Factors Influencing Consumers Intention to Use QR Code Mobile Payment – A Proposed Framework

Norazryana Mat Dawi

Abstract: The aim of this paper is to develop a framework to determine the factors that could influence consumers' intention to use QR Code mobile payment services. Based on extensive literature review on mobile payment adoption and Unified Theory of Acceptance of Use of Technology 2 (UTAUT2), this paper examines potential key determinants of mobile payment use in Malaysia: performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, trust, perceived risk and government support. Survey questionnaires will be distributed to about 1000 mobile payment consumers in Malaysia using convenience sampling method. Data collected will be analysed using partial least equation. The findings could help business owners to understand consumers' perception on the new technology, which could help businesses providing more functional payment systems that deliver customers' needs.

Index Terms: Mobile Payment; QR Code; Adoption; Consumer Behavior; UTAUT2.

I. INTRODUCTION

The continuous advancement in financial information system and technology has changed the business practices in the financial services. Mobile payment (m-payment) is one of the innovations that has reshaped the financial sector. Mobile payment can be defined as wireless-based electronic payment (e-payment) for mobile commerce to support point-of-sale and/or point-of-service payment transactions using customers' mobile devices [1]. In Malaysia, m-payment is still new but is gaining popularity with multiple m-payment merchants are available to provide m-payment as an alternative option to cash payment. Malaysia's government has a vision to make e-payment which include m-payment as the preferred medium for economic transactions. The Central Bank of Malaysia predicted that the number of e-payment made per person will be 200 transactions by end of 2020 [2]. Payment via Short-Message-Service (SMS) to buy digital contents such as ring tone, games and pictures is one of the earliest method of m-payment. Nowadays, m-payment services can be divided into two types: remote payment and proximity payment [3]. Near field communication technologies (NFC), Quick Response (QR) code payment and mobile wallets are examples of proximity payment, while Internet banking is

example of remote payment.

According to Malaysian Communications and Multimedia Commission (MCMC), the proportion of smartphone penetration in Malaysia grew by 7.2% from 68.7% in 2016 to

75.9% in 2017 [4]. It is forecasted that this figure will continue to grow to 82% in 2025 [5]. Despite the widespread use of smartphone in Malaysia, m-payment services are not frequently applied among Malaysia's mobile phone users [6]. A study conducted by Penny, et al. [7] found out that only 1% of the total respondents in Klang Valley have made payment using NFC. Even though not every mobile phone users use their mobile phones to make payment, it is predicted that the number of m-payment users to increase significantly in the coming years [8]. Therefore, it is crucial for business owners specially to know what are the factors that drive customers to use m-payment to complement existing payment methods.

Schierz, et al. [9] asserted the importance to understand the determinants of consumers' adoption since the adoption decision lies on consumers' hand. There are many factors that could affect customer's intention to use m-payment services. Many studies have been conducted to investigate the determinants of customer intentions to use m-payment. Based on extensive literature review on m-payment acceptance, it was found that benefits gained from using the technology is the most significant factor that affect customers' intention to use m-payment [10-12]. Then, the ease of using m-payment influence customers behaviour to use the services [10, 13]. Social influence is another factor that positively affect customers' behaviour to accept m-payment services [14]. Apart from the positive factors, negative factors such as risk and insecurity negatively influence customers' intention to accept m-payment services [11, 15, 16]. Until now, there is no consensus on what are the factors that actually influencing customers to use m-payment, especially in Malaysia. Therefore, this study aims to develop a behavioural model to determine the factors affecting the intention to use m-payment services. This study is based on Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model. UTAUT2 has been widely applied as underpinning theory in mobile commerce, but little attention is given on m-payment. Ten factors are expected to be affecting customers' intention to use m-payment services namely

performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, trust, perceived risk and government support.

With regards to the academic contribution of this research, it is noteworthy to include gender to study on the acceptance of mobile technologies. This is due to a claim stating that women have less access to mobile technology compare to men in a middle income country [5]. Moreover, gender has been identified as a key determinant in the adoption and use of mobile technology [17]. Therefore, the second aim for the current research is to assess the difference on m-payment acceptance between gender. We deem it relevant because it can help companies to plan strategies on different segmentation of customers.

II. INTENTION TO USE MOBILE-PAYMENT SERVICES

Studies on intention to adopt m-payment have been analysed using different theoretical models and multiple variables, which have drawn different conclusions. Technology acceptance model (TAM), by Davis [18], theory of planned behaviour (TPB), by Ajzen [19] and unified theory of acceptance and use of technology (UTAUT), by Venkatesh, et al. [20] are among the prominent theories used by researchers to explain users' intention to use technology. For instance Aldousari, et al. [21] used TAM to examine determinants of consumers' attitudes toward using online shopping. Raza, et al. [22] applied TPB to see students' acceptance of mobile learning in higher education, while in tourism industry, San Martín and Herrero [23] used UTAUT to explain users' intention to make bookings or reservations through websites.

UTAUT was primarily designed to predict employees' behavioural intention to use technology in organizational context [24]. Even though this theory has been applied and replicated to many non-organizational settings, an extended UTAUT known as UTAUT2 was developed to better understand consumer use context. Three additional constructs (hedonic motivation, price value and habit) are believed to improve the variance explained in customers' behavioural intention [24]. Compared to TAM, review of literature found that UTAUT2 has received little attention in m-payment intention research. Only four publications were found to have used UTAUT2 for m-payment intention so far [25-28]. The model highly explained the variances in behavioural intention, with 83% in [25], 62% in [27] and 58% in [26]. This theory will be adapted in the present research to construct theoretical framework to explain customers' adoption of m-payment in Malaysia.

Apart from the variables included in the original UTAUT2, this research added another three variables that are believed to affect customers' intention to use m-payment, namely trust, perceived risk and government support. Trust and perceived risk have been long considered in marketing field as factors to affect customers' intention to use a technology. M-payment is still at its infancy in many of developing countries such as Malaysia, which are still building up its IT infrastructure. As stated earlier,

Malaysia's government has planned to make electronic payments as the preferred medium for economic transactions. Thus, customers are relying to the IT infrastructure, law and policies provided by government to support m-payment transactions. Therefore, we feel that that it is important to study if the Malaysia's government support can influence the intention to use m-payment.

Despite the growing number of studies in intention to use m-mobile payment services, to the best of knowledge, there is lack of empirical studies in this area in Malaysia. Review of past research identified eight research papers that have investigated intention to use m-mobile payment services in Malaysia using different theories as depicted in Table 1.

Busu, et al. [6] conducted a study to determine factors that affect adoption of NFC among university students based on Technology Acceptance Model (TAM). They found out that only perceived usefulness, compatibility and perceived cost are significantly affecting customers' intention to adopt NFC. In contrast, Mun, et al. [29] found that all TAM variables are significantly affecting millennials' intention to use m-payment. Using the same underpinning theory, [30] found out that both perceived usefulness and perceived ease of use positively affecting customers' intention to use mobile credit card. In addition to the original constructs of TAM, Tan, et al. [31] have extended it to include social influence and personal innovativeness in information technology to study factors influencing the adoption of NFC technology.

Using Theory of Planned Behavior (TPB), Ting, et al. [14] found out that attitude, subjective norm and perceived behavioural control positively affect intention towards m-payment system. Interestingly, they discovered that intention to use m-payment is different by ethnicity where it is being distinguished by normative beliefs and subjective norm.

A study to measure customers' awareness of NFC found out only 16% of the respondents have heard about NFC where majority of them, regardless of gender would not choose NFC as the payment method [7]. Moreover, this study found out that convenience is the main factor for consumer to adopt this technology while security is the most concern that hinder customers to adopt it.

Teo, et al. [32] used Unified Theory of Acceptance and Use of Technology (UTAUT) model to predict m-payment behavioural intention among university students. They discovered that effort expectancy and facilitating conditions influence customers' behavioural intention to use m-payment, while social influence and performance expectancy do not have significant impact to behavioural intention. Moreover, the study ascertained that transaction convenience and speed also give positive effect to the model.

From the literature review of past studies on m-payment adoption in Malaysia, it can be seen that none of them have used UTAUT2 as the underpinning theory. The current study will become the first to examine the influence of UTAUT2 factors from m-payment perspectives in Malaysia. Moreover, this study will focus on the

adoption of QR Code m-payment which was neglected in the past studies.

Table 1. Past studies in m-payment behavioural intentions in Malaysia. Proposed M- Payment Services Acceptance Model

Author	Focus of Study	Underpinning Theory Used	Findings
[6]	Determining factors affecting intention to use NFC.	TAM	Perceived usefulness, compatibility and perceived cost are significantly affecting customers' intention to adopt NFC.
[29]	Determining factors affecting intention to use m-payment system among millennials.	TAM	Perceived usefulness, perceived ease-of-use, perceived credibility and social influence significantly affect consumers' intention to use NFC mobile payment services in Malaysia.
[14]	Determining factors affecting intention to use m-payment system.	TPB	Subjective norm and perceived behavioural control positively affect intention towards m-payment system.
[7]	Measuring NFC m-payment acceptance.	Enhanced Adoption Process Model	The main factor that draws people to pay using NFC is convenience while the main drawback for those who are reluctant to pay using NFC is security issue.
[32]	Measuring customers' intention to use m-payment.	UTAUT	Effort expectancy and facilitating conditions positively influence behavioural intention while social influence and performance expectancy do not influence intention to use m-payment.
[31]	Determining TAM factors that influence customer intention to adopt NFC m-payment.	TAM	Perceived usefulness, perceived ease of use, social influence, and personal innovativeness in information technology significantly affect intention to adopt NFC, while gender do not moderate the relationships
[30]	Predicting the determinants of NFC-enabled mobile credit card acceptance	TAM	Perceived usefulness and perceived ease of use are positively affecting intention to use mobile credit card.
[33]	Determining factors affecting intention to use m-payment system through SMS.	-	A conceptual framework for determinants of mobile payment based on consumer, business and technology features.

A. Performance Expectancy

Performance expectancy refers to the degree of which technology generates benefits [20]. In the case of m-payment services, it refers to the benefits generated in relation to conventional cash payment. Customer will get practical benefits by performing payment through ubiquitous usage of mobile phone [25]. In this research, customer expects greater economic benefits, satisfaction and convenience from the m-payment services, which then influence behavioral intention. Thus, the following hypothesis is proposed:

H1: Performance expectancy has a positive impact on intention to use m-payment services.

B. Effort Expectancy

Effort expectancy is similar to the concepts of perceived ease of use in TAM [18] which is defined as the degree of ease m-payment can be used [20]. This variable has been validated by numerous studies in electronic commerce (e-commerce) adoption. For instance, Escobar-Rodríguez and Carvajal-Trujillo [34] found that effort expectancy is the main factor that influence customer's intention to purchase online tickets for low cost carriers, while in Musleh, et al. [35] it positively impact customer's intention to shop online. In m-payment adoption, Abidin, et al. [25] proved that this variable affecting customer's intention to use the technology where customer expects greater ease in performing purchase than using conventional cash payment. In m-payment, customer need not to bring cash to make a payment. Thus, the following hypothesis is proposed.

H2: Effort expectancy has a

positive impact on intention to use m-payment services.

C. Social Influence

Social influence could be an important predictor for customers to adopt a new technology. In a qualitative study by Zhao and Kurnia [3], it was found that customers would consider social influence in making decision whether to adopt m-payment or not. Social participants in a social group will likely to share mutual service experiences among them, which will influence a service consumption [36]. In this research, social influence is defined as the degree where customer perceived that others think it is important for them to use m-payment. Hence, the following hypothesis is formulated.

H3: Social influence has a positive impact on intention to use m- payment services.

D. Facilitating Conditions

Facilitating conditions relate to user's view of available resources and support to use a particular technology [24]. Facilitating conditions has a positive relationship with adoption readiness which will lead to intention to use [25]. In this research, it is expected that a customers are encouraged to use m-payment services when requisite information and resources about m-payment are available to them. Thus, the following hypothesis is proposed.

H4: Facilitating conditions has a positive impact on intention to use m-payment services.

E. Hedonic Motivation

Hedonic motivation or also known as "perceived enjoyment" describe the pleasure or enjoyment a customer received from using a technology [24]. Research in information and communications technology (ICT) adoption have demonstrated that hedonic motivation influence customer's intention to use technology [34]. NFC m-payment that was designed to include hedonic elements such as virtual credit card display on mobile phone was proved to positively affecting customer's intention to use the technology [28]. Apparently, IS designers has changed design philosophy not only to perform task but also to entertain. For m-payment services, there is a tendency for a customer to use m-payment services if the customer finds enjoyment in using it, the following hypothesis is proposed.

H5: Hedonic motivation has a positive impact on intention to use m-payment services.

F. Price Value

Price value is defined as the trade-off between benefits gained from using technology and the cost to use it [24]. Positive price value generated when the benefits of using technology is greater than the cost paid. In e-commerce adoption study, it is proven that a positive price value significantly affects customer's intention to shop online. For instance Escobar-Rodríguez and Carvajal-Trujillo [34] used the term price saving to represent the monetary savings and perceived benefits in using e-commerce website. They found a positive relationship between price saving and online purchase intention. This variable has also been tested in

m-payment service setting. However, Abidin, et al. [25] and Slade, et al. [26] found insignificant effect of price value to behavioral intention to use m-payment services. Due to the contradict findings, it is deemed important to test this relationship in the current research setting. It is argued that when customers perceived the benefits using m-payment exceeding the costs to use it, then price value has a significant effect on intention to use m-payment services. The following hypothesis is posited.

H6: Price value has a positive impact on intention to use m-payment services

G. Habit

Habit is included in UTAUT2 to reflect the extent to which customers tend to perform automatic behaviour due to learning [24]. In conducting commercial tasks, customers engaged in a series of repetitive steps ranging from need recognition to product consumption, which could allow habit to form [28]. Habit in the specific context of m-payment arise from repetitive use of mobile devices in conducting mobile commerce such as mobile banking. Thus, habit may facilitate the transfer of behaviour and manifest the presence of m-payment services. The following hypothesis is proposed.

H7: Habit has a positive impact on intention to use m-payment services.

H. Trust

Trust play an important role especially in situations of uncertainty where it will influence the interactions taken place in a social context [37]. In traditional commerce, it is essential that customers have trust in the seller. In the context of m-payment services, customer trust can be gathered both from the service provider and mobile technology [38]. In several previous studies, the impact of trust on the intention to use m-payment services has been confirmed. Phonthanukitithaworn, et al. [39] found that perceived trust has a direct impact on customer intention to adopt m-payment services in Thailand. Through TAM model, Liébana-Cabanillas, et al. [10] argued that perceived trust has a significant effect on customer's attitude and perceived ease of use of using m-payment services. Thus, trust will almost certainly influence the customer intention to use m-payment services. Our hypothesis is as follows.

H8: Trust has a positive impact on intention to use m-payment services.

I. Perceived Risk

Perceived risk is defined as the feelings of uncertainty among customers in regards to possible negative effect of using new technology that may stop adoption [40]. Customers have to face uncertainty in conducting m-commerce transactions. In a research done to see Malaysian customers' perception on m-payment, it was found that customers are reluctant to adopt m-payment for the risk of losing confidential information. Moreover, customers also concern that mobile transaction will lead to

transaction fraud [29]. Several dimensions of risk related to the usage of m-payment were identified in a qualitative study conducted by Mallat [41]. Firstly, risk associated with the possibility that someone else would be able to make payment if the device was lost. Secondly, possibility of lack of transaction record that would cause a hassle to make follow-ups. Thirdly, risk of possible errors in payment transactions and lastly risk of exposing privacy through the mobile transactions. Recent studies have confirmed the negative influence of perceived risk on customer intention to use m-payment services [15, 25, 39]. Consistent with these findings, the following hypothesis is proposed.

H9: Perceived risk has a negative impact on intention to use m-payment services.

J. Government Support

Empirical research about the effect of government support to e-commerce adoption among customer is scarce. Few studies have tested it in banking sector [42, 43]. These studies indicated that government policies designed to foster e-commerce improves the adoption of e-commerce among customers. In Malaysia, the government through the Central Bank of Malaysia has planned several initiatives to foster the application of m-commerce. More rooms are opened for financial service providers and merchants in the mobile banking and payments ecosystem. Mobile public key infrastructure (mPKI) were set up to instil customer's confidence in m-commerce while road shows and exhibitions were conducted as promotional campaigns [2]. Furthermore, Reduced Merchant Discount Rate is another initiative taken by the central bank to reduce the usage of cash in the nation [44]. The latest initiative is the introduction of Real-time Retail Payments Platform (RPP) where customers can perform payment conveniently by scanning QR code. The Central Bank also is pushing hard for implementation of QR code – based payments by working with Payments Network Malaysia Sdn Bhd (PayNet) to put together the infrastructure called Interoperable Credit Transfer Framework (ICTF). Based on the multiple initiatives by the government, it is believed that government support may be contributing in the adoption of m-payment in Malaysia. Moreover, Tan, et al. [31] stressed out that future research in understanding m-payment acceptance should include government support in order to come out with a better research model. The following hypothesis is proposed.

H8: Government support for m-payment has a positive impact on intention to use m-payment.

K. Moderating effects of gender

Mobile payment adoption among gender is one of the issues raised in a report by GSMA, where it stressed out that women are lag in technology adoption compared to male [5]. Generally, men are more willing to engage in e-commerce compared to women [45]. Based on review of previous studies in e-commerce acceptance, it was found that gender moderates the relationship between variables. For instance, Pascual-Miguel, et al. [46] found out that gender moderates the relationship between effort expectancy and online purchase intention and between social influence and online

purchase intention. The moderating effect of gender has been demonstrated in mobile payment field as well. Liébana-Cabanillas, et al. [47] found out that the impact of ease of use on intention to use m-payment is significantly higher among men than women. In contrast, Tan, et al. [31] found that customers' intention to adopt NFC technology in Malaysia is equal between gender, while Humbani and Wiese [15] found that among eight factors, gender only moderate the relationship between convenience and m-payment adoption. Due to the contradict findings, it is important to further study this area. Our study will analyse moderating effect of gender to the relationships between factors and intention to use m-payment services. The following hypothesis is proposed.

H9: Gender moderates the relationship among the variables in the research framework.

Based on the literature review, the proposed research framework is depicted in Figure 1. Factors including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, perceived risk, trust, and government support will be used to examine their effects on the intention to use m-payment services.
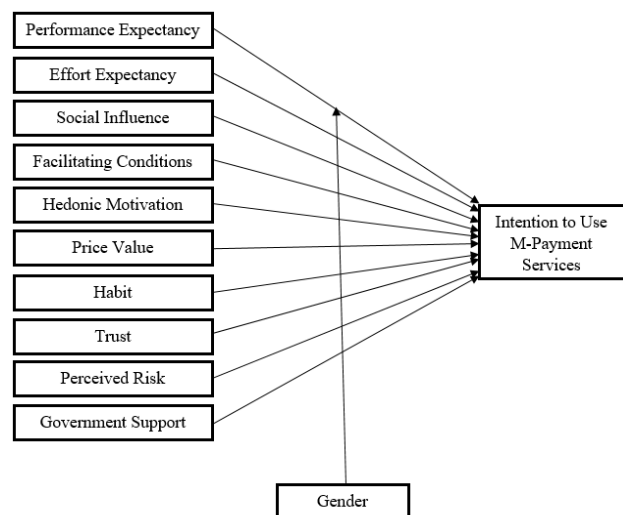

Fig. 1. Proposed Research Framework

III. RESEARCH METHODOLOGY

In order to achieve the research objective, a quantitative analysis will be adopted to empirically test the research questions through primary data collection. Online survey will be used as the instrument to collect data and convenience sampling techniques will be applied to select the respondents. The data will be analysed using SmartPLS3 through partial least square analysis after the reliability and validity of the data collected are tested. Having confirmed the measurement model, the structural model of the main relationships will be performed in order to test the hypotheses.

IV. CONCLUSION

Many researches have attempted to understand

m-payment services adoption, but only few have addressed the issue in an emerging country and taking gender into consideration. We deem it relevant to help companies understand the behaviour and characteristics of different market segments especially on how to influence women to adopt m-payment services. Understanding factors that influence customer to use m-payment is crucial, especially for business owners in order to increase customers' experience in doing a purchase. This is parallel to the current trend where customers prefer to use electronic payment methods compared to cash. Migration to m-payment will benefit Malaysia in terms of efficiency and productivity which then enhancing the country's economic competitiveness.

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Authors Profile

Norazryana Mat Dawi is a lecturer at Department of Business Analytics, Sunway University and has been a member of the school since 2017. She received Bachelor of Management Technology, Master of Management Technology and PhD in Management from Universiti Teknologi Malaysia (UTM). Her current research lies in the area of information technology management, wearables technology, service quality, customer behaviour, electronic commerce and mobile commerce. She is currently serving as a scientific committee member of an international conference. She is author and co-author of publications in peer-reviewed international conferences and journals. She also serving as a reviewer of a prestigious journal.