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Factors Influencing Behavioural Intention to Adopt the QR-Code Payment in Sarawak

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DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made. This thesis contains no material which has been accepted for the award of any degree or diploma in any university.

The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number HREC2018 - 0464.

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ACRONYMS AND ABBREVIATIONS

QR	Quick Response
MP	Mobile Payment
NFC	Near Field Communication
IT	Information Technology
RQ	Research Question
RO	Research Objective
H	Hypothesis
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
DOI	Diffusion Innovation Theory
PE	Performance Expectancy
EE	Effort Expectancy
FC	Facilitating Condition
SI	Social Influence
PV	Price Value
HT	Habit
HM	Hedonic Motivation
PIIT	Personal Innovativeness in Information Technology
BI	Behavioural Intention
DV	Dependent Variable
IV	Independent Variable
MCMC	Malaysian Communications and Multimedia Commission
SEM	Structural Equation Modelling
CB-SEM	Covariance Based Structural Equation Modeling
CFA	Confirmatory Factor Analysis
R 2	Coefficient of Determination
SD	Standard Deviation
ANOVA	Analysis of Variance Apps Applications
OLS	Ordinary Least Square
CR	Composite Reliability
AVE	Average Variance Extracted

Abstract

Sarawak is making a big step towards a digital economy by accepting more QR-Code third party mobile payment providers. The use of mobile payment (MP) is believed to have a huge potential that will drastically change the methods in which consumers purchase goods and services. However, the adoption of MP is not prevalent despite its benefits as documented. Under the state's call for digital transformation, this study aims to identify the factors which affect the consumers' behavioural intention to adopt the QR-code MP in Sarawak. The current study extends the UTAUT2 Model with the personal innovativeness construct based on the review of recent literature. The proposed research model is empirically tested using 453 responses collected through self-administered questionnaires. The consumers are approached through a convenience sampling method in selected shopping malls. Data collected are analysed using Structural Equation Modelling (AMOS 20.0). On appraising the proposed model, this study reveals that performance expectancy, social influence, habit, price value and personal innovativeness in information technology are significantly related to behavioural intention to adopt QR-code mobile payment in Sarawak. The effect of effort expectancy, facilitating conditions and hedonic motivation is found to be statistically insignificant. The findings of the study provide valuable theoretical contributions by extending the applicability of UTAUT2 in the area of QR -code mobile payment from the perspective of an emerging market. This study has also answered calls from past researchers to investigate the impact of personal innovativeness on behavioural intention. The finding of the study provides practical implications for industry decision makers, particularly to understand important user -centric factors affecting QR -code mobile payment adoption. The third-party payment providers/developers, marketing teams and merchants could devise the strategic marketing and development plan for successful acceptance of an innovation according to the factors examined. The study uses convenience sampling of Sarawak consumers, which leads to limited generalization of results. Also, this study is limited to QR-code mobile payment. The possibility of including additional variables such as perceived trust, security, privacy and existence of physical institutions are not addressed in this study, which leads to another limitation in this study. The disconfirmation of expectation constructed in this study might be partly

due to the research design (a cross-sectional design instead of a longitudinal design). Future researchers may take into consideration the comparison o f pre-usage and post-usage data when planning for a replication study. The current research also needs to be replicated to examine the findings across a wider range of individuals, in different research contexts to have a better understanding of QR-code mobile payment adoption.

Keywords: Mobile payment, QR-Code Mobile Payment, UTAUT2, Personal Innovativeness in Information Technology, Sarawak

Chapter 1: Introduction

1.0 Background

The continuous developments in mobile operating systems have resulted in a steady increase of mobile application (known as "mobile app") developers in Asia (Dogtiev 2016). This trend has recently been observed in the payment industry with the development of various mobile payment platforms (Teo et al. 2015). Mobile payment (MP) refers to payments which are conducted in a fast, convenient, safe and simple manner from anywhere, at any time using a smartphone (Leong et al. 2013). Among all MP methods developed by third-party payment providers, quick response (QR) codes payment has been widely adopted by well-known retailers (e.g. Starbucks), financial services group (e.g. Alibaba) and social communications app (e.g. WeChat) (Bai et al. 2017).

In China, the Alipay and WeChat pay have become a mainstream way of QR-code MP. It has been successfully adopted by 502 million users who have embraced cashless transactions (Aveni and Roest 2017). Mobile payment apps on mobile phones are replacing cash as the primary method of payment (Aveni and Roest 2017). Also, PayTm in India reaches 200 million users and 850,000 merchants in 2016 (Ani 2016). However, QR-code MP has failed to attract a significant number of users in the United States and Europe (Hartung 2014). The usage of QR-code MP has grown slowly in those countries mainly due to the reason for easy access to banking services (Hartung 2014).

Looking from Malaysia's perspective, despite having an integrated banking system, banks across the nation are intensely promoting digital transactions as to achieve efficiency and cost savings. According to the Malaysian Communications and Multimedia Commission (MCMC 2017), there are currently about 28.5 million mobile broadband subscriptions in Malaysia, which represent a promising colossal market for mobile payment. Seeing the opportunity, Bank Negara Malaysia (BNM) along with government initiatives and coordinated industry efforts, have spearheaded a plan to leapfrog the era of cash into digital payments in 2020 (BNM 2018).

By issuing licenses to more digital payment systems providers, Malaysia's digital economy experienced a Gross Domestic Product (GDP) growth of 17% in 2017 (Mior 2017). This growth indicates that the digital payment solution contributes

to economic growth by reducing transaction costs and improving efficiency in the flow of goods and services (BNM 2018).

Sarawak, the biggest state in Malaysia, is aiming to become a developed state with high-income economy status by 2030 (Desk 2017). However, when the world has already entered into Industry 4.0, Sarawak is still in Industry 2.0 (Chua 2017). The Sarawak's Chief Minister then launched the Sarawak Digital Economy Strategy (2018-2022) to call for a wider utilisation of digital technology to boost the economic status of the state (BNM 2018; Desk 2017).

The usage of mobile transaction has soared in the past few years. For example, mobile commerce has increased to 3.5 million in December 2017 compared to January 2017 that was only 2.0 million in Malaysia ("Mobile Commerce" 2018). This shows an explosive growth among consumers that use mobile as a tool to help them to shop and pay. Advances in mobile technology and the high penetration of smartphones have given the opportunity for industry leaders to introduce new payment solutions. From 2017 onwards, there has been an increase in the number of QR-code MP providers offering their services to consumers in Sarawak, to name a few, SarawakPay, MaybankQRpay, Vcash and Boost (Ling 2017; Amarthalingam 2017; Ten 2018; David 2018).

Although QR-code MP is in an initial stage in Sarawak, there has been a considerable increase in their usage in recent months (Chua 2017). More retailers are now accepting MP than ever before. For example, Boost increased 30,000 touch points to encourage consumers to transact through QR-code on a day-to-day basis. Nevertheless, QR-code MP providers are continuously striving to expand their services to more merchants and consumers (Pikri 2018). For example, Sarawak Pay targets to increase the number of registered merchants from 100 to 10,000 by the end of 2018 (Lim 2018).

To ensure success in the payment market, the system needs to reach critical mass for both users and merchants (Tarute, Nikou, and Gatautis 2017). Currently, a number of corporations and stakeholders (e.g., government, payment service providers, merchants and banks) have made considerable investments on QR-code MP solutions. In particular, consumers' intention to use QR-code MP systems is of great interest to researchers as stakeholders can gain valuable insight and a better

understanding of the underlying factors concerning users' intention in using the system (Singh, Srivastava and Sinha 2017).

1.1 Research Problem

As part of the Sarawak government's ambitious digital economy pushes**,** the vision of mobile payment is for the utilization of Sarawak citizens in daily cash transactions – either on a personal or professional level. QR-code mobile payment has been described as the financial backbone that drives the state's digital economy agenda. It is also to compete in an economic landscape that is very definitively becoming more digitalized, for example, to improve and gain local business participation in global e-commerce platforms. Also, mobile payments that propel greater economic efficiency is one of the nine focus areas under the government's blueprint to drive Sarawak's transition to a high value-added, high-income economy with adequate safeguards to preserve financial stability. The central bank is also working towards accelerating the migration of traditional method payments to mobile payments.

The trend of mobile payment has encouraged many industries to adopt QR-code payment system to establish effective ways of operating business. For instance, the banking industry (e.g. Maybank) has provided the mobile scan and pay services to its clients. The retail industry has also begun to adopt QR-code payment method (e.g. Boost, Sarawak Pay, Fave Pay) to provide convenience to customers for the ease of making purchases. Nevertheless, cash payment still plays a central role in the nation, accounting for over 80% of transactions (Amarthalingam 2017). The value of ATM cash withdrawals also increases by about 6.9% annually despite the high mobile penetration rate (Amarthalingam 2017). Also, the use of M-payment only covers 0.3% of the total payment (Amarthalingam 2017). Presently, there are many options available for Sarawak consumers who choose to pay without cash (e.g. online banking, credit card, debit card), in which this could discourage the usage of mobile payment (Goi 2016).

Given Sarawak's large geographical scale and scattered population, the adoption of technology required to push the digital economy forward is still at an early stage, where most of Sarawak citizens are still unaware of the availability of such technologies (Tuah 2018). The development of the digital economy is driven by

the rapid explosion of technological improvement and the disruptive forces of the digital revolution. Though convenience and flexibility are the strength of promoting QR-code MP adoption, consumers' acceptance in the mobile payment system remains a prime factor in ensuring the success of QR-code mobile payment (Schierz et al. 2010). In reality, there are cases where only limited MP providers have successfully reached the mass market (Tan 2018). Such failure might be due to MPs that have yet to fully customize or tailor their interface to suit consumers' needs and to maximize user's experience (Goi 2016).

Currently, QR-code MP providers are in the stage of making improvement in their interface design as well as features in order to meet the needs of current users (Bong 2017). Since QR-code MP is in a nascent stage in Sarawak (Shaw 2014), the issues associated with consumer behaviours are of critical importance, especially when researches have revealed different markets having different motivations for using MP (Teo et al. 2015). Consumers' adoption remains a critical success factor in the development of new technology**.** Hence, the operators have to grow the nation's intention of Sarawak residents on the platform. In order to understand consumers' behaviours towards new payment method, there is a need to examine the factors determining the intention of consumers to adopt QR-code mobile payment in Sarawak (Tan et al. 2014).

1.2 Research Gap

There has been an increased coverage on consumer acceptance of MP, yet, the majority refers to the adoption of limited MP systems (Slade et al. 2015). More recently, some studies have examined adoption of particular systems, such as remote MP in United Kingdoms (Slade et al. 2015), MP system via SMS in Spain (Liebana-Cabanillas, Ramos de Luna and Montoro-Rios 2015), Interbank MP service in India (Kapoor, Dwivedi and Williams 2015), NFC in Malaysia (Leong et al. 2013; Tan et al. 2014). Hitherto, only a few studies have been conducted to understand consumer's adoption intention towards the QR-code MP (e.g. Lu et al. 2011; Liebana-Cabanillas, Ramos de Luna and Montoro-Rios 2015). In De Luna, Liébana-Cabanillas and Sánchez-Fernández's (2018) study, it is worth noting the differences detected between the different mobile payments systems, in which this reinforced the idea that consumer behaviour differs depending on the type of mobile payment systems. Therefore, it remains a research gap in Malaysia as studying particular MP

system (e.g., NFC) is insufficient to establish a generalisation of consumers' behaviour towards the new MP systems (Liébana-Cabanillas, Sánchez-Fernández, and Muñoz-Leiva 2014).

Compare to other MP methods, QR-code MP is seen as the most promising technology in remote payments, gaining higher popularity among consumers and merchants (Chua 2017). Due to lower infrastructure cost and high penetration rate of mobile phones in Malaysia, it is predicted that QR-code has the potential to become a cost-effective alternative to cash in the near future (Amarthalingam 2017). Even though the number of QR-code MP platforms are slowly increasing, little is known about the indications that promote the adoption of the service (Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva 2014).

Most of the researches contribute to the deeper analysis in terms of security, privacy, fraud and risk of QR-code MP system (e.g. Zhuang, Leung and Hughes 2017). However, successful technology is also a consumer-focused innovation that should achieve both efficiency and data accuracy (Choy and Park 2016). Thus, this research attempts to fill the first gap, by choosing QR-code MP as the object of study with the aim to know the factors that affect consumers' behavioural intention in using QR-code MP.

In addition, most of the MP researches place significant concentration on technology acceptance model (TAM) aiming to identify the factors that may influence the MP adoption (See Table 1.1). In TAM, perceived usefulness, ease of use and attitude variables are widely used in MP studies. To further understand the phenomena, Slade et al. (2015) suggest to further address the specific impacts of technological and individual factors to reflect the acceptance of MP. In recent studies, few researchers examine the impact of the innovation characteristics, social and economic factors (e.g. habit, hedonic motivation, price value) on consumers' adoption behaviour (e.g. Pham and Ho 2015), but yet again, these issues have not been widely discussed in QR-code MP studies or other forms of MP studies in Malaysia (Liebana-Cabanillas, Ramos de Luna, and Montoro-Rios 2015). For instance, the MP study conducted by Tan et al. (2014) in Malaysia has restricted to several psychological science constructs, finance-related risks, and the TAM constructs. Instead of applying TAM, Tan et al. (2014) further advise to examine relevant constructs in future research and shed light on previously overlooked gaps in

theoretical understanding. Such calls are also made by Venkatesh, Thong and Xu (2012), who urge the usage of UTAUT2 in mobile technologies adoption studies.

UTAUT2 is considered as a comprehensive model as it integrates the constructs of previous technology adoption theories (Baptista and Oliveira 2015). This makes UTAUT2 a preferable theory since it provides a clear relationship between the essential customer-oriented concepts and measure of behavioural intentions (Morosan and DeFranco 2016). However, studies adopting UTAUT2 are very limited in MP studies (Koenig-Lewis et al. 2015). As proposed by Venkatesh, Thong and Xu (2012), UTAUT2 needs to be applied to different technologies, alongside with other factors to validate its applicability in the consumer behaviour context. From the review of literatures, several common factors such as risk and knowledge (Koenig-Lewis et al. 2015; Morosan and DeFranco 2016) are used to extend the UTAUT2 model in MP adoption; hitherto, little interest has been paid to extend UTAUT2 with the individual difference construct, particularly in the Asian countries.

As such, this study incorporates an individual difference construct, namely personal innovativeness in information technology (PIIT). PIIT is an attribute that has been increasingly studied in the extant literatures. It has also been found to be relevant when analysing pre-adoption of information technology in developing countries, such as India (Thakur and Srivastava 2014), Taiwan (Pham and Ho 2016), and Malaysia (Tan et al. 2014). In addition, Slade et al. (2015) propose an integrated model of MP adoption that incorporates PIIT into the UTAUT2 model, which is underused in MP adoption (Dahlberg, Guo and Ondrus 2015). With the intention of effectively promoting the QR-code MP adoption, measuring the effects of UTAUT2 incorporated with PI would be a fruitful path forward in Sarawak's context (Oliveira et al. 2016; Ooi and Tan 2016).

Thirdly, Dahlberg, Guo and Ondrus (2015) encourage further study in different countries for more research findings. The previous QR-code MP study is mainly focused on the adoption in the developed countries (e.g. Spain) (Liebana-Cabanillas, Ramos de Luna and Montoro-Rios 2015). One of the areas where developing country is lacking is innovative technology adoption (Chai and Dibb 2014; *The Star Online* 2018). Thus, this study contributes to the richness of the existing literature by providing an enhanced understanding of QR-code MP adoption

in Sarawak state, which is also an emerging player in the QR-code MP market (Qasim and Abu-Shanab 2016). Each of the leapfrogging technology has both its enthusiasts and its sceptics. The critical question concerns the factors that will enable some to succeed in supporting leapfrogging.

QR-code MP is poised to become a potential payment solution in Sarawak, as both consumers and merchants could have adopted these payment solutions at a minimal investment, cost and risk (Ten 2018). This study believes it is necessary and timely to examine the factors that induce users' adoption behaviours on QR-code MP in Sarawak. The outcome could assist service providers in understanding the factors that influence the adoption of QR-code MP to inspire the development of value-added QR-code mobile payment.

Table 1.1 List of Mobile Payment Adoption Studies

No	Author, Year	Theory	Country	Sample	Adoption factors & Findings	Type of MP
1	Humbani and Wiese (2018)	Technology readiness index	South Africa	416 mobile phone users	Optimism (-) Innovativeness (-) Convenience (+) Compatibility (+) Insecurity (+) Discomfort (-) Perceived cost (+) Perceived Risk (+)	General MP
2	De Luna, Liébana-Cabanillas and Sánchez-Fernández (2018)	TAM	Spain	168 consumers	Subjective Norm (+) Perceived Usefulness (+) Attitude (+) Perceived Security (-)	SMS, NFC & QR-Code MP
3	Johnson et al. (2018)	DOI	United States	270 Internet users	Ease of Use (+) Relative Advantage (+), Visibility (+) Perceived Security (+)	General MP
4	Khalilzadeh, Ozturk and Bilgihan (2017)	TAM & UTAUT & UTAUT2	USA	412 restaurant customers	Facilitating Condition (-) Social Influence (+) Trust (-)	NFC
5	Luna et.al (2017)	TAM,TPB, TRA, TAM3,IDT	Brazil	423 mobile phone users	Attitudes toward Use (+) Subjective Norms (+) Perceived Security (+) Individual Mobility (-) Innovativeness (+)	NFC
6	Phonthanukititha worn, Sellitto, and Fong (2016)	TAM & IDT	Thailand	529 Thai mobile phone users	Compatibility (+) Subjective Norm (+) Perceived Trust (+) Perceived Risk (+) Perceived Usefulness (-), Perceived Ease of Use (-) Perceived Cost (-)	General MP
7	Ooi and Tan (2016)	MTAM	Malaysia	459 mobile users	Mobile Perceived Security Risk(-) Mobile Usefulness (+) Mobile Perceived Compatibility(+) Mobile Ease of Use (-) Mobile Perceived Trust (+) Mobile Perceived Financial Resource (+)	NFC

Table 2.1 List of Mobile Payment Adoption Studies

8	Oliveria et.al, (2016)	UTAUT2 & DOI	Portugal	789 students & alumni	Performance Expectancy (+) Effort Expectancy(-) Social Influence(+) Facilitating Conditions(-) Hedonic Motivation(-) Price Value(-) Perceived Technology Security(+) Innovativeness(+) Compatibility(+)	NFC
9	Morosan and DeFranco (2016)	UTAUT2	USA	794 hotel consumers	Performance Expectancy (+) Effort Expectancy(-) Habit (+) Social Influence(+) Facilitating Conditions(+) Hedonic Motivation(+) General Privacy (-) System-related Privacy (+) Perceived Security (-)	NFC
10	Makki, Ozturk and Singh (2016)	-	USA	412 restaurant customers	Self-efficacy (+) Innovativeness (+) Risk (-)	NFC
11	Koenig-Lewis et.al (2015)	TAM & UTAUT2	France	316 university students	Perceived Usefulness(+) Perceived Ease of Use(-) Perceived Risk (+) Knowledge(+) Perceived Enjoyment (-) Social Influence (+)	General MP
12	Balachandran and Tan (2015)	DOI	Malaysia	487 Adults	Relative Advantage (-) Compatibility (+) Complexity (+) Variety of Services (+) Amount of Information (+) Financial Cost (+)	NFC
13	Liébana-Cabanillas, Luna & Montoro-Ríos (2015)	TAM	Spain	168 Facebook Users	Attitude (+) Subjective Norms (+) Individual Mobility (-) Innovativeness (+)	QR-Code MP
14	Slade et.al, (2015)	UTAUT2	UK	244 consumers	Performance Expectancy (+) Effort Expectancy(-) Social Influence(+) Facilitating Conditions(-) Hedonic Motivation(-) Habit (+) Price Value (-) Trust in Provider(+) Perceived Risk(+)	NFC
15	Tan et al. (2014)	TAM	Malaysia	187 Bank customers	Perceived Usefulness (+) Perceived Ease of Use (+) Social Influence (+) Innovativeness (+) Perceived Risk (-) Perceived Financial Cost (-)	NFC

(+) = Significant impact on intention to use (-) = Insignificant impact on intention to use

1.3 Research Questions

What factors influence consumers' intention to adopt QR-code payment?

1.4 Research Objectives

The current study has the following general and specific objectives:

1.4.1 General Objectives

To identify the factors that influence the behavioural intention to adopt QR-code payment.

1.4.2 Specific Objectives

1. To examine the relationship between performance expectancy and behavioural intention to adopt QR-code payment.
2. To examine the relationship between effort expectancy and behavioural intention to adopt QR-code payment.
3. To examine the relationship between social influence and behavioural intention to adopt QR-code payment.
4. To examine the relationship between facilitating conditions and behavioural intention to adopt QR-code payment.
5. To examine the relationship between habit and behavioural intention to adopt QR-code payment.
6. To examine the relationship between hedonic motivation and behavioural intention to adopt QR-code payment.
7. To examine the relationship between price value and behavioural intention to adopt QR-code payment.
8. To examine the relationship between personal innovativeness and behavioural intention to adopt QR-code payment.

1.5 Definition of Terms

Table 1.2 – Definition of Terms

No	Constructs	Definition
1	**Performance Expectancy**	Degree to which using a technology will provide benefits to consumers in performing certain activities (Venkatesh, Thong and Xu 2012).
2	**Effort Expectancy**	Degree of ease associated with consumers' use of technology (Venkatesh, Thong and Xu 2012).
3	**Social Influence**	Degree to which consumers perceive that others important to them (e.g., family and friends) believe they should use a particular technology (Venkatesh, Thong and Xu 2012).
4	**Facilitating Conditions**	Consumers' perceptions of the resources and support available to perform a behaviour (Venkatesh, Thong and Xu 2012).
5	**Hedonic Motivation**	The pleasure or enjoyment derived from using a technology (Venkatesh, Thong and Xu 2012).
6	**Price Value**	Consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost of using them (Venkatesh, Thong and Xu 2012).
7	**Habit**	Degree to which individuals tend to perform behaviours automatically because of learning (Venkatesh, Thong and Xu 2012).
8	**Personal Innovativeness in Information Technology**	"The willingness of an individual to try out any new information technology" (Agarwal and Prasad 1998).
9	**Behavioural Intention**	"The extent to which an individual intends to adopt the technology in the future" (Venkatesh et al. 2003).

1.6 Organization of the Thesis

This section presents an overview of the general structure of the thesis and provides an adequate frame of reference for the latter chapters. The thesis is divided into five chapters. Chapter 1 outlines the background of the thesis with details on the prevalence of QR-code mobile payment. The research problem, research gap and research objectives of this study are demonstrated in this chapter.

Chapter 2 reviews the literature on mobile payment, core theories, and relevant studies related to the behavioural intention to adopt mobile payment services. This chapter further outlines the development of the research hypotheses. The formulation of each hypothesis is based on support from the extensive literature review. Then, the conceptual framework is presented.

Chapter 3 presents the research methodology and design of this study. First, the research process for a quantitative study, questionnaire design and pilot test are discussed. Second, the sample selection, data collection and data analysis techniques are detailed. Third, the results of the pilot study are presented. Next, the selection of the Structural Equation Modeling (SEM) technique is justified. The assessment of the measurement model including convergent validity, discriminant validity and the model fit is described. This is followed by the assessment of the structural model.

Chapter 4 presents and interprets the results of data analysed using SPSS. This includes results related to the demographic profile and testing the underlying hypotheses using the two-stage approach of structural equation modelling. The aim of the first stage is to have valid and reliable constructs in order to test the eight hypotheses presented in Chapter 2 that represent the relationships among them.

Chapter 5 provides a summary of hypotheses results and discusses the significant theoretical and practical contributions for both academic scholars and industry parties. Finally, the thesis concludes with discussions on the limitations of this study and recommendations on future research directions.

Chapter 2: Literature Review

2.0 Introduction

This literature review begins with discussions on the types of mobile payment and definition of QR-code mobile payment. The review describes the UTAUT 2 model that could provide practical insights into the behavioural intention to adopt QR-code mobile payment. The study then focuses on the development of hypotheses and conceptual model for this study.

2.1 Types of Mobile Payment

Prior literature defines mobile devices as the main characteristic in distinguishing between MP from other forms of payment (Phonthanukitithaworn, Sellitto, and Fong 2016). Yet, differences can be found during the payment process that generates different outcomes (Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva 2014). Hence, Dahlberg et al. (2008) advise researchers to classify MP systems into two categories: remote and proximity.

Remote payment system enables consumers to pay for online purchases through short message service or remote payment servers, such as mobile banking and mobile shopping (Zhou 2013). Proximity payment system represents a payment mode for purchasing ticketing, dining, or point-of-sale items, such as Quick Response Code (QR-code) payment and NFC (Near field communication technology) payment (Zhou 2013). Recent proximity systems represent substitutes for traditional payment methods such as cash or credit cards (Tan et al. 2014). The characteristics of NFC and QR-code based solutions are identified and presented in Table 2.

Table 2: Characteristics of QR-code and NFC mobile payment

	QR-code	NFC
Transaction Mode	Passive and Active QR-code Scan	In proximity to recipient
Pros	1. Greatest potential service base: Mobile device with a built-in camera or bar scanner 2. Low cost of deployment	1. Fast – "Tap and Go" 2. No need Internet connection 3. High level of security
Cons	1. Less secure than NFC-based Solutions 2. Requires Internet connection	1. High expense: Expensive for merchants to adopt NFC-enabled technology (invest in

		Point-of-Sale terminal). 2. Interoperability issue caused by exclusiveness of mobile device manufacturers 3. No guarantee of additional market value
Scenario	Small, Medium and Large Amount Payment	Small Amount Payment
Examples	Wechat Pay, Boost, Vcash	ApplePay, SamsungPay

2.1.1 Near Field Communication (NFC)

Near Field Communication (NFC) is one of the popular proposed solutions for proximity-based mobile payment (Leong et al. 2013). The NFC technology enables the consumers to exchange the payment information with the merchant's POS terminal by simply touching or waving the mobile devices close to the terminal (typically 20 cm) (Leong et al. 2013).

NFC is widely viewed as one of the most promising technologies in the mobile proximity payments due to its security features and performance (de Reuver and Ondrus 2017). Although NFC technology provides a secure method to perform a transaction, there are criticisms in the market towards the acceptance of NFC mobile payments. Some argue it is a costly alternative, which would take small businesses up to ten years to fully embrace (Donovan 2012). Critics state that complex associations between banks, software developers, mobile phone operators are needed to make the NFC payment work. For example, NFC has been criticised for the fact that the payment method is limited by the uptake of NFC friendly devices by consumers.

On the supplier side, businesses need to install NFC enabled POS terminals to implement NFC technology, so this increases the cost of business, which is still an important reason for failure in the NFC domestic popularity (Slade, Williams and Dwivedi 2013). The COO of mobile payment company, Keith Rabois also states that NFC offers no value to both consumer and merchants (McHugh and Yarmey 2014).

2.1.2 QR-code Mobile Payment

Among all the payments, QR-code payment has been widely accepted in Asia countries (Lou, Tian and Koh 2017). It is defined as "a technology of information

storage, transferring, and recognition can be decoded by mobile phone anywhere" (Lu et al. 2017).

QR-code is an optical label that embeds payment information about the shop or products. The code can be decrypted by a barcode reader such as smartphone cameras (Zhu et al. 2016). The users can optically capture the QR-code provided by merchants by using a secure MP app to initiate the payment process (Goula 2017). With increasing time pressure, QR has been expanded from digital acceptance points to self-service options for paying bills at home (Griffiths 2014). By using QR payment, consumers have the benefits of avoiding crowds, queuing, and saving travel costs and time (Ani 2016). The payment method increases the efficiency and customers' satisfaction by allowing speedy completion of transactions (Lou, Tian and Koh 2017).

As shown in Table 2, it can be seen that QR-code mobile payments are less superior in terms of security and performance compared with NFC mobile payment. However, QR-code mobile payment can significantly reduce the dependencies of initiatives on other stakeholders and the adoption cost for both consumer and merchant. Furthermore, it ensures good interoperability among mobile network operators, mobile devices providers and banks. The QR-codes can be scanned through smartphone software (apps) and enjoy many possibilities in relation to both remote and online-payments as well as other value-added services (de Reuver and Ondrus 2017).

It is known that a number of studies have focused on NFC mobile payment adoption (e.g. Tan et al. 2014). However, it is supported by the literature that consumers' behaviour towards different mobile payment systems will differ from one system to another (Luna et al. 2018). In other words, particular mobile payment behaviour itself cannot be applied in a global manner. Thus, it is important for researchers to provide a systematic way to explore what factors influence the adoption of particular information systems to enhance the effectiveness of the services that the new technology provides (Luna et al. 2018).

In this study, Sarawak aims to facilitate the use of mobile payments using quick response technology, to get not only large business but also small and medium enterprises on board the country's cashless initiative (Teo 2018). The implementation of QR-code is believed to be an innovation that makes sense for all range of

enterprises from both cost and growth perspective. Although consumers could already see signs of QR-code payment being used in Sarawak, there is limited study directly analysing the adoption intention of the system. This makes the current study more significant.

2.2 Theoretical Background

In terms of theoretical frameworks, a number of adoption theories have been extended in the context of mobile payment, such as the technological acceptance model (TAM), theory of reasoned action (TRA), theory of planned behaviour (TPB), diffusion of innovation theory (DOI), unified theory of acceptance and use of technology (UTAUT) and unified theory of acceptance and use of technology 2 (UTAUT 2). Among the adoption theories, the TAM model has been widely used and underpinned in mobile payment adoption research (Dahlberg et al. 2015; De Luna, Liébana-Cabanillas and Sánchez-Fernández 2018; Khalilzadeh, Ozturk and Bilgihan 2017). (See Table 1.1). In order to understand and determine which model is suitable for this study, a review of Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT/ UTAUT2) will be discussed in this section.

2.2.1 Technology Acceptance Model (TAM)

The TAM model advocated by Davis (1989) has been widely accepted as a framework to understand users' technology acceptance processes. TAM is an adaptation of Ajzen and Fishbein's (1980) theory of reasoned action (TRA) to explain computer usage behaviour.

TAM model concentrates on white collar environment attempting to predict technology use in a working environment. In its formulation, users' intention to use technology is explained by two major determinants: perceived ease of use and perceived usefulness. Perceived usefulness represents the user perception of how new technology will increase his/her performance. On the other hand, perceived ease of use is the evaluation of the level of effort needed to use the new system (Davis 1989). Perceived usefulness is, in turn, influenced by perceived ease of use. One of the most significant findings of these determinants in the study is the relationship between usefulness - usage and ease-of-use - usage. Particularly, the relationship between usefulness and intention implies that the person believes that his/her job

performance is enhanced, regardless of positive or negative feelings (Davis, Bagozzi and Warshaw 1992).

The TAM model has been widely used for its clear structure and it is easy to apply to different situations. Previous studies have utilized the TAM model with some degree of success. Kim and Shin (2015) extend the TAM model to investigate smartwatch adoption among South Korean consumers. Tan et al. (2014) extend the TAM model to investigate NFC mobile payment adoption among Malaysia consumers. Both of these studies are effective, but it is also an example of theories that require additional variables because it does not explain all aspects of user acceptance.

Moreover, Venkatesh and Davis (2000) mention that one of the limitations of TAM is that it provides limited guidance about how to influence usage through design and implementation, which does not help understand acceptance in ways that guide the development of the system characteristics. Also, Khan and Woosley (2011) recommend that there is a need to expand the TAM model to embrace social and human factors. Other researchers like Priyanka and Kumar (2013, 147) observe the theory which "includes questionable heuristic value, limited explanatory and predictive power, triviality, and lack of any practical value". Additionally, Benbasat and Barki (2007) criticize the model for not being able to accommodate and adapt to the frequently changing IT settings.

2.2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

In 2003, Venkatesh et al. (2003) introduce an extension of the TAM model by capturing conceptual similarities and disparities across eight models to formulate the UTAUT model that relates to organisation contexts. The eight models are Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), motivational model, Theory of planned behaviour (TPB), combined TAM&TPB, innovation diffusion theory, social cognitive theory and the model of PC utilization. The model consists of 4 constructs: performance expectancy, effort expectancy, social influence and facilitating conditions. Since its publication in 2003, the UTAUT model has been cited by a great number of studies to investigate employees' readiness to complete certain tasks by integrating available technology (Venkatesh, Thong and Xu 2016). Because of its integrated approach, the model explains 70% of the variation in usage

intention and 50% in technology usage (Venkatesh, Thong and Xu 2012), which has rich explanatory ability in the intention and usage of technology compared to TAM model (Nair, Ali and Leong 2015).

The creation of new IT systems has attracted researchers to apply UTAUT model in predicting consumers' acceptance of mobile commerce, mobile banking, and mobile shopping (Williams, Rana and Dwivedi 2015). However, Teo (2015) criticize UTAUT for showing bias across different countries and contexts. In other words, the UTAUT theory has been adopted in a few mobile payment research studies in the individual users' contexts, however, the theory was originally developed for the organisational users in which the usage of technology is mandatory. Therefore, the constructs used in the mandatory environment of organisational context might not meet the requirements of consumers' voluntary adoption intention of innovations. Accordingly, Venkatesh, Thong and Xu (2012) urge to extend UTAUT with extra constructs as this may be crucial for explaining technology acceptance in consumer technology use context.

2.2.3 Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2)

The UTAUT was developed as a comprehensive integrated model for better understanding organisational users' acceptance toward new technology or system. According to Venkatesh, Thong and Xu (2012), there are three types which can enhance the prediction ratio of technology acceptance. The first type is to consider the consumer acceptance of new technology in variety of contexts such as culture and population. The second type is to consider to add different concepts to the model so as to widen the theoretic relationships of UTAUT. For the third type, Venkatesh, Thong and Xu (2012) consider to synthesize new predictor of variables into the UTAUT.

In 2012, Venkatesh, Thong and Xu (2012) develop a comprehensive theoretical framework for consumer use context by extending the UTAUT with three constructs: hedonic motivation, price value and habit. UTAUT2 claims greater predictive ability than UTAUT, which produces a substantial improvement in the variance explained in behavioural intention (74%) and technology use (52%). Due to its novelty, the authors highlight the necessity to test UTAUT2 in different cultures and settings in order to enhance its applicability and robustness.

In recent years, most of the Malaysian studies validate the UTAUT2 model in a web-based technology context, however, fewer studies have been done in the mobile technology context. For instance, researchers investigate the influence of UTAUT2 constructs on e-learning system (Ain, Kaur and Waheed 2016), mobile learning (Yang 2013), lecture capture system (Nair, Ali and Leong 2015) and social networking sites (Sharifi et al. 2016).

Only a few researchers include particular UTAUT2 constructs in attempts to predict mobile payment use. To highlight a few, Kerviler, Demoulin and Zidda (2016) find that hedonic motivation construct from UTAUT2 is one of the important

predictors of intention to adopt MP. Yen and Wu (2016) reveal that the habit construct from UTAUT2 predicts the mobile financial services adoption.

On the other hand, some scholars revisited the UTAUT2 core model by eliminating constructs or including additional constructs (e.g. Oliveira et al. 2016; Morosan and DeFranco 2016; Slade et al. 2015) in order to capture the specifics of task environments under MP study. Due to its novelty, studies using the UTAUT2 with the intention to adopt MP are limited (Hess et al. 2014). Since the purpose of this study is to explore the possible factors influencing individual users' adoptions of QR-code mobile payments, the UTAUT2 framework can provide more insights and, thus, will be adopted as the research model of this work. Hence, the model is chosen in this study as it (a) has higher predictive power and is designed based on the consumers' context (Venkatesh, Thong and Xu 2012) (2) is rarely explored in MP context (Dahlberg, Guo, and Ondrus 2015) (3) has engaged empirical validation in variety of IT contexts (Morosan and DeFranco 2016).

However, UTAUT2 model is insufficient in capturing the true essence of MP adoption (Tan et al. 2014). Taking the cue, this study includes personal innovativeness in information technology (PIIT) as an individual differences variable. The PIIT proposed in this study is different from the "innovativeness" construct in Diffusion of Innovation (DOI) theory. In DOI, innovativeness is considered as an innate characteristic that all individuals have at a lower or higher level and is conditional on a series of social factors. In general, innovativeness measures individuals' earlier adoption of technology behaviours which eventually leads to mass adoption of other people (Rogers 1995).

Despite DOI's contributions, Agarwal and Prasad (1998) argue that individuals change their beliefs about new technologies by combining info from various media. The authors further describe personal innovativeness as a risk-taking propensity that exists in certain individuals and not in others. For instance, for the same publicity to a variety of media, individuals with higher personal innovativeness are expected to possess more positive beliefs towards the target technology. Hence, personal innovativeness in information technology is more predictive of a particular behaviour than the general conception (Agarwal and Prasad 1998).

PIIT has been included in several IT adoption studies over the years. Among the studies, Serenko (2008) affirms that PI is a continuous and situation-specific trait

which has a strong tendency to influence IT adoption. Recent studies also reveal PIIT as a major factor for the diffusion of mobile payment (Makki, Ozturk and Singh 2016), mobile banking (Chitungo and Munongo 2013), mobile learning (Joo, Lee

and Ham 2014) and mobile credit card (Tan et al. 2014). Thus, in this study, innovativeness is considered to be specific to a domain but not a general characteristic of the individual's personality (Goldsmith and Hofacker 1991).

2.3 Hypotheses Development

The following section explains the development of the conceptual framework and the hypotheses.

2.3.1 Performance Expectancy (PE)

Performance Expectancy (PE) is the degree to which using a particular technology will provide benefits to consumers in performing certain tasks (Venkatesh, Thong and Xu 2012). Performance Expectancy variable represents perceived usefulness (Davis 1989), extrinsic motivation (Davis, Bagozzi and Warshaw 1992), job-fit (Thompson, Higgins and Howell 1991), relative advantage (Moore and Benbasat 1991) and outcome expectations (Compeau and Higgins 1995) constructs from previous technology acceptance model. It is a recognized antecedent of behavioural intention to technology adoption (Venkatesh, Thong and Xu 2012).

In technology adoption context, performance expectancy represents such features as efficiency, effectiveness, time and money saving, benefit seeking and others that are known to attract users to mobile application (Hew at al. 2015). Kim, Wang and Malthouse (2015) also mention convenience among the features that may draw consumers to mobile applications and differentiate mobile applications from other competing technologies. The empirical studies demonstrate that the greater the performance expectancy, the more likely mobile payment would be adopted.

Recently, various empirical researchers have delivered support for the belief that performance expectancy is a key forecaster of mobile payment adoption, capturing the considered advantages linked with mobile payment adoption (Slade et al. 2015; Baptista and Oliveira 2015; Oliveira et al. 2016; Wu and Lee 2017). Researchers believe that MP services could help to improve payment efficiency such as eliminating the need to carry cash, shortening payment time and improving payment convenience by paying anytime, anywhere (Morosan and DeFranco 2016). Besides, the simplified payment process has been found to greatly increase peoples' intention of the MP services (Shin 2010). The multiple benefits brought by MP related to location and time independent transactions will lead to proper time

management (Slade et al. 2015). When customers perceive MP apps as easier and faster alternatives to traditional modes of payment, it will eventually lead to behavioural intention to use (Shin 2010). Hence,

H1: Performance Expectancy has a positive effect on behavioural intention to adopt QR-code payment.

2.3.2 Effort expectancy (EE)

Effort expectancy (EE) is defined as an individual's evaluation of the effort necessary to complete a task using a given technology (Venkatesh, Thong and Xu 2012). When consumers perceive higher effort in using an innovative technology, their tendency to using the technology will decrease (Zhou 2011). EE is interchanged with perceived ease of use and complexity (Venkatesh et al. 2003), which has been validated as a significant antecedent of intentions to use new technology (Venkatesh, Thong and Xu 2012).

Yet, Morosan and DeFranco (2016) and Oliveira et al. (2016) found that the ubiquity of mobile phones makes EE for mobile-based technology less important. Also, Chong (2013) found that EE has no effect on BI to use familiar technology. The findings explain that EE might be more significant for nonusers who are unfamiliar with MP (Slade et al. 2015).

Owing to the fact that services on mobile devices may be viewed as complicated and tedious due to the various physical constraints associated with mobile payment (such as difficulties inputting information or the unclear navigations), mobile payment must comprise of ease of learning. Taylor and Levin (2014) report that users of mobile applications are interested in the simplicity of transaction and prefer mobile applications that have less distracting and irrelevant features. Moreover, Cugola et al. (2014) mention that customers prefer the applications to be adaptive and functional on various devices. This indicates that customers prefer to put less effort into learning how to use a mobile application. Hence, it is assumed that the influence of effort expectancy on the decision to use a system is important during the beginning phase of adoption.

Supports for the role of effort expectancy in behavioural intention are provided by previous empirical studies in Malaysia (Tan and Lau 2016; Wong et al. 2015: Ahmed and Phin 2016). Effort expectancy has also been shown to positively

influence behavioural intention in the context of mobile payment in Malaysia (Teo et al. 2015; Ramayah et al. 2017). Accordingly, if it is considered that mobile payment technology is easy to use, an individual will have positive attitude concerning mobile payment utilisation.

In the MP context, the ease of using technology can be evaluated from user s' experience on the app; time required to complete a task (e.g. smooth transaction), understandable features offered, and navigation simplicities (Weerakkody et al. 2017). It is assumed that when customers perceive MP apps are easier to use compared to current modes of payment, EE will then be expected to affect BI, hence：

H2. Effort Expectancy has a positive effect on behavioural intention to adopt QR-code payment.

2.3.3 Social Influence (SI)

During the early stages of technology implementation, most of the potential users experience a lack of reliable information on them (Kerviler, Demoulin and Zidda 2016). As such, social context plays a large role in influencing the attitude towards the new system (Oliveira et al. 2016). Social influence is equivalent to the subjective norm in TRA (Taylor and Todd 1995), where Venkatesh, Thong and Xu (2012) define this construct as the degree to which an individual perceives the approval of certain behaviours by other people's opinions, superior influences, and peer influences in their studies.

Social influence has been considered as a critical component in the decision-making process for people in behavioural science (Lu et al. 2017). From a consumer power perspective, Wei et al. (2009) and Lu (2014) claim that social influences can be reflected in the current high interconnection between individuals stemming from the rapid development of social media. Thus, mass media becomes a source of social influence.

On the other hand, payments are generally made in a public or social environment where individuals can observe other behaviour and thus possibly to be influenced by the people who are important to them (Koenig-Lewis et al. 2015). It is then believed that the adoption of mobile payment will be easy when it is supported and approved by family members, friends, colleagues and so forth (Wei et al. 2009;

Dinh, Nguyen and Nguyen 2018). Thus, the core measures of subjective norms still apply in this context.

A number of mobile technology studies in developing countries incorporate social influence into their operational models (Chong 2013; Chan and Chong 2013; Wei et al. 2009). The studies also successfully support the positive relationship between social influence and behavioural intention to adopt the information system. Drawing the above literature review, the adoption of mobile payment can be determined by social influence.

H3: Social Influence has a positive effect on behavioural intention to adopt QR-code payment.

2.3.4 Facilitating Conditions (FC)

Facilitating conditions (FC) refer to the user perceptions of the availability of the resources and support to utilize a given technology (Venkatesh, Thong and Xu 2012). Venkatesh et al. (2003) formulate facilitating conditions construct from the model of PC utilization (Thompson, Higgins and Howell 1991), perceived behavioural control (Ajzen 1991; Taylor and Todd 1995) and compatibility (Moore and Benbasat 1991).

In the mobile technology context, customization and personalization of the mobile application could be important in facilitating condition for potential users. For instance, Kim, Wang and Malthouse (2015) describe that customization among the features could increase the user willingness to interact with the mobile application. Also, Morosan and DeFranco (2016) confirm the importance of service personalization for mobile payment applications' adoption. Moreover, Cugola et al. (2014) describe that it is important for mobile applications to be adaptive and functional on various types of devices. Hence, user knowledge, experience, environments and high levels of compatibility could lead to a higher degree of innovation adoption. As mobile applications become more interactive, the ease with which the innovation fits into a consumer's current lifestyle or situation may also become a facilitating condition for the intention to adopt mobile application (Legner, Urbach and Nolte 2016).

In the mobile payment context, customers are required to have basic operational knowledge, skills, resources and also technical infrastructure in order to

perform a task through an innovation (Alalwan, Dwivedi and Rana 2017). Previous technology-adoption studies demonstrated positive effects of facilitating conditions on the use of new technologies as well (Alalwan, Dwivedi and Rana 2017; Morosan and DeFranco 2016). The finding in Malaysia also states that the infrastructure such as smartphones, 4G services, Internet access, secured applications are possible factors that motivate MP adoption (Teo et al. 2015). In the replication of UTAUT2 model, Hew et al. (2015) report that the high level of users' perception of facilitating conditions, such as online support, mobile devices, internet connection influence the intention to adopt the mobile application.

Hence, it is known that when new users possess digital literacy and find that corresponding help or guideline is available during the usage process, they will have stronger behavioural of mobile payment adoption (Lucini and Evans 2015). Therefore:

H4: Facilitating Conditions has a positive effect on behavioural intention in QR-code payment.

2.3.5 Habit (HT)

Habit is defined as the automatic performance of certain tasks or behaviours among consumers because of the satisfactory results obtained in the similar task environment (Venkatesh, Thong and Xu 2012). Venkatesh, Thong and Xu (2012) found habit to have a more significant effect on BI than any other UTAUT2 variables. Yet, habit development requires repetition or practice (Gardner et al. 2014). Therefore, the habit construct is excluded in few MP research studies since habit is less applicable in a relatively new technology that has yet to gain widespread use among consumers to form a used habit (Oliveira et al. 2016; Koenig-Lewis et al. 2015; Slade et al. 2015).

However, Jia, Hall and Sun (2014) examine the effect of different technology usage habits and found that mobile service usage has a positive relationship with users' intention to use mobile payments. The result denotes that mobile payments and other mobile commerce apps are similar to some extent; as the app usually guides users through the paying process which are comparable to MP contexts (Jia, Hall and Sun 2014). Accordingly, habit may enable the transfer of actions from

general to particular contexts (Morosan and DeFranco 2016), allowing behaviours to manifest in the presence of QR-code payment.

Nowadays, mobile services have well integrated into human lives (Hew et al. 2015). The usage behaviour makes users unconsciously reliant on mobile technology services as they are more likely to repeat behaviours that can be performed with less effort (Hsiao, Chang and Tang 2016). Hence, it is believed that the repetitive use of mobile phones for services will slowly evolves into habit. The habit then fosters user's intention to adopt a similar mobile technology without planning (Giovanis, Binioris and Polychronopoulos 2012).

Psychology and behavioural sciences also suggest that users' habits are important factors of IT adoption (Fuller and Dennis 2009; Limayem, Hirt and Cheung 2007). Indeed, some studies find that when forming a habit of using mobile technology, consumers would increase their willingness to use similar mobile technology services (e.g. Hsiao, Chang and Tang 2016; Baptista and Oliveira 2015). For example, Yen and Wu (2016) demonstrate that customers are likely to use mobile financial services due to personal habit. A study conducted by Morosan and DeFranco (2016) also found that habit will influence the consumers' development of intentions to use NFC mobile payment. Therefore, based on the findings above, this study posits the following hypotheses:

H5. Habit has a positive effect on behavioural intention to adopt QR-code payment.

2.3.6 Hedonic Motivation (HM)

Hedonic motivation (HM) represents the "intrinsic motivations" within the consumers (Kim 2016). HM is interchangeable with perceived enjoyment where consumers adopt new technologies not just to enhance performance but also as sources of enjoyment (Koenig-Lewis et al. 2015). HM plays a significant role in the technologies adoption, such as mobile banking (Alalwan, Dwivedi and Rana 2017), mapping apps and mobile commerce (Verkijika 2018). In MP context, HM involves a desire to experience instant gratification and emotionally satisfaction of an emerging system (Koenig-Lewis et al. 2015). Due to the fact that QR MP is considered as novel technology in Sarawak, the technology might stimulate the feelings of joy and gratification in using it (Alalwan, Dwivedi and Williams 2016).

Apart from the novelty-seeking trait, Kerviler, Demoulin and Zidda (2016) also identify that if consumers enjoy the interface design (e.g., detailed information, attractive digital receipt patterns and interactive designs), they find the emotional motivation to interact with the system (Simintiras et al. 2014). Besides that, the interactive features (e.g., gamification) of smartphone applications might bring meaningful enjoyment which is expected to increase customers' intention to use (Kim and Ahn 2017). For example, grabbing the red packet in Wechat and "hiding" of red envelopes in Alipay.

HM is a salient construct in the MP adoption process among consumers (Morosan and DeFranco 2016). It is found to have a positive influence on new users' behavioural intention on proximity MP (Kujala, Mugge and Miron-Shatz 2017; Wu and Lee 2017). Also, the perceived entertainment value has a significant effect in Malaysian consumers' acceptance of mobile application (Goi and Ng 2011). Thus:

H6: Hedonic Motivation has a positive effect on behavioural intention to adopt QR-code payment.

2.3.7 Price Value (PV)

Price value (PV) is defined as consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them (Venkatesh, Thong and Xu 2012). In other words, PV is evaluated according to the values of service offered, compared with the monetary sacrifices the consumer makes to acquire and use a service (Venkatesh, Thong and Xu 2012). If the perceived benefits of using a particular technology are greater than the perceived monetary cost, price value has a positive impact on the intention to adopt mobile payment (Venkatesh, Thong and Xu 2012).

In consumer usage context, consumers have to bear the monetary cost of using the technology (Venkatesh, Thong and Xu 2012). However, several researchers study based on consumers' perspectives often omits the price value construct, by considering the fact that the MP application provided is free of charge (e.g. Koenig-Lewis et al. 2015). Conversely, a study conducted by Chong (2013) in the developing country shows the costs such as data usage payment and the cost of mobile devices are still a concern for consumers although the application is free. Thus, previous research enhances the important role of price value in the conceptual

model. In line with Chong (2013), monetary cost is measured by the cost paid for accessing mobile app, such as the mobile equipment (smartphone), network charges and mobile maintenance fee that can be weighed against the perceived benefits of mobile payment (e.g. Slade 2015; Balachandran and Tan 2015; Alalwan, Dwivedi and Williams 2016; Alalwan, Dwivedi and Rana 2017).

On the other side, the perception of perceived value is associated with time, distance, and cost savings, as well as with the other benefits or quality offered (Kerviler, Demoulin and Zidda 2016). This specifically holds true in the context of MP services as they facilitate the transaction speed (Ozturk et al. 2017). Convenience is also a potential benefit delivered by MP due to its novel and technological features (e.g. no need to carry a wallet) (Kerviler, Demoulin and Zidda 2016). Besides that, the net benefit can be acquired by comparing the difference in technology usage cost and its perceived value with another similar payment method, such as credit card, debit card and cash (Yuan et al. 2015; Sheikh et al. 2017).

Price value has been studied in various contexts such as mobile payment, mobile banking and mobile internet (Wu and Lee 2017; Alalwan, Dwivedi and Rana 2017; Venkatesh, Thong and Xu 2012). Wu and Lee (2017) find that PV has a positive influence on intention of mobile payment usage due to the lower service charges compared to banks in Korea. Likewise, Alalwan, Dwivedi and Rana (2017) indicate that Jordanian customers' intentions are derived by the role of price value due to the lower costs of financial transactions applied by mobile banking. The significant influence of perceived price value over intention has also been proven by Deng et al. (2014) on the utility of a free mobile health app. In Malaysia context, Ooi and Tan (2016) and Tan et al. (2014) find that sunk cost is of no concern to consumers as they perceive the prices of devices and data plan as reasonable for the usage of NFC mobile (Teo et al. 2015).

In light of the preceding findings, this study proposes the consumers will perceive that the benefit to be gained from using mobile payment is of greater value than monetary cost. Therefore, a further hypothesis is that:

H7: Price Value has a positive effect on behavioural intention to adopt QR-code payment.

2.3.8 Personal Innovativeness in Information Technology (PIIT)

In this study, the QR-code payment method delivers an innovative and new way for Sarawak users to achieve greater payment efficiency, also toward digital economy. Due to novelty and the uncertainty of the new product, individuals develop a resistance to adoption (Veryzer 1998). The notion of "adoption" in the context of innovations is characterized by decisions often made in light of higher risk, lower familiarity and knowledge, and in unknown reactions from an individual's social system (Rogers 1995).

Reviewing the literature on individual innovation, sociologists reveal akin definitions that describe adoption of emerging innovation by the individual - "the degree of how early an individual is to adopt an innovation" by Rogers and Shoemaker (1971); the tendency to buy new products after they appear in the market and relatively earlier than most other consumers in the market segment by Foxall, Goldsmith and Brown (1998). Similarly, Midgley and Dowling (1978) categorise innovativeness as the extent to which individuals are receptive to new ideas and make decisions about innovations independently of the communicated experiences of others.

All the definitions are slightly similar to Rogers (1983) Diffusion of Innovation (DOI) which is defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system". In his work, Rogers further proposed four elements that must be present in the diffusion of innovation process, namely innovation, communication channels, time, and social system (Rogers 1983). Yet, it is unlikely that a consumer will reflect greater readiness in accepting every product and service that they are aware of (Vandecasteele and Geuens 2010).

Goldsmith and Hofacker (1991) and Chao, Reid and Mavondo (2012) highlight the flaws associated with general approaches to innovativeness. Agarwal and Prasad (1998) also argue that personal innovativeness should be applied specifically to a particular product category or domain. Further, Agarwal and Prasad (1998) develop personal innovativeness in information technology (PIIT) which is defined as "the willingness of an individual to try out any new information technology".

Agarwal and Prasad (1998) further describe PIIT as personal trait variable, symbolizing the risk-taking propensity that exists in certain individuals. Consumers

with PIIT are recognized as capable of coping with large amounts of uncertainty, thus they tend to develop more favourable intentions towards using innovations or new technology (Lu, Yao and Yu 2005). Liu et al. (2015) mention individuals with PIIT tends to have a strong sense of curiosity and are more likely to try new things. Johnson et al. (2018) also specify that innovative users usually form positive perceptions in terms of relative benefits, ease of use, compatibility, which implies the importance of PIIT for BI.

In mobile technology context, an individual's innovative personality is explored as a concept of risk-taking tendencies since it involves unavoidable risk and uncertainty (Tan et al. 2014). Accordingly, extant literatures delineate that such innovative disposition of individuals can serve as a direct determinant for mobile technology adoption (Im and Ha 2014). For instance, PIIT concept is found to be a key determinant of new product and innovation adoption across mobile financial services (Lee et al. 2012). Yang et al. (2012) find PIIT plays a significant role in facilitating initial adoption of MP services in China. Similarly, Thakur and Srivastava (2014) confirm that the adoption of MP is determined by PIIT in India. Tan et al. (2014) also conduct a study with respondents in Malaysia, and the findings verify that PIIT has the strongest impact on intention to adopt MP.

Since previous studies in the MP literature have demonstrated the important role that PIIT plays in adoption intention in developing countries, thus, a similar effect may occur when the study is conducted in a similar context. Accordingly, this study believes that PIIT consumers are more likely to explore and adopt QR-code mobile payments in Sarawak. Therefore:

H8: Personal innovativeness has a positive effect on behavioural intention to adopt QR-code payment.

2.3.9 Behavioural Intention (BI)

Behavioural intention (BI) is defined as a person's intentions to perform various behaviours (Fishbein and Ajzen 1975). The construct originally developed in TPB and TRA, and is widely used in following models related to technology acceptance (eg. TAM (Davis 1986), TAM2 (Venkatesh and Davis 2000), TAM3 (Venkatesh and Bala 2008), UTAUT (Venkatesh et al. 2003), and UTAUT 2 (Venkatesh, Thong and Xu 2012). Intentions to perform a behaviour result from

conscious decision-making (Davis 1989), and thus they represent probabilities of behavioural responses (Fishbein and Ajzen 1975).

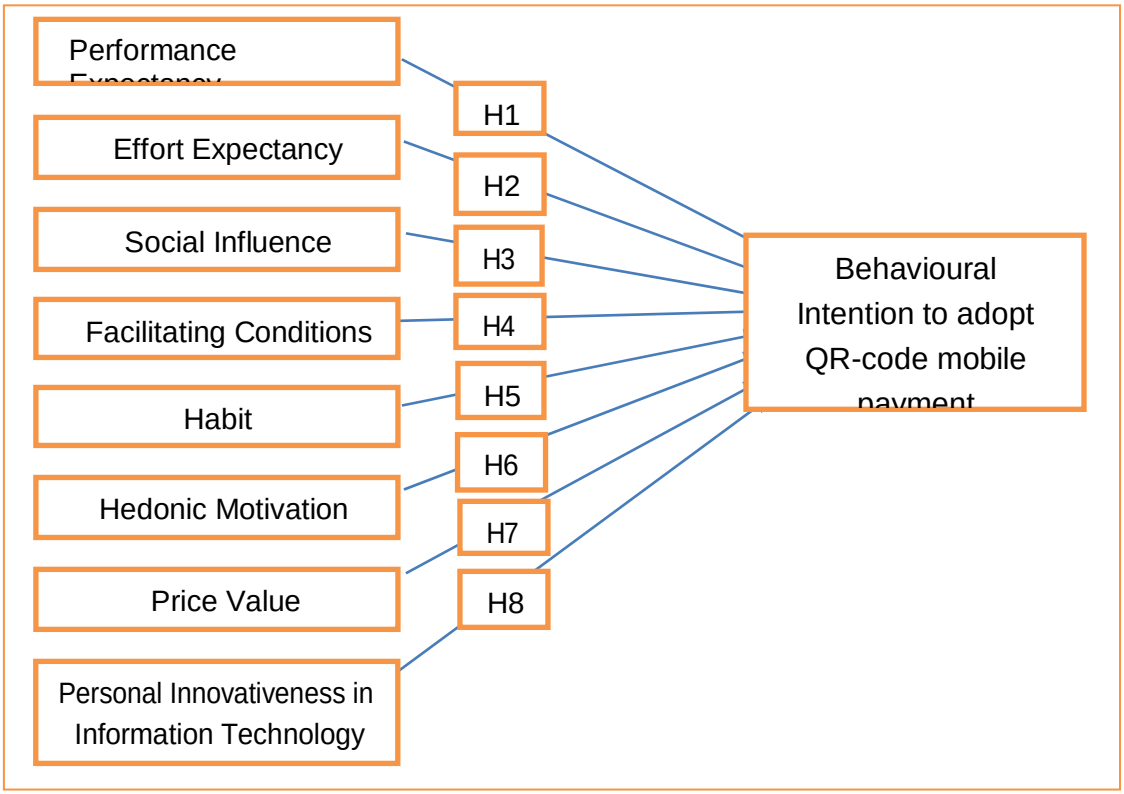
There is evidence in prior studies that shows that BI is driven by an individual's attitude towards actual behaviour and social norms (Tan et al 2014). Consumers with a higher intention to adopt new technology are more likely to become adopters (Leong et al. 2013) and to recommend the technology to others (Miltgen, Popovič and Oliveira 2013). Therefore, behavioural intention is a key construct to predict actual behaviour. Follow previous studies, BI is a dependent variable in the current study (e.g. Qasim and Abu-Shanab 2016; Oliveira et al. 2016; Yen and Wu 2016).

Besides that, BI is suitable to use in situations which the system is not uniformly deployed and actual use behaviour cannot be observed (Morosan and Defranco 2016). Therefore, consumers' intentions to use the QR-code payment system is used in this study as an indicator of actual use behaviour.

2.4 Conceptual Framework

Based on the discussion above, Figure 1 illustrates an integrated conceptual framework that can be used to achieve the purpose of this study.

Figure 1: Conceptual Framework of the Study



2.5 Summary

This chapter discusses a review of the extant literature on the concept of the theoretical foundations that are relevant to addressing the present research objectives. The hypothesized relationships between variables of this study are developed based on the extant literatures in the context of mobile payment industry. Further, the inclusion of personal innovativeness as an important variable provides a better understanding of the role that PIIT play in the proposed theoretical model.

Chapter 3: Research Methodology

3.0 Introduction

This chapter encompasses an explanation of research design, followed by a description of the data collection method, including sampling procedures, operationalization of variables and questionnaires design. Meanwhile, there will be an assessment of the validity and reliability of the questionnaire, ethical considerations and a discussion of data analysis techniques.

3.1 Research Design

A research design is a blueprint for conducting a study with maximum control so that desired information can be obtained (Creswell 2012). There are three types of research design, namely, quantitative, qualitative and mixed methods approach (Creswell 2014). Previous researchers have mainly used quantitative methods in examining the antecedents of consumer behavioural intentions toward MP adoption (e.g. Oliveira et al. 2016; Slade et al. 2015).

The quantitative approach is selected in this study as well to exa mine the similar phenomenon that has already been researched in different countries (Creswell 2014). This method grants the opportunity for researchers to use static data to make powerful interpretation (Creswell 2014). Besides that, the quantitative research method is highly recommended in situations when the researcher wants to determine the significance of the relationship between a specified variable and another (Babbie 2016).

3.1.1 Nature of Research Design

Quantitative research designs may be descriptive or experimental (Saunders, Lewis and Thornhill 2012). This study is categorised as a descriptive study. Descriptive research is used to estimate consumer behaviour in a particular phenomenon, and determine perceptions and attitudes (Malhotra 2010). The phenomenon discussed in this research portrays the factors influencing the adoption of QR-code MP. The main purpose is to ensure a valid estimate of a relationship between variables based on a large sample (Iacobucci and Churchill 2010).

3.1.2 Time Horizon of Research Design

The descriptive study can be either cross-sectional or longitudinal (Saunders, Lewis and Thornhill 2016). The present study adopts a cross-sectional method to answer the research hypotheses. The cross-sectional study gathers data to make inferences about a population of interest at one point in time (Saunders, Lewis and Thornhill 2016; Sekaran and Bougie 2016). The data collection is conducted between 21 July 2018 to 05 August 2018, where respondents to the survey are approached only once (Malhotra and Dash 2013). The cross-sectional data collection method is considered sufficient as it is normally used by many researchers in MP studies due to time constraints (e.g. Qasim and Abu-Shanab 2016; Oliveira et al. 2016; Yen and Wu 2016). The data collection process ends when the desired sample size is reached.

3.2 Sampling Design

Sampling design is a definite plan in obtaining a sample from a given population. The sampling design process includes several steps: define the study population, sampling elements, determine the sample size, sampling location and sampling techniques (Malhotra and Peterson 2014). The sampling design process will be discussed in the following sections.

3.2.1 Target Population

The target population is the collection of elements that possesses a common set of characteristics that the researcher looks for (Malhotra and Peterson 2014). The target population of this study is Sarawak consumers. According to the Consumer Protection Act (1999), 'consumer' is defined as an individual who purchases goods or services to satisfy personal or household needs, wants or desires. As this study intends to examine the adoption intention of mobile payment technology, consumers are suitable for this study as they are the one who are involved in the payment process at regular intervals.

3.2.2 Sampling Elements

The sampling elements are the target respondents of a study (Malhotra and Peterson 2014). The sampling elements of this study are Sarawak citizens, aged 18 years old and above. There is a strict selection for consumers who are 18 years old and above as they are the eligible consumer group that can register to MP application (Maybank 2018). Meanwhile, consumers below 18 years old are considered to be

legally not having the capacity to make an informed decision for their welfare. Hence, consumers who are underage are excluded to ensure the validity and reliability of the study (Drew, Hardman and Hosp 2007).

3.2.3 Sample Size

Malhotra (2013) defines the sample size as the number of elements to be included in the study. There are wide discrepancies in the references of a suitable sample size for structural equation modelling (SEM) analyses. According to Thompson (2004), it is advisable that more than 200 respondents are to be sampled to obtain stability in factor analysis. Apart from that, Krejcie and Morgan (1970) suggest a sample size of 384 as sufficient for a population size of more than 1 million.

Recent years, Westland (2012) suggests calculating the lower bounds on sample size in structural equation modelling by using software developed by Soper (2015). This method has been used by Ooi and Tan (2016) in justifying that the sample size is sufficient to test the structural model. There are eight latent variables and 48 observed variables in the proposed model. Through Soper's calculator (2015), the recommended sample size is 200. The recommended sample size is calculated with the following settings:

- anticipated effect size: 0.3 (Dutot 2015)
- desired statistical power level: 0.8 (Cohen 1988)
- significance probability level: 0.05 (Fisher 1925)

Based on the previous studies on mobile payment adoption in Malaysia, the sample sizes are also in the range of 150 to 300 respondents. For example, 156 by Tan et al. (2014), 194 by Teo et al. (2015), and 262 by Leong et al. (2013). With the rule of thumb developed by different scholars, the choice of having 384 sample sizes is considered reasonable for the interpretation of results in this study. Hence, the questionnaires will be equally spread at a minimum of 96 respondents in each district. The confidence interval is set at 95% and the margin of error is 5% as it is acceptable in most researches (Krejcie and Morgan 1970).

3.2.4 Sampling Location

Sampling location is the place or area where the samples should be drawn (Hair et al. 2010). In the current study, four major areas of the Sarawak state are

particularly selected, namely Kuching, Sibu, Miri and Bintulu. There are few reasons for selecting samples in these districts:

(1) With a large population of 1,179,236 people in these districts, their high level of income and economic activities have made Sarawak the second largest state by a contribution of GDP in Malaysia. Hence, the purchasing power tends to be strong, where many payment transactions take places in the selected cities and towns (Furuoka 2014).

(2) The people of these areas have adequate broadband coverage for allowing digital business and usage, hence the readiness to use digital payment is also higher in comparison to other districts (Kong 2018).

(3) These four cities and towns are under development strategy for digital economy, it provides an indication that the consumers are experiencing an increased use of digital technologies in the society (Lau 2017).

(4) The residents of these cities are deemed to have more familiarity with mobile payment services due to the improved socioeconomic level compared to other cities (Ramayah et al. 2017).

Thus, the consumers from these locations are considered to be a valid sampling population to study about the adoption intention of a new innovative payment system.

Paper-based surveys are distributed at the shopping malls of each selected areas. The shopping mall is selected as payment transaction happen frequently due to the primary role as a centre of purchasing goods (Balachandran and Tan 2015). Shopping malls have also become a centre of social activities of an entire community, where visiting shopping malls during weekends has become part of consumers' lifestyle (Chong et al. 2012). The diverse consumer group comprises of various ethnics, ages, and backgrounds can be identified in the shopping malls which enable this study to be generalized in the Sarawak context (Ooi and Tan 2016). Collecting data in the shopping mall is deemed to be appropriate as there are few MP researchers in Malaysia that rely on the data collected in shopping malls as well (Ooi and Tan 2016; Balachandran and Tan 2015; Chong et al. 2012).

In this study, one shopping mall in each area is selected as the sampling location. The selected shopping malls are the Star Mega Mall (Sibu), Vivacity Mall

(Kuching), ParkCity Mall (Bintulu) and Permaisuri Imperial City Mall (Miri). The criteria used to qualify the outlets to be part of the samples are based on the size of the mall and the number of shop lots operated in it (Ooi and Tan 2016). The selected shopping malls contain a huge number of stores which should thereby attract a wide range of consumers (Ooi and Tan 2016). It is reasoned that the selected shopping malls would give a fair characteristic presentational of the gender, age and ethnicity of the general population (Leong et al. 2011). Phau and Teah (2009) also note that measuring consumers' attitudes and behaviour in a mall or shopping-related environment would allow the population of interest to relate to what the research intends to measure, which in this case is consumer payment behaviour.

3.2.5 Sampling Technique

Sampling technique refers to the method that is used to obtain the sample of the study (Zikmund et al. 2013). There are two main types of sampling techniques: non-probability sampling and probability sampling (Zikmund et al. 2013). Non-probability sampling technique relies on the personal judgment of the researcher rather than the chance to select sample element. While for probability sampling, sampling units are selected by chance (Malhotra 2007). As QR-code payment is still an emerging technology in Sarawak, there is no reliable sampling frame from which to conduct probability sampling (Slade et al. 2015). Therefore, the non-probability sampling design is used to obtain the sample.

The sample for this study is selected using the mall-intercept convenience sampling technique. Mall-intercept convenience sampling has been viewed as an acceptable approach particularly in survey approach studies due to the benefits of increased internal validity and control (Hoyle, Hausman and Judd 2002). Also, literature reviews show that over 90 per cent of high ranking social and behavioural sciences studies utilize convenience sampling to collect data (Collier and Bienstock 2007). Sekaran and Bougie (2013) describe mall-intercept convenience sampling as a technique where elements of a sample are drawn from a group which is easily accessible to the researcher in the shopping mall. There are several advantages of employing convenience sampling in data collection, such as the availability of respondents, low cost and the speediness at which the data could be collected for analysis (Etikan, Musa and Alkassim 2016).

Hulland et al. (2018) claim that the use of a convenience sample may suffice when the primary aim of the research is to test the veracity of proposed hypotheses. Likewise, the convenience sampling method is appropriate for studies that only seek to test the theory in particular phenomena (Sarstedt et al. 2016). Hence, given the constraints of the study in terms of time and finance, a convenience sample of consumers is sought. The convenience sampling approach is consistent with recent MP studies due to a large population and unknown sampling frame (e.g. Teo et al. 2015, Humbani and Wiese 2018, Pham and Ho 2015, Shankar and Datta 2018).

The limitation of this approach is acknowledged, specifically, convenience samples typically include small numbers of underrepresented socio-demographic subgroups. This results in insufficient power to detect differences among socio-demographic subgroups and the findings cannot be generalized to a specific population (Bornstein, Jager and Putnick 2015). However, this study is not concerned about generalizing findings to a specific population but aims to test the proposed relationship between the independent and dependent variables. Hence, a sampling strategy based on convenience is sufficient (Creswell and Clark 2017).

The questionnaires are distributed to consumers who happen to be in the shopping mall during the sampling period. The data collection is conducted from 11 am to 8 pm during weekends (Saturday and Sunday) in the three-week period. The mall intercepts are conducted with the assistance of four research assistants. To reduce unavoidable sampling error (e.g. nonresponse or insufficient effort responding), the research assistants are employed to collect 150 sets of valid questionnaires from each sampling location. All research assistants are trained and instructed by the researcher to ensure that they follow the standard research protocols.

The process of intercepting is voluntary, where consumers are approached and asked for their consent to be the respondent. Following Tan et al. (2014) and Ooi and Tan (2016), the respondents are briefed on the terminology and definitions adopted in the questionnaires upon agreement. The respondents are given time (15 minutes) to answer the questionnaire and research assistant is there to assist if the respondents do not understand the questions.

3.3 Data Collection Methods

Data collection methods refer to the methods used to obtain useful data as well as identify the variables measured (Malhotra 2010). The present study is carried out with the help of primary data. The questionnaire is chosen as research instrument to collect primary data.

3.3.1 Questionnaires

The questionnaire is widely used to collect descriptive data about opinions, behaviours and characteristics from a large sample (Saunders, Lewis and Thornhill 2012). In the MP literature reviews, questionnaires are popular tools for acquiring information on perception of mobile payment both in Malaysia (e.g. Ooi and Tan 2016; Teo et al. 2015; Tan et al. 2014) and other developing countries (e.g. Gichuki and Mulu-Mutuku 2018; Qasim and Abu-Shanab 2016; Yen and Wu 2016). Since the behavioural intention is measured contemporaneously with beliefs, the questionnaire is used as it plays an important role to obtain genuine feelings and thoughts about the variable that is observed by the researcher (Malhotra 2013).

The data collection employs a structured questionnaire, with closed-ended questions where the respondents are requested to select a response which is closest to their viewpoint (Dillman 2014). The closed-ended questionnaire is considered suitable for this study for three reasons. First, it is less time-consuming for the respondents to complete the questionnaire (Dillman 2014). Second, it maximizes the ease of coding responses given that the responses are constant (Fink 2013). Third, the predetermined response is given to improve respondent cooperation to avoid missing data (Reja et al. 2003).

The use of questionnaire also comes with few criticisms as identified by Moser and Kalton (2017). First, collecting data by questionnaires is disposed to biases such as social desirability and non-response. Second, the answers to the questionnaires are fixed. Despite these criticisms, questionnaires appear to be very suitable to examine the factors that influence user adoption. In fact, the study outcomes from questionnaire-based studies have yielded rich set of findings with regards to different user groups (Johnson et al. 2018).

3.3.2 Questionnaire Design

Completing a questionnaire is a cognitive burden for respondents because consumers are required to read the questions and think intently to respond (Fink 2013). To lower the cognitive burden, the questionnaire is prepared using simple English, which allows a better understanding of question requirement (Malhotra 2007). Also, ordinary and unambiguous words are used to avoid implicit assumptions and improve the ease of completing the questionnaire (Creswell 2014).

The survey instrument is a four-page questionnaire comprising three major sections, containing a total of 57 items to capture the independent and dependent variables proposed in the model and demographic information. The participant information statement is attached to state the purpose of the questionnaire, to explain that respondents' participation is voluntary and provide assurance concerning the confidentiality of the information provided (Dillman 2014). Clear instruction is included at the beginning of each section to provide guidance to the respondents when answering the respective sections (Dillman 2014).

The questionnaire is categorised into three parts - Section A (Demographic Profile), Section B (Adoption Factors), and Section C (Intention). Section A represents 4 questions on the demographic profile of respondents, such as gender, age, ethnic group and educational level. The question is designed with a series of answer that requires respondents to select one that best describe themselves. Section B contains 48 questions to measure the factors that influence the behavioural intention to adopt MP. It includes performance expectancy, effort expectancy, social influence, facilitating conditions, habit, price value, hedonic motivation and personal innovativeness. In Section C, respondents need to answer 5 questions regarding their adoption intention towards QR-code MP. Table 3.1 shows the summary of questionnaire design for this study.

Table 3.1: Summary of questionnaire design

Section	Numbers of items	Content
A	4	Target respondents' demographic profile
B	48	Eight independent variables of the study
C	5	One dependent variable of the study

3.3.3 Pilot Test

Pilot testing is carried out with the consideration of the disadvantages of survey instrument, such as low response rate and difficulty in reading questionnaire (Guo et al. 2016). Conducting a pilot study could help to detect the potential flaws in the instrumentation and to ensure that the respondents understand the questions, make good data quality, and avoid misinterpretations (Burns and Bush 2014; Malhotra 2013). In depth, pilot study is conducted to assess the consistency of internal data, the goodness of data and the validity and reliability of the measurement scales for the variables (Sekaran and Bougie 2013).

The pilot sample is usually a small subset of the target population. In this study, the instrument has been pilot-tested with 30 respondents. This is in line with the recommendation by Malhotra (2007) that the sample size for pilot test is normally ranged between 15 to 30 respondents. The data collected will subsequently be used to conduct a reliability test through SPSS software. Cronbach's alpha is used to examine the internal reliability of the data (Sekaran and Bougie 2013).

Table 3.2 reveals that all the internal consistency reliability coefficients for constructs under study range from 0.70 to 0.94 are well above the commonly acceptable level of 0.70 (Sekaran and Bougie 2013). The respondents also clarify that the statements are easy to understand. Hence, no amendment is required as the measurement items are considered feasible for actual data collection. The pilot study responses are not included in the actual sample used in the final data analysis to avoid skewness of the result (Sekaran and Bougie 2013).

Table 3.2: Results of the Pilot Test

Variables	Cronbach's Alpha	No. of items	Level of Reliability
Performance Expectancy	0.823	5	Good
Effort Expectancy	0.804	6	Good
Social Influence	0.734	8	Acceptable
Facilitating Conditions	0.822	6	Good
Price Value	0.799	5	Acceptable
Hedonic Motivation	0.941	6	Excellent
Habit	0.873	6	Good

Personal Innovativeness	0.703	6	Acceptable
Behavioural Intention	0.755	5	Acceptable

3.4 Measurement Scale

Likert scale is one of the most frequently used psychometric means in social sciences research. It enables researcher to depict the complexity of human thoughts, feelings and attitudes toward an issue in a validated and reliable manner (Joshi et al. 2015). Likert scale has been widely used in the published literature relevant to MP study (Johnson et al. 2018; Oliveira et al. 2016). Responses to each of the items are in the form of a 5-point Likert scale, with scale points labelled from (1) Strongly disagree to (5) Strongly agree. The 5-point scale appears to be less confusing for respondents and thus helps to increase response rate (Sekaran and Bougie 2010).

All constructs are measured by scales drawn and modified from existing literatures, wherever possible from within the IT usage domain. This is to ensure that this study meets both validity and reliability of corresponding construct (Leong et al. 2013). Selection of the items is based on previous MP studies relating to operational definitions (Sekaran and Bougie 2010). A copy of the questionnaire is shown in Appendix C. The following section reveals where the measurement instruments for the present study are adopted/adapted from.

3.4.1 Performance Expectancy

Venkatesh, Thong and Xu (2012) and Davis (1989) items' measurement scale for performance expectancy have been widely adopted and modified by scholars in MP adoption studies (Morosan and DeFranco 2016; Oliveira et al. 2016; Slade et al. 2015). The Cronbach Alpha values for both measurement scales from the related literatures have demonstrated an acceptable internal consistency (greater than 0.8). The scale is used to measure the perception of improvement by using technology such as transactions speed, convenience and usefulness, productivity and efficiency (Morosan and DeFranco 2016; Baptista and Oliveira 2015). Consistent with prior studies in the context of technologies adoption, this study measured PE by adapting 5 items developed by Venkatesh, Thong and Xu (2012) and Davis (1989).

3.4.2 Effort Expectancy

The 6 items of effort expectancy in this study is measured based on the item advanced by Venkatesh and Bala (2008) and Venkatesh, Thong and Xu (2012). The EE measurement items are generally used to measure the perception of non-monetary sacrifices of using new technology, such as the time, physical and mental effort of learning to use the tool or device (Venkatesh, Thong and Xu 2012). The measurement scale has been commonly adapted by other scholars in wide variety of technology adoption, such as Internet-enabled TV shopping (Wagner et al. 2017), mobile payment (Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva 2014) and mobile commerce (Faqih and Jaradat 2015).

3.4.3 Social Influence

Most of the studies consider SI as "peer influence", such as family, friends and colleagues (Venkatesh, Thong and Xu 2012), while Wei et al. (2009) include the mass influence to measure the effect of SI, such as mass media and other unfamiliar members of the social community. Hence, eight items of social influence in this study are adapted from Wei et al. (2009) and Venkatesh, Thong and Xu (2012), respectively. Both measurement scales have been empirically tested in technology adoption context to examine the effect of peer and mass influence in Malaysi a context. For example, social networking usage (Yap and Gaur 2016), mobile commerce (Lu et al. 2014) and mobile learning (Tan et al. 2014).

3.4.4 Facilitating Conditions

Most of the mobile technology adoption studies adapt 4 items by Venkatesh, Thong and Xu (2012) to measure the FC. For example, mobile banking (Baptista and Oliveira 2015), mobile shopping (Chopdar et al. 2018) and mobile payment studies (Morosan and DeFranco 2016). The items include the perceptions of individuals on having resources and skills such as using a smartphone, connecting to the Internet, installing applications, as well as knowledge of mobile service providers and security affect the mobile technology adoption (Chopdar et al. 2018).

Also, Venkatesh, Thong and Xu (2012) further incorporate items that tap the fit between the individual's prior experience of technology usage and the adoption of the technology (so called technology compatibility). Apart from technology compatibility, there are a number of MP researchers adapting the measurement items

of compatibility from Moore and Benbasat (1991) to measure both technology and lifestyle compatibility (e.g. Pham and Ho 2015; Cobanoglu, Yang and Agarwal 2015; Yang et al. 2012). Akin to previous MP studies, the measurement items from Moore and Benbasat (1991) and Venkatesh, Thong and Xu (2012) are adapted to measure whether individuals adopt technology well-suited to individual's prior experience of using smartphone, payment patterns or expected lifestyle (Schierz, Schilk and Wirtz 2010). The instrument contains six items in total.

3.4.5 Habit

Limayem et al. (2007) develop a perception-based approach to the measurement of habit. In UTAUT2 model, Venkatesh, Thong and Xu (2012) adopt habit in keeping with Limayem et al. (2007) as self-reported perception. Both measurement scales are generally used to measure the extent of interaction and familiarity that is developed with technology. For instance, the measurement items are used to study the effect of habit towards the adoption intention in developing country, such as the context of mobile social networking services in China (Yang, Wang and Lu 2016), mobile phone adoption in Arab (Ameen, Willis and Shah 2018) and also mobile financial services in Malaysia (Yen and Wu 2016). With similar conceptual definition, five items of the habit questionnaire are adapted from Venkatesh, Thong and Xu (2012) and Limayem et al. (2007).

3.4.6 Hedonic Motivation

In IS research, many researchers combine both enjoyment and hedonic motivation items to measure the expected pleasure or satisfaction from the interaction with the technology itself (Van der Heijden 2004; Venkatesh, Thong and Xu 2012). For instance, to examine the greater entertainment value (e.g. pleasant, interesting, enjoyable and fun) mobile banking (Baptista and Oliveira 2015) and mobile payment services bring to target users (Baptista and Oliveira 2017). With the same study purpose, six items are adapted from Van der Heijden (2004) and Venkatesh, Thong and Xu (2012) in this study.

3.4.7 Price Value

The five measurement items for PV are adapted from Kim et al. (2007), which are consistent with the studies in mobile technology context such as mobile payment (Yang et al. 2015), mobile coupon (Liu et al. 2015) and mobile GPS app

(Wang et al. 2018). Additionally, Baptista and Oliveira (2015) measure PV by including the bundle purchase of the target technology to determine the impact on perception of price value. Hence, this study slightly modifies the measurement items by including price factors such as mobile data cost, device cost, service costs, and transaction fees to investigate the impact of PV towards the adoption intention of MP.

3.4.8 Personal Innovativeness in Information Technology

PIIT is measured by adapting five items by Goldsmith and Hofacker (1991) and Agarwal and Prasad (1998). Chao, Reid and Mavondo (2012) assert that domain-specific measures of personal innovativeness are the most useful scale to measure consumer innovativeness in a specific product category. The measurement items examine the respondents' proclivity to be the first to use and experiment with new technologies. The adapted measurement items are believed to be useful in this study as the explanatory power of the instrumentals of PI has been proven by several MP studies (e.g. Oliveira el at. 2016; Ramos-de-Luna, Montoro-Ríos and Liébana-Cabanillas 2016; Thakur and Srivastava 2014).

3.4.9 Behavioural Intention

BI is measured with a five-item scale adapted from the work of Venkatesh and Davis (2003), Venkatesh, Thong and Xu (2012) and Zarmpou et al. (2012). The measurement items are widely used to predict consumers' intention to use mobile technology in near future. For instance, Kalinic and Marinkovic (2016) adapt the measurement scale by Zarmpou et al. (2012) to measure the subjective probability that an individual will adopt mobile commerce. Likewise, Alalwan, Dwivedi and Rana (2017) adapt the BI items from Venkatesh and Davis (2003) and Venkatesh, Thong and Xu (2012) to predict the customers' willingness to adopt mobile banking.

3.5 Ethical Considerations

To ensure compliance with the ethical standards set by the National Health and Medical Research Council (NHMRC) in Australia, the researcher completes the research ethics and integrity training at Curtin University. The researcher then applies to the Human Research Ethics Committee (HREC) for ethical approval prior to collecting data. All the necessary documents (e.g. information sheet, questionnaires) have been examined by the HREC and the ethics application has been approved with approval number HREC2018-0464 (see appendix A).

3.6 Data Analysis Technique

The quantitative analysis is conducted by adopting two statistical techniques. First, the Statistical Package for the Social Sciences (SPSS) version 17 software is used to analyse the preliminary data and provide descriptive analyses about study sample. Second, Analysis of Moment Structures (AMOS 20) software is used to evaluate the relationship among the constructs of the research model by conducting Maximum Likelihood (ML) analysis. Confirmatory factor analysis is also performed using AMOS 20 to check on the construct validity and the model fitness.

3.6.1 Preliminary Data Analysis

Preliminary analysis is an important process to identify any potential violation of the preliminary assumptions related to the application of SEM (Pallant 2016). This process ascertains the suitability and cleanliness of the data for a quality and meaningful outcome. The data obtained will be explored with respect to six different preliminary tests, including missing values, outliers, normality, linearity, homoscedasticity and multicollinearity as suggested by Field (2013).

3.6.2 Descriptive Analysis

Descriptive statistics allow frequency and percentage distributions to be performed to describe the demographic characteristics of the respondents (i.e., gender, age, educational level and ethnicity) (Hair et al. 2010). Moreover, descriptive analyses are conducted on all items of performance expectancy, effort expectancy, facilitating conditions, social influence, price value, hedonic motivation, habit, personal innovativeness and behavioural intention. These analyses are conducted for each of the variables to gain preliminary information about the sample (i.e., frequencies, mean, and standard deviation) (Hair et al. 2010).

3.6.3 Structural Equation Modelling (SEM)

Structural Equation Modelling (SEM) is a collection of statistical techniques used to simultaneously estimate the interrelated relationships pattern between one or more latent constructs and associated indicators (Kline 2015; Hoyle 2012). More generally, SEM is based on the typically assumption of causal relationships where a change in one variable (X1) is associated with change in another variable (Y1). The use of SEM technique is more appropriate in this study for several reasons as follows:

(1) SEM provides a confirmatory approach by specifying the associations between variables (Byrne 2016).

(2) The relationships among multiple observed and unobserved variables can be assessed in a way that minimizes the measurement error in the model. For example, to eliminate variables characterized by weak measurement (Astrachan, Patel and Wanzenreid 2014).

(3) SEM is superior for "extending the possibility of relationships among the latent variables" by evaluating two components: a measurement model and a structural model (Schreiber et al. 2006, 325). With this functionality, SEM allows for either validity of the structures and constructs in the proposed theoretical models or theory development advancement (MacCallum and Austin 2000).

(4) Multiple structural relationships are assessed in SEM approach simultaneously while sustaining statistical efficiency (Hair et al. 2014). According to Holbert and Stephenson (2008), SEM is also efficient in estimating variance and covariance, testing hypotheses, and confirmatory factor analysis (as cited in Goodboy and Kline 2017).

(5) SEM provides an overall test of model fit and parameter estimate tests simultaneously to provide the best model that fits to the data adequately (Hair et al. 2014).

The benefits mentioned above also explain the preference of many authors applying SEM in the technology adoption studies (Sarstedt et al. 2016) (see Ramadan and Aita 2018; Gao and Waechter 2017).

However, SEM still has its disadvantages. The direction of a relationship in a SEM model represents a researcher's hypotheses of causality. The represented chosen pathways will restrict the ability of SEM to reconstruct the pattern of variance and covariance that have been observed. Hence, SEM can confirm a proposed model when the model fits the data well, but might ignore other unexamined models that may explain the data equally well or better. Despite this shortcoming, SEM technique remains useful in understanding the relationship between variables in multivariate systems. The abilities of SEM to analyse relationships between latent variables without measurement error differentiate SEM from other relational modelling techniques (Sarstedt et al. 2016).

There are two types of SEM techniques, namely covariance based structural equation modeling (CB-SEM; Jöreskog 1971) and partial least squares structural equation modeling (PLS-SEM; Wold 1982). Both approaches share the basic aim, which is to test relationships between multiple constructs and indicators (Sarstedt et al. 2016). CB-SEM is deemed to be an appropriate technique in this study for the following reasons:

(1) CB-SEM allows for the comparison between observed and proposed covariance matrices (Hair et al. 2014). This enables assessment of the overall "fit" of the proposed causal model (Hair et al. 2014).
(2) CB-SEM is suitable for large sample size (Hair et al. 2014).
(3) CB-SEM tends to be more accurate in parameter estimation than PLS-SEM (Reinartz, Haenlein and Henseler 2009). PLS-SEM tends to overestimate measurement path parameters and underestimate structural path parameters which introduce bias (Hair et al. 2014).

In this study, SEM is conducted using the two-stage approach recommended by Anderson and Gerbing (1988). The first stage includes the assessment of the measurement model (constructs and items), while the second stage includes assessment of the structural model through interpreting the path coefficients and identifying the causal relationships of the research model. In brief, SEM combines the approach of confirmatory factor analysis for the measurement model and path analysis for the structural model.

3.7 Assessment of Measurement Model

The measurement model analysis is conducted by specifying how the observed variables (items) are corresponding to the underlying theoretical constructs (composite and latent variables) (Arbuckle 2005). Anderson and Gerbing (1998) advocate that measurement model assessment is an important criterion for further interrelationship analysis among the latent variables. Several psychometric tests are conducted to test the adequacy of the reflective constructs, which are constructs reliability, convergent validity, discriminant validity and measurement model fit indices (Hair et al. 2016). Violating the assumption of each test could severely cause biased items and disrupt the ability of parameter estimation (Gefen et al. 2000).

3.7.1 Confirmatory Factor Analysis (CFA)

In the first stage, the measurement model of each latent variable is evaluated and modified by performing confirmatory factor analysis (CFA). CFA is a multivariate statistical method, a tool that is used to confirm the underlying structure in a data matrix (Hair et al. 2010). In this study, CFA is applied to test the measurement theory, whereby the researcher could confirm that the measures adopted to represent the latent variables (Hair et al. 2010). According to Anderson and Gerbing (1988), the main function of CFA is to remove or constrain all redundant items in each construct. This involves the assessment of the unidimensionality, reliability and validity of the underlying constructs. The relevant assessments are discussed below.

3.7.1.1 Unidimensionality

The fit of each constructs' measurement model is assessed by using a CFA to make sure that each one is unidimensional. Anderson and Gerbing (1988) claim that unidimensional measurement models provides precise tests to ensure that a set of item empirically measures a single dimension. Unidimensionality is achieved when the AVE of 0.5 or higher (Fornell and Larcker 1981).

3.7.1.2 Reliability

Reliability refers to the accuracy or consistency of the measuring instrument with the absence of random measurement error (Hair et al. 2016). The Cronbach's Alpha coefficient is the most popular measurement of internal consistency in mobile payment studies (e.g. Johnson et al. 2018; Oliveira et al. 2016; Slade et al. 2015). It is considered 'absolutely the first measure' to assess the reliability of a measurement scale (Nunnally 1978). In addition, Cronbach's alpha is a useful statistical technique in measuring multi-point scale items (i.e., 5-point Likert scale used in this thesis) (Sekaran and Bougie 2010). Hair et al. (2010) recommend that Cronbach's alpha should be equal to or greater than 0.70 to indicate satisfactory internal reliability.

Nevertheless, Cronbach's alpha is found to be unidentical with reliability (McNeish 2017). Arguments have been made by quite a number of researchers that Cronbach's alpha underestimates the reliability of congeneric measures (McNeish 2017). Due to the limitations of Cronbach's alpha, Hair et al. (2010) suggest to adopt

Composite Reliability (CR) and Average Variance Extracted (AVE) as the alternative reliability index to measure internal consistency.

Composite Reliability (CR) is a more favourable statistical technique due to its ability to draw on the standardized regression weights and measurement correlation errors for each item (Hair et al. 2017). According to Henseler, Ringle and Sarstedt (2012), composite reliability is ensured if the values are greater than the accepted benchmark of 0.7 for confirmatory purposes. On the other hand, AVE estimation reflects the overall amount of variance explained by latent construct indicators (Hair et al. 2017). AVE values that are equal or greater than 0.50 are considered satisfactory and indicate that at least 50% of the variance in a measure is due to the hypothesized relationship (Hair et al. 2017).

Statistically, this study computes three types of reliability: Cronbach's alpha of individual item, Composite Reliability (CR) of the overall scale and Average Variance Extracted (AVE) extracted from the subscales. The assessment of reliability could be made using the following criteria (see Table 3.3).

Table 3.3: Measurement Model Criteria

No.	Assessment	Criterion	Recommended Value
1	Internal consistency	Coefficient Alpha	≥ 0.70 (Hair et al. 2017)
		Composite Reliability (CR)	≥ 0.70 (Hair et al. 2017)
2	Convergent Validity	Average Variance Extracted (AVE)	≥ 0.5 (Hair et al. 2017)
3	Discriminant Validity	Average Variance Extracted (AVE)	≥ 0.5 (Hair et al. 2017)

3.7.1.3 Validity

Construct validity refers to the degree of accuracy of an instrument in measuring a latent construct that it is supposed to measure (Sekaran and Bougie 2010). The estimated strength of relationships between the latent variables can only be meaningfully interpreted if construct validity is established (Henseler, Ringle and Sarstedt 2015). Threats to construct validity arise when one construct masks the effects of another measured construct (Sarstedt and Mooi 2014). Thereby, Sarstedt and Mooi (2014) advise to employ convergent validity and discriminant validity to evaluate the construct validity.

Convergent validity examines whether the measures of theoretically similar constructs are highly correlated (Sekaran and Bougie 2010). Following Hair et al. (2010), convergent validity is evaluated using three criteria: (1) factor loadings of all items on the respective constructs should be greater than 0.5, (2) the AVE for each construct should exceed the threshold of 0.5, and (3) CR scores should exceed the acceptable value of 0.7. On the other hand, discriminant validity test is conducted to determine that the measures of theoretically different constructs are not correlated highly among other constructs (Hair et al. 2010). Discriminant validity exists when the square roots of the AVE from each factor is greater than the squared correlation between the constructs (Hair et al. 2014).

3.8 Assessment of Structural Model

Once the adequacy of the measurement model has been evaluated in stage one, SEM is used to further examine the structural relationships between latent constructs in stage two (Anderson and Gerbing 1988). The structural model requires two procedures for measurement (Hair et al. 2010). They are the fitness of model and evaluation of causal relationship with path analysis. The first step is to test the model fit as to examine the structural model validity (Hair et al. 2010). The second step is to measure the model of causal relationship (Hair et al. 2010).

In this study, the structural model analysis is carried out to measure the significance of the factors on intention behaviour. In the proposed theoretical model discussed in Chapter Two, the underlying constructs are classified into two classes, which are independent constructs (performance expectancy, effort expectancy, social influence, facilitating condition, habit, price value, hedonic motivation and personal innovativeness in information technology) and dependent constructs (behavioural intention). A structural model is designed to test the correlation effect of the independent variables on dependent variables (Hair et al. 2010). The path diagram shows the standardised path coefficients and path significance for eight hypotheses.

Structural relationships are evaluated by the significance of the parameter estimates and coefficients values (Hair et al. 2017). Coefficients' values are obtained by dividing the variance estimate by its Standard Error (S.E). The hypothesized path between the factors is considered significant when the p-value is less than 0.05 and Critical Ratio (C.R.) is greater than 1.645 (one-tailed) for a regression weight (Hair et al. 2010). In testing the hypothesised model, standardized estimate (ß) with

positive value indicates that the hypothesized paths are positively significant in the hypothesized direction, and vice versa. Also, standardized estimates are observed to indicate the strength of relationship between hypothesized paths. Acceptable estimates of strength are ranged from 0.4 to 0.8 (Tabachnick and Fidell 2013).

3.9 Fitness of the Models

The fit indices measurement allows for an evaluation of how well the data conform to the overall measurement model and structural model (Hair et al. 2010). A more precise and accurate estimation can be made in further analysis when the model fitness is achieved (Hair et al. 2010). There are various categories of fit criteria to assess the model fit. Kline (2011) advocate to report the Chi-squared test ($\chi 2$), the Root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardised root mean square residual (SRMR). These indices have been selected over other indices as they are least affected by sample size, model misspecification and parameter estimates (Hooper, Coughlan and Mullen 2008).

According to Marsh, Hau and Grayson (2005), goodness-of-fit indices such as the goodness of fit index (GFI), comparative fit index (CFI) and standardised root mean square residual (SRMR) are used to test statistics in a classical null hypothesis testing framework. Thus, if a goodness-of-fit index meets the recommended cut-off values, the model is retained and used as if it is correctly specified (Kline 2011). In the present study, CFA relies on multiple fit indices recommended by Kline (2011), Marsh, Hau and Grayson (2005) and Hooper, Coughlan and Mullen (2008) to determine the adequacy of model fit to the data. The fit measures include the Chi-square test ($\chi 2$), relative/normed chi-square ($\chi 2$/df), comparative fit index (CFI), goodness of fit index (GFI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR). Table 3.4 shows the recommended values of different fit indices.

Table 3.4: Model fit indices and recommended values

Name of Index	**Recommended Value**
Chi-Square ($\chi 2$)	≥ 0.05
Chi-Squared/Degree of Freedom ($\chi 2$/df)	Between 1 and 3 (Ho 2006)
Goodness-of-Fit (GFI)	≥ 0.90 (Ho 2006)
Root Mean Square Error	≤ 0.08 (Kline 2011)

of Approximation (RMSEA)	
Standardised root means square residual (SRMR)	≤ 0.10 (Kline 2005)
Comparative Fit Index (CFI)	≥ 0.90 (Hair et al. 2010)

3.10 Summary

This chapter discussed the research design, instrument and techniques for data collection. A pilot study is undertaken to facilitate the development of the survey questionnaire. Procedures for seeking ethical approval of this study are stated. Data analysis strategies for this study include preliminary data analysis, descriptive analysis, reliability and validity tests. The main statistical technique used for the analysis of data is SEM. The following chapter examines the collected data.

Chapter 4: Findings and Discussions

4.0 Introduction

The main purpose of this chapter is to present the results of data analysis of this study. First, preliminary data analyses using Statistical Package for the Social Sciences (SPSS) are discussed. Following, sample characteristics and descriptive statistics for each variable are presented. Besides, the results of Confirmatory Factor Analysis (CFA) are reported to ensure overall data quality. CFA is presented to confirm the underlying structure of performance expectancy, effort expectancy, facilitating conditions, social influence, price value, hedonic motivation, habit, personal innovativeness and behavioural intention. Next, the results of the Structural Equation Modeling (SEM) using AMOS 20 are illustrated, followed by the evaluation of the hypothesized structural model. Finally, the discussions of overall findings from this study are presented.

4.1 Preliminary Activities

According to Rowley (2014), preliminary activities are important to ensure that the data are accurate, complete and appropriate for the further analysis. Overlooking of the initial data screening would seriously inflate the standard error estimates, which in turn underestimate the statistical significance of a regression coefficients (Dong and Peng 2013). Upon data collection, the responses are coded and inserted into the SPSS software and subsequently undergo a preliminary analysis. In the following section, the key assumptions, including missing values, insufficient effort responding (IER), outliers, normality, linearity, homoscedasticity, and multicollinearity are conducted to test the 600 questionnaires collected.

4.1.1 Missing Values

Missing values occur when no data value is provided by respondent on the variables of interest (Pampaka, Hutcheson and Williams 2016). The nature of survey-based research study with all variables is potentially subjected to missing data (Cheema 2014). In this study, it is believed that self-administration questionnaire method is limited by the lack of supervision, which ultimately increases missing data. Missing data should be handled properly as it introduces biased estimates and affects the statistical power of a study (Pampaka, Hutcheson and Williams 2016). In order to identify cases of missing data, the researcher

conducts a descriptive analysis using SPSS software. The result reveals that 42 cases are missing completely at random (MCAR), meaning that the missingness is independent of the observed and missing responses (Pampaka, Hutcheson and Williams 2016).

Cheema (2014) recommends to employ listwise deletion mechanism when the missing data are MCAR, in which this is to exclude cases with any missing values on variables from the analysis. In accordance to the recommendation made by Cheema (2014), removing 42 missing cases by using listwise deletion is acceptable in this study and the sample size left is enough for further analysis. After deletion, a total of 558 completed questionnaires are remained for further preliminary analysis.

4.1.2 Insufficient Effort Responding (IER)

Insufficient effort responding (IER) is defined as "a response set in which the respondent answers a survey measure with low or little motivation to comply with survey instructions, correctly interpret item content, and provide accurate responses" (Huang et al. 2012, 100). Researchers would like to believe that the target respondents provide thoughtful responses to all the survey items. However, data collected using paper surveys are frequently vulnerable to an inconspicuous but insidious threat to data quality with the fact that respondents are not satisfactorily motivated to provide accurate responses (Huang et al. 2012). Meade and Craig (2012) indicate that IER often occurs in survey-based study due to the reason of respondent interest, environmental distraction, survey length, and social contact. In this study, two forms of IER, straightlining (SL) and random responding (RR) are used in an attempt to detect the invalid data.

Straightlining denotes an act of a respondent to select consecutive identical responses for all items (DeSimone et al. 2018). For example, selecting "agree" for all items. According to Krosnick and Alwin (1989), up to 10% of a sample can demonstrate this kind of response pattern (as cited in DeSimone et al. 2018). Given such response pattern, Kam and Meyer (2015) advise to remove the straighlining as it can inflate construct correlations as construct means could become identical consequently.

Random responding are respondents who answer to survey items inconsistently in an effort to pretend to have respond attentively (DeSimone et al.

2018). It is important to focus on identifying random response as the construct means of random respondents tend to drift to particular point of a Likert scale which could affect the extent of a correlation (Huang, Liu and Bowling 2015). In this study, the researcher detected random responding by screening through the response of regular and reverse-worded items of personal innovativeness (Huang et al. 2012). Respondents who strongly agree with the former item should rationally strongly disagree with the latter, and vice versa. If not, the data is considered as random responding as the respondent provided inconsistent answers to the questions which eventually lead to a biased estimation of relationships (Huang et al. 2012).

Threats to construct validity can arise from the choice of including IER data for further analysis (DeSimone et al. 2018). Consequently, the existence of IER data can affect inter-item correlations, estimate of internal consistency, factor analytic results, inter-scale correlations, and structural relationship between measured variables and latent constructs. To reduce untrustworthy data, the researcher decided to remove both straightlining and random response data that can impact survey results (DeSimone et al. 2018). Out of 558 respondents, 31 and 37 respondents are removed from this study for straightlining and random response, respectively. In total, 490 questionnaires are retained.

4.1.3 Outliers

Outliers are data points that differ greatly from the majority of a set of data (Hair et al. 2010). Outliers are divided into two categories, namely univariate outliers (of a single variable) and multivariate outliers (of a combination of variables) (Hair et al. 2010). In this study, the univariate outliers are detected by examining the boxplots in SPSS; and the multivariate outliers are assessed with Mahalanobis Distance (D2) (Aguinis, Gottfredson and Joo 2013).

By examining the boxplots in SPSS, data values beyond the fences of the boxplot are considered as univariate outliers (Hair et al. 2010). In this study, 30 cases are identified as outliers and subsequently been removed from the sample. As a result, 460 responses are retained. On the other hand, the standard method for multivariate outlier detection is to compare the Mahalanobis distance result with a critical value of the Chi-square ($\chi 2$) with p degrees of freedom, which is a probability of $p < 0.001$ (Kline 2005). If Mahalanobis is larger than the critical Chi-Square value at a critical alpha value of .001), the case is considered multivariate outlier and should be

eliminated. In this study, 7 multivariate outliers are identified and subsequently deleted from further analysis. After removing outliers, 453 responses are retained.

4.1.4 Common Method Bias (CMB)

There may be issue of Common Method Bias (CMB) when self-reported questionnaires are used in which the independent and dependent variables are collected by using the single method or from the same source (Chang, Witteloostuijn and Eden 2010). CMB refers to the "variance that is attributable to the measurement method rather than to the constructs of interest" (Podaskoff et al. 2003, 879).

The CMB is assessed in most of the behavioural intention studies as the data is dependent on self-reporting surveys (e.g. Upadhyay and Jahanyan 2016; Xin, Techatassanasoontorn and Tan 2015) which may introduce spurious associations among the variables (Podsakoff, MacKenzie and Podsakoff 2012). Behavioural research affected by CMB suffers from false correlations and runs the risk of reporting incorrect study results or conclusions (Podsakoff et al. 2003).

As advised by Johnson, Rosen and Djurdjevic (2011), both procedural and statistical procedures are applied in this study to address the CMB issue. On the procedural aspect, all respondents are assured of the anonymity of their responses and have been informed that there are no right or wrong answers to all questions. Statistical wise, Harman's single-factor test has been performed to examine the existence of CMB. According to Podsakoff, MacKenzie and Podsakoff (2012), CMB exists if one factor accounts for more than 50% of the variance among the measures.

4.1.4.1 Harman's Single Factor

As displayed in Table 4.1, the largest factor contributes to only 29.15% of the total variance, which is less than 50% criteria suggested by Podsakoff, Mackenzie and Podsakoff (2012). The result of principal components analysis for all indicator items, without rotation, indicates that data is free from the prejudiced response and further analysis could be conducted.

Table 4.1: Harman's Single Factor analysis

Factors	Eigenvalue	Percentage of variability	
		Component	Cumulative
1	15.451	29.153	29.153
2	3.207	6.051	35.203
3	2.488	4.693	39.897

4	2.418	4.562	44.458
5	2.176	4.107	48.565
6	1.743	3.289	51.854
7	1.493	2.817	54.671
8	1.378	2.601	57.271
9	1.220	2.302	59.574
10	1.154	2.177	61.750
11	1.094	2.064	63.815
12	1.035	1.953	65.767
13	.920	1.736	67.503
14	.880	1.660	69.164
15	.866	1.633	70.797
16	.785	1.481	72.278
17	.715	1.349	73.627
18	.699	1.318	74.945
19	.683	1.289	76.233
20	.640	1.208	77.441
21	.619	1.167	78.608
22	.596	1.125	79.733
23	.593	1.119	80.852
24	.562	1.061	81.912
25	.548	1.034	82.946
26	.531	1.002	83.948
27	.510	.962	84.910
28	.482	.909	85.819
29	.477	.901	86.720
30	.442	.833	87.553
31	.425	.802	88.355
32	.421	.794	89.149
33	.402	.758	89.907
34	.392	.740	90.647
35	.376	.709	91.356
36	.357	.673	92.028
37	.344	.649	92.678
38	.323	.609	93.287
39	.309	.583	93.870
40	.297	.561	94.430
41	.295	.557	94.987
42	.285	.539	95.526
43	.269	.507	96.033
44	.253	.478	96.511
45	.243	.459	96.970
46	.239	.451	97.421
47	.230	.435	97.856
48	.221	.418	98.273
49	.202	.382	98.655
50	.201	.379	99.034
51	.185	.349	99.384

52	.171	.323	99.706
53	.156	.294	100.000

4.1.5 Normality Test

Normality refers to the distribution of data towards a specific variable and its correspondence to a normal distribution (Hair et al. 2010). The Shapiro-Wilk test, Kolmogorov-Smirnov test and Z-score are well known for testing univariate normality. However, Kim (2013) argues that those tests may be used from small to medium sized samples (n < 300), and may be unreliable for large samples. Therefore, normality in this study is validated by using skewness and kurtosis. Byrne (2016) suggest that the acceptable range value of the skewness is +/- 2, and the range value of kurtosis is +/-7.

As presented in Table 4.2, skewness and kurtosis statistics for the variables reveal that the data in this study fits well in normal distribution. Overall, the skewness statistics for the variables are in the range of -0.277 to 0.130. On the other hand, the kurtosis statistics for the variables are in the range of -0.360 to 0.212. Hence, univariate normality assumptions are not violated in the present study (please refer to Appendix E).

Table: 4.2 Results of Normality Test for the Variables

Variables	Items	Skewness	Kurtosis
Performance Expectancy	5	-0.023	-0.360
Effort Expectancy	6	-0.171	-0.165
Social Influence	8	-0.227	-0.187
Facilitating Conditions	6	0.052	-0.360
Hedonic Motivation	6	0.052	0.139
Price Value	5	0.130	-0.154
Habit	6	-0.171	-0.302
Personal Innovativeness	6	-0.277	0.011
Behavioural Intention	5	-0.254	0.212

Univariate normality describes the distribution of only one variable in the sample while multivariate normality describes the joint distribution of all variables in the sample. In SEM, multivariate normality of the data is one of the critical concerns, as it determines what estimation method will be used and to what extent the estimates obtained are trustworthy (Byrne 2016). As suggested by Byrne (2016), multivariate normality is assessed using the Mardia's measures (Mardia 1970). As shown in Table 4.3, the Mardia's coefficient of the nine constructs range from 6.795

to 27.388; and critical ratio from 8.643 to 25.013. Bentler (2006) recommends that values above 5.00 are indicative of data that are non-normally distributed. Consequently, multivariate normal distribution assumption is violated (values > 5.0).

Table 4.3: Mardia's coefficients and critical ratios of the nine constructs

Variables	**Mardia's coefficient**	**Critical Ratio**
Performance Expectancy	6.795	8.643
Effort Expectancy	16.647	18.081
Social Influence	27.388	23.042
Facilitating Conditions	12.223	13.276
Hedonic Motivation	23.030	25.013
Price Value	10.802	13.740
Habit	14.521	15.772
Personal Innovativeness in Information Technology	9.349	10.155
Behavioural Intention	11.044	14.048

Barnes et al. (2001) indicate that normal distribution in social sciences studies is rare. In this study, multivariate normality could be significant in large samples (Kline 2015). However, Hair et al. (2010) mention that large sample size reduces the detrimental effect of multivariate non-normality. Another potential reason is that the data generated using Likert-scale rarely supports normal distribution (Barnes et al. 2001). Despite the presence of non-normal distributions, the item variables are retained without transformation. This is because in the latter phase of data analysis using SEM, Maximum Likelihood (ML) method of estimation will be applied (Byrne 2016). There exists an agreement among researchers that the ML approach to estimation moderates the effects of non-normality in the distribution of data (Kline 2011; Blunch 2012; Byrne 2016). Muthén and Muthén (2002) states that ML estimation is considered relatively robust to violation of multivariate normality for large samples (n > 200) (Hair et al. 2010).

Likewise, previous similar studies are concerned with only the significance levels of the path coefficients, it is assumed that the slight departures from normality can be justifiably disregarded (Morosan and DeFranco 2016; Oliveira et al. 2016). Hence, 453 valid cases remained for further analyses in the study.

4.1.6 Linearity Test

Linearity denotes to the steady slope of change that represents the relationship between an IV and a DV (Hair et al. 2010). In this study, linearity of data is tested with the help of Deviation from Linearity Test of ANOVA in SPSS (Hair et al. 2010). If the significance value (also p-value) for deviation from linearity is more than 0.05, the relationship is linear (Hair et al. 2010). Table 4.4 shows the outcomes of the linearity test, the significant values for Deviation from Linearity are well above the threshold at 0.05, except hedonic motivation variable.

If the p-value of deviation from linearity is less than 0.05, ordinary least square (OLS) is performed for further verifications of linearity between HM and BI. The linearity is confirmed if the p-value is less than 0.05 in OLS test (Leong, Jaafar and Ainin 2018). The output generated from the OLS regression confirmed that the relationship between HM and BI is linear ($p < 0.05$). In this study, linearity assumption is validated statistically.

Table 4.4: Result of Linearity Test

Variables	Type of Test	Sig.	p-value	Remark
BI*PE	ANOVA test for linearity	0.544	>0.05	Linear
BI*EE	ANOVA test for linearity	0.646	>0.05	Linear
BI*SI	ANOVA test for linearity	0.157	>0.05	Linear
BI*FC	ANOVA test for linearity	0.103	>0.05	Linear
BI*HM	OLS (linear regression)	0.000	<0.05	Linear
BI*PV	ANOVA test for linearity	0.649	>0.05	Linear
BI*HT	ANOVA test for linearity	0.347	>0.05	Linear
BI*PI	ANOVA test for linearity	0.694	>0.05	Linear

4.1.7 Homoscedasticity

Homoscedasticity refers to a situation where the variance on dependent variables exhibit equal levels across the range of predictor variables (Hair et al. 2010). The homoscedasticity of the variables is tested with scatter plots of dependent variables and the regression standardized residuals (Hair et al. 2010). The scatter plots show that all dots are evenly distributed along a straight line (see Appendix F) thus verifying homoscedasticity assumption. Arrange in order, the R2 values are: 0.669 (Hypothesis 6), 0.743 (Hypothesis 2), 0.754 (Hypothesis 8), 0.778 (Hypothesis

5), 0.786 (Hypothesis 4) 0.801 (Hypothesis 7), 0.818 (Hypothesis 3) and 0.825 (Hypothesis 1). The R2 statistics reveal that at least 66.9% (0.825) of the variance in the dependent variables is explained by the independent variables (Hair et al. 2010).

4.1.8 Multicollinearity test

Multicollinearity occurs when two or more of the IVs are highly correlated (Pallant 2016). The impact of multicollinearity is well recognized because if the constructs are not truly independent, it may be measuring redundant information (Pallant 2016). The standard error of the variables' coefficients is likely to increase when multicollinearity occurs which by implication renders validity of the results (Tabachnick and Fidell 2013). Consequently, this possibly affects the predictive power of the study model (Pallant 2016). Multicollinearity is assessed by using Variance Inflation Factor (VIF) and Pearson's correlation analysis (Pallant 2016).

4.1.8.1 Variance Inflation Factor and Tolerance

The multicollinearity problem is absent based on the VIF is less than 10, and tolerance values greater than 0.10 (Kline 2005). All VIFs and tolerance values are less than the recommended threshold, indicating that the variables of this study do not suffer from multicollinearity. Table 4.5 consists of results from the VIF tests. The full results are as shown in Appendix F.

Table 4.5: Multicollinearity Test - VIF and Tolerance

Dependent Variables: Behavioural Intention

Variables	Tolerance	VIF
Performance Expectancy	.561	1.781
Effort Expectancy	.453	2.209
Social Influence	.681	1.468
Facilitating Condition	.498	2.009
Hedonic Motivation	.562	1.781
Price Value	.463	2.161
Habit	.624	1.602
Personal Innovativeness in Information Technology	.673	1.486

4.1.8.2 Pearson's correlation analysis

A Pearson's correlation analysis is conducted to examine the issue of multicollinearity. The issue of multicollinearity between the variables arises when the values are higher than 0.9 (Hair et al. 2010). The results of the correlation coefficient for this study are indicated in Table 4.6. Upon review of the correlation

matrix, Pearson's correlation between all variables in this study ranges from 0.258 to 0.632. On the whole, the results demonstrate acceptable levels of correlation. Hence, multicollinearity poses no potential threat to the parameter estimates in this study.

Generally, it can be concluded that all multivariate assumptions have been fulfilled for further analysis. Upon completion of the preliminary data analysis, 453 survey results are considered as valid for statistical analysis in the next section.

Table: 4.6 Pearson's correlation

	PE	EE	SI	FC	HM	PV	HT	PI	BI
Performance Expectancy (PE)	1								
Effort Expectancy (EE)	.600**	1							
Social Influence (SI)	.258**	.356**	1						
Facilitating Conditions (FC)	.530**	.632**	.412**	1					
Hedonic Motivation (HM)	.339**	.440**	.468**	.425**	1				
Price Value (PV)	.471**	.531**	.457**	.529**	.613**	1			
Habit (HT)	.443**	.392**	.381**	.461**	.423**	.510**	1		
Personal Innovativeness (PI)	.336**	.467**	.381**	.421**	.376**	.453**	.419**	1	
Behavioural Intention (BI)	.418**	.507**	.427**	.462**	.471**	.575**	.446**	.496**	1
Note. **. Correlation is significant at the .01 level									

4.2 Descriptive Analysis

The demographic characteristics of 453 respondents are summarised using descriptive statistics such as frequencies and percentages so as to provide an overview of the collected datasets.

4.2.1 Sample Characteristic

Table 4.7: Demographic Information (n = 453)

Variables	**Categories**	**Frequency**	**Percentage (%)**
Gender	Male	185	40.8
	Female	268	59.2

Age	18-24	166	36.6
	25-34	197	43.5
	35-44	66	14.6
	45-54	18	4
	55-64	6	1.3
Ethnicity	Malay	71	15.7
	Chinese	295	65.1
	Iban	47	10.4
	Others	40	8.8
Level of Education	Secondary School	124	27.4
	Diploma	91	20.1
	Bachelor Degree	214	47.2
	Master Degree/ Professional Qualification/ PhD	24	5.3
Employment	Employee	247	54.5
	Self-Employed	68	15.0
	Student	110	24.3
	Homemaker	10	2.2
	Retired	2	.4
	Unemployed	16	3.5

The demographic profile of the respondents is illustrated in Table 4.6. The sample consists of 453 respondents. Of the 453 respondents, 185 (40.8%) are males and 268 (59.2%) are females. In terms of age group, 166 (36.6%) of the respondents aged between 18 to 24, 197 (43.5%) aged between 25 to 34, 66 (14.6%) aged between 35 to 44, 18 (4%) aged between 45 to 54 and 6 (1.3%) aged between 55 to 64. Among the respondents, 71 (15.7%) are Malay, 65.1% are Chinese, 10.4% are Iban and 8.8% are others. In terms of level of education, 124 (27.4%) of the sample respondents complete secondary education, 91 (20.1%) owns Diploma, 214 (47.2%) are Bachelor Degree graduates and 24 (5.3%) are Masters, Professional or PhD holders. Besides that, 247 (54.5%) of the respondents are employees, 68 (15%) are

self-employed, 110 (24.3%) are students, 10 (2.2%) are homemaker, 2 (0.4%) as retired, 16 (3.5%) are unemployed.

4.2.2 Mean and standard deviation analysis

As noted in Chapter 3, respondents are asked to indicate their perceptions to each item using a five-point Likert-scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Higher mean score indicates that respondents have more positive perceptions of the variables. Based on Table 4.8, the mean scores for the variables are: Performance Expectancy (3.72), Effort Expectancy (3.77), Social Influence (3.47), Facilitating Conditions (3.67), Hedonic Motivation (3.50), Price Value (3.50), Habit (3.28), Personal Innovativeness (3.49) and Behavioural Intention (3.56). In general, all the mean values are above the midpoint of 2.50, indicating that the respondents generally have positive perceptions with the variables in the context of QR-code MP that are being examined in this study. This also indicates a near to agree stance among the respondents.

Standard deviation is commonly used to measure the dispersion or variability of a distribution of the data values. Standard deviation formula is calculated as the square root of variance (Hair et al. 2010; Sekaran and Bougie 2016). A low standard deviation value designates that the data variation has a tendency to be similar to the mean. On the other hand, high standard deviation value indicates data points are very spread out from the mean. Across all variables as displayed in Table 4.8, it consistently provides the smallest standard deviation, attributable to the substitution on the constant value: performance expectancy (0.57), effort expectancy (0.52), social influence (0.57), facilitating conditions (0.56), hedonic motivation (0.64), price value (0.60), habit (0.72), personal innovativeness (0.63) and behavioural intention (0.67). Collectively, the standard deviation values for the variables in this study are in the range of 0.52 to 0.72. This outcome indicates the scores cluster closely to the average mean, more generally, reveals that the majority of consumers held positive attitude towards QR-code mobile payments.

Table 4.8 Mean and standard deviation

Item code	Item	Mean	Standard Deviation
	Performance Expectancy	3.72	.57

PE1	QR-code mobile payment would be useful to conduct my payment.	3.77	.71
PE2	Using QR-code mobile payment would enable me to accomplish payment more quickly.	3.81	.73
PE3	Using QR-code mobile payment would increase my productivity.	3.67	.76
PE4	Using QR-code mobile payment would increase my chances of achieving things that are important to me.	3.57	.75
PE5	Using QR-code payment would make it easier for me to make payment.	3.79	.76
	Effort Expectancy	3.77	.52
EE1	My interaction with QR-code mobile payment would be clear and understandable.	3.71	.72
EE2	It would be easy for me to become skilful at using QR-code mobile payment.	3.74	.78
EE3	I would find QR-code mobile payment easy to use.	3.81	.69
EE4	Learning to use QR-code mobile payment would be easy for me.	3.84	.73
EE5	Interacting with the QR-code mobile payment does not require a lot of my mental effort.	3.79	.76
EE6	I think it is easy to get the QR-code mobile payment to do what I want it to do.	3.71	.72
	Social Influence	3.47	.57
SI1	I will adopt QR-code mobile payment if people who influence my behaviour think that I should use it.	3.31	.81
SI2	I will adopt QR-code mobile payment if people who are important to me think that I should use it.	3.37	.88
SI3	I will adopt QR-code mobile payment if people whose opinions that I value prefer that I use it.	3.45	.84
SI4	Friend's suggestion and recommendation will affect my decision to adopt QR-code mobile payment.	3.43	.83

SI5	Family members/relatives will have an influence on my decision to adopt QR-code mobile payment.	3.46	.88
SI6	I will adopt QR-code mobile payment if my colleagues/classmates use it.	3.39	.85
SI7	Information from mass media (e.g. TV, Radio, newspapers, internet) will influence my decision to adopt QR-code mobile payment.	3.48	.84
SI8	I would adopt QR-code mobile payment if the service is widely used by people in my community.	3.85	.78
	Facilitating Conditions	3.67	.56
FC1	I have the resources necessary to use QR-code mobile payment (e.g. smartphones, internet services, and secured applications).	3.77	.79
FC2	I have the knowledge necessary to use QR-code mobile payment.	3.62	.81
FC3	QR-code mobile payment is compatible with other technologies I use.	3.69	.73
FC4	I can get help from others when I have difficulties using QR-code mobile payment.	3.63	.83
FC5	Using QR-code mobile payment fits well with the way I like to make payment effectively.	3.69	.80
FC6	Using QR-code mobile payment fits into my lifestyle.	3.60	.84
	Hedonic Motivation	3.50	.64
HM1	Using QR-code mobile payment would be fun.	3.49	.76
HM2	Using QR-code mobile payment would be enjoyable	3.49	.79
HM3	Using QR-code mobile payment would be entertaining	3.43	.80
HM4	Using QR-code mobile payment would be pleasant	3.51	.75
HM5	Using QR-code mobile payment would be exciting.	3.44	.81
HM6	Using QR-code mobile payment would be interesting.	3.59	.76

	Price Value	3.50	.60
PV1	With the smartphone fee I need to pay, QR-code mobile payment can be beneficial to me.	3.50	.77
PV2	With the mobile internet fee I need to pay, QR-code mobile payment can be worthwhile to me.	3.50	.83
PV3	With the smartphone maintenance fee I need to pay, QR-code mobile payment is good value for money.	3.47	.73
PV4	QR-code mobile payment can provide me better value than other payment methods (e.g. cash, credit/debit card).	3.49	.81
PV5	Overall, the use of QR-code mobile payment will deliver me good value.	3.53	.70
	Habit	3.28	.72
HT1	The use of mobile phones for payment has become a habit for me.	3.50	.88
HT2	I am addicted to use mobile phones for general payment.	3.22	.93
HT3	I must use mobile phones for payment.	2.99	.98
HT4	Using mobile phones for payment has become natural to me.	3.36	.88
HT5	When faced with payment activities, using mobile phones for payment is an obvious choice for me	3.34	.89
HT6	Using mobile phones for payment is something I do without planning.	3.29	.96
	Personal Innovativeness	3.49	.63
PI1	If I heard about new information technology, I will try to use it.	3.71	.75
PI2	In my social circle, I am usually the first to try out new information technology.	3.12	.96
PI3	I know more than my friends on new information technology.	3.19	.96
PI4	I like to experiment with new information technology.	3.63	.81
PI5	I enjoy taking chances in using new	3.57	.84

	information technology.		
PI6	In general, I do not want to try out new information technology.	3.72	.81
	Behavioural Intention	3.56	.67
BI1	Given the chance, I intend to make payment by using QR-code mobile payment.	3.56	.78
BI2	Given the chance, I will always try to make payment by using QR-code mobile payment in my personal life.	3.40	.85
BI3	I plan to use QR-code mobile payment in the near future.	3.55	.81
BI4	I predict that I will use QR-code mobile payment in the near future	3.64	.83
BI5	I believe my interest towards QR-code payment will increase in the near future.	3.67	.84

4.3 Measurement Model Analysis and Results

The measurement models of each theoretical constructs such as performance expectancy, effort expectancy, facilitating conditions, social influence, price value, hedonic motivation, habit, personal innovativeness in information technology and behavioural intention are assessed for their unidimensionality, validity, reliability and goodness-of-fit. The label of the constructs and the number of indicators used in this study are summarized in Table 4.9.

Table 4.9: Constructs and number of indicator variables

No.	Label	Constructs	No. of items
1	PE	Performance Expectancy	5
2	EE	Effort Expectancy	6
3	SC	Social Influence	8
4	FC	Facilitating Condition	6
5	HM	Hedonic Motivation	6
6	PV	Price Value	5
7	HT	Habit	6
8	PI	Personal Innovativeness in Information Technology	6

9	BI	Behavioural Intention	5

4.3.1 Measurement Model for Performance Expectancy

This measurement model has five items as shown in Figure 4.1, the goodness-of-fit indexes are reported in Table 4.10. The results of the initial estimation of the CFA model for performance expectancy indicate a poor level of fit. Value for the $\chi 2$ (79.388) meet the recommended value which is higher than 0.05. Also, value for GFI (0.943) and CFI (0.906) meet the threshold of 0.90. Besides, the SRMR also indicates a well acceptable value at 0.0509. However, the other fit measures including the x2/d.f. ratio (15.878) is outside the recommended tolerances of 2 to 5; RMSEA (0.181) is above the acceptable value at 0.08.

Figure 4.1: Initial Confirmatory Factor Analysis Model for Performance Expectancy

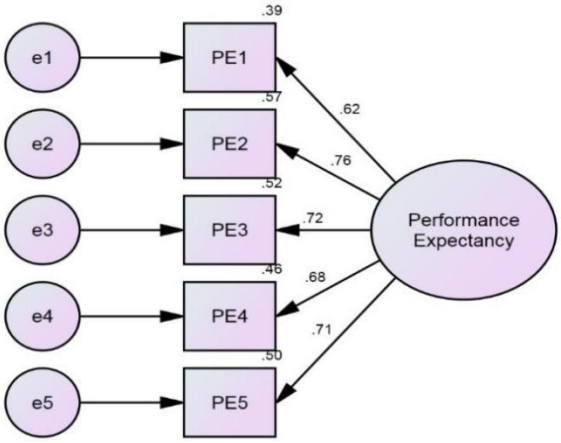


Table 4.10 Goodness-of-fit indexes of Performance Expectancy

CMIN	$\chi 2$/DF	GFI	CFI	RMSEA	SRMR
79.388	15.878	.943	.906	.181	0.0509

With the poor fit indexes of the x2/d.f. ratio and RMSEA, the AMOS output is examined to identify a better fitting model. The factor weight and recommended modification indexes (MI) are used to identify the items that contribute to the poor fit. This item, PE4 (Using QR-code mobile payment would increase my chances of achieving things that are important to me) is removed from the measurement model, and resulted in a four-item variable (refer Figure 4.2).

Figure 4.2: Confirmatory Factor Analysis Model for Performance Expectancy (Revised)

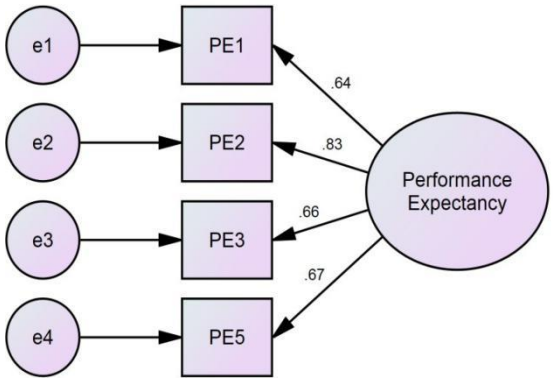


Table 4.11 Goodness-of-fit indexes of Performance Expectancy (Revised)

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
5.101	2.550	.994	.994	.059	.0175

After an item (PE4) is removed from the model, the results reveal that the fit indices achieve the minimum acceptable values. The GFI and CFI reach 0.994; RMSEA reaches 0.059; and SRMR reaches 0.0175 (refer Table 4.11). The χ2/DF values achieve the minimum acceptable level which indicates a good fit model.

4.3.2 Measurement Model for Effort Expectancy

The initial measurement model consists of six indicator variables (see Figure 4.3). As a result, the value for the χ2 (92.172) meet the recommended value which is higher than 0.05. The value for GFI (.938) is above the permissible level. Also, the SRMR also indicates a well acceptable value at .0588. Nevertheless, as shown in table 4.12, the x2/d.f. ratio (10.241) is beyond the recommended tolerance of 2 to 5. The RMSEA (.143) is above the acceptable value at 0.08. In addition, the CFI (0.893) is slightly below the threshold of 0.90, which indicate a poor fitting model.

Figure 4.3: Initial Confirmatory Factor Analysis Model for Effort Expectancy

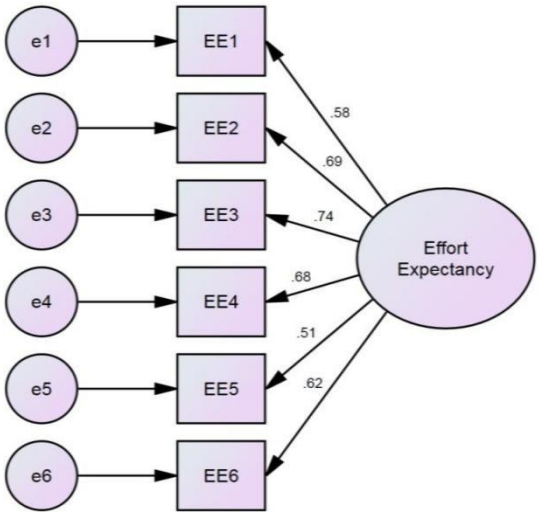
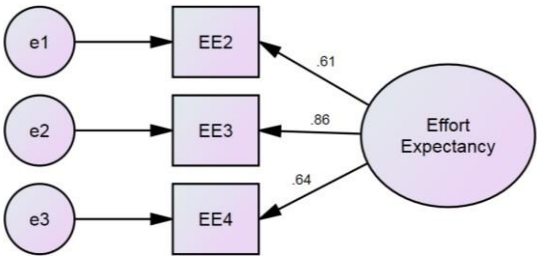


Table 4.12 Goodness-of-fit indexes of Effort Expectancy

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
92.172	10.241	.938	.893	.143	.0588

With the poor fit indexes of the x2/d.f. ratio, CFI and RMSEA, the AMOS output is examined to identify a better fitting model. The output of the factor weight and modification indexes (MI) has identified three items that contribute to the poor fit. Hence, EE1, EE5 and EE6 are removed from the measurement model, and a three-item variable resulted, please refer to Figure 4.4.

Figure 4.4: Confirmatory Factor Analysis Model for Effort Expectancy (Revised)



4.3.3 Measurement Model for Social Influence

The initial measurement model consists of eight indicator variables as shown in Figure 4.5, the goodness-of-fit indexes are reported in Table 4.13. The results of the initial estimation of the CFA model for social influence indicate a poor level of fit. Given that the value for χ2/DF (12.582), CFI (0.817) and RMSEA (0.160) are not within the acceptable level, further assessment is performed to develop a better fit

and more parsimonious model. This assessment involves inspection of factor weight and modification indices.

Figure 4.5: Initial Confirmatory Factor Analysis Model for Social Influence

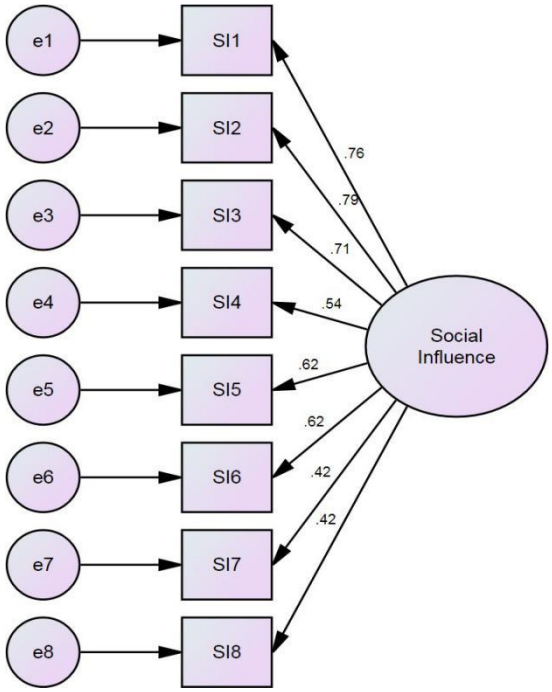


Table 4.13 Goodness-of-fit indexes of Social Influence

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
251.64	12.582	.841	.817	.160	.0893

Due to poor loadings, two variables: SI7 (0.42) and SI8 (0.42) are deleted. Also, the output of the modification indexes has identified two items that contribute to the poor fit. Therefore, it has been decided to remove the items (SI5 and SI6) from the measurement model.

Figure 4.6: Confirmatory Factor Analysis Model for Social Influence (Revised)

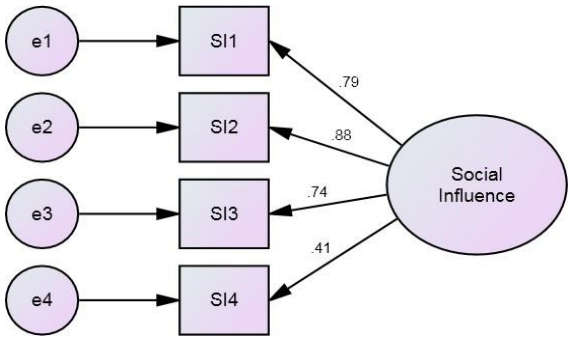


Table 4.14 Goodness-of-fit indexes of Social Influence (Revised)

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
3.135	1.568	.997	.998	.035	.0154

The final model with the four items deleted improves the fit of the model. The fit indices indicate a good fit model where the CMIN, χ2/DF, GFI, CFI, RMSEA and SRMR yield values that are within the acceptable range as shown in Table 4.14. The four-indicator model is illustrated in Figure 4.6. The factor loading of SI4 is below 0.5, however, the item with loading exceeds 0.4 could be retained if other items have high loadings value to complement the CR and AVE (Byrne 2016). Hence, the item (SI4, factor loading >0.4) is retained since the summation of the SI items' loadings contributes to the AVE score above 0.5 (seeTable 29).

4.3.4 Measurement Model for Facilitating Conditions

This measurement model has six items as shown in Figure 4.7. As shown in Table 4.15, the six indicators variable model relate to "facilitating condition" dimension suggest poor fitting model in the first estimate. Value for the CMIN (137.75), SRMR (0.0762) and GFI (.900) are above the permissible level. However, the χ2/DF ratio (15.306) and RMSEA (0.178) is beyond the desired range of tolerances. Also, CFI (0.832) is below the permissible level.

Figure 4.7: Initial Confirmatory Factor Analysis Model for Facilitating Conditions

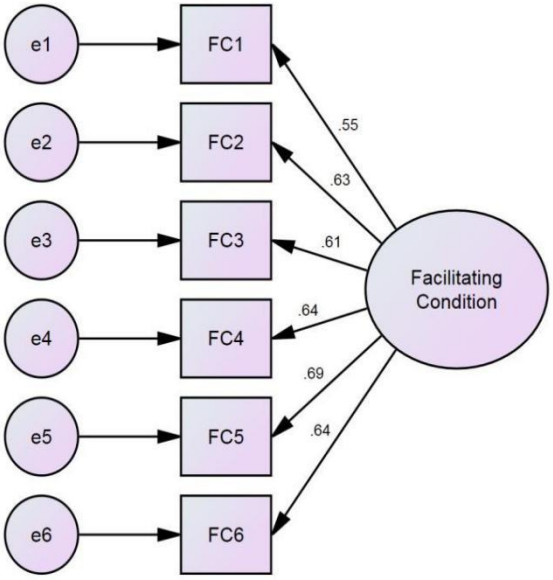
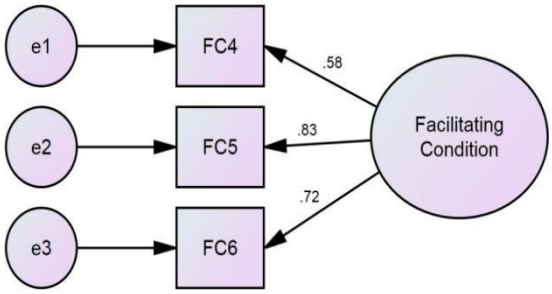


Table 4.15 Goodness-of-fit indexes of Facilitating Conditions

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
137.75	15.306	.900	.832	.178	.0762

A review of the output through factor weight and modification indexes identifies three items as major causes for poor fit. Thus, FC1, FC2 and FC3 are removed and resulted in a three-item variable (refer Figure 4.8).

Figure 4.8: Confirmatory Factor Analysis Model for Facilitating Conditions (Revised)



4.3.5 Measurement Model for Habit

Initially, this model contains six observed variables as illustrated in Figure 4.13. The initial model is fit based on the value of CMIN (96.080), GFI (.935), CFI (0.932) and SRMR (0.0480). However, the value of $\chi 2$/DF (10.676) and RMSEA (0.146) indicates poor fit despite other statistics pointing towards good fit (please refer to 4.19). For these two indices which indicate poor fit, the modification indices are applied to improve the model.

Figure 4.9: Initial Confirmatory Factor Analysis Model for Habit

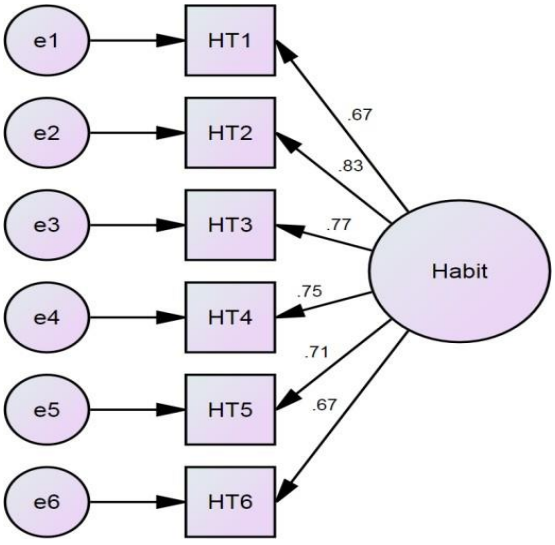


Table 4.16 Goodness-of-fit indexes of Habit

CMIN	$\chi 2$/DF	GFI	CFI	RMSEA	SRMR
96.080	10.676	.935	.932	.146	.0480

The modification indices of the results suggest two items that contribute to poor fit. As illustrated in Figure 4.14, HT2 and HT5 are removed as to get a well fit model. The revised model is found to be good fitting model as shown in Table 4.20.

Figure 4.10: Confirmatory Factor Analysis Model for Habit (Revised)

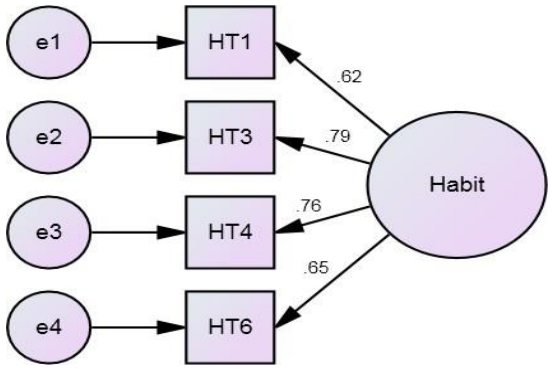


Table 4.17 Goodness-of-fit indexes of Habit (Revised)

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
6.342	3.171	.993	.992	.069	.0193

4.3.6 Measurement Model for Hedonic Motivation

Initially, the measurement model consists of six observed variables as shown in Figure 4.9. As reported at Table 4.16, the value for CMIN (88.362), GFI (.942), CFI (0.949) and SRMR (0.365) are above the permissible level. However, the initial measurement model (χ^2/df = 9.818, RMSEA = 0.140) does not yield an adequate model fit for the data. On the basis of the poor model fit indexes of the χ^2/df and RMSEA, the measurement model is re-examined to identify a better fitting model.

Figure 4.11: Initial Confirmatory Factor Analysis Model for Hedonic Motivation

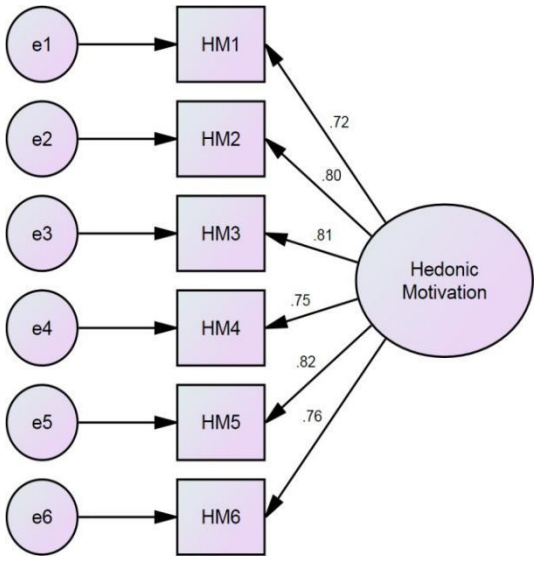


Table 4.18 Goodness-of-fit indexes of Hedonic Motivation

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
88.362	9.818	.942	.949	.140	.0365

The output of modification indexes shows that two items contribute to poor fit of the model. As a result, HM4 and HM5 are removed from the model (please refer to Figure 4.10). As shown in Table 4.17, the goodness-of-fit statistics indicate that the four indicator variables are good measures of hedonic motivation construct.

Figure 4.12: Confirmatory Factor Analysis Model for Hedonic Motivation (Revised)

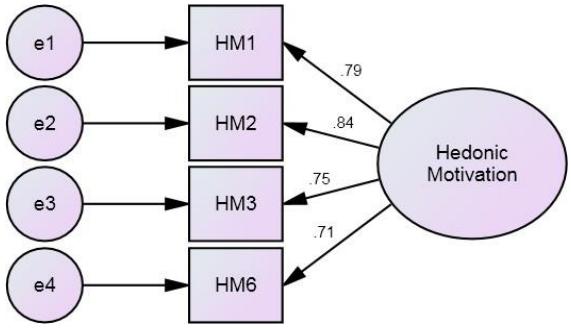


Table 4.19 Goodness-of-fit indexes of Hedonic Motivation (Revised)

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
5.018	2.509	.994	.996	.058	.0145

4.3.7 Measurement Model for Price Value

The initial measurement model of price value consists of five observed variables as illustrated in Figure 4.11. The fit indexes for price value as displayed in Table 4.19 indicate a poor model fit. Overall, the CMIN (80.402), GFI (.930), CFI (0.920) and SRMR (0.698) meets recommended threshold. Yet, χ2/DF (16.080) and RMSEA (0.183) are both outside the recommended value (see Table 4.18). Hence, factor weights and modification indices are explored in order to identify the parameter misfit.

Figure 4.13: Initial Confirmatory Factor Analysis Model for Price Value

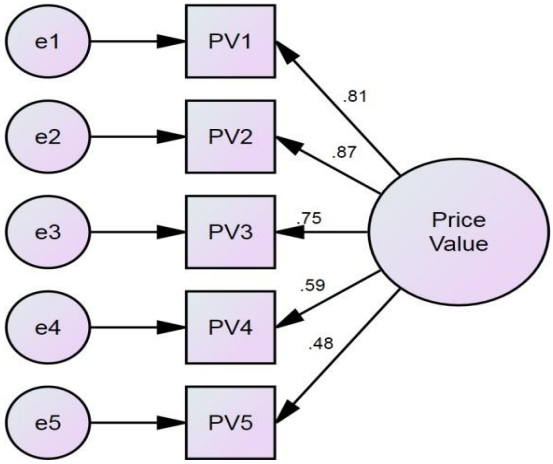
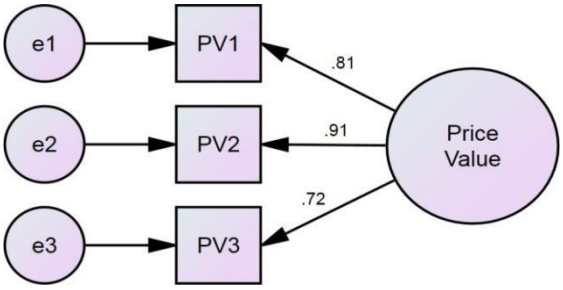


Table 4.20 Goodness-of-fit indexes of Price Value

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
80.402	16.080	.930	.920	.183	.0698

By checking the factor weight, it is found that the loading of PV5 item is relatively low (0.48). Also, modification indices identify one item (PV4) in the variable that contributes to the poor fit. Hence, PV4 and PV5 are removed from the model and this resulted in a three-item measurement model. The revised measurement model for price value is presented in Figure 4.12.

Figure 4.14: Confirmatory Factor Analysis Model for Price Value (Revised)



4.3.8 Measurement Model for Personal Innovativeness in Information Technology

The initial measurement model consists of six indicator variables as illustrated in Figure 4.13, the goodness-of-fit indexes are reported in Table 4.21. The results of the initial estimation of the CFA model for personal innovativeness in information technology indicate a poor level of fit. The value for χ2/DF (19.456), GFI (.885), CFI (0.841) and RMSEA (0.202) are outside the recommended tolerances. With the poor fit indexes of the x2/d.f. ratio, GFI, CFI and RMSEA, the modification indexes are used to identify the item that contributes to the poor fit.

Figure 4.15: Initial Confirmatory Factor Analysis Model for PIIT

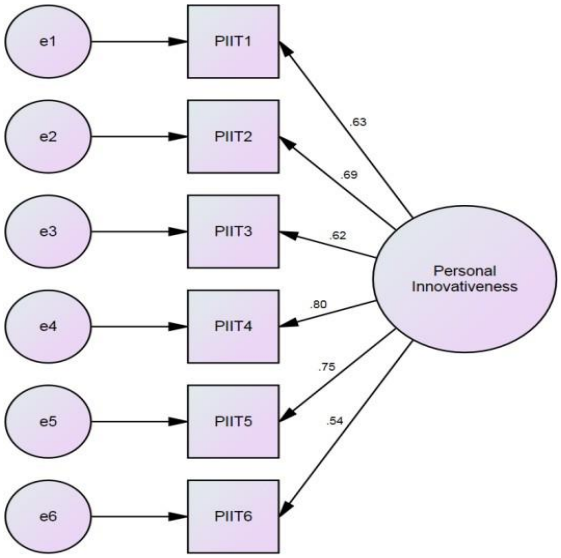


Table 4.21 Goodness-of-fit indexes of PIIT

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
175.11	19.456	.885	.841	.202	.0747

The modification indices of the results suggest two items that contribute to poor fit. As illustrated in Figure 4.14, PIIT3 and PIIT6 are removed as to get a well fit model. The revised model indicates a good fit to the data as shown in Table 4.22.

Figure 4.16: Confirmatory Factor Analysis Model for PIIT (Revised)

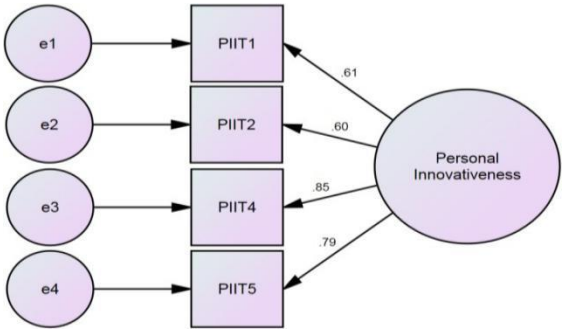


Table 4.22 Goodness-of-fit indexes of PIIT (Revised)

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
6.321	3.161	.993	.993	.069	.0223

4.3.9 Measurement Model for Behavioural Intention

The initial measurement model consists of five indicator variables as illustrated in Figure 4.15, the goodness-of-fit indexes are reported in Table 4.23. The results of the initial estimation of the CFA model for behavioural intention indicate a poor level of fit. Although the value for GFI (0.928), CFI (0.928) and SRMR (0.0542)

meet the thresholds, yet, the value for χ2/DF (17.280) and RMSEA (0.190) are outside the recommended tolerances. With the poor fit indexes of the x2/d.f. ratio and RMSEA, the modification indexes are used to identify the item that contribute to the poor fit.

Figure 4.17: Initial Confirmatory Factor Analysis Model for Behavioural Intention

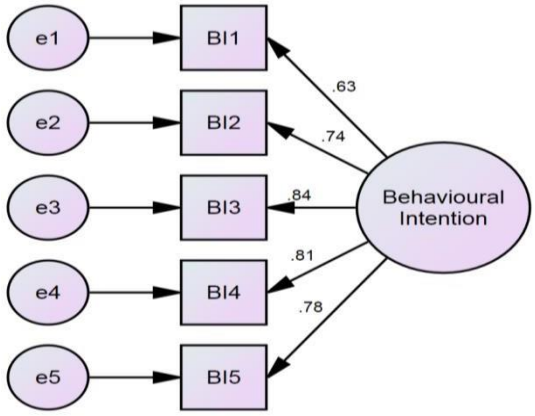


Table 4.23 Goodness-of-fit indexes of Behavioural Intention

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
86.399	17.280	.928	.928	.190	. 0542

The modification indices of the results suggest one item contribute to poor fit. As illustrated in Figure 4.16, BI2 is removed as to get a well fit model. The revised model indicates a good fit to the data as shown in Table 4.24.

Figure 4.18: Confirmatory Factor Analysis Model for Behavioural Intention (Revised)

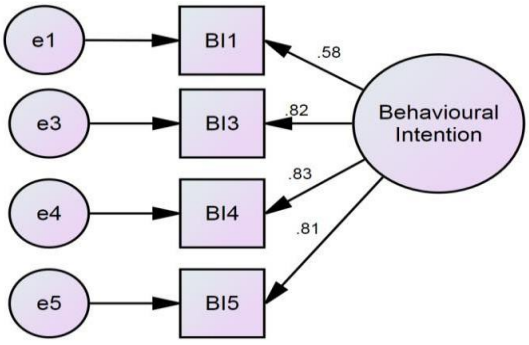


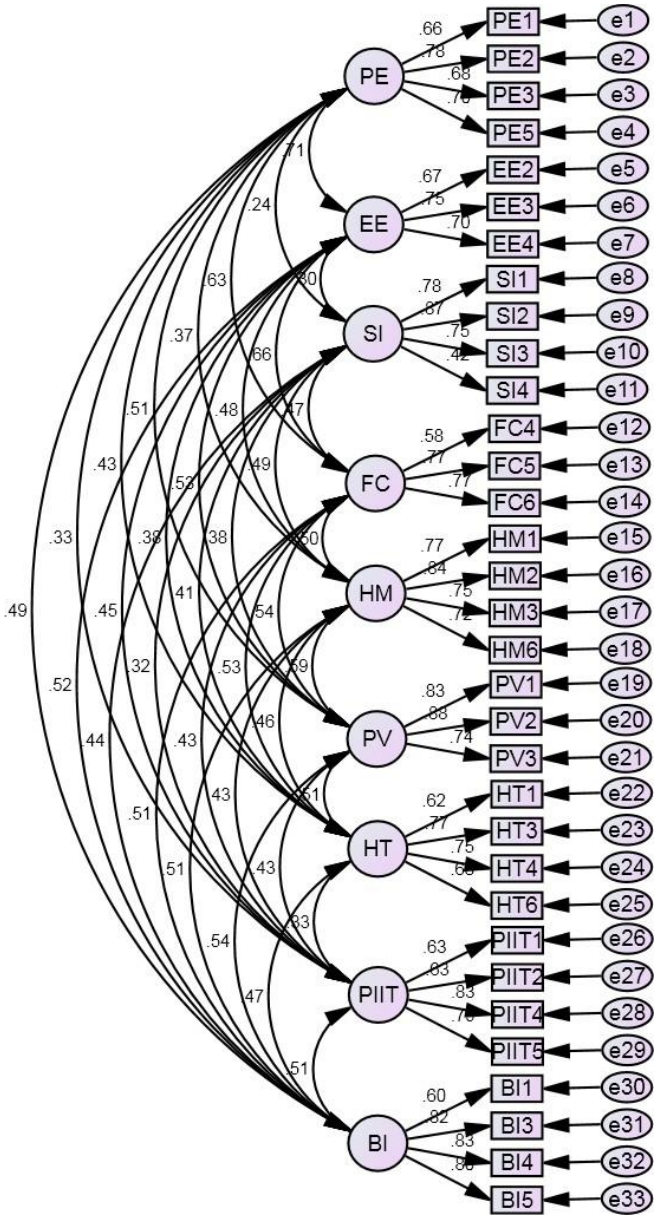
Table 4.24 Goodness-of-fit indexes of Behavioural Intention (Revised)

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
2.768	1.384	.997	.999	.029	.0111

4.4 Confirmatory Factor Analysis for the Overall Measurement Model

As shown earlier, each construct or latent variable in the first stage has its own measurement model, in which the observed variables (items) define each construct. After conducting the confirmatory factor analysis for each variable, an overall measurement model is subjected to confirmatory factor analysis to further assess convergent and discriminant validity of all measures. As presented in figure 4.17, the overall measurement model is a model where all the variables are free to correlate with one another (Hair et al. 2010). The absolute goodness-of-fit measures for the initial measurement models are displayed in Table 4.25.

Figure 4.19: Initial Confirmatory Factor Analysis for Overall Measurement Model



The initial measurement model (CFA) of the current study (χ^2 = 929.02, χ^2/df = 2.024, GFI = 0.889, CFI = 0.931, RMSEA = 0.048, SRMR = 0.0487) does not yield an adequate model fit for the empirical data. The GFI does not fulfil the recommended threshold values of 0.90. Therefore, it is decided to delete the redundant items iteratively until the most representative model that fits the data is achieved.

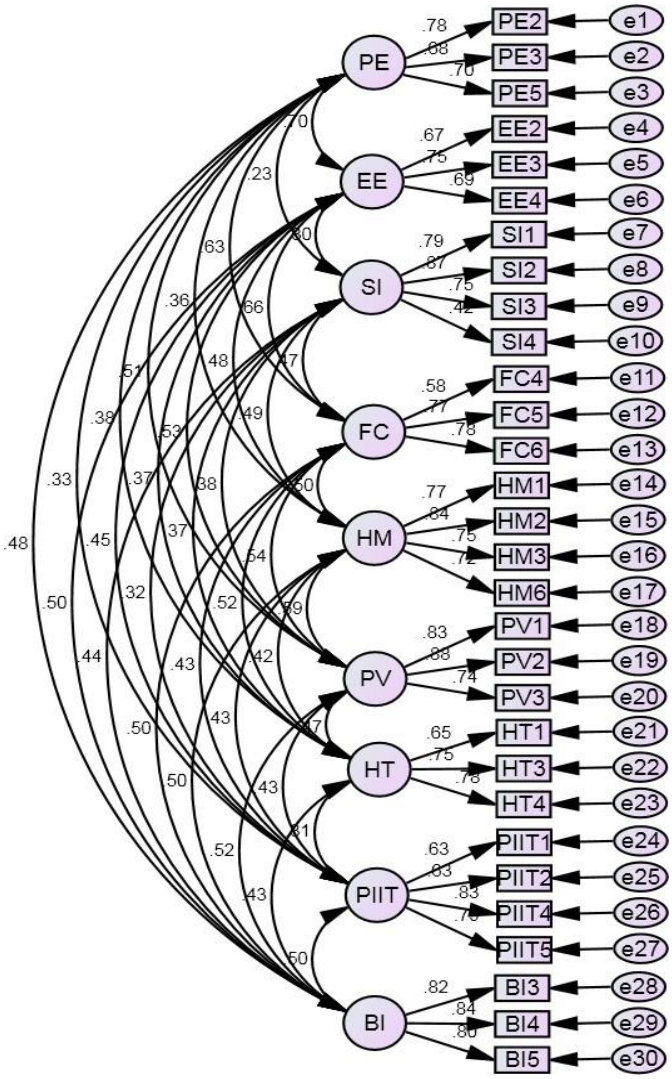
4.5 Confirmatory Factor Analysis for the Final Measurement Model

On the basis of the poor model fit indices of the GFI, the measurement model is re-examined to identify a better fitting model. The process is to delete only one problematic variable at a time and then re-estimate the model. The item BI1 is first removed, followed by PE1 and HT6 due to high modification indices. After the removal of the 3 items, the measurement model is tested again with the sample. Overall, the fit indexes indicate a good level of model fit. The value of χ2/DF is 2.078. Meanwhile, the value for CFI (0.935) is above the recommended threshold of 0.90; RMSEA (0.049) and SRMR (0.0470) are both within the recommended tolerances. In addition, the value for GFI (0.90) has improved significantly, which meet the threshold of 0.90. In sum, on the basis of the improved fit indexes, the revised overall measurement model is accepted and meets the statistical requirement for further analysis. The summary of the fit indexes for the revised measurement model are shown in Table 4.25.

Table 4.25: GFI indices for Initial & Final Measurement Model

Fit Indices	Initial Model (n=453)	After BI1 Dropped (n= 453)	After PE1 Dropped (n= 453)	After HT6 Dropped (n= 453)	Recommended Value
Chi-square	929.02	864.757	825.568	766.843	-
χ2/DF	2.024	2.020	2.074	2.078	≤5.00
RMSEA	0.048	0.048	0.049	0.049	≤0.08
SRMR	0.0487	0.0479	0.0486	0.0470	≤0.10
GFI	0.889	0.893	0.894	0.900	≥0.90
CFI	0.931	0.934	0.933	0.935	≥0.90

Figure 4.20: Confirmatory Factor Analysis for Final Measurement Model



4.6 Unidimensionality

As mentioned earlier, each one of the construct is examined in a separate measurement model (Kline 2005). In confirming each measurement model, it may be the case that some items in the scales have become redundant, as such, the measurement model needs to be re-specified by removing the redundant items (Kline 2005). In this way, parsimonious unidimensional constructs are obtained (Anderson and Gerbing 1988).

The basis for the above process includes two main considerations as recommended by Fornell and Larcker (1981) and Kline (2005). First, AVE value should be .50 or greater (Fornell and Larcker 1981). Second, the estimated correlations between the factors should not be greater than .85 (Kline 2005). These

two considerations are made in conjunction with the overall goodness-of-fit indices to suggest acceptance of unidimensionality for model.

As shown in Table 4.29, the AVEs for the constructs are all higher than the recommended level of .50. Also, the estimated correlation between the constructs in the measurement model is below .85, which indicates that the items are distinguishable (please refer 4.28). Thus, the existence of unidimensionality in this model is supported by the acceptable AVE and estimated correlations value between the factors.

4.7 Convergent Validity

Since the goodness-of-fit indices are statistically acceptable, the next step is to test convergent validity of the data (Byrne 2016). Table 4.29 presents the CFA results which include standardised factor loadings and item reliability for each indicator (Observed Variables). Following Hair et al. (2010), convergent validity is evaluated using three criteria: (1) factor loadings of all items on the respective constructs should be greater than 0.5, (2) the AVE for each construct should exceed the threshold of 0.5, and (3) CR scores should exceed the acceptable value of 0.7.

Firstly, the factor loadings are investigated to identify potential problem with the CFA model. According to Hair et al. (2010), the standardised factor loading must be significantly associated with the latent variable and have at least loading estimate of 0.5. However, the item's loading that exceeds 0.4 is satisfactory if other items have high loading values to complement the CR and AVE (Bryne 2016). The CFA results (see Table 4.29) point out that each factor loadings of the indicators are statistically significant at 0.001 level, except SI4 with 0.423 factor loadings. However, the CR scores exceed the acceptable value at 0.809 and AVE exceeds the threshold of 0.5. This indicates that the measurement model has a satisfactory convergent validity.

Secondly, the item composite reliability in the CFA model is examined. According to the results reported in Table 4.29, all the item composite reliability values have surpassed the suggested benchmark by Hair et al. (2010), which range from 0.747 (Effort Expectancy) to 0.861 (Behavioural Intention). Consequently, the results confirm that the variables in this study are very consistent in explaining the

variances constituted in them. Hence, convergent validity is thereby supported by the composite reliability.

Thirdly, convergent validity is supported by AVE .50 and over (Hair et al. 2010). Table 4.29 shows that none of the variables have an AVE value below 50%. The lowest AVE is generated by the effort expectancy variable, with a percentage of 50 and the highest AVE is scored by behavioural intention variable with a percentage of 67.4. In summary, convergent validity is supported by the three criteria stated by Hair et al. (2010).

4.7.2 Discriminant Validity

The methods of assessing discriminant validity are performed in this section. First, a more conservative method for establishing discriminant validity is utilized (Hair et al. 2014). Discriminant validity exists when the square roots of the AVE from each factor is greater than the squared correlation between the constructs (Hair et al. 2014). As it can be seen in Table 4.26, the variance extracted from each variable is all above its squared correlation with other variables. Consistent with Hair et al. (2014) guidelines, it is evidenced that these results explain adequate evidence for discriminant validity of the measurement model.

Table 4.26: Correlation Matrix for the Overall Measurement Model

	PV	**PE**	**SI**	**FC**	**PITT**	**EE**	**BI**	**HM**	**HT**
PV	**0.819**								
PE	0.505	**0.723**							
SI	0.383	0.228	**0.727**						
FC	0.538	0.634	0.470	**0.715**					
PIIT	0.433	0.334	0.322	0.432	**0.722**				
EE	0.527	0.696	0.300	0.656	0.448	**0.705**			
BI	0.523	0.479	0.441	0.496	0.500	0.501	**0.821**		
HM	0.588	0.360	0.486	0.497	0.427	0.477	0.497	**0.774**	
HT	0.468	0.383	0.367	0.524	0.310	0.372	0.432	0.418	**0.729**

Note: EE= Effort Expectancy, FC=Facilitating Condition, HM= Hedonic Motivation, PV= Price Value, HT=Habit, BI= Behavioural Intention, PE=Performance Expectancy, and SI= Social Influence

Table 4.27: Measurement Model Evaluation

Construct	Items	Factor Loadings (>.50)	Cronbach's alpha (>.70)	CR (>.70)	AVE (>.50)
Performance Expectancy	PE2	0.782	**0.759**	**0.766**	**0.523**
	PE3	0.684			
	PE5	0.700			
Effort Expectancy	EE2	0.668	**0.737**	**0.747**	**0.50**
	EE3	0.749			
	EE4	0.694			
Social Influence	SI1	0.785	**0.793**	**0.809**	**0.529**
	SI2	0.871			
	SI3	0.749			
	SI4	0.423			
Facilitating Conditions	FC4	0.583	**0.749**	**0.755**	**0.511**
	FC5	0.766			
	FC6	0.778			
Hedonic Motivation	HM1	0.774	**0.855**	**0.856**	**0.598**
	HM2	0.844			
	HM3	0.751			
	HM6	0.720			
Price Value	PV1	0.829	**0.854**	**0.858**	**0.670**
	PV2	0.879			
	PV3	0.742			
Habit	HT1	0.647	**0.767**	**0.772**	**0.531**
	HT3	0.750			
	HT4	0.783			
Personal Innovativeness	PIIT1	0.628	**0.799**	**0.811**	**0.522**
	PIIT2	0.627			
	PIIT4	0.826			
	PIIT5	0.785			
Behavioural Intention	BI3	0.817	**0.861**	**0.861**	**0.674**
	BI4	0.841			
	BI5	0.804			

4.7.3 Construct Reliability and Variance Extracted Measures

Reliability of instrument items is checked to assure that the items are free from random error and provides consistent results (Zikmund et al. 2013). Reliability of measure in this study is first assessed using Cronbach and Meehl's (1955) coefficient alpha and then using confirmatory factor analysis (CFA) (see Section 3.8.1.2). As for Cronbach's coefficient alpha, Table 4.27 shows that all the constructs

exceed the suggested level of .70 (Sekaran and Bougie 2010). In using confirmatory factor analysis, Hair et al. (2017) recommend that CR should be equal to or greater than .60, and AVE should be equal to or greater than .50.

According to the results reported in Table 4.27, all the Cronbach Alpha values has surpassed the suggested benchmark by Sekaran and Bougie (2010). If the composite reliability value is 0.7 or higher, the scale will have a reasonable internal consistency (Hair et al. 2017). Consequently, the results confirm that the variables in this study are extremely reliable as they are very consistent in explaining the variances constituted in them.

The average of variances extracted (AVE) for each individual construct is another important aspect of construct reliability (Hair et al. 2017). Table 4.27 shows that none of the variables have an AVE value below 50%. Therefore, it is acceptable to conclude that the variables in the model are reliable because this cut-off value confirms that at least 50% or more of the variances in the observed variables are explained by the set of indicators.

Based on these assessments, measures used within this study are within the acceptable levels supporting the reliability of the constructs (see Table 4.27).

4.8 Structural Equation Model

In the first stage of a 2-step approach to SEM, an overall measurement model consisting of nine constructs achieves acceptable levels of model fit, thereby confirming the adequacy of the model in representing the sample data. Following this, the model can now be tested utilising the structural equation model analysis for hypotheses testing purposes. The hypothesised directions of relationships between the constructs are represented by single-headed arrows, pointing towards the constructs in the structural model. Before analysing the structural links, the overall fit of the structural model to the observed data is examined so as to assess whether the model is valid. Figure 4.21 shows the structural model.

4.8.1 Model Fit Results

The same set of fit indices utilised to assess measurement model is used to test the full structural model (Byrne 2016). Based on the examination of fit statistics, the fit indexes for the structural model obtained in this study are summarised in Table 4.28. All the fit indexes fulfilled the threshold values. These values reveal that

the structural model developed for this study is well fitted. The statistical values of the indexes are: CMIN (766.84), χ2/DF (2.078), GFI (.900), CFI (.935), RMSEA (.049) and SRMR (.0470). Once the fit indexes fulfilled the threshold values and tolerances, the structural model is confirmed to be valid and acceptable for the analysis of structural links (Hair et al. 2010).

Figure 4.21: The Hypothesized Structural Model

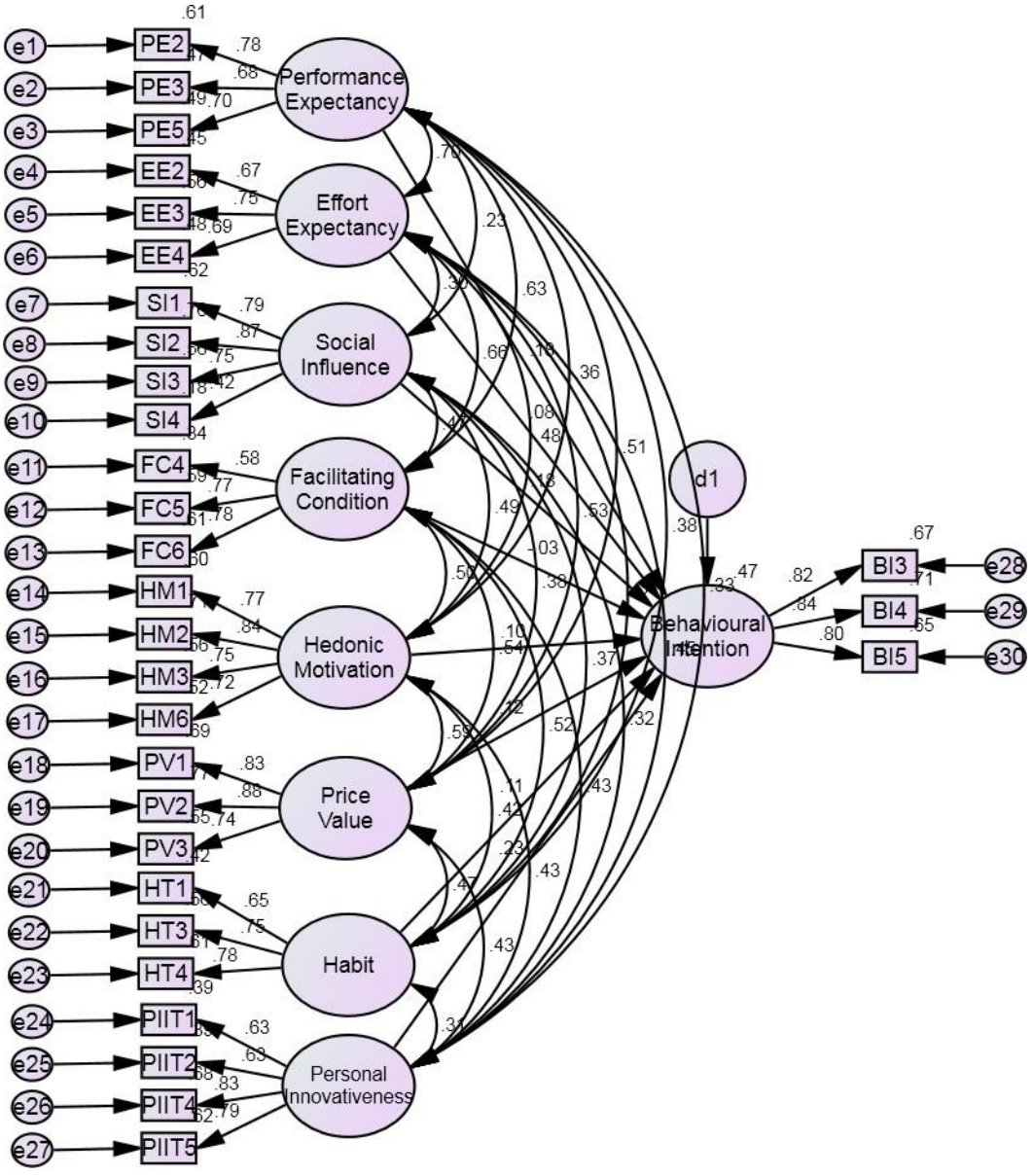


Table 4.28: Goodness-of-fit Result of Structural Model

CMIN	χ2/DF	GFI	CFI	RMSEA	SRMR
766.84	2.078	.900	.935	.049	.0470

4.8.2 Hypotheses Testing Results

In total, eight hypothesized relationship are examined. As shown in Table 7.9, behavioural intention is used where dependent variables and independent variables include performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation, habit, price value and personal innovativeness in information technology. The following part presents the findings from the hypotheses testing.

H1: Performance Expectancy has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between performance expectancy and behavioural intention latent variables. The structural coefficient is 0.234 and the standard error is 0.110. The parameter estimate is significant (at p-value 0.017), and the critical ratio value is 2.131, which is greater than 1.645 (one-tailed). Thus, the results of the test show that H1 is supported.

H2: Effort expectancy has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between effort expectancy and behavioural intention latent variables. The structural coefficient is 0.113 and the standard error is 0.122. The parameter estimate is not-significant (at p-value 0.176), and the critical ratio value is 0.930, which is lower than 1.645 (one-tailed). Thus, the results of the test show that H2 is not supported.

H3: Social influence has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between social influence and behavioural intention latent variables. The structural coefficient is 0.189 and the standard error is 0.061. The parameter estimate is significant (at p-value 0.001), and the critical ratio value is 3.092, which is greater than 1.645 (one-tailed). Thus, the results of the test show that H3 is supported.

H4: Facilitating condition has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is negative between facilitating conditions and behavioural intention latent variables. The structural coefficient is -

0.045 and the standard error is 0.124. The parameter estimate is not significant (at p-value 0.359), and the critical ratio value is -0.362, which is lower than 1.645 (one-tailed). Thus, the results of the test show that H4 is not supported.

H5: Habit has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between habit and behavioural intention latent variables. The structural coefficient is 0.110 and the standard error is 0.059. The parameter estimate is significant (at p-value 0.033), and the critical ratio value is 1.847, which is greater than 1.645 (one-tailed). Thus, the results of the test show that H5 is supported.

H6: Hedonic motivation has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between hedonic motivation and behavioural intention latent variables. The structural coefficient is 0.117 and the standard error is 0.073. The parameter estimate is not significant (at p-value 0.054), and the critical ratio value is 1.612, which is lower than 1.645 (one-tailed). Thus, the results of the test show that H6 is not supported.

H7: Price value has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between price value and behavioural intention latent variables. The structural coefficient is 0.154 and the standard error is 0.082. The parameter estimate is significant (at p-value 0.031), and the critical ratio value is 1.877, which is greater than 1.645 (one-tailed). Thus, the results of the test show that H7 is supported.

H8: Personal innovativeness in information technology has a positive effect on behavioural intention to adopt QR code payment.

For this hypothesis, the sign of the parameter is positive between personal innovativeness in information technology and behavioural intention latent variables. The structural coefficient is 0.225 and the standard error is 0.056. The parameter estimate is significant (at $p < 0.001$), and the critical ratio value is 4.023, which is greater than 1.645 (one-tailed). Thus, the results of the test show that H8 is supported.

Table 4.29 reveals the relationship of the measured scales based on the coefficient and significance. Based on the significant parameter estimates results, the performance expectancy, social influence, price value, habit, and personal innovativeness in information technology are statistically significant in explaining the behavioural intention, thus confirming H1, H3, H6, H7, and H8. The effort expectancy, facilitating conditions and hedonic motivation are not statistically significant, and consequently hypotheses H2, H4 and H5 are not supported. The summary of parameter estimates and hypothesis testing for Hypothesis 1 to Hypothesis 8 is presented in Table 4.29. Further details about the hypotheses of this thesis are discussed in the following section.

Table 4.29: Results of Hypotheses Testing

Hypotheses	**Path Coefficient (β)**	**P-value**	**Result**
H1: Performance Expectancy has a positive effect on behavioural intention in QR-code payment.	.234	0.017*	Supported
H2: Effort Expectancy has a positive effect on behavioural intention in QR-code payment.	.113	0.176	Not supported
H3: Social Influence has a positive effect on behavioural intention in QR-code payment.	.189	0.001**	Supported
H4: Facilitating Conditions has a positive effect on behavioural intention in QR-code payment.	-0.045	0.359	Not supported
H5: Hedonic Motivation has a positive effect on behavioural intention in QR-code payment.	.117	0.054	Not supported
H6: Habit has a positive effect on behavioural intention in QR-code payment.	.110	0.033*	Supported
H7: Price Value has a positive effect on behavioural intention in QR-code payment.	.154	0.031*	Supported
H8: Personal innovativeness in information technology has a positive effect on behavioural intention in QR-code payment.	.225	***	Supported

Note: Two-tailed t tests are performed. *p < .05; **p < .01; ***p < .001.

4.9 Discussion of Findings

As outlined in Chapter 1, this quantitative study involves a general overarching question to guide the research. This study follows the suggestion from Slade et al. (2015) research with the goal of extending the UTAUT2 theory with personal innovativeness in information technology. The UTAUT2 model postulates that the core constructs of performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, habit and price value are direct determinants of individual behavioural intention (Venkatesh, Thong and Xu 2012). The stated purpose of this study is to investigate the relationship between the UTAUT2 constructs, personal innovativeness in information technology and the intention of QR-code mobile payment adoption by Sarawak consumers.

In order to seek answers for the research questions, several research objectives and hypotheses are proposed. Accordingly, a conceptual model depicting the paths is developed based on the research questions and objectives proposed for the quantitative study.

RQ 1: What factors influence consumers' intention to adopt QR-code mobile payment?

RO 1.1: To examine the relationship between performance expectancy and behavioural intention to adopt QR-code payment.

In align with the research objective, hypothesis 1 proposes that performance expectancy is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. As shown in Table 4.29, the path that connects performance expectancy to behavioural intention yields a significant positive coefficient value of 0.234 ($p<0.05$). The finding reveals that performance expectancy is positively associated with behavioural intention to adopt QR-code payment in Sarawak, as predicted, thereby confirming H1. The finding is consistent with most of the past studies which found that the perception of performance expectancy is positively related to behavioural intention to use the mobile payment in developing countries (Tan et al. 2014; Thakur and Srivastava 2014; Yan and Yang 2015; Madan and Yadav 2016). Hence, such finding confirms the role of performance expectancy in the adoption of mobile technologies in developing country perspective.

The current research finding implies that, the utilitarian benefits of QR -code mobile payment as compared to traditional payment (i.e. cash) is a decisive factor in determining consumers' intention towards QR-code mobile payment usage. Faster speed of transactions (Teo et al. 2015), convenience (Pham and Ho 2015), transfer of secured information between devices with low volume of payments (Leong et al. 2013), and immediacy are the utilitarian benefits offered by QR-code mobile payment (Zhou, Lu and Wang 2010). This could be explained with the advancement of mobile technologies and wireless networks, where people tend to focus on the convenience of online monetary transactions in terms of portability and flexibility (Teo et al. 2015). More specifically, single payment method in mobile payment that replaces multiple payment methods may i ncrease the ease to transact, which is more favoured by consumers. Hence, the adoption intention tends to be high when QR-code mobile payment is found to provide more features or abilities that could increase the performance in transactions.

This study also implies the majority agrees that QR-code mobile payment will bring benefit rather than disadvantages in their lives. However, it is important to emphasize that the respondents of this study are skewed to the age group of 18–34 whom are more vibrant and technology-savvy. Yet, this skewedness shall not affect the conclusion as both the older and younger generations have also been exposed to traditional payment methods. With digital life converging into smartphones, customers expect to do more than just communications and commerce with their internet services (MCMC 2017). It is likely that customers compare the expected advantages of using current payment methods to using QR-code mobile payment when deciding to adopt such technology.

RO 1.2: To examine the relationship between effort expectancy and behavioural intention to adopt QR-code payment.

The H2 "effort expectancy has a positive effect on behavioural intention to adopt QR-code payment" is proposed with the intention of seeking the answer to the above mentioned research objective. As shown in Table 4.29, effort expectancy exhibits insignificant relationship on intention to adopt QR-code mobile payment (β=0.113, $p>0.05$). Hence, hypothesis 2 is not supported. The findings contradict with most of the past studies conducted on mobile payment in Malaysia where

consumers would accept the new innovation if the system is effortless (Balachandran and Tan 2015, Dutot 2015, Leong et al. 2013, Tan et al. 2014).

As gadgets become more advanced, they are now being built to fit in everything. Having multifunction compacted into one device has made life so much easier today with the elevation of technology. This is confirmed by a study conducted by Wei et al. (2009) who found that users are more aware and experienced in using mobile technologies due to the growing penetration of smartphones and internet users. Thus, the consumers may perceive that mobile technology as easy to use and probably requires lesser effort to learn (Wong et al. 2015).

The invalidated relationship between effort expectancy and intentions is in sync with previous studies conducted in mobile payment context (Madan and Yadav 2016, Chong 2013; Slade et al. 2015). It can be assumed that since Sarawak has been experiencing an increasing growth of mobile applications usage (e.g. mobile banking, mobile shopping, mobile commerce) (MCMC 2017), the users are aware with the advantages from mobile technology offer and therefore are not attracted to adopt QR-code mobile payment on ease of use. Remarkably, this finding supports that consumers are ready to learn to use the mobile application, regardless of its complexity, as long as the system suggests performance in task completion (Morisan and Defranco 2016). Therefore, effort expectancy might not be imbeded as an important antecedent in QR-code mobile payment adoption decision due to the use of already experienced technologies (i.e. interface of mobile devices) (Ooi and Tan 2016).

RO 1.3: To examine the relationship between social influence and behavioural intention to adopt QR-code payment.

H3 proposes that social influence is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. As shown in Table 4.29, the positive effects of social influence on behavioural intention (H3) are supported in this study (β=0.189, $p<0.05$). This implies that the influences perceived from social groups like family and peers have positive effects on intention behaviour. The QR-code mobile payment usage in Sarawak is still in the embryonic stage. With this, the influence from references groups is viewed as a trusted information source before any decision

is taken towards QR-code mobile payment adoption. The finding is inconsistent with previous MP studies (Teo et al. 2015). As previous studies focus on different target population (e.g. students, young consumers), it is understood as younger generations are identified as the savviest cohort when it comes to internet use and adoption of technological innovations, such as internet marketing (Tan, Chong and Lin 2013), NFC mobile payment (Khalilzadeh, Ozturk and Bilgihan 2017).

This observation supports the results of previous studies conducted in the field of mobile payment adoption in Malaysia (Tan et al. 2014; Schierz et al. 2010; Yang et al. 2012; Slade et al. 2015). It is observed that family, friends, peer groups and virtual communities influence the behaviours of people in the country. One possible explanation is the four dimensions of culture by Hofstede (2009). Sarawak is a collectivist culture compared to Western society. In collectivist cultures, social norms are highly valued and are expected to play an important role. Specifically, the consumers are known to be more concerned about how they can fit into society; hence they behave in accordance with social norms.

Besides that, Srite and Karahanna (2006) explain that peers and friends of individuals could help to reduce one's technology anxiety by sharing their own personal experiences and perception of the system. With a collectivist culture, consumers' social environment is a valuable source of information that might also help to reduce uncertainty and determine whether the use of a system is appropriate (Morosan and DeFranco 2016). As such social groups are perceived to have higher credibility when compared with other sources of information, any positive word-of-mouth recommendations made by significant individuals might be greater motivators for usersthat are trying out any new technology or information system.

RO 1.4: To examine the relationship between facilitating conditions and behavioural intention to adopt QR-code payment.

H4 proposes that facilitating conditions is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. Contrary to the study's expectations, the relationship between facilitating condition and user's intention to adopt QR-code mobile payment is not significant (β=-0.045; $p>0.05$) as shown at Table 4.29. The finding is in line with what are reported in some earlier mobile

technology adoption studies (Oliveira et al. 2016; Yu 2012; Chong 2013). Consequently, H4 is not confirmed.

Facilitating conditions are found to have a mixed effect on behavioural intention. Several studies confirm the impactful role of facilitating conditions on intention on mobile technology usage (Raman and Don 2013; Venkatesh, Thong and Xu 2012; Zhou, Lu and Wang 2010). However, Venkatesh et al. (2003) illustrate that facilitating conditions have a positive influence on the actual usage behaviour; rather than on the behavioural intention. Several studies also validate that the facilitating conditions are not a determinant of the behavioural intention (Oliveira et al. 2016; Khalilzadeh, Ozturk and Bilgihan 2017; Slade et al. 2014). For example, Slade et al. (2014) state that FC has an insignificant influence on BI to use mobile payment because most of the respondents are non-users and therefore they are unable to determine what resources needed to use mobile payment.

According to Singh (2015), age affects the relationship between the facilitating conditions and the intention to adopt the technology. Singh (2015) finds that older adults place more emphasis on facilitating conditions compared to young people in the adoption of new technology. Similar to the study conducted by Gell et al. (2013), facilitating conditions, in addition to effort expectancy, are responsible for low technology adoption among older adults due to physical, vision, and memory impairments (Gell et al. 2013). Therefore, the hypothesis is not supported in this study may due to this study consists of many young respondents.

In this study, personal innovativeness exhibits positive effects on behavioural intention. Lewis, Agarwal and Sambamurthy (2003) mention that personal innovativeness influences facilitating conditions in peripheral ways. For example, technology users with high levels of personal innovativeness tend to explore the technology and quickly seek out support from a variety of sources than user with less personal innovativeness. It indicate that users with personal innovativeness rely less on formal support for their acceptance of technology (Leonard-Barton and Deschamps 1998). Hence, the finding assumes that majority of the consumers have their own capabilities to obtain product information and purchase products or service with QR-code MP services. As discussed in Section 4.9.3, social influence of significant others can play an important role in the behaviour of adoption intention.

Hence, this study assumes that support from significant one is generally considered as one of the common methods to deal with the difficulty met by consumers.

Another possible explanation is that facilitating conditions could be confounded with ease of use, which has been verified by few researchers (Khalilzadeh, Ozturk and Bilgihan 2017; Maillet et al. 2015). Hence, it is assumed that when the technical and administrative infrastructure for the use of QR-code mobile payment exists, consumers will only perceive the procedure as easy. Since the findings indicate that effort expectancy is not a factor in determining the intention to adopt the QR-code mobile payment, consumers therefore do not expect to have strong institutional support to help them because they perceive that mobile payment is easy to use. Besides that, consumers may perceive that the systems are compatible with other mobile financial apps. Hence, users' existing knowledge and skills of using these features enhance their perception of the capability of using similar applications.

However, Baptista and Oliveira (2017) mention that users will only discover the need to have a whole set of facilitating conditions such as mobile payment tutorials, online demos, and chat or phones number in actual usage. Similar to the study conducted by Heerink et al. (2010), the older adults in the study did not get to experience the use of the robot and may have a limited belief that the system's support exists to assist the use of the robots.

Overall, the results of the study demonstrate that facilitating conditions would not have any impact on intention to use QR-code mobile payment, but it might have a positive impact on actual usage of it (Khalilzadeh, Ozturk and Bilgihan 2017).

RO 1.5: To examine the relationship between habit and behavioural intention to adopt QR-code payment.

H5 proposes that habit is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. As shown in Table 4.29, consumers' automatic behaviours, expressed as habits, is found to influence intentions (β=0.110, $p<0.05$), thereby confirming H5.

This finding is similar to the studies conducted by Albugami and Bellaaj (2014), Morosan and DeFranco (2016) and Yen and Wu (2016), which find that habit is a significant factor in mobile financial technology adoption. The reason for this

finding might lay under the fact that mobile phones have become a part of people's everyday life nowadays, which makes the users automatically reliant on mobile apps in the nation (Hew et al. 2015). An interesting highlight from the observation of iPay88's data insights is the obvious preference of online banking for payments in Malaysia (iPay88 2018). The choice of online banking for payment is more attractive now and it is also generally positive because it advocates the habit of spending what consumers have in the bank. In depth, when the usage of mobile for payment becomes frequent, habit emerges and becomes a force that increases the behavioural intention to continue using the mobile apps (Hew et al. 2015).

The finding demonstrates that consumers can extend their mobile application usage behaviours to QR-code mobile payment (Venkatesh, Thong and Xu 2012). It can be inferred that, when users perceive mobile phone for payment as useful, users will adopt these types of payment apps. This fosters unplanned use of the apps (Giovanis, Binioris and Polychronopoulos 2012).

RO 1.6: To examine the relationship between hedonic motivation and behavioural intention to adopt QR-code payment.

H6 proposes that hedonic motivation is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. As shown in Table 4.29, the influence of hedonic motivations over behavioural intention is found to be not statistically significant ($\beta = 0.117$, $p > 0.05$). It appears that consumers adopt QR-code mobile payment because of utilitarian reasons rather than hedonic reasons. In that sense, they believe using QR-code mobile payment is not for the purpose of satisfying the emotional needs and pleasurable experiences, but more towards to better task performance or completion.

Recently, researchers have recognized the importance of hedonic components (e.g. perceived enjoyment) in affecting individuals' use of IT systems, especially hedonic or semi hedonic-oriented services (Hong, Lin and Hsieh 2017; Merhi 2016; Li and Mao 2015; Venkatesh, Thong and Xu 2012). Likewise, empirical studies conducted by Ooi et al. (2011), Wong et al. (2016) and Lee et al. (2017) find that consumers in Malaysia are highly interested in hedonic factors, but mainly on entertainment based product (e.g. broadband, mobile TV, mobile shopping).

Therefore, the reason for this contrast might lay under the fact that the studies are in two different contexts. The finding is consistent with earliest study of Kahlilzadeh, Ozturk and Bilgihan (2017) and Oliveira et al. (2016). In this study, the reason for not having relationship between hedonic motivation and behaviour intention might be due to the pleasures obtained from using mobile payment services which might stir risky emotions toward financial facilities (Khalilzadeh, Ozturk and Bilgihan 2017).

According to VMware Banking Consumer 2020 Study, Sarawak's consumers concerns towards mobile payment applications are mainly related to aspects involving privacy of personal information, security of online transaction systems and the uncertainty of product quality (Teo 2018). Thus, consumers might be more concerned with utilitarian aspect of performance expectancy instead of the hedonic motivation in the adoption stage (Khalilzadeh, Ozturk and Bilgihan 2017).

RO 1.7: To examine the relationship between price value and behavioural intention to adopt QR-code payment.

H7 proposes that price value is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. As shown in Table 4.29, the influence of price value over behavioural intention is found to be statistically significant (β= 0.154, $p<0.05$). Research has empirically demonstrated that mobile payments adoption is discouraged by economic factors such as advantageous transaction service fees or concerns on basic fees for connecting to mobile payment services (Yang 2009). However, consistent with Venkatesh, Thong and Xu (2012), the current study highlights the importance of price value in consumers' decision making regarding to QR-code mobile payment adoption. The result of this study shows that price value has a significant impact on a person's intention to use a QR -code mobile payment app. Although many apps are free, it does not mean that people will intend to use it, especially if it does not bring value. On the other hand, people may be willing to pay for access if they can receive value from it.

In this study, the value which the consumer perceives to receive in terms of additional advantages (better quality of service, additional utilities) offered by QR-code mobile payment services over the traditional payment channels, in exchange for price paid to avail such services, is predicted to have a significant

influence on consumers' intentions in adopting it. This observation supports the results of previous study conducted in the field of mobile payment adoption (Madan and Yadav 2016). Users who show interest to adopt QR-code mobile payment services might seek user friendly and innovative applications that can offer value to them and make their life easier.

Interestingly, price value is a significant determinant of behavioural intention. This leads us to believe that when QR-code mobile payment is value for money, potential adopters will have higher expectation on the benefits of usefulness in their daily lives. The findings validate the view by Tan et al. (2014) on NFC mobile credit card in Malaysia. Teo et al. (2015) also accredit the reason with the affordable prices of smartphones and telecommunication plans in Malaysia. Recently, a service tax of RM25 on each credit or charge card that an individual owns will be charged upon renewal of the card (Surendran 2018). Hence, price value has positive influence on intention of mobile payment usage due to free service charges compared to banks. Therefore, consumers tend to perceive that the benefits of using a technology is greater than the perceived monetary cost incurred to use the technology (Venkatesh, Thong and Xu 2012).

RO 1.8: To examine the relationship between personal innovativeness and behavioural intention to adopt QR-code payment.

H8 proposes that personal innovativeness in information technology is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak. Consistent with expectations, the hypothesis of the influence of personal innovativeness on behavioural intention is valid and shows positive effects (β=0.225, $p<0.05$), as shown in Table 4.29, thereby confirming H5. The finding is consistent with existing literatures which illustrated the important role of innovativeness towards behavioural intention for mobile payment in Malaysia and various contexts (Tan et al. 2014; Makki, Ozturk and Singh 2016; Oliveira et al. 2016; Patil, Rana and Dwivedi 2017). The finding suggests that individual characteristics typically excluded from existing theoretical models of technology acceptance are actually important considerations in this mobile technology context.

Personal innovativeness in information technology is characterized by a risk taking propensity and ability to cope with uncertainty, which is also more salient in

gadget lovers who are knowledgeable about novel high-tech products in the market place. Their ability to cope with uncertainty allows them to generate an intrinsic motivation to use a variety of leading edge technological goods. However, some gadget lovers who lack knowledge about certain gadgets may have fewer propensities to use leading edge technological high-tech products and to take risks on the goods and products. This suggests that the level of education (knowledge) might influence the level of personal innovativeness of the consumers (Thakur, Angriawan and Summey 2016). The findings in this study showcase personal innovativeness as positively related to behavioural intention. As majority of the respondents are highly educated, it is assumed that potential consumers tend to have certain knowledge and awareness about mobile payment or similar mobile applications in the society. With the trend of more creative mobile applications being launched for the consumers, more consumers are now accessing the sites using a mobile than a desktop (e.g. mobile banking, mobile commerce, mobile shopping) (MCMC 2017). Therefore, individuals might decide to adopt new products according to the given the amount of knowledge or previous experience with certain similar gadgets.

Another possible explanation could be the fact that the innovation is generally new in Sarawak, compared with other forms of payments. This results in a strong sense of curiosity from consumers where they are more willing to accept QR-code mobile payment as a new channel of payment, as well as making them sources of opinions for peers (Liu et al. 2015).

4.10 Summary

This chapter summarises the data obtained from the questionnaire survey in terms of the sample characteristics, descriptive statistics, reliability, convergent validity and discriminant validity. Modifications to the measurement model and structural model are performed to improve the goodness-of-fit. Results from hypotheses testing are discussed, in reference to the extant literature reviewed in Chapter 2. The hypothesised relationships are tested based on standardised regression estimates of direct paths only. Findings of the study indicate that performance expectancy, social influence, habit, price value and personal innovativeness in information technology are important determinants of behavioural intention in Sarawak context.

Chapter 5: Implications and Conclusion

5.1 Introduction

This chapter provides an overview of the present study and summarises the major findings in relation to the objectives and hypotheses of the study. This chapter also presents the theoretical and practical implications, followed by the acknowledgement of the limitations of the study. Recommendations on practice and future research are forwarded. The conclusions are then made in the final section.

5.2 Recapitulation of the Study

The general objective of this study is to identify factors that influence the behavioural intention to adopt the QR-code mobile payment in Sarawak. The present study therefore provides an assessment of the roles of UTAUT2 constructs and personal innovativeness in information technology construct as factors of behavioural intention. The analyses of the data from questionnaires reveal the following noteworthy findings:

- Performance expectancy is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Effort expectancy is not positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Social influence is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Facilitating conditions are not positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Habit is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Hedonic motivation is not positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Price value is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.
- Personal innovativeness in information technology is positively related to behavioural intention to adopt QR-code mobile payment in Sarawak.

5.3 Implications of the Study

In this section, the theoretical and practical implications are drawn from the results reported in Chapter 4.

5.3.1 Theoretical Implications

In the current literature, consumers‘ behavioural intentions are recognised as one of the most vital elements that leads to the success and sustainability of any mobile payment providers. Unlike most prior research that focus mainly on the systems’ performance (i.e., UTAUT theory), this study took a different approach to examine whether habit, hedonic motivation and price value had a significant influence on consumers’ behavioural intention in Sarawak mobile payment industry.

This study makes contribution to examine the adoption intention behaviour of an innovation, taking QR-code mobile payment technology in Sarawak as the context. The first theoretical implication of this study is to fill the gap by exploring all UTAUT2 constructs in mobile payment context (Hess et al. 2014). The second implication of this study is to fulfil the previous research gaps by enhancing the knowledge about adoption towards QR-code mobile payment products and services. The study also provides further theoretical support of the role of performance expectancy, social influence, habit, price value in the adoption of QR-code mobile payment systems. On the other hand, effort expectancy, facilitating conditions and hedonic motivation are considered not relevant in this study context.

Furthermore, recent literature has suggested that consumer innovativeness should be an important driver in innovation adoption study (Tan et al. 2014; Li, Zhang and Wang 2015; Avornyo et al. 2019), particularly in the innate trait of innovativeness (Pagani and Malacarne 2017; Slade et al. 2015). This study therefore examines whether personal innovativeness in information technology influences the behavioural intention to adopt QR-code mobile payment. While the results for the influence of personal innovativeness in information technology on behavioural intention are as hypothesized, its impact on behavioural intention generates significant results. This study presents one of the few empirical works investigating the role of consumer innovativeness, and thus validates the inclusion of personal innovativeness as constructed in mobile payment adoption research.

5.3.2 Practical Implications

Findings from this study provide valuable insights for mobile payment application developers and mobile payment marketing teams. Since performance expectancy is reported to have a significant impact on BI, mobile payment providers should place utmost attention on performance expectancy to boost the adoption rate. It is believed that the intention tends to be higher when QR-code mobile payment is

found to provide more features or abilities that could increase the performance in transactions.

In practical terms, taking expected performance into account during the implementation of a QR-code mobile payment is possible through the use of several approaches. The high levels of performance expectation recommend to service providers to continue investing time and money to create awareness and educate consumers about the usefulness, convenience, and advantages of the service. This would further lead to increasing acceptance of QR-code mobile payments apps among the potential users. User payment and consumption data collected from the app can be used to customize promotions and discounts, improving whenever possible channel usability and user experience.

Such finding is useful for promotional and marketing purposes showing that users are ready to adopt mobile payment applications which they believe will create value and perform well for them. Clear communication of the potential performance of mobile application will help increase the adoption rate of the app. Therefore, for effective integration of the QR-code mobile payment technology into particular industry (restaurant, retailers etc.), industry marketers and technology vendors must jointly publicize the technology as an innovative but safe alternative to the status quo payment methods.

Social influence is another important dimension highlighted in this study which coincides with the findings of other researches as well (Tan et al. 2014; Yang et al. 2012; Slade et al. 2015). Given that social influence is reported to have a significant impact on BI, merchants and application developers should consider approaches that capitalize on the social influence among consumers. In this realm, opinions shared by friends, relatives and superiors are influential in the recognition, promotion, and successful adoption of QR-code mobile payment technology. This study attributes the importance of the current high level of interconnection between individuals on account of the rise of mobile communication technologies. Besides that, consumers also tend to comply with the opinions of salient others. This social influence could be leveraged by engaging in marketing campaigns with opinion leaders while intending a snowball effect for the realization of a more positive perception towards the technology.

Also, to expedite the adoption of QR-code mobile payment, the service providers could embed their customer-centric promotions through community and informal social networking sites along with robust word of mouth propaganda (Wei et al. 2009). This will help the customers to exchange their experiences and draw useful information before adopting QR-code mobile payment. For instance, advertising creativity based on testimonials could help. This, in turn, will generate a greater response where payment transactions performed on mobile devices.

Given that habit influences intentions, consumers' own utilization of mobile devices for payment will influence their intentions to use QR-code mobile payment. For such influences to manifest in the adoption process, the payment environment should structurally match the consumption behaviour that consumers use regularly in their environments (e.g. payments for groceries, fast food purchases, etc.). Besides that, merchants could encourage consumers to engage in multiple transactions on the property by promoting that the mobile payment is similar to the other payment methods (e.g. card/cash) that are familiar to consumers, and that they are encouraged to use their mobile phones to enter transactions.

In some cases, merchants may need to seek guidance about consumers' habits and preferences or cooperate with mobile payment providers to conduct promotions to develop a habit of using it. Besides that, merchants could propose service bundling to increase the stickiness of consumers and develop consumers' habit. For instance, Alipay uses a flexible service pricing strategy, providing appealing subsidies to the end-users (both merchants and consumers) in the initial stage as to attract consumers and develop their habits' of using QR-code mobile payment. Additionally, it enables Alipay to obtain mass users' data which can be utilised to develop value-added services, for instance, Yu'e Bao.

In this study, the behavioural intentions of the consumers are also influenced by the price value. In other words, for those consumers who perceive QR-code mobile payment as a useful technology in contributing to their daily life with several benefits (e.g. efficiency, convenience, time and effort-saving), they are more likely to perceive QR-code mobile payment to be more valuable instead of the monetary cost paid (Zhu and Chen 2012; Alalwan et al. 2018). Companies could enhance their price value by advertising the value of using free QR-code mobile payment application.

Also, companies could add more values of using QR-code mobile payment application by providing more frequently used payment services to facilitate users' daily consumption. For example, there have been a dozen categories of services offerings on WeChat Pay and Alipay that provide users with access to a wide variety of both financial and non-financial services to facilitate the daily life of the users. Those services include booking services for taxi, cleaning and repairing services, flight tickets, movie tickets, hotel or group buying which currently are absent and may be added in the future. By embracing interoperable platforms, it adds clear value for users and helps to grow a wider network of merchants and acceptance points.

Results from this study also imply that QR-code mobile payment providers need to engender users' innovativeness in order to facilitate the usage of mobile payments. Service providers may consider targeting some of their advertising campaigns to the segment of more innovative users. Advertising campaigns are needed as consumers do have willingness to use the aspirational products and services, provided there are platforms to do so. Hence, marketers play an important role to reach out the innovators. Marketers could organise campaigns or events to identify or invite innovative consumers to use the services on the spot with rewards or incentives. For example, Alipay launch promotional campaign for taxis to further promote new payments in Hong Kong. Customers get discount or rewards when they make payments by using Alipay, meanwhile, increasing the interaction between a service and the users (Cho and Ho 2017). Given that social influence influences behavioural intention, marketers should attempt to identify 'opinion leaders' in order to encourage positive word-of-mouth promotion.

5.4 Limitation of the Study

Though this study reveals several noteworthy findings, there are certain limitations. The main focus of this study is on the effects of UTAUT2 and personal innovativeness in information technology on behavioural intention to adopt QR-code mobile payment adoption in Sarawak. Besides, this study does not examine other factors that may consider important to the adoption of mobile payment, such as trust (Gao and Waechter 2017), perceived security (Khalilzadeh, Ozturk and Bilgihan 2017) and risk (Kerviler, Demoulin and Zidda 2016). By excluding such variables, this study might not have captured the complete domain of behavioural intention to adopt QR-code mobile payment.

The R^2 statistics reveal that at least 47% of the variance in the dependent variables is explained by the independent variables. Such value of R^2 accounted in behavioural intention was also observed within an acceptable level, which exceeded all the recommended values in this regard, such as: 30% (Kline 2011) and 40% (Straub, Boudreau and Gefen 2004) By including personal innovativeness along with UTAUT2 factor, the R^2 value extracted in BI is increased to reach 47%, which in turn supports comprising personal innovativeness as an external factor among the conceptual model. However, this study examines the role of PIIT along with other existing UTAUT2 constructs while overlooking other personality traits (e.g. tacit knowledge and self-efficacy), which might influence individuals' adoption intention towards innovative systems.

Also, participants in this study are all from a typically collectivist country and cultural differences in individualism and collectivism have been shown to impact IT usage behaviour (Lu et al. 2017). Thus, the findings in this study may not be generalizable to individualistic countries.

In this study, convenience sampling approach is to collect data, yet, non-random sampling techniques are associated with less generaliza bility. The definition of the population is restricted due to resources constraints and the availability of adequate sampling frames. The respondents in the study are consumers who have visited specific shopping malls in Sarawak during the survey period. Therefore, the sample here might not be representative of other consumers who visit the shopping mall during other periods of the year. Hence, the results might only reflect the group from which the sample is taken. Also, majority of the respondents in this research are Chinese, therefore, limiting the generalizability of this research across the population in Sarawak and across the region.

Despite the limitation of this study, the potential bias in results could be overcome by more comprehensive studies on a wider scale. In the next section, future research avenues are suggested to overcome the limitations discussed as above.

5.5 Recommendations for Future Research

The future study could replicate current study setting to examine customers' intention and behaviour towards different technologies (e.g. e-learning, online shopping, wearable technology, mobile government, mobile health services, mobile

payment) in different contexts (education, retailers, government, healthcare, hotels). Besides that, future studies could consider the cultural differences (collectivism & individualism) through multinational data sampling and the inclusion of appropriate cultural dimensions in the research model (Chen and Li 2017).

Given that the multifaceted nature of QR-code mobile payment, there could be possibilities that other factors play a role supporting behavioural intention to adopt QR-code mobile payment. Due to their novelty and uneven deployment, QR-code mobile payment systems can be the object of system-related privacy concerns as there is not enough public evidence of their ability to protect privacy (Morosan and DeFranco 2016). Hence, future researches could extend the model by incorporating perceived risk, security or trust construct to examine consumers' behavioural intention toward QR-code mobile payment.

Follow-up studies should also construct a more comprehensive model by incorporating moderating variables to predict adoption intentions. Past studies have proven that age, gender, and experience pose an influence on adoption intention (Venkatesh, Thong and Xu 2012; Liebana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva 2014; Khalilzadeh, Ozturk and Bilgihan 2017). Based on the limitations that exist in this study, future researches should seek to test the extended version of UTAUT2 validated by this study with random samples of users of QR - code mobile payment, or conduct a multi-group comparison study (e.g. age, gender, experience) (de Luna et al. 2018). Also, this study only focuses on behavioural intention of QR-code mobile payment. Future studies can focus on consumers' actual or continuance usage of QR-code mobile payment. Interested researchers may take into consideration the comparison of pre-usage and post-usage data to see whether factors such as effort expectancy, facilitating conditions and hedonic motivation become relevant after actual use and experimentation with the technology (Lu et al. 2017). Additionally, this study is a cross-sectional study. Longitudinal research of this kind would also test the validity of the model over time and see how its predictive capacity holds when effects on usage are also hypothesised.

Furthermore, it is advised that future research to stay abreast with technology advances. For example, facial recognition is now evolving and is able to be used as a form of payment method. In this study, a possible reason for why hedonism was not a significant factor for QR-code MP usage intentions among consumers can be attributed to high familiarity of mobile usage. Yet, hedonism

might play a significant role for this alternative due to its newness and the significance of personal innovativeness in the present study. That is to say, when innovative consumers are faced with new (unfamiliar) technologies, hedonism may play a significant role due to the gratification that consumers are more likely to experience as a result of new explorations (as in the case of significant findings of hedonism in past studies (refer Table 1.1) published when technologies were emerging rather than maturing).

In addition, this study focuses on only one-sided perception from consumers on the variables tested in this study. Although consumers play a key role in the ecosystem, providing focus on one single aspect at a time could only provide limited explanations about the complex phenomenon of mobile payments adoption. The

actions of other market actors (regulators, financial institutions, merchants) could impact the QR-code mobile payment adoption rates as well (Dahlberg et al. 2015). It would be useful to gather data from multi-perspectives. This dyadic approach would help the researcher to have a better understanding of the relationships of the variables.

5.6 Conclusions

This study provides valuable empirical findings to the current mobile payment literature by identifying the factors influencing consumers' intention to adopt a specific type of mobile payment in a state that has not been widely examined. The main objective of this study is to examine the factors that influence the behavioural intention to adopt QR-code mobile payment. This study formulates a research model combining constructs from well-known theory, UTAUT2, with personal innovativeness in information technology.

Eight research objectives are raised in response to the research questions. The research model is tested with data from Sarawak. Five out of eight paths in the research model are discovered to be significant in the study. The findings show that performance expectancy, social influence, habit, price value and personal innovativeness in information technology play a significant role in the adoption of QR-code mobile payment.

As the state progresses towards a wider utilisation of digital technology to leapfrog the economy status, mobile payment providers need to ensure that they are well positioned to lead the trends and exploit emerging opportunities in a digital economy environment. Overall, the result of this work may be helpful for practitioners in the mobile payment industry in identifying the needs of the consumers and improve or advance their application functionality, value and marketing strategies as to achieve increase consumer acceptance.

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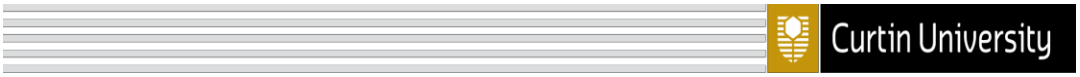
Appendix

Appendix A: Ethics Approval Letter



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17-Jul-2018

Name: Goi Chai Lee Goi
Department/School: Curtin Malaysia
Email: ChaiLee.Goi@cbs.curtin.edu.au

Dear Goi Chai Lee Goi

RE: Ethics Office approval
Approval number: HRE2018-0464

Thank you for submitting your application to the Human Research Ethics Office for the project **Factors Influencing Behavioural Intention to adopt the QR code payment in Sarawak**.

Your application was reviewed through the Curtin University Negligible risk review process.

The review outcome is: **Approved**.

Your proposal meets the requirements described in the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007)*.

Approval is granted for a period of one year from **17-Jul-2018** to **16-Jul-2019**. Continuation of approval will be granted on an annual basis following submission of an annual report.

Personnel authorised to work on this project:

Name	Role
Suo, Wen Jing	Student
Goi, Goi Chai Lee	CI
Sim, Adriel	Co-Inv

Approved documents:

Document

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:

- proposed changes to the approved proposal or conduct of the study
- unanticipated problems that might affect continued ethical acceptability of the project
- major deviations from the approved proposal and/or regulatory guidelines
- serious adverse events

3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval

You do not have to provide participants with a separate consent form as you have included the implied consent statement and tick box at the top of your survey questionnaire. Therefore please remove reference to the consent form in your information sheet.

This letter constitutes low risk/negligible risk approval only. This project may not proceed until you have met all of the Curtin University research governance requirements.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Catherine Gangell
Manager, Research Integrity

Appendix B: Participant Information Sheet

HREC Project Number:	HRE2018-0464
Project Title:	Factors Influencing Behavioural Intention to adopt the QR-code payment in Sarawak
Principal Investigator:	Dr. Goi Chai Lee
Student researcher:	Ms. Suo Wen Jing
Version Number:	1
Version Date:	25/12/2017

What is the Project About?

- **Background of the research project**

With the aim towards a cashless society, Sarawak state government had encouraged more cashless QR-code payment applications, to empower the state's digital economy and ease business transactions. The app offers payment which made through mobile wallet, mobile credit card or mobile banking for Sarawak citizens to pay bills by scanning the QR-code. Though QR-Code mobile payment is simple to use and beneficial to consumers, it is still in nascent stage in Sarawak. However, it is highly encouraged as it allows speedier check-out compare to traditional payment methods. In government side, E-payment results in savings amounting to 1% of a country's GDP, which reduces the costs of doing bill tallying and currencies printing.

- **Aim of Project**

The aim of this study is to identify the factors influencing behavioural intention to adopt the QR-code payment in Sarawak.

- **Contribution**

The outcome of this study is to identify the factors influence users to adoption of QR-code for payment. Exploring the potential factors affecting the use of QR-code payment could possible provide practical suggestions to stakeholders, including government, mobile network operators, merchants, banks and system designers for the improvement of app services. The study will identify product and customer specific characteristics, which is possible to assist service providers to invest appropriate time, effort and money in the development, provisions and marketing of app services as to enable digital economy transformation as well as to satisfy the needs of users in the future.

Who is doing the Research?

- This study is being carried out by Ms. Suo Wen Jing with the supervision under Dr. Goi Chai Lee and Dr Adriel Sim.
- This project is being funded by Curtin Malaysia Postgraduate Research Scholarship.

Why am I being asked to take part and what will I have to do?

- You have been asked to take part because you have met the following conditions:
    1) Sarawak Citizens who are 18 years old and above.
- The questionnaire may take you about 10-15 minutes to complete. We will ask you questions about the factors render you to influence behavioural intention to adopt QR-code payment application. You will only be asked to complete the survey once.

Are there any benefits' to being in the research project?

- There will be no direct benefits to you from participating in this research.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

- Apart from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study.

Who will have access to my information?

- Any information we collect and use during this research will be treated as confidential. The following people will have access to the information we collect in this research: the research team and the Curtin University Ethics Committee.
- Electronic data will be password-protected and hard copy data will be in locked storage.
- The information we collect in this study will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be kept indefinitely.

Will you tell me the results of the research?

- We will send you a one-page summary of the results if you wish to have it.

Do I have to take part in the research project?

- Your participation of this study is entirely voluntary. You have the right to refuse or withdraw from participating the survey whenever you want, it will not affect your relationship with the University, staff or colleagues.

What happens next and who can I contact about the research?

For further information, please contact:

Student: Suo Wen Jing (Suo.Wen.Jing@postgrad.curtin.edu.my) or

Supervisor: Dr. Goi Chai Lee (goi.chai.lee@curtin.edu.my)

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2018-0464). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Appendix C: Questionnaire

Questionnaire

Please tick at the box below	
☐	I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I voluntarily agree to take part in this study.
Section A: Demographic Profile	
Please tick at the relevant box for the questions below.	
Gender	□ Male □ Female
How old are you?	Please specify: _____years old
Ethnicity	□ Chinese □ Malay □ Iban □ Others
Highest Education Level	□ Secondary School □ Diploma □ Bachelor Degree □ Master Degree / Professional Qualification/ PHD

Section B: Factors affecting the adoption intention of QR-code mobile payment						
Please circle one number per line to indicate the degree to which you agree or disagree with a statement, where (1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree.						
Performance Expectancy						
PE1	QR-code mobile payment would be useful to conduct my payment.	1	2	3	4	5
PE2	Using QR-code mobile payment would enable me to accomplish payment more quickly.	1	2	3	4	5
PE3	Using QR-code mobile payment would increase my productivity.	1	2	3	4	5
PE4	Using QR-code mobile payment would increase my chances of achieving things that are important to me.	1	2	3	4	5
PE5	Using QR-code payment would make it easier for me to make payment.	1	2	3	4	5
Effort Expectancy						
EE1	My interaction with QR-code mobile payment would be clear and understandable.	1	2	3	4	5
EE2	It would be easy for me to become skilful at using QR-code mobile payment.	1	2	3	4	5
EE3	I would find QR-code mobile payment easy to use.	1	2	3	4	5
EE4	Learning to use QR-code mobile payment would be easy for me.	1	2	3	4	5
EE5	Interacting with the QR-code mobile payment does not require a lot of my mental effort.	1	2	3	4	5
EE6	I think it is easy to get the QR-code mobile payment to do what I want it to do.	1	2	3	4	5

Facilitating Conditions						
FC1	I have the resources necessary to use QR-code mobile payment (e.g. smartphones, internet services, and secured applications).	1	2	3	4	5
FC2	I have the knowledge necessary to use QR-code mobile payment.	1	2	3	4	5
FC3	QR-code mobile payment is compatible with other technologies I use.	1	2	3	4	5
FC4	I can get help from others when I have difficulties using QR-code mobile payment.	1	2	3	4	5
FC5	Using QR-code mobile payment fits well with the way I like to make payment effectively.	1	2	3	4	5
FC6	Using QR-code mobile payment fits into my lifestyle.	1	2	3	4	5
Social Influence						
SI1	I will adopt QR-code mobile payment if people who influence my behaviour think that I should use it.	1	2	3	4	5
SI2	I will adopt QR-code mobile payment if people who are important to me think that I should use it.	1	2	3	4	5
SI3	I will adopt QR-code mobile payment if people whose opinions that I value prefer that I use it.	1	2	3	4	5
SI4	Friend's suggestion and recommendation will affect my decision to adopt QR-code mobile payment.	1	2	3	4	5
SI5	Family members/relatives will have an influence on my decision to adopt QR-code mobile payment.	1	2	3	4	5
SI6	I will adopt QR-code mobile payment if my colleagues/classmates use it.	1	2	3	4	5

SI7	Information from mass media (e.g. TV, Radio, newspapers, internet) will influence my decision to adopt QR-code mobile payment.	1	2	3	4	5
SI8	I would adopt QR-code mobile payment if the service is widely used by people in my community.	1	2	3	4	5
Habit						
HT1	The use of mobile phones for payment has become a habit for me.	1	2	3	4	5
HT2	I am addicted to use mobile phones for general payment.	1	2	3	4	5
HT3	I must use mobile phones for payment.	1	2	3	4	5
HT4	Using mobile phones for payment has become natural to me.	1	2	3	4	5
HT5	When faced with payment activities, using mobile phones for payment is an obvious choice for me	1	2	3	4	5
HT6	Using mobile phones for payment is something I do without planning.	1	2	3	4	5
Price Value						
PV1	With the smartphone fee I need to pay, QR-code mobile payment can be beneficial to me.	1	2	3	4	5
PV2	With the mobile internet fee I need to pay, QR-code mobile payment can be worthwhile to me.	1	2	3	4	5
PV3	With the smartphone maintenance fee I need to pay, QR-code mobile payment is good value for money.	1	2	3	4	5
PV4	QR-code mobile payment can provide me better value than other payment methods (e.g. cash, credit/debit card).	1	2	3	4	5
PV5	Overall, the use of QR-code mobile payment will deliver me good value.	1	2	3	4	5

Hedonic Motivation						
HM1	Using QR-code mobile payment would be fun.	1	2	3	4	5
HM2	Using QR-code mobile payment would be enjoyable	1	2	3	4	5
HM3	Using QR-code mobile payment would be entertaining	1	2	3	4	5
HM4	Using QR-code mobile payment would be pleasant	1	2	3	4	5
HM5	Using QR-code mobile payment would be exciting.	1	2	3	4	5
HM6	Using QR-code mobile payment would be interesting.	1	2	3	4	5
Personal Innovativeness in Information Technology						
PI1	If I heard about new information technology, I will try to use it.	1	2	3	4	5
PI2	In my social circle, I am usually the first to try out new information technology.	1	2	3	4	5
PI3	I know more than my friends on new information technology.	1	2	3	4	5
PI4	I like to experiment with new information technology.	1	2	3	4	5
PI5	I enjoy taking chances in using new information technology.	1	2	3	4	5
PI6	In general, I do not want to try out new information technology.	1	2	3	4	5

Section C: Behavioural Intention						
Please circle one number per line to indicate the degree to which you agree or disagree with a statement, where (1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree.						
Behavioural intention						
BI1	Given the chance, I intend to make payment by using QR-code mobile payment.	1	2	3	4	5
BI2	Given the chance, I will always try to make payment by using QR-code mobile payment in my personal life.	1	2	3	4	5
BI3	I plan to use QR-code mobile payment in the near future.	1	2	3	4	5
BI4	I predict that I will use QR-code mobile payment in the near future	1	2	3	4	5
BI5	I believe my interest towards QR-code payment will increase in the near future.	1	2	3	4	5

Thank you & Have a nice day!

Appendix D: Permission to Conduct Research Study

Appendix D1: Permission letter from Permaisuri Imperial City Mall

Curtin University

CRICOS Provider Code 00301J (WA)

Title: Permission to Conduct Research Study

Dear Sir/Madam:

I am writing to request permission to conduct survey at Permaisuri Imperial City Mall. I am currently enrolled in the Master of Philosophy at Curtin University in Miri, and I am in the process of writing my master's thesis. The study is entitled "Factors Influencing Behavioural Intention to adopt the QR code payment in Sarawak".

Due to the nature of the study, I hope to recruit consumers to anonymously complete a 5-page questionnaire. Consumers, who volunteer to participate, will be given a participant information sheet and consent form to be signed by them. The participants will need to return the questionnaire form to the research assistant after completing the survey. The survey results will be used for the thesis project and individual results of this study will remain absolutely confidential and anonymous. No costs will be incurred by either your shopping mall or the individual participants.

Your approval to conduct this study will be greatly appreciated. You may contact me at my email address: Suo.Wen.Jing@postgrad.curtin.edu.my

If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on your institution's letterhead acknowledging your consent and permission for me to conduct this survey at your institution.

Sincerely,

Suo Wen Jing

Approved by:

Name: Eric Jong
Manager - Function & Marketing

Company Stamp:

IMPERIAL MALL

Appendix D2: Permission letter from Vivacity Mall

Curtin University

CRICOS Provider Code 00301J (WA)

Title: Permission to Conduct Research Study

Dear Sir/Madam:

I am writing to request permission to conduct survey at Vivacity Mall. I am currently enrolled in the Master of Philosophy at Curtin University in Miri, and I am in the process of writing my master's thesis. The study is entitled "Factors Influencing Behavioural Intention to adopt the QR code payment in Sarawak".

Due to the nature of the study, I hope to recruit consumers to anonymously complete a 5-page questionnaire. Consumers, who volunteer to participate, will be given a participant information sheet and consent form to be signed by them. The participants will need to return the questionnaire form to the research assistant after completing the survey. The survey results will be used for the thesis project and individual results of this study will remain absolutely confidential and anonymous. No costs will be incurred by either your shopping mall or the individual participants.

Your approval to conduct this study will be greatly appreciated. You may contact me at my email address: Suo.Wen.Jing@postgrad.curtin.edu.my

If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on your institution's letterhead acknowledging your consent and permission for me to conduct this survey at your institution.

Sincerely,

Suo Wen Jing

Approved by:

Name: Morgan Chai

Company Stamp:

CHANGKAT MALL SDN BHD

* T & C :
- Assigned to be at planter box in front Padini.
- Not allowed to go around the mall to distribute survey forms.

Appendix D3: Permission letter from Park City Mall

Curtin University

CRICOS Provider Code 00301J (WA)

Title: Permission to Conduct Research Study

Dear Sir/Madam:

I am writing to request permission to conduct a research study at Park City Mall. I am currently enrolled in the Master of Philosophy at Curtin University in Miri, and I am in the process of writing my master's thesis. The study is entitled "Factors Influencing Behavioural Intention to adopt the QR code payment in Sarawak".

Due to the nature of the study, I hope to recruit consumers to anonymously complete their own 5-page questionnaire (copy enclosed). Consumers, who volunteer to participate, will be given a participant information sheet and consent form to be signed by them (copy enclosed) and returned to the primary researcher at the beginning of the survey process. The survey results will be used for the thesis project and individual results of this study will remain absolutely confidential and anonymous. No costs will be incurred by either your shopping mall or the individual participants.

Your approval to conduct this study will be greatly appreciated. You may contact me at my email address: Suo.Wen.Jing@postgrad.curtin.edu.my

If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on your institution's letterhead acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,

Suo Wen Jing

Approved by:

Name: Kiew Kwong Ee

Company Stamp: PARKCITY SHOPPING MALL MANAGEMENT SDN. BHD. (736492-K) MKT

Appendix D4: Permission letter from Star Mega Mall

Curtin University

CRICOS Provider Code 00301J (WA)

Title: Permission to Conduct Research Study

Dear Sir/Madam:

I am writing to request permission to conduct survey at Star Mega Mall. I am currently enrolled in the Master of Philosophy at Curtin University in Miri, and I am in the process of writing my master's thesis. The study is entitled "Factors Influencing Behavioural Intention to adopt the QR code payment in Sarawak".

Due to the nature of the study, I hope to recruit consumers to anonymously complete a 5-page questionnaire. Consumers, who volunteer to participate, will be given a participant information sheet and consent form to be signed by them. The participants will need to return the questionnaire form to the research assistant after completing the survey. The survey results will be used for the thesis project and individual results of this study will remain absolutely confidential and anonymous. No costs will be incurred by either your shopping mall or the individual participants.

Your approval to conduct this study will be greatly appreciated. You may contact me at my email address: Suo.Wen.Jing@postgrad.curtin.edu.my

If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on your institution's letterhead acknowledging your consent and permission for me to conduct this survey at your institution.

Sincerely,

Suo Wen Jing

Approved by:

Name:

Company Stamp:

Appendix E: Normality Test (Univariate Level)

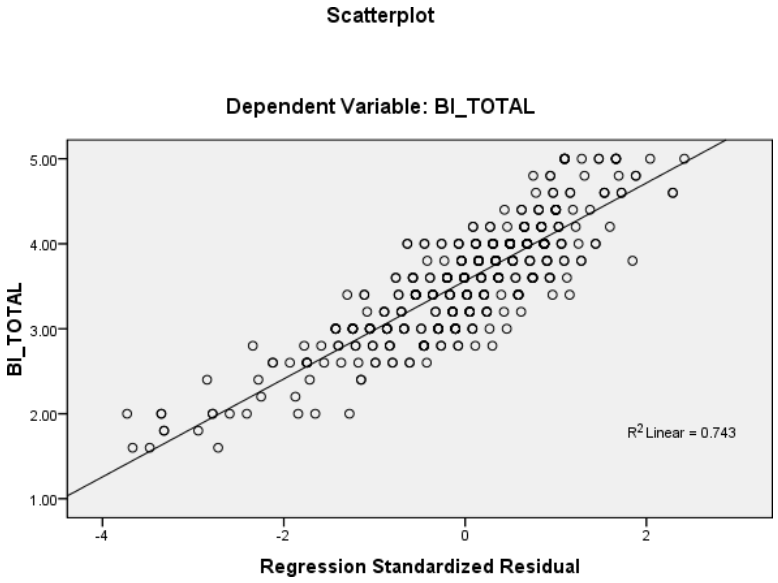
Descriptive Statistic

Items	N	Skewness	Kurtosis
PE1	453	-0.059	-0.112
PE2	453	-0.228	0.022
PE3	453	0.087	-0.507
PE4	453	0.072	-0.204
PE5	453	-0.108	-0.448
EE1	453	-0.191	0.065
EE2	453	-0.234	-0.147
EE3	453	-0.193	-0.050
EE4	453	-0.381	0.126
EE5	453	-0.445	0.542
EE6	453	-0.103	-0.061
SI1	453	-0.293	0.084
SI2	453	-0.388	-0.042
SI3	453	-0.364	0.077
SI4	453	-0.397	0.064
SI5	453	-0.386	-0.058
SI6	453	-0.160	-0.319
SI7	453	-0.312	0.021
SI8	453	-0.408	0.191
FC1	453	-0.314	0.006
FC2	453	-0.318	0.139
FC3	453	0.079	-0.453
FC4	453	-0.315	-0.059
FC5	453	-0.241	-0.216
FC6	453	-0.114	-0.360
HM1	453	-0.209	0.609

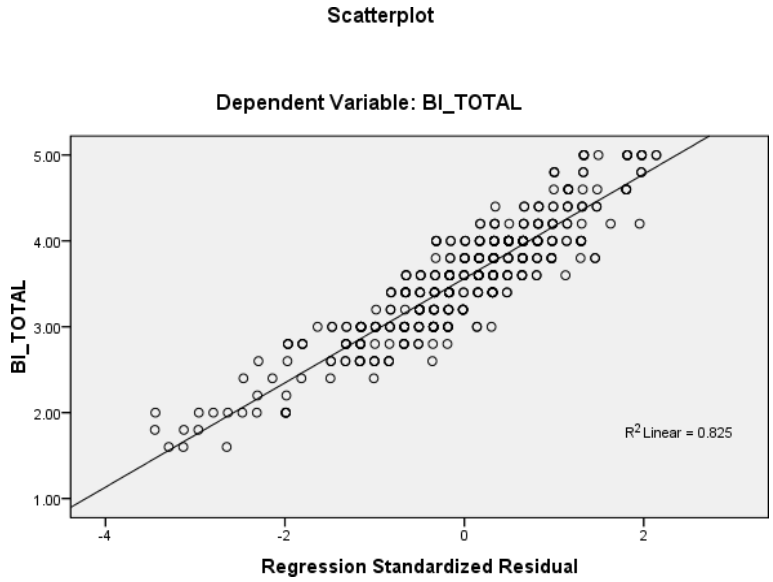
HM2	453	0.006	-0.146
HM3	453	-0.023	-0.229
HM4	453	-0.058	-0.144
HM5	453	-0.018	0.019
HM6	453	-0.106	-0.151
PV1	453	-0.004	0.092
PV2	453	-0.041	0.021
PV3	453	-0.158	0.435
PV4	453	0.052	-0.225
PV5	453	0.292	-0.276
HT1	453	-0.317	-0.057
HT2	453	-0.162	-0.238
HT3	453	-0.141	-0.335
HT4	453	-0.125	-0.195
HT5	453	-0.021	-0.486
HT6	453	-0.154	-0.393
PI1	453	-0.483	0.605
PI2	453	-0.082	-0.195
PI3	453	-0.204	-0.325
PI4	453	-0.236	-0.037
PI5	453	-0.383	0.097
PI6	453	-0.084	-0.317
BI1	453	-0.246	-0.034
BI2	453	-0.070	-0.149
BI3	453	-0.188	-0.079
BI4	453	-0.449	0.484
BI5	453	-0.514	0.623

Appendix F: Homoscedasticity

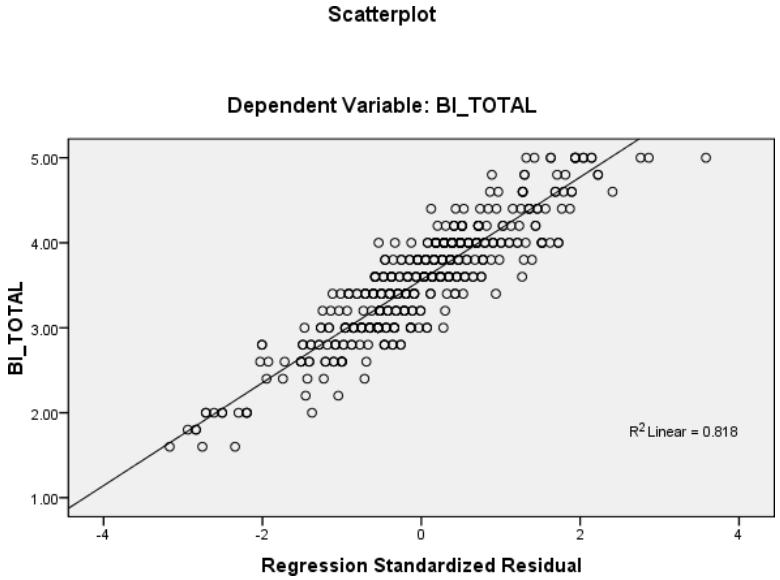
Relationship between Performance Expectancy and Behavioural Intention



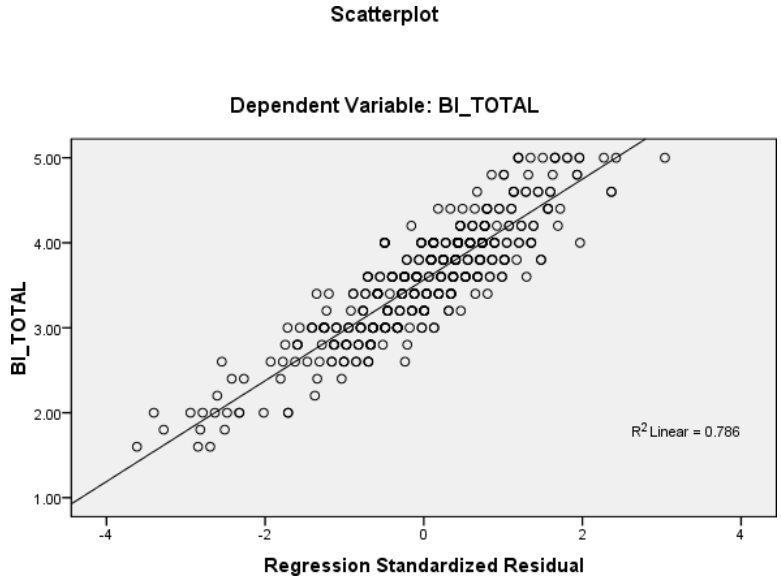
Relationship between Effort Expectancy and Behavioural Intention



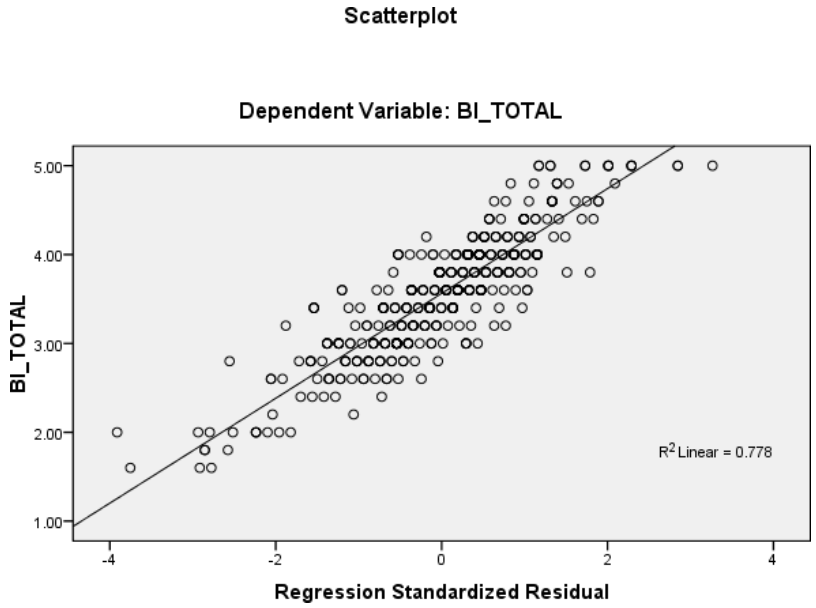
Relationship between Social Influence and Behavioural Intention



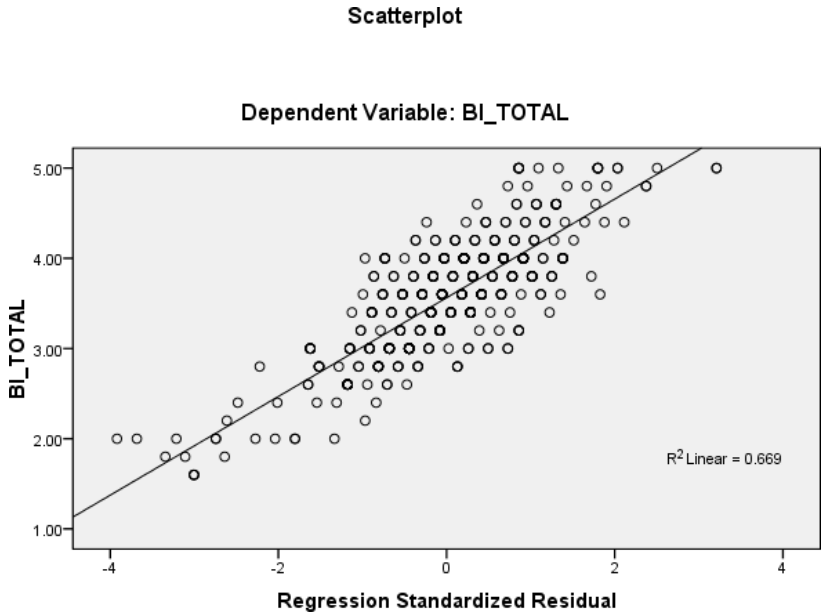
Relationship between Facilitating Conditions and Behavioural Intention



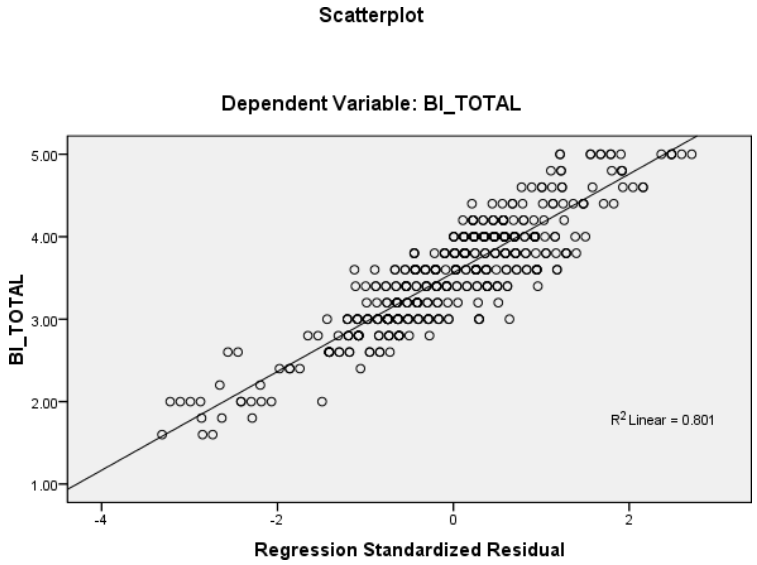
Relationship between Hedonic Motivation and Behavioural Intention



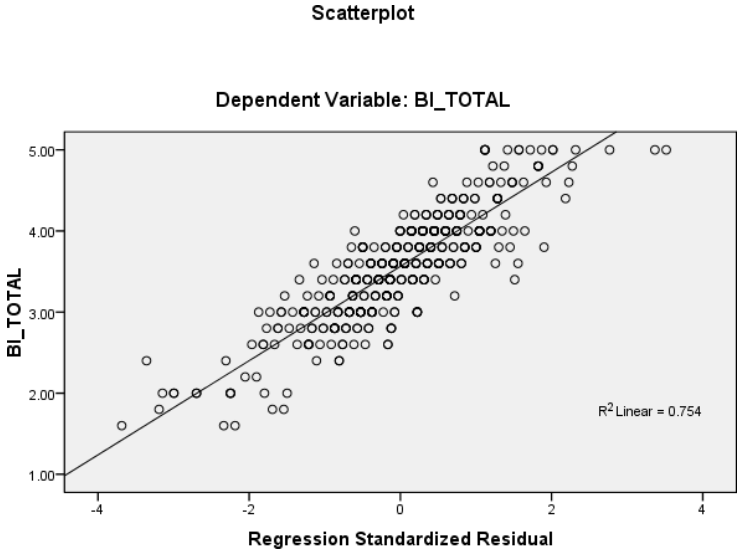
Relationship between Price Value and Behavioural Intention



Relationship between Habit and Behavioural Intention



Relationship between Personal Innovativeness in Information Technology and Behavioural Intention



Appendix G: Results of VIFs and Tolerance values

Dependent Variables: Performance Expectancy

Variable	Tolerance	VIF
Effort Expectancy	.504	1.983
Social Influence	.676	1.480
Facilitating Condition	.511	1.957
Hedonic Motivation	.558	1.791
Price Value	.446	2.241
Habit	.643	1.554
Personal Innovativeness in Information Technology	.645	1.551
Behavioural Intention	.547	1.828

Dependent Variables: Effort Expectancy

Variable	Tolerance	VIF
Performance Expectancy	.633	1.579
Social Influence	.672	1.488
Facilitating Condition	.561	1.783
Hedonic Motivation	.562	1.780
Price Value	.444	2.250
Habit	.624	1.603
Personal Innovativeness in Information Technology	.662	1.510
Behavioural Intention	.554	1.805

Dependent Variables: Social Influence

Variable	Tolerance	VIF
Performance Expectancy	.563	1.777
Effort Expectancy	.446	2.244
Facilitating Condition	.507	1.973

Hedonic Motivation	.582	1.718
Price Value	.445	2.249
Habit	.625	1.601
Personal Innovativeness in Information Technology	.651	1.536
Behavioural Intention	.552	1.810

Dependent Variables: Facilitating Conditions

Variable	**Tolerance**	**VIF**
Performance Expectancy	.575	1.740
Effort Expectancy	.502	1.991
Social Influence	.685	1.461
Hedonic Motivation	.558	1.792
Price Value	.446	2.240
Habit	.630	1.587
Personal Innovativeness in Information Technology	.645	1.550
Behavioural Intention	.546	1.833

Dependent Variables: Hedonic Motivation

Variable	**Tolerance**	**VIF**
Performance Expectancy	.560	1.785
Effort Expectancy	.449	2.228
Social Influence	.702	1.425
Facilitating Condition	.498	2.009
Price Value	.501	1.994
Habit	.624	1.603
Personal Innovativeness in Information Technology	.644	1.553
Behavioural Intention	.549	1.822

Dependent Variables: Price Value

Variable	Tolerance	VIF
Performance Expectancy	.566	1.768
Effort Expectancy	.449	2.230
Social Influence	.677	1.477
Facilitating Condition	.503	1.987
Hedonic Motivation	.634	1.578
Habit	.634	1.578
Personal Innovativeness in Information Technology	.646	1.547
Behavioural Intention	.571	1.750

Dependent Variables: Habit

Variable	Tolerance	VIF
Performance Expectancy	.581	1.721
Effort Expectancy	.449	2.228
Social Influence	.678	1.476
Facilitating Condition	.506	1.976
Hedonic Motivation	.562	1.780
Price Value	.452	2.214
Personal Innovativeness in Information Technology	.658	1.520
Behavioural Intention	.549	1.821

Dependent Variables: Personal Innovativeness in Information Technology

Variable	Tolerance	VIF
Performance Expectancy	.560	1.785
Effort Expectancy	.458	2.182
Social Influence	.680	1.471
Facilitating Condition	.499	2.005

Hedonic Motivation	.558	1.793
Price Value	.443	2.256
Habit	.633	1.580
Behavioural Intention	.570	1.755

Appendix H: AMOS Output (Measurement Model)
Model Fit Summary

Model Fit Summary

CMIN

Model	CMIN	DF	P	CMIN/DF
Default model	766.843	369	.000	2.078
Saturated model	.000	0		
Independence model	6599.945	435	.000	15.172

GFI

Model	GFI
Default model	.900
Saturated model	1.000
Independence model	.273

Baseline Comparisons

Model	CFI
Default model	.935
Saturated model	1.000
Independence model	.000

RMSEA

Model	RMSEA
Default model	.049
Independence model	.177

Appendix I: AMOS Output (Structural Model)

Maximum Likelihood Estimates

	Estimate	S.E.	C.R.	P
Behavioural_Intention <- Performance_Expectancy	.234	.110	2.131	.033
Behavioural_Intention <- Effort_Expectancy	.113	.122	.930	.352
Behavioural_Intention <- Social_Influence	.189	.061	3.092	.002
Behavioural_Intention <- Facilitating_Condition	-.045	.124	-.362	.717
Behavioural_Intention <- Hedonic_Motivation	.117	.073	1.612	.107
Behavioural_Intention <- Price_Value	.154	.082	1.877	.061
Behavioural_Intention <- Habit	.110	.059	1.847	.065

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
Behavioural_Intention	.469

CMIN

Model	CMIN	DF	P	CMIN/DF
Default model	766.843	369	.000	2.078
Saturated model	.000	0		
Independence model	6599.945	435	.000	15.172

GFI

Model	GFI
Default model	.900
Saturated model	1.000
Independence model	.273

Baseline Comparisons

Model	CFI
Default model	.935
Saturated model	1.000
Independence model	.000

RMSEA

Model	RMSEA
Default model	.049
Independence model	.177