Factors Influencing Malaysian Consumers' Intention to Use Quick Response (QR) Mobile Payment
(Faktor Yang Mempengaruhi Keinginan Pengguna Malaysia untuk Menggunakan Pembayaran Mudah Alih 'Quick-Response' (QR))

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ABSTRACT

In the past decade, conventional payment methods of using cash is progressively replaced with electronic payments. Recently, QR mobile payment begins to receive more attention from many countries including Malaysia. Nevertheless, QR mobile payment is a relatively green area in which very limited literature exists on this subject matter pertaining to consumer acceptance and characteristics of adopter segments of this technology. Therefore, by applying the Technology Acceptance Model (TAM) as the main theoretical framework, the aim of the present study is to investigate the factors influencing intention to use QR mobile payment in Malaysia. Self-administered questionnaires were distributed which resulted in 485 complete responses. Perceived usefulness, personal innovativeness, perceived ease of use, subjective norm, and perceived security were found to be significant in determining intention to use QR mobile payment among Malaysian consumers.

Keywords: Intention to use; quick response (QR) mobile payment; technology acceptance model (TAM)

ABSTRAK

Pada dekad yang lalu, kaedah pembayaran konvensional yang menggunakan wang tunai secara beransur-ansur digantikan dengan pembayaran elektronik. Baru-baru ini, pembayaran mudah alih 'Quick Response' (QR) mula mendapat perhatian lebih banyak dari banyak negara termasuk Malaysia. Walau bagaimanapun, pembayaran mudah alih QR adalah bidang yang masih baharu memandangkan hanya terdapat literature yang terhad berkaitan penerimaan pengguna dan ciri-ciri segmen pengguna teknologi ini. Oleh itu, dengan menggunakan Model Penerimaan Teknologi (TAM) sebagai kerangka teori utama, matlamat kajian ini adalah untuk mengkaji faktor-faktor yang mempengaruhi niat/keinginan untuk menggunakan pembayaran mudah alih QR di Malaysia. Borang soal selidik telah diedar dan dilengkapkan oleh 485 responden. Tanggapan kebergunaan, inovasi diri, tanggapan mudah digunakan, norma subjektif, dan tanggapan keselamatan didapati penting dalam menentukan keinginan untuk menggunakan pembayaran mudah alih QR dalam kalangan pengguna Malaysia.

Kata kunci: Keinginan menggunakan; pembayaran mudah alih 'Quick Response' (QR); model penerimaan teknologi

INTRODUCTION

A shift to a cashless society is on the horizon in which the conventional payment methods of using cash is progressively replaced with electronic payments over the past decades (de Almeida, Fazendeiro & Inácio 2018). According to Hugh Thomas (2013), cash is still used in 85% of payments globally. However, many countries have started to make a progress in moving away from using cash. According to World Payments Report 2017, Sweden accounts for merely 2% of cash transactions with the figure expected to shrink further by 2020 (CNBC 2018) thus emerging as one of the most cashless society in the world (The Star Online 2017). In the United Kingdom cash payments accounted for 40% of all payments in 2016 (The Guardian 2018) which declined by 15% in 2017 due to popularity of new technology and payment innovation such as the contactless cards like debit cards while cash payment is expected to account for merely 16% by 2027 (Finextra 2018). China's mobile payment market was worth $5.5 trillion in 2016 thus outgrowing the United States' $112 billion market by 50 times the

size (The New York Times 2017). Other countries in Asia are following suit in embracing noncash payment alternatives such as Singapore (The Global Treasurer 2017), South Korea (The Independent 2017) and India (Forbes 2017). With the rising global trend of going cashless, it is imminent that alternative noncash payment methods will penetrate to different countries including Malaysia.

Currently, 85% of payments in Malaysia still comprises of cash transactions (Maybank 2017). The Financial Sector Blueprint 2011-2020 introduced by Bank Negara Malaysia (BNM) or Central Bank of Malaysia has outlined strategic initiatives aiming to reduce the volume of cash payments nationwide which include promoting alternative payment methods like the use of debit cards and electronic payments such as mobile payment systems (The Edge Market 2016). With 71% of adult population in Malaysia owning at least one smartphone indicating a relatively high rate of smartphone penetration (The Edge Markets 2017), mobile payment is set to be the next wave in Malaysia's payment system according to BNM (The Edge Markets 2018) and is expected to become a vital channel for carrying out financial transactions (Yang et al. 2012). Currently, mobile payment is largely driven by online payment using credit or debit cards through mobile phones.

Nevertheless, a new type of mobile payment has been recently introduced to local consumers which is the quick-response (QR) code mobile payment. QR mobile payment functions by scanning a two-dimensional code of black and white squares displayed by sellers upon making purchases followed by consumers entering the payment amount and the transaction is therefore completed. As such, this increases the speed of the payment process. Unlike QR mobile payment, other mobile payment systems require consumers to browse through the payment website, sign in with user credentials, enter account information of seller, and obtain a security pin before completing the payment which take a greater number of steps. While China has been the front-runner in employing QR mobile payment across different payment settings in the country for many years now (The Asian Banker 2014), only recently the technology begins to receive more attention from other countries as is the case for Malaysia. Given the nation's access to high speed Internet connectivity, high smartphone penetration rate among users, and support from key financial institutions, there is a reason to believe that QR mobile payment has a potential to grow further in Malaysia.

PROBLEM STATEMENT

According to Dahlberg, Guo and Ondrus (2015) in their critical review of mobile payment researchs, studies with respect to mobile payment adoption have been extensively done by various researchers all over the world. This conclusion is made based on the findings of their analysis where despite the many studies conducted on mobile payment, most researchers continued to focus on the same topics (especially consumer adoption and technology aspects). Not many new knowledge was added to this research area. This includes studies concerning mobile payment in general (Koenig-Lewis et al. 2015; Thakur & Srivastava 2014) and specific types of mobile payment such as near field communication or NFC mobile payment (Busu, Karim & Haron 2018; Moroni, Talamo & Dimitri 2015; Pham & Ho 2015) or short messaging service or SMS mobile payment (Liébana-Cabanillas, Ramos de Luna & Montoro-Ríos 2017). Considering that these mobile payment systems are different from one another, the factors impacting the adoption of such technologies may also be different (Liébana-Cabanillas et al. 2017).

The application of quick-response (QR) code has been studied in different contexts such as in advertising (Gönül, Qiu & Zhou 2016; Okazaki et al. 2017), product authentication (Bala Krishna & Dugar 2016), food labelling (Bacarella et al. 2015), and mobile marketing (Cata, Patel & Sakaguchi 2013; Sang Ryu & Murdock 2013). However, QR code in the context of mobile payment represents a new form of application and is a relatively green area in which very limited literature exists on this subject matter (Liébana-Cabanillas, Ramos de Luna, & Montoro-Ríos 2015) despite QR code is expected to be the next "big thing" in mobile payment services (Koenig-Lewis et al. 2015).

Considering that QR mobile payment is still at an early stage and is yet to receive widespread attention from consumers, there is a need to understand factors affecting the adoption of this payment technology (Liébana-Cabanillas et al. 2018; Patil, Dwivedi & Rana 2017) especially in emerging markets where such technology is new (Liébana-Cabanillas et al. 2015) such as in Malaysia. Therefore, this study attempts to address this gap by investigating the factors influencing the intention to use QR mobile payment in Malaysia.

More specifically, this study investigated the influence of the following factors (perceived usefulness, perceived ease of use, subjective norm, personal innovativeness, perceived security, self-efficacy, intention to use and risk aversion) on intention to use QR mobile payment among Malaysian consumers.

LITERATURE REVIEW

MOBILE PAYMENT ADOPTION

Mobile payment refers to the integration of mobile technology and online payment system which allows consumers to make payment for goods and services (Qasim & Abu-Shanab 2015) in which they have the ability to initiate, authorise, and complete a financial transaction either through mobile network or wireless communication technologies (Slade et al. 2015). There are two types of mobile payment which include proximity mobile payment (PMP) and remote mobile payment (RMP) (Zhou 2013). Proximity mobile payment requires consumers to be in a close proximity to the merchant (Humbani & Wiese 2017) in which credentials of the transactions are stored on the mobile phone and exchanged within a small distance by using barcode scanning or radio-frequency identification (RFID) technology (Qasim & Abu-Shanab 2015). This means that there is a direct interaction between a buyer and a seller who are physically near each other. Here, consumers hold their smartphones over checkout terminals to pay with one of their digitized valuables. In Malaysia, users are familiar with PMP like WeChat Pay and TouchnGo e-Wallet. On the other hand, remote payments allow consumers to make a transaction through the remote payment servers for payments such as mobile banking and the mobile internet payment service (Humbani & Wiese 2017). In this case, the buyer and seller are not physically near each other. An example of RMP is PayPal. Personal information is saved on PayPal's servers, where money can be digitally sent and received to make online transactions. On the other hand, QR mobile payment represents a unique combination of both proximity and remote payment. Using QR mobile payment, consumers will have direct interaction (proximity) with the seller, in which smartphone camera needs to first scan the QR code to encode the payment information before contactless transactions (remote) can be performed accordingly through a smartphone application.

The importance of mobile payment has been recognised by many and yet the uptake of this technology remains limited (Qasim & Abu-Shanab 2015). As such, it has come to no surprise that extensive number of studies have been conducted regarding mobile payment adoption (Dahlberg et al. 2015). Many researchers have empirically investigated the underlying factors contributing to the adoption or acceptance of mobile payment. Koenig-Lewis et al. (2015) examined mobile payment adoption in general among young consumers and found factors such as perceived usefulness and social influence to be among the significant predictors to mobile payment adoption. In another studies by Thakur and Srivastava (2014), factors such as adoption readiness, personal innovativeness and perceived risk were found to have significant relationships with intention to use mobile payment.

Nevertheless, Schierz, Schilke and Wirtz (2010) suggest that studies with regards to specific type of mobile payment should also be conducted. Consequently, studies related to mobile payment adoption have taken a specific direction based on the type of mobile payment. Moroni, Talamo and Dimitri (2015) investigate the factors influencing the intention to use NFC mobile payment with findings showing perceived usefulness, perceived ease of use, and perceived compatibility to be significant predictors of NFC mobile adoption. Pal, Vanijja and Papasratorn (2015) also found a similar result with perceived usefulness and perceived ease of use significantly impact consumers' intention to use NFC mobile payment. Liébana-Cabanillas et al. (2017) conducted a comparative study between the adoption of NFC mobile payment and SMS mobile payment and found that factors influencing consumers will depend on the type of mobile payment system.

Many researchers have also recommended that studies should also look into other different technology in mobile payment such as QR code payment (Liébana-Cabanillas et al. 2018; Liébana-Cabanillas et al. 2014; Patil et al. 2017) especially considering the emergence of QR mobile payment in different countries. However, studies concerning QR mobile payment adoption remains limited (Liébana-Cabanillas et al. 2015). A preliminary investigation on QR mobile payment adoption conducted in Spain by Liébana-Cabanillas et al. (2015) found that attitude, personal innovativeness, and subjective norms to have significant direct relationships with consumers' intention to use QR mobile payment before further suggesting that a similar study to be conducted in other countries.

Notwithstanding different models that exist in the literature to explain consumers' technology adoption behaviour, TAM remains to be one of the most influential models (Davis, Bagozzi & Warshaw 1989; Hong, Thong & Tam 2006) and considered to be relatively robust (Lu et al. 2008) which serves as a useful model of technology acceptance behaviour (Kim, Mirusmonov & Lee 2010; Legris, Ingham & Collerette 2003) employed in numerous studies across different contexts of technology (Diniz, Porto de Albuquerque & Cernev 2011). Similarly, TAM has been employed by a majority of researchers in order to understand consumers' adoption behaviour in mobile payment technology (Dahlberg et al. 2015; Patil et al. 2017). Sook Harn et al. (2014) used TAM in their study because it is a multi-attribute model that predicts user's intention to use a technology based on their perception of user-friendliness and usefulness of the system.

UNDERPINNING THEORY

The present study adopts the Technology of Acceptance Model (TAM) as the main theoretical background based on perceived usefulness and perceived ease of use to determine intention to use QR mobile payment. This is further extended with additional predictor variables which include personal innovativeness, subjective norm, and perceived security. The proposed research framework employs the constructs originated from TAM (Venkatesh & Davis 1996) as a starting point which include perceived usefulness, perceived ease of use, and intention to use. Furthermore, intention of use is used as a substitute for actual usage behaviour due to the novelty of the technology context (Slade et al. 2015) as the use of the technology is yet to be uniformly deployed among consumers and consequently the actual use behaviour is not feasible to be measured (Morosan & DeFranco 2016) as is the case of QR mobile payment in Malaysia. As TAM does not account for the role of individual differences, Agarwal and Prasad (1998) propose that personal innovativeness to be incorporated in TAM whereas Madan and Yadav (2016) suggest that the same construct to be factored in when it comes to mobile payment adoption and hence included in this framework. Considering that social factors may also influence adoption of technology (Mathieson 1991; Yi et al. 2006) and the lack thereof in TAM, subjective norm which derives from the seminal work of Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) is therefore included in the present study. The TPB states that behavioural achievement depends on both motivation (intention) and ability (behavioural control). The theory also posits that attitude toward behaviour, subjective norms, and perceived behavioural control, together shape an individual's behavioural intentions and behaviours. In addition to subjective norm, security concerns are very sensitive in the case for mobile payment as it involves a financial service and this consequently would influence adoption decisions (Liébana-Cabanillas et al. 2018). Therefore, the inclusion of perceived security is deemed to be relevant considering the similar technological context in the present study.

INTENTION TO USE QR MOBILE PAYMENT

Behavioural intention is defined as intention to perform a behaviour which stems from a conscious decision making (Davis 1989). In the context of mobile payment, consumers' intention to use the technology remains a critical interest to both researchers and practitioners because many parties such as financial institutions and payment service providers will gain benefit to understand the factors underlying consumers' intention to use (Kim et al. 2010). Intention to use often becomes the main dependent construct in many previous studies including in mobile payment adoption (e.g. (Liébana-Cabanillas et al. 2017; Lwoga & Lwoga 2017; Mun, Khalid & Nadarajah 2017).

PERCEIVED USEFULNESS

Perceived usefulness is a classic variable derived from TAM which is defined as the extent to which a system would improve one's job performance (Davis 1989). Rogers (1983) stated that consumers are willing to accept an innovation if the innovation is advantageous or beneficial to them. According to Mohd Tallaha, Abdul Shukor and Abu Hassan (2014), the existence of the perception of usefulness itself can be influenced by several factors including satisfaction; experience; and the time taken to use an application. The relationship between perceived usefulness and intention has been extensively investigated in many past studies (Mun et al. 2017). As such, perceived usefulness is one of the most tested variable in the field of mobile payment adoption (Dahlberg et al. 2015). Kim et al. (2010) found a significant positive relationship between perceived usefulness and intention to use mobile payment. A similar relationship between the two constructs has been empirically validated in many studies in mobile payment (Busu et al. 2018; Kalinic & Marinkovic 2016; Mun et al. 2017; Pham & Ho 2015). This leads to the following hypothesis:

H_1 There is a significant relationship between perceived usefulness and intention to use QR mobile payment.

PERCEIVED EASE OF USE

Perceived ease of use is another classic construct from TAM that refers to the extent to which a person believes that using a system is effortless (Davis 1989). Mun et al. (2017) further extend the definition by stating that perceived ease of use can be considered as being free from mental and physical effort in using a technology. This is consistent with what Davis defines ease as "Freedom from difficulty or great effort", with effort as a finite resource which a person will allocate to various action for which he or she is liable (Jenkins & Ophoff 2016). Mohd Suki et. al. (2011) assert that in general, when a system is found to be easy to use, users will have the

intention to use the system. Over the past decades, research proposed that perceived ease of use will positively influence a consumer's intention to use mobile payments. (Wang et al. 2006). Zhong et al. (2013) found a significantly positive relationship between perceived ease of use and consumers' intention to adopt mobile payments in China. It is also consistent with empirical investigation of numerous studies (Johnson et al. 2017; Koenig-Lewis et al. 2015; Mun et al. 2017). This leads to the following hypothesis:

H_2 There is a significant relationship between perceived ease of use and intention to use QR mobile payment.

PERSONAL INNOVATIVENESS

The concept of innovativeness was brought to light when Rogers (1983) introduces it in his diffusion of innovation theory, defined as the degree to which how fast a new idea is adopted by an individual in comparison with other members within a society. Agarwal and Prasad (1998) further conceptualise it specifically in the domain of technology as Personal Innovativeness in Technology (PIIT) which is defined as a person's willingness to try a new technology. It is proposed that an innovative person is more likely to adopt a new technology (Rogers 1983). Yang et al. (2012) found a significant positive relationship between personal innovativeness and intention to use mobile payment service in China. This result is consistent with the work of other similar studies in mobile payment adoption (Lwoga & Lwoga 2017; Oliveira et al. 2016; Thakur & Srivastava 2014; Yang et al. 2012). With respect to QR mobile payment, Liébana-Cabanillas et al. (2015) found the relationship to be significant in a study conducted in Spain. This leads to the following hypothesis:

H_3 There is a significant relationship between personal innovativeness and intention to use QR mobile payment.

SUBJECTIVE NORM

Subjective norm refers to the social pressure exerted on an individual to conform to a certain act (Ajzen 1991). This perceived social pressure may stem from family members, relatives, friends, and people that have close relationships with the individual. Consequently, it is likely for the individual to behave in a way that is expected from people around him or her (Liébana-Cabanillas et al. 2018) whereby he or she is encouraged to meet such expectations. The element of social pressure has been incorporated in consumer behaviour studies in general. In the context of technology, the relationship between these two constructs have also been empirically validated including in the scope of mobile payment adoption. Liébana-Cabanillas et al. (2017) found subjective norm to be a significant predictor to consumers' intention to use mobile payment. Similar results have also been obtained by other studies in mobile payment adoption (Ting et al. 2016). In a QR mobile payment adoption study conducted in Spain, Liébana-Cabanillas et al. (2015) also found the relationship between the two constructs to be significant. This leads to the following hypothesis:

H_4 There is a significant relationship between subjective norm and intention to use QR mobile payment.

PERCEIVED SECURITY

Perceived security refers to the perception of protection concerning risks related to mobile payment particularly the risk of losing personal data which could result in a financial loss (Ooi & Tan 2016). Security concerns are very sensitive in the case for mobile payment as it involves a financial service and this consequently would influence adoption decisions (Liébana-Cabanillas et al. 2018). The relationship between perceived security and intention to use mobile payment has been explored in a number of past studies. Musa, Khan and AlShare (2015) found perceived security to be the strongest predictor of consumers' intention to use mobile payment in Qatar. In a specific context of NFC mobile payment, Liébana-Cabanillas et al. (2018) obtained a similar result with perceived security to be one of the strongest predictors in determining consumers' intention to use NFC mobile payment. These results are consistent with other studies of mobile payment adoption (Johnson et al. 2017; Oliveira et al. 2016; Sfenrianto, Junadi & Saragih 2017) further validating that perceived security has a significant positive relationship with intention to use mobile payment. This leads to the following hypothesis:

H_5 There is a significant relationship between perceived security and intention to use QR mobile payment.

RESEARCH METHODOLOGY

RESEARCH DESIGN

This study employs a quantitative research design. The population size of this study is approximately 25.2 million smartphone users in Malaysia. Purposive sampling was used with a sample size of 485. The questionnaire was divided into several sections: (i) Intention to use, (ii) Perceived usefulness, (iii) Perceived ease of use, (iv) Personal innovativeness, (v) Subjective norm, and (vi) Perceived security. To measure the constructs related to factors influencing intention to use QR mobile payment, scales of multiple items that have been tested in past studies are adopted in the current study. In addition, five-point Likert scale is used for every item of all the scales. Scales to measure perceive usefulness, perceived ease of use, subjective norms, perceived security, and intention to use are adopted from Liébana-Cabanillas et al. (2015) and personal innovativeness is measured using the Personal Innovativeness in Information Technology (PIIT) scale by Agarwal and Prasad (1998).

The primary data in this study was collected using survey questionnaires that were distributed online and offline. According to Malhotra (2012), surveys via online, home and workplace have been adopted to acquire secure higher response rates, time efficiency, low cost and to reach a large number of respondents. This study employs a non-probability sampling technique. Whereas, purposive sampling is used because of its suitability with respect to this study. Since the target population of this study comprises individual smartphone users in Malaysia, only those of age between 18 to 65 years old are selected to be the sample. This is because these are the individuals who have the purchasing ability and most likely to use QR mobile payment. This is complemented with quota sampling to ensure that adequate representation of individuals is obtained in which other criteria such as gender, ethnicity, education level, income, and types of profession are kept diverse in order to maximise the variation within the sample. These relevant strata are chosen not only because they provide meaningful demographic information, but also the relevancy of each group to the topic studied (Taheerdost 2016). This is also done to ensure that appropriate statistical analyses can be carried out accordingly. For online survey, the questionnaire was prepared using Google Form. This resulted in an online link which directs respondents to the questionnaire. This link was disseminated to the respondents. Since the target respondents in this study involve smartphone users, the Google Form link was distributed using smartphone applications such as WhatsApp, Facebook, and Twitter. Distributing the questionnaire online allows for an easier, faster, and wider dissemination. It also ensures respondents to complete all questions without error (Creswell 2013) thus ensuring the validity of the data obtained. The online survey is complimented with physical distribution of the survey through paper-based questionnaire. Not only this technique is to ensure that the amount of responses collected sufficiently meets the requirement of this study, but also to widen the chances for those without online facilities to be the respondents. In this case, filling out a paper questionnaire is a practical and easy method because the respondent only needs a pen and time to participate (Ebert et al. 2018). Prior to the distribution of the survey questionnaire, the questionnaire was first pre-tested with five experts from the academia in the field of marketing and technology. Following the pre-test, a pilot study was subsequently conducted which was participated by 24 respondents. Finally, the actual distribution of the survey questionnaires was carried out throughout October 2018.

FINDINGS AND ANALYSIS

DEMOGRAPHIC PROFILE

The demographics of the respondents are shown in Table 1. This study received a higher participation from female respondents in comparison with male respondents with 58.8% and 41.2% respectively. In terms of age groups, approximately more than 80% of the respondents are below the age of 35 while the percentage of respondents declines as the age groups increase above 35 years old. In addition, the distribution of ethnicity among the respondents in this study sufficiently approximates Malaysia ethnic composition with 63.9% Malay, 19.6% Chinese, 4.9% Indians, and 11.5% others which incorporate indigenous ethnic groups in East Malaysia such as Kadazan and Iban. In terms of education level, more than half of the respondents (63.3%) have at least obtained a bachelor's degree while a small fraction of the respondents has also obtained masters, doctorate level degrees and professional certificates (15.4%). Furthermore, 58.3% of the respondents are working with most of them are employed in the private sector whereas the remaining respondents are either students, not working, or retirees. Consequently, this gives rise to different levels of income among the respondents with more than 80% of the respondents earning RM6000 or less. Most of the respondents reside in urban areas in comparison with non-urban areas with 73.6% and 26.4% respectively.

TABLE 1. Demographic profile of respondents

Characteristics		Frequency	Percentage (%)
Gender	Male	200	41.2
	Female	285	58.8
Age	17 and below	12	2.5
	18 – 24	184	37.9
	25 – 34	213	43.9
	35 – 44	61	12.6
	45 and above– 54	15	3.1
Ethnicity	Malay	310	63.9
	Chinese	95	19.6
	Indian	24	4.9
	Others	56	11.5
Education Level	High school	30	6.2
	Matriculation / A-Level	22	4.5
	Diploma	51	10.5
	Bachelor's Degree	307	63.3
	Masters, PhD & Professional Certificate	75	15.4
Occupation	High school student	14	2.9
	University Student	160	33.0
	Not working/self-employed	61	12.5
	Private sector employee	216	44.5
	Government employee & Retiree	34	7
Income Level	RM1,000 and below	181	37.3
	RM1001 – RM3000	102	21.0
	RM3001 – RM6000	127	26.2
	RM6001 – RM9000	33	6.8
	RM9000 and above	42	8.7
Area of Residence	Urban area	357	73.6
	Non-urban area	128	26.4

$N = 485$

SMARTPHONE PAYMENT USAGE

Majority of respondents reported that they use smartphone payment 2-3 times monthly or 2-3 times a week. Only 8.2% respondents have never used smartphone payment before. The frequency distribution of smartphone payment usage among the respondents is depicted in Table 2.

TABLE 2. Frequency distribution of smartphone payment

Usage	Frequency	Percentage (%)
Never	40	8.2
Once a month	58	12.0
2-3 times a month	158	32.6
Once a week	56	11.5
2-3 times a week	113	23.3
Daily	60	12.4
Total	485	100.0

QR MOBILE PAYMENT USAGE

On the other hand, almost 50% (44.1%) respondents have never used QR mobile payment before. And less than 20% has used it 2-3 times a month and only 6.8% used it 2-3 time a week. Table 3 provides the frequency distribution of QR mobile payment usage among the respondents.

TABLE 3. Frequency distribution of QR mobile payment

Usage	Frequency	Percentage (%)
Never	214	44.1
Once a month	114	23.5
2-3 times a month	82	16.9
Once a week	31	6.4
2-3 times a week	33	6.8
Daily	11	2.3
Total	485	100.0

SETTINGS OF QR MOBILE PAYMENT

Most of the respondents that used QR mobile payment had used it at food service outlets. QR mobile payment were also conducted across different payment settings as shown in Table 4.

TABLE 4. Settings of QR mobile payment

Payment Settings	Frequency	Percentage (%)
Food service outlets	214	79.0
Hotels	44	16.2
Public transportations	141	52.0
Cinema	176	64.9
Parking	74	27.3
Convenience stores	122	45.0

RELIABILITY ANALYSIS

The scales used to measure all the constructs in this study were subject to reliability analysis. The findings i.e. Cronbach's Alpha are shown in Table 5. Cronbach's alpha ranges from 0.769 to 0.954 1. According to Hair et al. (2013), the reliability score as measured by Cronbach's alpha should exceed 0.70 to be deemed as acceptable. Since the Cronbach's alpha for all constructs shown in Table 5 are above 0.70, the reliability scores in this study are therefore acceptable.

CONSTRUCT VALIDITY

Construct validity refers to the extent to which theoretical latent constructs can be truly represented by a set of measured variables (Hair, Black, Babin, & Anderson, 2013). In this study, the validity of the constructs was established through face validity, convergent validity, and discriminant validity.

Face or content validity was established by pre-testing the questionnaire. Five experts from the academia who are in the marketing and technology fields were selected to review the questionnaire. The questionnaire was then submitted to the experts for their review. The feedbacks collected were mainly favourable i.e. appropriate use of scale measurement, understandable questionnaire structure and language. Additional suggestions were made pertaining to certain measurements in the questionnaire i.e. demographic characteristics of the respondents. Therefore, minor amendments were done accordingly following the pre-test results.

Convergent validity depicts measurement items in a given construct that have a high correlation and converge in the same dimension. This was carried out via confirmatory factor analysis (CFA) using AMOS. According to Hair et al. (2013), this type of validity can be determined via multiple ways which include the size of factor loading, construct reliability (CR), and average variance extracted (AVE). In order to establish convergent validity, the AVE value should be 0.5 or higher whereas the composite reliability should be more than

0.7 (Hair et al. 2013). Based on Table 5, the AVE values for PU, PEOU, SN, PS and BI are 0.5 and above with the composite reliability illustrate values of more than 0.7. Thus, the convergent validity for these scales has been attained. While only the AVE value for PI falls slightly below 0.5, its CR value still achieves the recommended value of more than 0.7. According to Fornell and Larcker (1981), the convergent validity of the construct may still be concluded as acceptable on the ground of composite reliability alone although more than 50% of the variance is due to error, arguing that the average variance extracted may be a more conservative estimate of the validity of the measurement model. Given that the CR value of PI attains the recommended value exceeding 0.7, thus the convergent validity of this construct is also acceptable in this study.

TABLE 5. Convergent validity

path		factor loadings	ave	cr	cronbach's alpha
Perceived Usefulness, PU					
PU1	<--- PU	0.819			
PU2	<--- PU	0.860	0.711	0.887	0.901
PU3	<--- PU	0.911			
PU4	<--- PU	0.777			
Perceived Ease of Use, PEOU					
PEOU1	<--- PEOU	0.880			
PEOU2	<--- PEOU	0.882	0.788	0.937	0.954
PEOU3	<--- PEOU	0.903			
PEOU4	<--- PEOU	0.885			
Personal Innovativeness, PI					
PI1	<--- PI	0.868			
PI2	<--- PI	0.709	0.491	0.763	0.801
PI3	<--- PI	0.158			
PI4	<--- PI	0.827			
Subjective Norm, SN					
SN1	<--- SN	0.809			
SN2	<--- SN	0.911	0.771	0.910	0.891
SN3	<--- SN	0.910			
Perceived Security, PS					
PS1	<--- PS	0.813			
PS2	<--- PS	0.930	0.574	0.822	0.761
PS3	<--- PS	0.853			
PS4	<--- PS	0.209			
Intention to Use QR Mobile Payment, BI					
BI1	<--- BI	0.904			
BI2	<--- BI	0.916	0.835	0.953	0.927
BI3	<--- BI	0.911			
BI4	<--- BI	0.924			

Discriminant validity refers to how much a construct truly differs from other constructs. Similarly, discriminant validity can also be computed from the results of CFA. According to Hair et al. (2013), discriminant validity can be established given that the average variance value (AVE) of a given construct is larger than the squared correlation estimate of that construct with other constructs. Table 6 details the AVE values and the squared correlation estimates of all the constructs used in this study. The AVE value of each of the construct as shown in the table is higher than the squared correlation estimate of that construct with other constructs. Thus, it can be concluded that this study has achieved discriminant validity as well.

TABLE 6. Discriminant validity

	PU	PEOU	PI	SN	PS	BI
PU	**0.711**					
PEOU	0.483	**0.788**				
PI	0.307	0.343	**0.491**			
SN	0.223	0.245	0.162	**0.771**		

PS	0.104	0.096	0.060	0.079	**0.574**	
BI	0.473	0.416	0.371	0.248	0.106	**0.835**

(AVE = BOLD AND DIAGONAL VALUES)

MULTIPLE REGRESSION ANALYSIS

A standard multiple regression analysis was conducted to predict intention to use QR mobile payment based on perceived usefulness, perceived ease of use, personal innovativeness, subjective norm, and perceived security. The results are shown in Table 7. Based on the results, approximately 55% of the variance in intention to use QR mobile payment can be explained by perceived usefulness (PU), perceived ease of use (PEOU), personal innovativeness (PI), subjective norm (SN), and perceived security (PS) ($R^2 = 0.547$, adjusted $R^2 = 0.543$). In addition, the results indicate that the regression model is statistically significant, $F(5,475) = 115.796$, $p < 0.001$. Furthermore, all the predictors were found to have a significant positive relationship ($p < 0.05$) with intention to use QR mobile payment at 95% confidence level. These include perceived usefulness ($p < 0.05$), perceived ease of use ($p < 0.05$), personal innovativeness ($p < 0.05$), subjective norm ($p < 0.05$), and perceived security ($p < 0.05$). Therefore, all the hypotheses (H_1, H_2, H^3, H_4, and H_5) in this study as depicted in Figure 1.0 below are accepted. The results also reveal that the strongest predictor in the model to be perceived usefulness ($\beta = 0.333$). This is sequentially followed by personal innovativeness ($\beta = 0.208$), perceived ease of use ($\beta = 0.196$), and subjective norm ($\beta = 0.143$). The weakest predictor in the regression model is perceived security ($\beta = 0.09$). From the model, the following regression equation was obtained:

Intention to use QR mobile payment = 0.106 + 0.362 (PU) + 0.230 (PI) + 0.206 (PEUO) + 0.137 (SN) + 0.94 (PS).
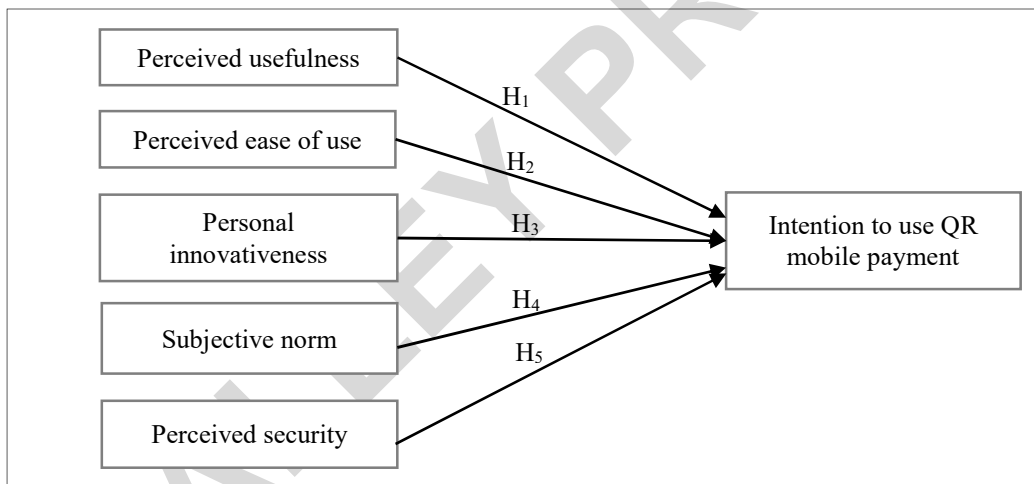

FIGURE 1. Research framework

TABLE 7. Results of multiple regression analysis

Model Summary[b]

Model	R	R Square, R^2	Adjusted R Square	Std. Error of the Estimate
1	0.740[a]	0.547	0.543	0.57521

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	191.565	5	38.313	115.796	0.000[b]
Residual	158.485	479	0.331	-	-
Total	350.049	484	-	-	-

Coefficients[a]

Model	Unstandardized Coefficients		Standardised Coefficients	t	Sig.	VIF
	B	Std. Error	Beta, β			
(Constant)	0.106	0.165		0.644	0.520	
Perceived usefulness	0.362	0.046	0.333	7.789	0.001	1.936
Perceived ease of use	0.206	0.045	0.196	4.536	0.001	1.972
Personal innovativeness	0.230	0.040	0.208	5.798	0.001	1.355
Subjective norm	0.137	0.035	0.143	3.945	0.001	1.381
Perceived security	0.094	0.036	0.090	2.603	0.010	1.268

a. Dependent Variable: Intention to use QR mobile payment

b. Predictors: (Constant), Perceived security, Personal innovativeness, Subjective norm, Perceived usefulness, Perceived ease of use

DISCUSSION

The aim of this study is to investigate the factors influencing intention to use QR mobile payment in Malaysia from the Technology Acceptance Model (TAM). The results of the multiple regression analysis suggest that all variables which include perceived usefulness, personal innovativeness, perceived ease of use, perceived security, and subjective norm have a significant and positive relationship with intention to use QR mobile payment respectively.

Perceived usefulness emerged as the strongest predictor in the model among all the variables. This suggests that the respondents are most likely to use QR mobile payment system when they believe the mobile payment system to be useful or beneficial to them. Davis (1989), who first established the strong correlation between perceived usefulness with user acceptance of technology through TAM, states that the functions or benefits that a technology provides serve as a primary purpose for its adoption before concluding that successful design and implementation of technology systems should ultimately emphasize on its usefulness to the users. This finding is also consistent with other past studies pertaining to the context of mobile payment (Busu et al. 2018; Kim et al. 2010; Pham & Ho 2015). Similarly, Liébana-Cabanillas et al. (2015) also found significant relationship between perceived usefulness and intention to use QR mobile payment in their study conducted in Spain. As such, this finding indicates similar observation when it comes to the local respondents in Malaysia.

Following perceived usefulness, the results of the multiple regression analysis also reveal personal innovativeness to be a strong predictor of intention to use QR mobile payment. This implies that respondents who have a higher level of personal innovativeness are more likely to use QR mobile payment. This finding is therefore in accordance with the role of personal innovativeness in technology adoption that first came to light when Rogers (1983) states that a new technology is more likely to be adopted by an innovative person. In addition, this finding also add support to numerous past studies in which significant relationship has been established between personal innovativeness and intention to use mobile payment (Lwoga & Lwoga 2017; Oliveira et al. 2016; Yang et al. 2012). Most importantly, this finding establishes validation for the role of personal innovativeness in intention to use specifically in the context of QR mobile payment.

Next, perceived ease of use was also found to be a significant predictor of intention to use QR mobile payment. This indicates that the more the respondents believe that it is easier to conduct QR mobile payment, the higher the likelihood of them using the technology. This finding roots back to its origin in TAM by Davis (1989) who states that a secondary reason for adoption of technology by users following perceived usefulness is how easy it is for the users to perform functions through the technology. Furthermore, this finding is not uncommon with the findings from past studies in mobile payment acceptance. Zhong et al. (2013) also obtained a significant positive relationship between perceived ease of use and intention to use mobile payment. Other studies have also reported similar findings (Johnson et al. 2017; Mun et al. 2017). The finding of the present study further validates the relationship between the two constructs specifically in the context of QR mobile payment. Ultimately, this suggests that it is imperative for QR mobile payment to be easy to use i.e. easy interaction with the payment system and the steps in performing payments through QR are simple to follow and understandable by its users.

In addition, subjective norm was also found to be a significant predictor in determining intention to use QR mobile payment. This implies that the respondents are more likely to use QR mobile payment when they receive social pressure from the people around them to use the technology. This finding can be explained through the seminal work of Ajzen (1991) in TPB that states the higher likelihood of a person to conform to certain acts upon receiving social pressure. In fact, the impact of social pressure as represented by subjective norm is not uncommon in the field of consumer behavior. The finding of the current study is consistent to findings from several studies related to mobile payment acceptance (Liébana-Cabanillas et al. 2017; Ting et al. 2016). In terms of QR mobile payment, this finding provides support to a similar result obtained by Liébana-Cabanillas et al. (2015). Consequently, this study depicts the important role of subjective norm i.e. recommendations, opinions, and perceptions of people who are important to the respondents in influencing their intention to use QR mobile payment.

The final important predictor in determining intention to use QR mobile payment is perceived security. This means that the more the respondents believe that QR mobile payment is secure, the higher the likelihood of them conducting payments through this technology. Security is critical when it comes to wireless technology (Liébana-Cabanillas et al. 2018) especially when it comes to financial transactions due to the risks involved. As such, the finding of this study is in line with the findings from other studies related to mobile payment (Oliveira et al. 2016; Sfenrianto et al. 2017) and contributes specifically to the context of QR mobile payment. Consequently, the finding of this study shows that QR mobile payment needs to be perceived with minimized risks involved e.g. risks of intervention from unauthorized third party and risks of abuse in billing or personal information in order to increase the likelihood of people in using the technology.

CONCLUSION

This study contributes to the literature by providing a preliminary insight on acceptance of QR mobile payment in Malaysia. By investigating the factors influencing intention to use QR mobile payment, the study extends Technology Acceptance Model (TAM) by incorporating additional variables and further validates extended TAM as a significant model in predicting acceptance of technology in the context of QR mobile payment. Given the rise of QR mobile payment in Malaysia currently, very few literatures exist that focus on the subject matter. Therefore, this study narrows down the gap that exists in the literature with respect to this matter.

Despite the emergence of QR mobile payment in Malaysia with the payment technology getting adopted mainly in the retail and food service industry, existing literature that sheds light on QR mobile payment remains limited. Therefore, this study provides empirical evidence regarding the factors influencing intention to use QR mobile payment in Malaysia. By extending TAM with additional variables drawn from the literature, and based on the multiple regression analysis, factors such as perceived usefulness, personal innovativeness, perceived ease of use, subjective norm, and perceived security were found to be significant in determining intention to use QR mobile payment.

In addition, this study is also important to the local financial institutions and finance technology sector that are increasingly involved in QR mobile payment in Malaysia. The main findings of this study help them to understand the factors that are significant in determining consumers' intention to use this technology. When developing a new or enhancing an existing QR mobile payment, factors such as perceived usefulness, perceived ease of use, and perceived security represent the features that should be heavily emphasised at product development stage and promotional stage. This could help them to increase the uptake of QR mobile payment technology among the local Malaysian consumers.

SUGGESTIONS FOR FUTURE RESEARCH

There are several suggestions for future studies pertaining to this subject matter. First, the sample size for future studies could be increased to potentially obtain results with better precision and power. Consequently, it would also be interesting for future studies to investigate factors influencing the acceptance of QR mobile payment in other countries in which the payment technology is also emerging. For markets where QR mobile payment has been extensively adopted, actual usage of the payment technology can be employed instead of opting for behavioural intention to represent acceptance of the payment system. Furthermore, future studies could explore more variables that may contribute to the acceptance of the payment system such as rewards, compatibility, or personality traits in order to have a broader understanding of the subject matter. Pertaining to the characteristics of QR mobile payment adopter segments, future studies could explore potential difference in other characteristics e.g. lifestyles to have more inclusive insights on the segments' activities that may relate to the payment technology. Finally, it is also recommended for future studies to investigate the factors influencing acceptance of QR mobile payment across different adopter segments should there be any potential differences.

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