Malaysian consumers' perceptions of cost has no statistically significant relationship with attitude to adopt mobile payment. On the other hand, the factors of Perceived Usefulness, Perceived Ease of Use, Subjective Norm and Consumer Trust play significant roles. The results of this study also have some practical implications for the spread and management of mobile payment industry in Malaysia and some suggestions are offered to mobile payment platform. At the end of this paper, the limitations and future research directions are listed.

Keywords: Malaysia, acceptance, competitive advantage, mobile payment, perceived usefulness, perceived ease of use, subjective norm, consumer trust, perceived cost

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1. Introduction

The payment method used by consumers will have a significant impact on the future of a country's financial system and business model. Mobile payment system is becoming more and more popular in the financial field. It has great potential to replace cash and become the most popular means to complete transactions in the near future (OECD, 2012; Cocosila & Trabelsi, 2016). The Malaysian government has also issued some policies to actively encourage Malaysians to move towards a cashless society. Bank Negara Malaysia (BNM) has launched a blueprint for the financial sector (2011-2020) to develop and manage the future of Malaysia's financial markets and payment systems (Widjaja, 2016).

However, the development of mobile payment is still in the infant stage in Malaysia, its uptake remains limited (Qasim & Abu-Shanab, 2016). Statistic shows that the number of mobile payment users in Malaysia is only 3.2 million, and penetration is only 9.9% (Statista-MCMC, 2018).

Though there are many advantages of mobile shopping and payment, the usage in Malaysia is still very low, and the attitude to the channel of mobile shopping remains unclear (Ghazali, 2018). Due to the rapid rise of communication technologies, mobile payment system has emerged as a popular method to facilitate payment transactions. Notwithstanding its widespread use, what affects intention of mobile users towards paying through mobile phones and why in the context of developing market remain largely unanswered (Ting et al., 2016). Thus, the purpose of this paper is to study the factors of acceptance of mobile payment in Malaysia. This paper builds a model that affects the acceptance of mobile payment in Malaysia, and makes a forecast on the long-term development of mobile payment in Malaysia and puts forward some useful suggestions.

2. Literature Review

This paper's theoretical constructs are based on Technology Acceptance Model (TAM), theory of Perceived Risk (PR), Compass Acceptance Model for the analysis and evaluation of mobile service (CAM). These well-established theories are influential in clarifying and predicting users' acceptance and adoption in a new system and can be helpful to build a rigid theoretical foundation for this research.

2.1 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is a theory proposed by Davis to study the individual acceptance behaviour of the information system (Davis, 1989). According to this model, a technology adoption depends on behavioral intention (BI), while behavioral intention is determined by attitude toward using and perceived usefulness (PU). Attitude toward using is determined by perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness is determined by perceived ease of use and external

variables, and perceived ease of use is determined by external variables. PEOU and PU are the two core concepts in TAM.

In this model, Davis defines Perceived Usefulness (PU) as the extent to which users think that the use of innovative technologies can improve their efficiency. Perceived Ease of Use (PEOU) is defined as the degree of difficulty that users believe in mastering the innovative technology. Actual Use (AU) is defined as the behaviour in which the user finally actually uses innovative technology. Behavioural Intention (BI) refers to the degree of willingness of users to apply modern technology. Attitude toward using is defined as a user's positive or negative view of the use of modern technology. External Variables are defined as all factors that can affect users' PU and PEOU, including personal consumer characteristics (demographic characteristics, psychological characteristics), situational factors.

Now, TAM has become a widely used theoretical model in the field of information system adoption, and it can well explain users' intentions and behaviors of recent technologies. TAM has been applied to many research fields over time and been most cited by researchers so far. "*Adequacy of TAM's theoretical structure in explaining technology adoption was assessed in a wide range from voluntarily used technologies such as the Internet, e-mail, distance education, and shopping Websites to the other technologies such as microprocessors, commercial software, management information systems, and Intranet*" (Çelik, 2009). This research adopts TAM as the most important theoretical model.

2.2 Theory of Perceived Risk (PR)

Perceived risk was originally a concept in the field of psychology, which was introduced in 1960 by Harvard University scholar Bauer into the field of marketing and used in the study of consumer behavior (Bauer, 1960). The Theory of Perceived Risk proposed that any behaviors of consumer may lead to a certain risk, in other words, consumer behavior could be considered as risk taking. Perceived risk suggests the idea that consumers' may be influenced during the mobile payment process by the feelings like anxiety, concern, discomfort, uncertainty, and cognitive dissonance in this research.

In this paper, perceived risk refers to the psychological expectation and risk-bearing of possible adverse consequences when using mobile payment services. When any modern technology comes out, users may have a sense of risk when using it. Consumers' risk perception comes from their feelings of uncertainty or anxiety about their behaviors and the results of their behaviors. The characteristics of mobile payment indicate that consumers may encounter potential risks, such as concerns about the vulnerability of wireless communication security. Specifically, users may worry about whether their personal privacy may be disclosed and whether account funds may be stolen (Slade et al., 2013). In addition, inexperienced users may not be familiar with the using step and the operation differences of various technological products, which may confuse consumers and ultimately improve their perception of technical risks (Guar et al., 2012). Considering these respects, PR is a major barrier to attempt to apply modern

technology, and perceived risk theory is regarded as an important theoretical source of this study.

2.3 The Compass Acceptance Model for the Analysis and Evaluation of Mobile Service (CAM)

CAM is a theory especially designed for analysis and evaluation of the user acceptance for mobile services. Based on the TAM theory, and combined with the features of mobile services, Amberg et al. (2004) proposed the Compass Acceptance Model for the analysis and evaluation of mobile service (CAM) to analyse and evaluate the influencing factor of acceptance of mobile services. The model determines four influence factors on the acceptance of mobile service according to four aspects of income, pay, service and service situation. The four-factor is Perceived Usefulness (PU), Perceived Ease of Use (PEU), Perceived Mobility (PM) and Perceived Cost (PC).

The CAM theory kept two variables, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) in TAM, whose definitions were the same as in TAM. Considering the characteristics of mobile services, Amberg et al. added the variable of Perceived Mobility (PM) which is characterized as the convenience degree of the user to get mobile services anytime and anywhere. The last variable, Perception Cost (PC), is defined as the total cost of the user when he uses a certain mobile service.

The CAM helps to verify the perception concerning user acceptance or to understand the user (types of users and behaviour patterns) and the implication of service design better. The insights assist in considering the user acceptance in the design of a mobile service explicitly.

3. Research Model and Hypotheses

Based on these theories, the hypotheses are developed and then the research model is proposed. The independent variables are Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Subjective Norm (SN), Consumer Trust (CT) and Perceived Cost (PC), and Acceptance of mobile payment is the mediating variable and Competitive Advantage (CA) is the dependent variable.

3.1 Perceived Usefulness (PU)

Perceived Usefulness is one of the core constructs of TAM, it can be interpreted as being the way a system could enhance a consumer's job performance. In the context of mobile payment services adoption, PU is defined as the extent to which an individual believes that using mobile payment services will enhance his or her productivity and performance in conducting payment transactions.

If consumers gain a more positive view of mobile payment services, they will have a positive attitude and intention toward the services. Some empirical studies on mobile payment adoption (Kim et al., 2016; Mun, 2017), have also noted PU as an important

factor influencing consumer intention to adopt m-payment services. Therefore, the following hypothesis is proposed:

H1: Perceived usefulness of mobile payment services has positive effect upon consumers' acceptance of mobile payment services in Malaysia.

3.2 Perceived Ease of Use (PEOU)

Although individuals believe that using a particular application could improve their performance, they might find that the application is difficult to master. In TAM and CAM, Perceived Ease of Use is an important element and is concerned with the extent of users' belief that a system is easy to use, to set up, or to learn. Generally, if a payment system is conducted easily, many people are willing to use it. To some extent, mobile payment has such characteristics. mobile payment applications have a very positive impact on job expectations due to their ease of use. Mobile payment applications are also classified as user-friendly, so it may encourage many people to use it because of their ease of use and accuracy. It is because mobile payment uses a system easily understood by many people that it has a positive impact on business expectations (Slade, 2015). This leads to the following hypothesis. Many researchers believe that PEOU has also been found to have a direct impact on individuals' intentions to adopt mobile payment services (Kim et al., 2016). Perceived ease of use may have a positive upon the attitude towards mobile payment services, and have a positive effect upon the perceived usefulness. This leads to the following hypothesis:

H2: Perceived ease of use has positive effect upon consumers' acceptance of mobile payment services in Malaysia.

3.3 Subjective Norm (SN)

Subjective Norm refers to the degree to which an individual pays attention to and is influenced by the opinions of people who are important to him/her while considering a particular activity (Fishbein & Ajzen, 1975). It relates to a person's beliefs about whether peers and people of importance to the person think he or she should engage in the behavior. Some scholars point out that adoption of a new technology is significantly affected by social institutional pressure (Bass, 1969). A technology may provide a positive impact when utilizing social networks because they will have more intentions (Musa, 2015). Subjective norms have been found to be more important prior to, or in the early stages of innovation implementation when users have limited direct experience from which to develop attitudes (Hartwick & Barki, 1994; Taylor & Todd, 1995). Empirical researches show that subjective norm has positive effect on intention to use mobile payment system (Ting et al., 2016; Teng et al., 2018). As Malaysia is a country with strong social labor division and cooperation, consumers tend to seek opinions from their families and friends on mobile payment experience, and their social influence may have

a significant impact on consumers' willingness to use mobile payment. Therefore, the hypothesis for this study with regard to SN is proposed as:

H3: Subjective Norm has positive effect upon consumers' acceptance of mobile payment services in Malaysia.

3.4 Consumer Trust (CT)

"*Perceived risk has been long used in explaining consumer behaviour, and examined in a considerable amount of researches*" (Forsythe & Shi, 2003). Some researchers suggest that "*the Technology Acceptance Model provides a good basis to explain the use of mobile payment solutions, yet, a new construct, trust, should be included into the model to augment the present descriptors in explaining consumer adoption decisions in the mobile payment context*" (Dahlberg et al., 2003). "*Due to its significant role, trust has received considerable attention in information system research*" (Eid, 2011). In empirical research, some scholars believe that trust is an important factor in the acceptance of new technology (Arvidsson, 2014; Yan et al., 2015; McNeish, 2015; Jamshidi et al., 2016; Tham, 2018). Some researched declared that customer satisfaction is closely related to interpersonal trust (Geyskens et al., 1996; Yang et al., 2015), trust is "*highly conducive to such psychological forces as expectations, attitudes, willingness and perceived probability*" (Kim et al., 2009). Trust is seen as an expression of security when making an exchange, or in another type of relationship (Garbarino & Johnson, 1999). Therefore, the hypothesis for this study with regard to Consumer Trust is proposed as:

H4: Consumer Trust has positive effect upon consumers' acceptance of mobile payment services in Malaysia.

3.5 Perceived Cost (PC)

Perceived Cost (PC) refers to the sum of the expenditures felt by the customer during the actual consumption process. It is the time, money, physical strength and energy involved in the customer's entire process of consuming the product or service. In Compass Acceptance Model for the analysis and evaluation of mobile service, Perceived Cost (PC) was thought to be a factor affecting the attitude toward mobile service (Amberg et al., 2004). Many empirical research has discussed how perceived cost affect acceptance of network products (Soane et al., 2010; Benazić et al., 2015). Several studies suggest that Perceived Cost could be a major barrier to the adoption of new technologies in mobile phone services in Taiwan, Malaysia, Thailand and so on (Cheong & Park, 2005, Wei et al., 2009; Phonthanukitithaworn, 2016). Therefore, the hypothesis for this study with regard to PC is proposed as:

H5: Perceived cost of mobile payment services has negative effect upon consumers' acceptance of mobile payment services in Malaysia.

Overall, the conceptual framework is established, as shown in Figure I.

Figure I: The conceptual framework
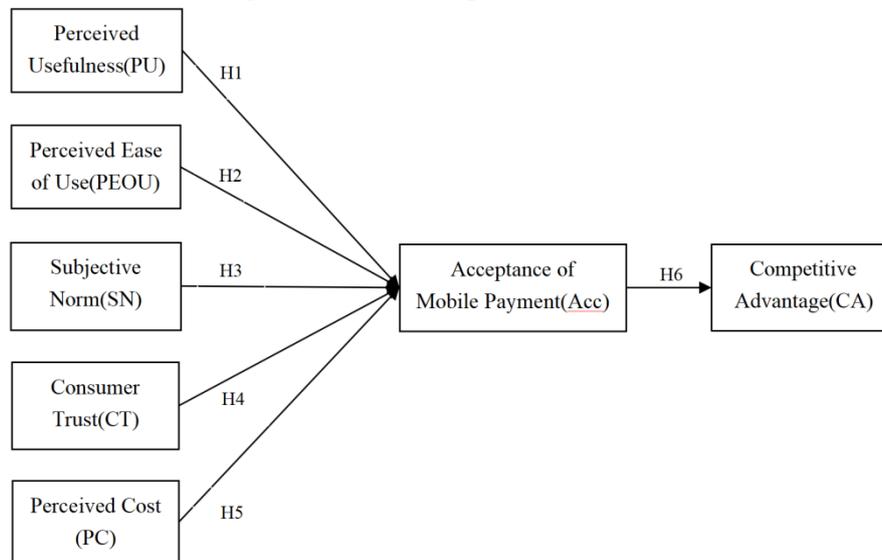
4. Research Methodology

4.1 Measure Development

Survey has been selected as the central research methodology in this research. The multi-item scales measure was applied to this research in order to test the proposed research model. The statements are written for each item, and the participants were required to indicate whether they agreed or disagreed with the statements on a Likert scale. Some of the items in the survey were taken from previously published scales with appropriate psychometric properties research. The items were adopted or adapted to fit the context of mobile payments. After an extensive literature review on the topic, new items were also developed by this research.

4.2 Data Collection

Mobile payment users are the target participants for this survey, which does not necessarily suggest that the participants have adopted the services. Basically, this research will select the people in the economically developed Klang Valley, Kuala Lumpur area as the research object. Respondents were invited to participate in the survey by answering papery questionnaire.

The questionnaire collects two major types of information. One-part concerns participants' demographic information, and the other part is about participants' perceptions of each of the constructs in the proposed model. The demographic information includes gender, age, level of education, and occupation. The rest of the questionnaire asks for participants' the opinions of each item.

The sample size depends on several important criteria including statistical, managerial issues and budget. Statistics show that the number of mobile payment user

in Malaysia is about 3.2 million. According to Sekaran & Bouge (2010), it is adequate for this study with the sample size 384. A total of about 500 questionnaires were distributed to mobile payment users in Klang Valley, Malaysia and 392 valid were collected.

5. Data Analysis

Following the response from survey, the pilot is conducted. The pilot study is a preliminary small-scale study conducted by researchers before a large-scale questionnaire is distributed, which can help them decide how to best conduct whole research projects.

After pilot, the proposed hypotheses will be tested. SEM based analysis techniques will be used to analysis the data. First, the Confirmatory Factor Analysis (CFA) will be employed to assess the validity of the measurement for the model, then the proposed model will be tested using the Structural Equation Modeling (SEM), so that the causal structure of the model can be evaluated. The research will use AMOS to analyse the measurement model and the structural model.

The proposed research model was evaluated using structural equation modelling and employed a two-step modelling approach, including the assessment of the measurement model and the assessment of the structural model (Byrne, 2010). The assessment of the measurement model ensures that observed variables are appropriately loaded with regards to the factors they belonged to, with no significant cross-loading to an item of another factor. The assessment of the structural model determines the relationship between independent and dependent variables.

5.1 Pilot Study
Table 1 outlined the result of the pilot study performed before the actual data collection. The purpose is to evaluate the reliability. Forty questionnaires were distributed in KL, and 31 were used for analysis.

Table 1: Result of Cronbach's Alpha for Pilot Study

Variable	Cronbach's Alpha
PU	0.868
PEOU	0.822
SN	0.878
CT	0.910
PC	0.944
Acc	0.915
CA	0.885

Before large-scale distribution of questionnaires, pre-testing of the questionnaires is required. The purpose is to obtain high-quality questionnaires with high reliability. If there are items that do not meet the requirements, they need to be modified or deleted.

As can be seen from the above table, the Cronbach's Alpha values of all variables are greater than 0.7, and the variable reliability in the pre-test questionnaire is verified to meet the requirements, and subsequent data analysis can be performed. The study questionnaire does not need to be modified.

5.2 Assessment of Measurement Model

A confirmatory factor analysis using AMOS (v20) was conducted on all the items simultaneously to evaluate the validity of the items and the underlying constructs in the measurement model. Structural equation modeling can be defined as "*a class of methodologies that seeks to represent hypotheses about the means, variances, and covariances of observed data in terms of a smaller number of 'structural' parameters defined by a hypothesized underlying conceptual or theoretical model*" (Kaplan, 2001). It belongs to multivariate statistics. It is the preferred multivariate statistical analysis method used by researchers to analyse structural relationships, which combines factor analysis and multiple regression analysis to analyse the structural relationship between the measured variables and the underlying structure. Its advantage is that it can estimate multiple interrelated dependencies in analysis and obtain the direct, indirect, or overall influence of the independent variable on the dependent variable.

In this paper, confirmatory factor analysis (CFA) is conducted for all variables. Figure II shows the confirmatory factor analysis overall measurement model for all variables. Amos operation results show the overall measurement model in Figure 2 and Fitness Index values are shown in Table 2.

Table 2: Fitness Index values of CFA

Fitness Index	Critical Value	Result
X^2		1643.816
df		839
X^2/df	1-3	1.959
CFI	＞0.9	0.930
RMSEA	＜0.08	0.050

As for the fitness index, according to Table 2, the model fitness index of confirmatory factor analysis is X^2/df=1.959>0.9, CFI=0.930>0.90, RMSEA=0.050<0.08. All the indexes meet the basic requirements of model fitting, indicating that the confirmatory factor analysis is passed.
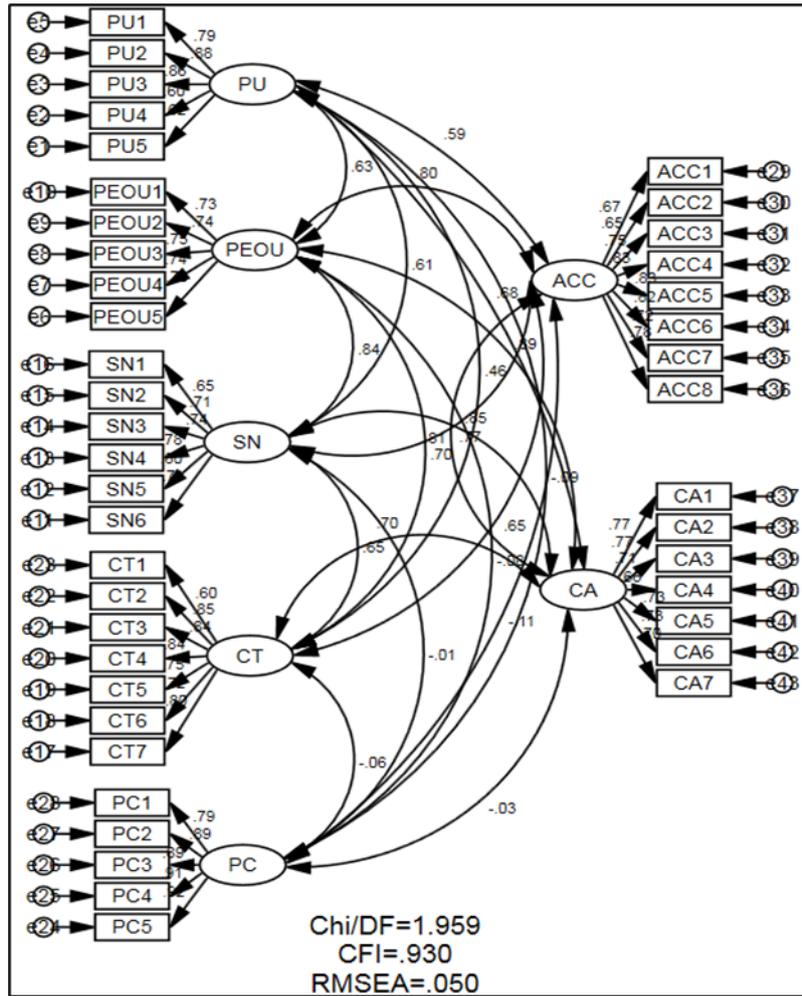
Figure 2: Overall measurement model

Construct validity was examined through the test for convergent and discriminant validity. Convergent validity was evaluated using the attributes of factor loading, average variance extracted (AVE), and construct reliability (CR). The values are provided in Table 3. It shows that all the scale items are highly loaded with respect to their constructs as all factor loadings are above the threshold value of 0.50, and item reliability of each indicator, including CR, had scores above 0.70, suggesting good reliability as well as good convergent validity. Notably, the CR values of the five constructs in the model are all above 0.85 which provides evidence that these measures consistently represent the same latent construct. It shows that all variables have good composite reliability and convergence validity, and the intrinsic quality of the questionnaire is good.

Table 3: Factor loading, AVE, item reliability,
and construct reliability of the seven-construct CFA model

Construct	Item	Loading	SMC	1-SMC	CR	AVE
PU	PU1	0.791	0.626	0.374	0.869	0.575
	PU2	0.876	0.767	0.233		
	PU3	0.860	0.740	0.260		
	PU4	0.598	0.358	0.642		
	PU5	0.621	0.386	0.614		
PEOU	PEOU1	0.734	0.539	0.461	0.864	0.560
	PEOU2	0.736	0.542	0.458		
	PEOU3	0.752	0.566	0.434		
	PEOU4	0.743	0.552	0.448		
	PEOU5	0.776	0.602	0.398		
SN	SN1	0.653	0.426	0.574	0.883	0.559
	SN2	0.709	0.503	0.497		
	SN3	0.737	0.543	0.457		
	SN4	0.782	0.612	0.388		
	SN5	0.796	0.634	0.366		
	SN6	0.796	0.634	0.366		
CT	CT1	0.604	0.365	0.635	0.913	0.602
	CT2	0.846	0.716	0.284		
	CT3	0.837	0.701	0.299		
	CT4	0.844	0.712	0.288		
	CT5	0.748	0.560	0.440		
	CT6	0.721	0.520	0.480		
	CT7	0.801	0.642	0.358		
PC	PC1	0.794	0.630	0.370	0.945	0.774
	PC2	0.885	0.783	0.217		
	PC3	0.887	0.787	0.213		
	PC4	0.912	0.832	0.168		
	PC5	0.916	0.839	0.161		
Acc	Acc1	0.666	0.444	0.556	0.915	0.577
	Acc2	0.650	0.423	0.577		
	Acc3	0.749	0.561	0.439		
	Acc4	0.834	0.696	0.304		
	Acc5	0.830	0.689	0.311		
	Acc6	0.818	0.669	0.331		
	Acc7	0.720	0.518	0.482		
	Acc8	0.785	0.616	0.384		
CA	CA1	0.773	0.598	0.402	0.886	0.526
	CA2	0.769	0.591	0.409		
	CA3	0.71	0.504	0.496		
	CA4	0.661	0.437	0.563		
	CA5	0.726	0.527	0.473		
	CA6	0.727	0.529	0.471		
	CA7	0.704	0.496	0.504		

5.3 Discriminant Validity

Discriminant validity is intended to verify that scales developed are actually measures of different constructs (Garver & Mentzer, 1999). A construct possesses discriminant validity in case it shares more variance with its own measures than with other constructs (Hulland, 1999). In order to test whether there is good validity between various variables, this study follows the measure proposed by Hair (2010), which is called the Fornell and Larcker criterion (1981). According to Fornell and Larcker, the square root of AVE values was compared with the correlation estimates for assessing discriminant validity. The Fornell and Larcker criterion postulates that a latent variable should explain better the variance of its own indicators than the variance of other latent variances, and the average variance extracted (AVE) of a latent variable should be higher than the squared correlations between the latent variable and other variables (Chin, 1998; Fornell & Larcker, 1981). Therefore, if the square root of each construct's average variance extracted (AVE) is greater than its correlation with other constructs, it indicates there is a good degree of differentiation between variables.

According to the AVE obtained from the table, it is subjected to the square root processing to calculate the AVE square root between the variables and then placed in the diagonal of the variable correlation coefficient to check whether this value is greater than the value in the same column and the same row. The correlation matrix in Table 4 shows that the square root of AVE values is all larger than the correlation estimates, confirming that a satisfactory level of discriminant validity has been achieved. This evidence indicates that the measured variables have more in common with the construct they are associated with rather than other constructs in the model. Further, it indicates that all the constructs in the measurement model are significantly different from each other.

Table 4: Factor loadings comparison of correlation
estimates for the examination of discriminant validity

	PU	PEOU	SN	CT	PC	Acc	CA
PU	0.758						
PEOU	0.443**	0.748					
SN	0.442**	0.602**	0.748				
CT	0.325**	0.475**	0.475**	0.776			
PC	-0.042	-0.027	-0.004	-0.017	0.880		
Acc	0.421**	0.546**	0.535**	0.454**	-0.033	0.760	
CA	0.483**	0.680**	0.624**	0.508**	-0.019	0.592**	0.725

5.4 Structural Equation Model

After the statistical analysis of the reliability and validity of the questionnaire, the overall theoretical model is established, as shown in Figure 3, and the initial fitness of the structural equation model is obtained, as shown in Table 5.

Figure 3: Initial Structural Equation Model

Chi/DF=2.750
CFI=.871
RMSEA=.067
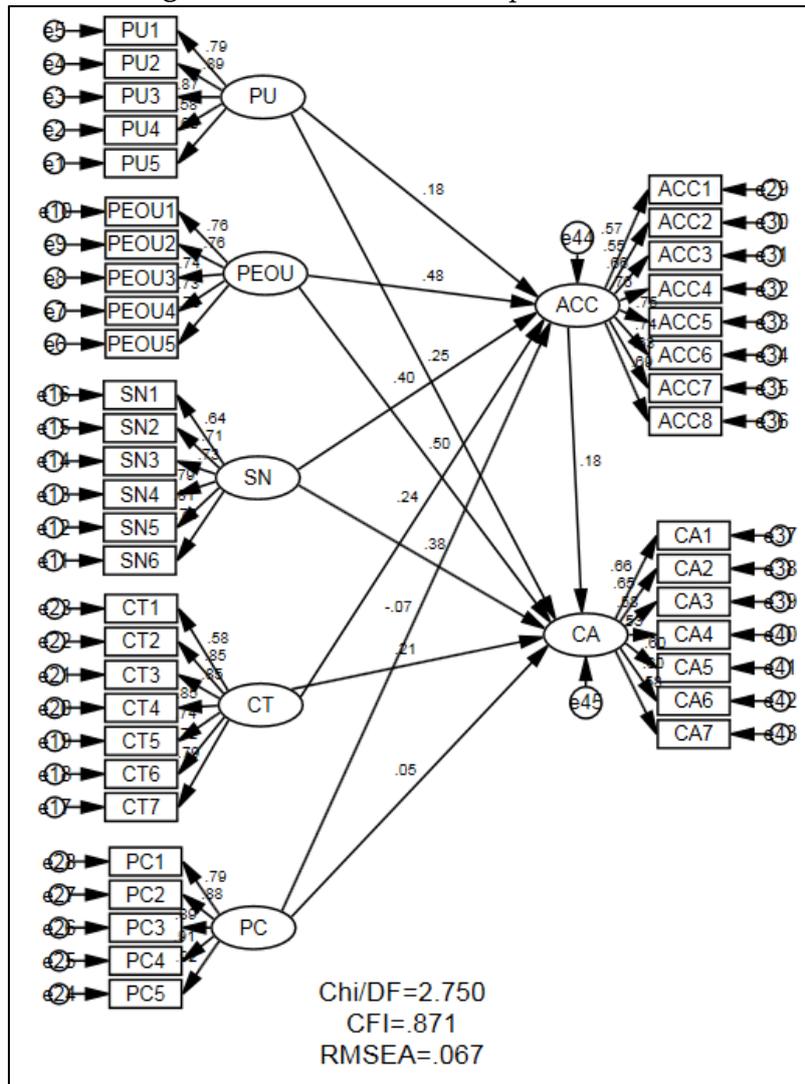
Table 5: Initial Fitness of Structural Equation Model

Fitness Index	Critical Value	Result	Fitting Judgement
X²		2334.345	
df		849	
X²/df	1—3	2.750	Y
CFI	>0.9	0.871	N
RMSEA	<0.08	0.067	Y

It can be seen from Table 5 that the fitness of the structural equation model CFI=0.871<0.9, does not reach the standard, indicating that the structural equation model is unacceptable, and further modification of the model is needed. Table 6 shows the model modification indices, the modified structural equation model is shown in Figure 4, and the Fitting index list of the modified structural equation model is shown in Table 7.

Table 6: Modification Indices of SEM

			M.I.	**Par Change**
e1	<-->	e2	43.088	0.159
e11	<-->	e12	24.272	0.087
e14	<-->	e15	27.683	0.048
e15	<-->	e16	22.419	0.098
e22	<-->	e21	24.735	0.088
e27	<-->	e28	25.775	0.069
e29	<-->	e30	16.984	0.064
e30	<-->	e31	26.877	0.077
e32	<-->	e33	20.665	0.053
e33	<-->	e34	20.962	0.058
e35	<-->	e36	17.977	0.062
e37	<-->	e38	64.373	0.103
e40	<-->	e41	19.456	0.071

Figure 4: Modified Structural Equation Model
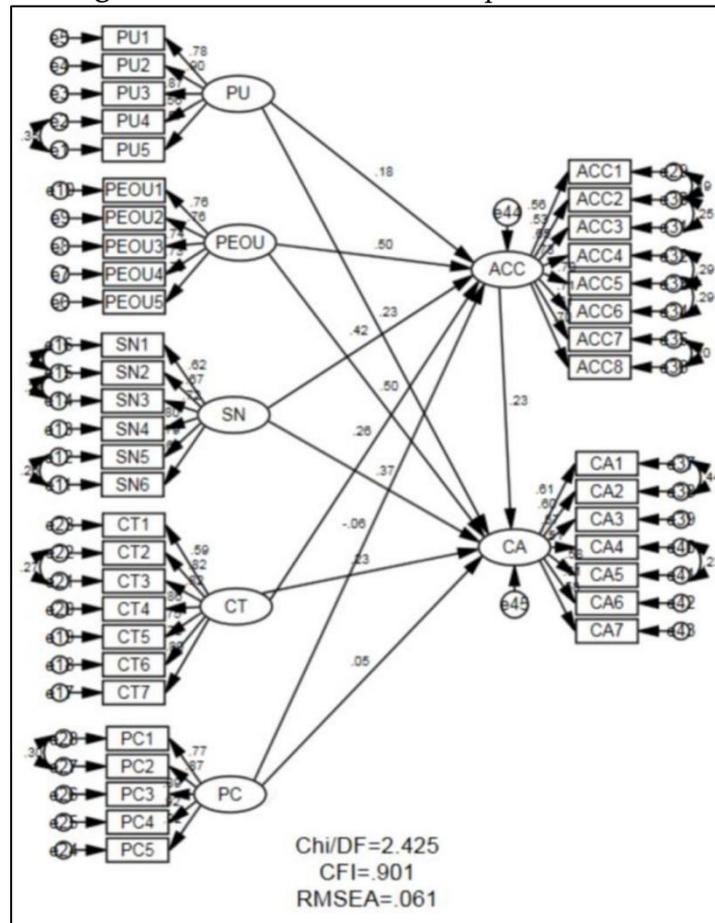
Table 8 shows that the corrected structural equation model-fitting indexes achieve the standard requirement, indicating modified structural equation model is acceptable. The corresponding path parameter is verified.

Table 7: Fitting index list of Modified Structural Equation Model

Fitness Index	Critical Value	Result	Fitting judgement
X²		2034.144	
df		838	
X²/df	1—3	2.245	Y
CFI	>0.9	0.901	Y
RMSEA	<0.08	0.061	Y

5.5 Assessment of Structural Model and Hypotheses Testing

Structural model analysis was undertaken to determine the relationships among the constructs in the proposed model, and subsequently determine the direction of significant paths between the constructs. The overall fit of the structural model was shown satisfactory, which was indicative of good model performance.

Table 8 shows that almost all the indexes of the structural equation basically reach the ideal value, which shows that the structural equation model is acceptable. The path parameters are shown in Table 8 which provide a basis for the following hypothesis verification.

Table 8 shows that PU, PEOU, SN and CT have positive effects on Acc (β= 0.181, P < 0.01; β= 0.500, P < 0.001; β= 0.420, P < 0.001; β= 0.265, P < 0.001). Acc, PU, PEOU, SN and CT have positive effects on CA (β= 0.231, P < 0.01; β= 0.232, P < 0.01; β= 0.495, P < 0.001; β= 0.369, P < 0.001; β= 0.230, P < 0.01). In the case of the relationship between PC and Acc, PC between CA, the significance is not lower than the standard of 0.05, so there is no meaningful relationship between PC and Acc, PC and CA.

Table 8: The Path Parameters

Constructs Path			S.E.	C.R. (T-value)	P	Standardize Estimate (Beta)
Acc	←	PE	0.036	3.628	0.003	0.181
Acc	←	PEOU	0.039	7.717	***	0.500
Acc	←	SN	0.038	6.747	***	0.420
Acc	←	CT	0.029	5.193	***	0.265
Acc	←	PC	0.017	-1.429	0.153	-0.064
CA	←	Acc	0.084	2.952	0.004	0.231
CA	←	PE	0.041	4.643	0.002	0.232
CA	←	PEOU	0.045	6.965	***	0.495
CA	←	SN	0.042	5.752	***	0.369
CA	←	CT	0.030	4.624	0.002	0.230
CA	←	PC	0.017	1.163	0.245	0.048

Finally, this paper conducts an intermediary test of the influence path model based on Acc. To comprehensively assess the hypothesis of mediation and enhance the reliability of the empirical results of the intermediary test, this thesis uses Bootstrap to assess the role of mediation further. The result is shown in Table 9.

The test steps are as follows: 1) Find out the effective amount of indirect effect of intermediate variable; 2) Use the relevant variable value in the table above to find the corresponding upper limit and lower limit of the interval; 3) Judge whether the intermediate effect exists by the upper limit and lower limit of the interval. It is known from Table 9 that the interval of PU—Acc—CA, PEOU—Acc—CA, SN—Acc—CA, CT—Acc—CA does not contain 0, so there are mediating effects via Acc, that is, the effect of the intermediary paths PU—Acc—CA, PEOU—Acc—CA, SN—Acc—CA, CT—Acc—CA exist while the effect of the intermediary path PC—Acc—CA does not exist.

Table 9: Bootstrap Mediation Effect

Mediation Path	Standardized Estimate	S.E.	Percentile method（95%）	
			Lower Bounds	Upper Bounds
PU—Acc—CA	0.232	0.025	0.003	0.099
PEOU—Acc—CA	0.495	0.052	0.011	0.212
SN—Acc—CA	0.369	0.052	0.009	0.228
CT—Acc—CA	0.230	0.039	0.004	0.159
PC—Acc—CA	0.048	0.017	-0.060	0.005

"*Partial mediation refers that there is not only a significant relationship between the mediator and the dependent variable but also some direct relationship between the independent and dependent variable*" (Baron, 1986). Table 9 shows that Acc plays a partial mediation effect between PU and CA, PEOU and CA, SN and CA, CT, and CA.

The results for the structural path analysis indicate the model's structural paths. Four of the model's five paths are statistically significant at the 0.05 level of significance. After cross-matching the results of structural path analysis with the hypotheses, four hypotheses (H1, H2, H3, and H4) are supported and one (H5) is rejected.

6. Research Findings and Their Implications

The results from the testing of the hypotheses derived from the research model reveals that Malaysian consumers' perceptions of cost has no statistically significant relationship with the acceptance of mobile payment. On the other hand, the factor of perceived usefulness, perceived ease of use, subjective norm and consumer trust has significant influence on the acceptance of mobile payment in Malaysia.

The results show that the two constructs of TAM, perceived usefulness (PU) and perceived ease of use (PEOU) may influence consumers' acceptance of mobile payment. As to perceived usefulness (PU), the results show that there was a significant positive correlation between perceived usefulness and acceptance of mobile payment. This shows that the performance expectancy of mobile payment services as a convenient and efficient payment transaction has become an important factor in persuading Malaysian consumers to use such services. People in Malaysia recognize that mobile payment has many advantages over traditional payment methods such as cash and credit card. With mobile applications, users can create faster processes on any work related to finance, and it is

relatively safe to use mobile payment applications. As mobile payment can save a lot of time, it has a highly positive effect on the performance of the users. With the convenience provided by this application, many activities can be completed in a short time. Furthermore, Mobile payments assist many people to gain profits, including making it easier to carry out financial transaction activities so that many people adopt the system in their daily activities (Oliveira et al., 2016). The convenience and efficiency of mobile payments is very attractive to consumers, and it is regarded as the biggest competitive advantage of mobile payments compared to other payment instruments such as cash and credit cards. This conclusion is consistent with that of some previous researches (Martins et al., 2014; Ramon et al. 2019). In order to further popularize mobile payment, mobile payment operators need to continuously improve the consumer experience and provide consumers with better services. The users' usage habits can be gradually cultivated if the Perceived Usefulness of mobile payment is improved.

As to perceived ease of use (PEOU), from the results of empirical analysis of this study, it is known that Perceived Ease of Use will positively affect consumer attitude and acceptance to mobile payments. If a mobile payment service provider provides a user-friendly payment process to use, consumers will feel like to accept mobile payment service. It will enhance users' acceptance if mobile payment is easy to learn and can quickly find the required functions. The conclusion of this study proves that users have perceived the ease of use of this service, and it may have a significant impact on the behavioral intention of adopting the technology. Many researchers have observed the same results, this result is consistent with the findings of some researchers in mobile payment research (Oye, 2014; Martins et al., 2014; Ramon et al. 2019). Practically, mobile payment software should be designed with a simpler interface, designed to be a smoother payment process, to provide consumers with a better user experience, and to make users think that mobile payment is easier to use, so users are more willing to use mobile payment. For mobile payment operator, a simple interface and a simplified payment process is necessary.

As tested in this study, subjective norm (SN) has a significant impact on consumers' willingness to use mobile payment services. Previous scholars have come to similar conclusions (Oliveira, 2016; Mun, 2017; Andre, 2019). The influence of friends, parents and colleagues may become a key determinant in the decision-making process for potential users to adopt mobile payment services. In the early stages of mobile payment adoption, information about services among potential adopters will be limited. For people who have not previously used this service, they may rely heavily on other people's opinions to help them make decisions. While for consumers who have already adopted mobile payment, the importance of maintaining their social relations also encourages them to continue to adopt the service. The impact of social influence as a significant factor affecting behavioral intention implies that if mobile payment service were adopted by relatives and friends, or leaders and colleagues, it will be more likely for consumers to adopt. This finding might be attributed to the culture in Malaysia society. As we all know, Malaysia is famous for its multi-ethnic culture where People

attach importance to interpersonal relationships, care for others, protect the environment and equality, and are interpersonal oriented in the process of communication. Due to this characteristic, it could be assumed and tested social influence plays an important role in acceptance of mobile payment. Therefore, practically, mobile payment operators should pay attention to the role of social influence, and at the same time, create a social atmosphere for mobile payment through multiple channels through online and offline activities. It is necessary to strengthen the depth and breadth of publicity to establish a good brand image. It's important to achieve multi-angle communication of mobile payments through online channels and social software. In addition, it is important to ensure that consumers receive various kinds of consultations on mobile payment services anytime, anywhere, and conveniently so that users can ubiquitously feel the mobile payment.

According to data analysis, Consumer Trust is proved to be a factor affecting people's attitude to mobile payment services, and many researches supported that Consumer Trust is positively related to consumers' electronic commerce behavior including mobile payment and mobile banking (Qiu et al., 2008; Chong et al., 2012; Phonthanukitithaworn, 2016; Tham, 2018). This finding suggests that consumers will not use mobile payment if they feel that they lack trust in entities associated with the provision of mobile payment services. This lack of trust may be a fundamental problem for consumers to refuse to provide personal information to mobile payment providers. It is important to build trust among potential users of mobile payment services because individuals who have no experience with mobile payment may be insecure in wireless transactions that are invisible to them.

This study believes that consumer trust is considered to be related to Malaysians' avoidance of uncertainty in financial practice. People attach importance to safe and clear rules. Because people highly avoid uncertainty, they are very concerned about safety and procedural norms. In particular, in the process of mobile payment transactions, money, products and recipients are not present. They may also worry about whether the mobile payment platform provides a secure transaction system to protect their personal information, such as credit card details and passwords, from fraud or criminal use. In this case, consumer trust is indeed a factor that has an important impact on the acceptance of mobile payment.

The results of this study show that there is no statistical correlation between Perceived Cost (PC) and consumer' acceptance of mobile payment, which may be inconsistent with the research conclusions of some scholars (Wei et al., 2009; Phonthanukitithaworn, 2016). The reason may be that the current mobile payment cost in Malaysia is relatively low. Users only need to use a small amount of mobile data to complete the operation of the mobile payment platform. In addition, to complete the transfer from the mobile payment platform to the bank, only a very low commission charge is required. In short, the total cost of mobile payment is relatively low. Most people think these costs are reasonable.

This study uses a combination of theoretical research and empirical analysis. Based on the investigation of the current situation of mobile payment among Malaysians, this paper formulates hypotheses, establishes a model, analyzes the factors affecting Malaysians' use of mobile payment, and enriches the research on Malaysian users' acceptance of mobile payment.

The results of this study also have important practical significance for the spread and management of mobile payment industry in Malaysia. Firstly, mobile payment platform should optimize process operations to improve consumers' perceived ease. From the empirical analysis of this study, it is known that perceived ease of use will positively affect consumer acceptance of mobile payments. Mobile payment software should be designed with a simpler interface, designed to be a smoother payment process, provide consumers with a better user experience, and make users think that mobile payment is easier to use. Secondly, mobile payment platform should improve consumers' feeling of usefulness. The convenience of mobile payments is extremely attractive to consumers, which is the biggest competitive advantage of mobile payments compared to other traditional payment instruments. To further promote mobile payment, mobile payment operators need to continuously enhance customers' feelings and provide consumers with better services. Consumers' usage habits can be gradually cultivated if the performance expectancy is improved. Thirdly, mobile payment platform should reduce user perceived risk and enhance user trust. This study shows that people always concern about their security issues before they accept mobile payment. Mobile payment operators need to emphasize security in the measurement of security and thus enhance consumer trust. Mobile payment industry standards should be specified in order to enhance the security and stability of mobile payment. The terminal, client and technology platform should fully guarantee the security of input, processing, and storage in the users' payment process, thus mobile payment can achieve the highest level of financial security through the testing and certification of the designated organization. Lastly, mobile payment platform should pay attention to social influence. As this study shows, social influence has a significant impact on the acceptance of mobile payment. Social relations and good reputation play important roles in the spread of mobile payments. Individuals or groups around the customer may influence on customers' use of mobile payments. Therefore, mobile payment operators should attach the importance to social influence, and at the same time, create a social atmosphere for mobile payment through multiple channels through online and offline activities. It is necessary to strengthen the depth and breadth of publicity so as to establish a good brand image. In addition, it is important to ensure that consumers receive various kinds of consultations on mobile payment services anytime, anywhere, and conveniently so that users can ubiquitously feel the mobile payment. Thus, consumers' habit of using mobile payment can be cultivated, and it is possible to integrate it into the users' daily life.

7. Conclusion

This paper reports a study on the acceptance of mobile payment and its sustainable usage intention in Malaysia. This paper proposes a theoretical model that includes the relevant psychological measurement factors that affect consumers' acceptance of mobile payment, and conducts an empirical test to verify it. It is found that perceived usefulness, perceived ease of use, subjective norm and consumer trust affect Malaysian consumers' acceptance of mobile payment.

The results of this study have some implications for the mobile payment service agents in Malaysia, as it helps them to understand the consumer behavior in the decision-making process of adopting mobile payment, and points out the areas they can focus on to encourage people to adopt and use the service.

7.1 Limitations and Directions for Future Study

This study inevitably confronts limitations. This paper assumes five independent variables, namely perceived usefulness, perceived ease of use, subjective norm, consumer trust, perceived cost, and other factors that are not discussed in detail in this paper. Therefore, in the follow-up study, scholars are advised to explore more factors affecting mobile payment acceptance. This study did not set any moderating variables, nor did it consider the moderating effects of demographic variables, for example, gender, age, and income. These situations may lead to the incompleteness of the research model, and the conclusions drawn may be one-sided. These are issues that need to be solved and improved by subsequent research.

Conflict of Interest Statement

The authors declare no conflicts of interests.

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Appendixes

A. Measurement Items

a. Perceived Usefulness

PU1: *"I believe that using Mobile Payment will enable me to pay more quickly and it can save time for me."*

PU2: *"I believe that using Mobile Payment will enable me to conduct a payment transaction whenever I want, thus it can enhance my payment efficiency."*

PU3: *"I believe that using Mobile Payment will enable me to conduct a payment transaction wherever I am, thus it can enhance my payment efficiency."*

PU4: *"I believe Mobile Payment provides convenience because there is no need to carry cash or credit card."*

PU5: *"Mobile payment can bind multiple cards from different banks, enabling users to complete cross-bank financial transactions."*

b. Perceived Ease of Use

PEOU1: *"I think the mobile payment interface is designed to be friendly and easy to understand."*
PEOU2: *"I believe mobile payment easy to learn."*
PEOU3: *"I believe that it is easy to open a Mobile Payment account."*
PEOU4: *"I believe that it is easy to complete transaction by Mobile Payment."*
PEOU5: *"For me, using Mobile Payment do not require much mental effort."*

c. Subject Norm

SN1: *"If people who are important to me (for example, my family) use mobile payment, I will consider to use it."*

SN2: *"If people whose opinions I value (for example, my close friends and my relatives) use mobile payment, I will consider to use it."*

SN3: *"If people who are vital to my work (For example, my leaders) use mobile payment, I will consider to use it."*

SN4: *"If many colleagues of mine use m-payment, I will consider using it."*

SN5: *"If the frequency of appearance on the media is high, I will consider using mobile payments."*

SN6: *"If most vendors or merchants accept consumers to use mobile payments, then I will also consider using mobile payments."*

d. Consumer Trust

CT1: *"I believe Mobile Payment is a mature technology."*

CT2: *"I believe that my account money is safe (for instance, no loss of my financial details to thieves)."*

CT3: *"I believe that my personal information is safe (for instance, it may not be exposed to others)."*

CT4: *"I believe that my money transfer process is secure and safe (for instance, no overcharge from merchants or credit card providers)."*

CT5: *"I believe that when the payment security problem arise, the mobile payment service provider and bank are able to solve these problem in time."*
CT6: *"I believe there is no financial loss in my mobile payment account even if the smart phone is lost."*
CT7: *"I believe that mobile payment providers are trustworthy and honest."*

e. Perceived Cost
PC1: *"I'm worried the cost of opening a mobile account will be high."*
PC2: *"I'm worried the transaction fees for using m-payment will be high."*
PC3: *"I'm worried the cost of transferring money from a mobile account to a bank account will be high."*
PC4: *"I am worried that using mobile payments will consume a lot of mobile phone data and increase my spending."*
PC5: *"I am worried that it will cost a lot of money to replace a device that can use mobile payments."*

f. Acceptance of Mobile Payment in Malaysia
Acc1: *"The performance of Mobile Payment meets my expectation."*
Acc2: *"I think the positive effect of mobile payments is greater than negative."*
Acc3: *"For me, using mobile payment is a good idea."*
Acc4: *"Mobile payment brings me a pleasant experience, I am willing to use it."*
Acc5: *"When I don't have time to visit the site (such as working or studying) and need to spend at the same time (such as online shopping or buying tickets), I am happy to use mobile payment."*
Acc6: *"I am happy to use mobile payments when the mall needs to line up."*
Acc7: *"Given the chance, I will begin to use Mobile Payment."*

g. Competitive Advantage of mobile payment
CA1: *"Compared with cash, Mobile Payment enables paperless operation, thus it saves social resource."*
CA2: *"For customer, Mobile Payment reduces queue for paying."*
CA3: *"As a result of automation, compared with banking, Mobile payment reduces the number of employees."*
CA4: *"Compared with banking, Mobile payment no need to establish branches."*
CA5: *"The use of Mobile Payment may reduce the overall operational cost of the society."*
CA6: *"Mobile Payment may meet the needs of overseas tourist, such as tourist from China."*
CA7: *"Mobile Payment may be supported by the government of Malaysia."*

Table 10: Demographic data

Categories	Demographic frequency	Percentage
Gender		
Male	187	47.70%
Female	205	52.30%
Age		
Below 20	51	13.01%
20-35	133	33.93%
36-50	94	23.98%
51-60	74	18.88%
Above 60	40	10.20%
Education level		
High school or lower	134	34.18%
Bachelor	208	53.06%
Master	41	10.46%
Doctor	9	2.30%
Monthly income (RM)		
1500 or less	115	29.34%
1500-3000	125	31.89%
3001-5000	89	22.70%
5001-8000	41	10.46%
Above 8000	22	5.61%
Occupation		
Government servant	70	17.86%
Business owner	16	4.08%
Staff in private company	105	26.79%
Student	123	31.38%
Others	68	17.35%