WILLINGNESS TO ADOPT MOBILE WALLET IN MALAYSIA

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DECLARATION

I hereby declare that the dissertation is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

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APPROVAL SHEET

This dissertation/thesis entitled "**WILLINGNESS TO ADOPT MOBILE WALLET IN MALAYSIA**" was prepared by CHUA CHANG JIN and submitted as partial fulfillment of the requirements for the degree of Master of Philosophy in (Social Science) at Universiti Tunku Abdul Rahman.

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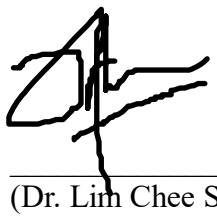

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John F. Kennedy stated that "As we express our gratitude, we must never forget that the highest appreciation is not to utter words, but to live by them".

ABSTRACT

A mobile wallet is a part of financial technology (FinTech) products. A mobile wallet is an electronic wallet that can make financial transactions. Mobile wallet adoption of Malaysian consumers still in the infant stage. It is a lower adoption rate as compared with other countries, such as China and India. The studies that related the factors affecting the mobile wallet adoption in the Malaysia context are less. Hence, it is crucial to study the willingness to adopt mobile wallet among the consumers. The research objectives are 1) to identify the factors affecting the consumers' willingness to adopt mobile wallet in Malaysia, 2) to analyse the relationships between perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, brand image, and behavioural intention to use with the willingness to adopt mobile wallet, and 3) to investigate the relationship between the behavioural intention to use mobile wallet and willingness to adopt mobile wallet in Malaysia. The data collected by online questionnaires. Data analysis used descriptive analysis, correlation analysis, homogeneity test, reliability test, multiple regression analysis, multivariate analysis, and hypothesis testing. The results showed that perceived usefulness, perceived ease of use, social influence, and brand image have a significant influence on the consumers' behavioural to use the mobile wallet, and also the consumers' behavioural has significantly influenced toward willingness to adopt mobile wallet. The mobile wallet companies could make the appropriate marketing decision in designing a more personalized mobile wallet to Malaysian consumers. The findings might support the government to generate the formative digital payment policies to motivate mobile wallet adoption toward a cashless nation

in the South East Asia region. The government should support the dynamic development of the mobile wallet market and protect the benefits of consumers with the effective rules and regulations.

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LIST OF ABBREVIATIONS

ACH	Automated Clearing Houses
ANN	Artificial Neural Networks
ANOVA	Analysis of Variance
B2C	Business to Consumer
BI	Brand Image
CAGR	Compound Annual Growth Rate
CFA	Confirmatory Factor Analysis
ePIF	e-Payment Incentive Fund
eWOM	electric word of mouth
ESS	Sum of Squares
FinTech	Financial Technology
GSCA	Generalized Structured Component Analysis
MANOVA	Multivariate Analysis of Variance
MSE	Mean Squared Error
MSR	Regression Mean Square
OLS	Ordinary Least Squares
PE	Perceived Ease of Use
PLS	Partial Least Squares
POS	Point-of-Sale
PS	Perceived Security
PU	Perceived Usefulness
PV	Price Value
QR	Quick Response
RSS	Residual Sum of Squares
SI	Social Influence
SM	Social Media
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TSS	Total Sum of Square

CHAPTER I

Introduction

Financial technology (FinTech) is the new technology that aims to compete with traditional financial patterns in the transmission of financial services (Lin, 2015). A mobile wallet is a part of Fintech products and services. In general, the mobile wallet is the mobile payment service that operated under the financial ordinance and performed by a mobile device.

1.1 Research Background

This section involves the discussion on the definition of mobile wallet and the targeted respondents of this study.

1.1.1 Definition of Mobile Wallet

A mobile wallet defined as an electronic wallet that can make financial transactions by adopting a mobile device (Amoroso & Magnier-Watanabe, 2012). Mobile wallet is known as a digital customarily and physical wallet that can be used to store the digital information for authorization and application based on

the grant permission for accessing it (Reddy, Agrawal, Chaitanya, Bist, Safdar, Patil, & Rao, 2017). This grant permission has provided by password, QR code, facial image, or biometric characteristics. The mobile wallet defined as using a one-time password for authentication is disclosed based on one embodiment of the invention in a network system (Cox, 2013). It can protect the payment accounts, identification, and other personal information. The authentication process with a user's unique biometrical characteristic can allow the information of mobile wallet owners to be copied to the device or regain it after that. Example of mobile wallets in Malaysia is Alipay, WeChat Pay, (Maybank Anytime, Everyone), CIMB Pay, WECONNECT, Boost, Samsung Pay, Razer Pay, and so on. The advantages of using the mobile wallet are supporting different types of financial transactions, flexibility in settling the transaction, reducing the need for cash, getting discount coupons, and providing the government greater financial inclusion and transparency (Shin, 2009; Yadav, 2017). The usage of mobile wallet can protect the safety and finance of merchants and consumers from the theft and robbery threat. The consumers can have their financial transactions in safety and convenient manner if compared with cash usage.

The payments sector is full of innovations in the financial industry. The evolution of payment methods can reduce the payment transaction time of consumers when purchasing goods and services. For most of the 20th century, payments meant exchanging the paper money or checks (Rysman & Schuh, 2017). In the 1950s, the credit cards and charge cards are introduced and required an extended phone authorization, which is around 4 minutes. The MasterCard development & regional Automated Clearing Houses (ACH) has

introduced in the early 1970s. In 1974, a fully electronic system to Visa was being introduced, which is required 40 seconds to complete the authentication of a transaction. Thus, the development of retail payments, debit cards (1982), and electronic exchange systems such as PayPal in 2002. In addition, banks start to use digital "substitute checks" in 2003. They have finally come to the mobile payment, mobile banking, and then into the mobile wallet development. In 2004, Alibaba Group launched Alipay mobile wallet on an online shopping website, which is Tabao in China (Anna, 2018). The western history of mobile wallets starts in July 2008, when Apple launched an application store and opened it to third-party developers (Ed & Josephine, 2017). It allowed everyone to develop an app that held payment data. The mobile wallet users are adapting to online and offline transactions.

1.2 Current Development

Malaysia has been comparatively slow in the high-tech payment trend (The Star, 2018). In 2016, Maybank launched the first mobile wallet payment platform in the form of MaybankPay, then followed by lender partnered Samsung introduced the Samsung Pay mobile wallet in 2017. The banks have more advantages than technology firms in developing financial services due to the banks have proper risk management, bigger customer financial databases, better financial regulation, and more sophisticated financial instruments. Furthermore, the technology firm has to navigate a stronghold of financial regulation; then, it will be slower to violate financial services. Banks can

generate trust among consumers while the financial technology companies might need to solve the problems of consumer trust and adoption. For example, Maybank is a pioneer in the mobile wallet market, and its competitive advantage prevents the technology companies from moving into this financial technology services is trust and adoption. Based on the Singapore Fintech 2017 report, digital wallet adoption is only about 11% in Malaysia. Besides that, Malaysia has a lot of opportunities and spaces for the development of smartphone e-payment solutions and services. Bank Negara initiated the 10-year E-payment roadmap in the Financial Sector Blueprint 2011-2020 (The Star, 2017). Besides, many different reform measures being introduced to eliminate the price distortion, implant the market incentives, and stimulate the market competition to reduce the costs of E-payment services. It supports in developing a conducive environment to speed up the migration to E-payments in Malaysia, such as mobile banking and mobile wallet. For instance, these reform measures have effectively decreased the number of cheque usage in Malaysia (The Star, 2017). In 2011, the number of Malaysia cheque usage being reduced by 42% from 205 million cheques to 120 million cheques in 2017.

Some main factors are modelling the Malaysia payment platform. The internet and mobile revolution make society more digitalized and easy to connect. There are 42.8 million mobile phone usages in Malaysia, while the Malaysian population is about 32.1 million (The Star, 2017). Apart from this, E-payment technology has become more advanced and cost-friendly. The merchants can reduce the cost of electronic payment adoption by using the Quick Response (QR) codes, such as mobile payment. The advancements in tokenization and

biometric technologies can enhance the capabilities of payment service providers in developing new application cases and provide better customer experience (Bank Negara, 2017). On the other hand, there have sufficient, diverse, and increasingly advance market players in the E-payment landscape. Only in 2017, Bank Negara has handled applications from 43 new non-bank players. There is a growth of 91% if compared to the past two years. The payment industry has invested RM893 million to enhance the e-payment infrastructure in Malaysia from 2009 to 2017 (The Star, 2017). Furthermore, the industry expected to invest more RM346 million to develop the point-of-sale (POS) terminal network since 2009. They also will invest more RM40 million to develop the Real-time Retail Payments Platform to increase the usage of cashless payments in 2009. To promote cashless payments, Bank Negara offered zero Instant Transfer fee for the transactions up to RM5,000 per transaction made by individuals and SMEs (Bank Negara, 2017). This will be effective on 1 July 2018 to support businesses and individuals to use E-payments. The e-Payment Incentive Fund (ePIF) will be further developed with an additional investment of RM198 million from financial institutions to support account holders to migrate efficiently to E-payments. The enhancement of the E-payment platform and services can stimulate the development of the mobile wallet market.

In November of 2017, Sarawak state government launched its mobile wallet, which called Sarawak Pay (The Star, 2017). The consumers can use Sarawak pay to make the bill payment of the local councils, local retailers, and merchants. In 2017, there are about 1 million small and medium-sized enterprises (SMEs), which are 28.2% doing online business in Malaysia (Ee, 2018). SME

Corp Malaysia is aiming for 100,000 SMEs to move into cashless transactions in 2018 through the collaborations with industry players and the awareness programs with SMEs. Besides that, only 7,000 SMEs now using the cashless transactions in 2018. The cashless transactions can enhance the SMEs' operational efficiency, lower the administrative cost, and gain the ability to enjoy high-speed access to collection proceeds. Apart from this, there is a partnership between the RHB Bank Bhd and SME Corp Malaysia, which supporting the SMEs move into this mode of cashless transactions. SME Corp Malaysia collaborated with Axiata and then to offer service, namely PayNet (Payment Networks Malaysia Sdn Bhd) in supporting SMEs towards cashless transaction usage. Besides that, the billers required to sign up with one bank only to collect payments through most banks in Malaysia. These are 7,000 SME merchants who adopted the cashless transactions through its partnership with Axiata Digital Services Sdn Bhd's mobile wallet Boost. There is a positive growth in the usage of cashless payment systems of SMEs which can enhance the mobile wallet development in Malaysia. In 2019, Axiata Digital Services Sdn Bhd with Boost mobile wallet known as Malaysia's biggest mobile wallet player. These are the implementation of Boost payment services in different public universities (The Star, 2019). Also, Boost payment services now are available in almost all the Shell stations in this country (Digital News Asia, 2019). Maybank has launched their mobile wallet MAE - Maybank Anytime, Everyone (New Straits Times, 2019). MAE provides the cashless consumption capability and allows users to open Maybank account on their mobile phones. MAE mobile wallet comprises instant transfers, bill payments, prepaid reloads, QRPay, contactless payment, and so on. Figure 1.2 showed the list of all the mobile wallet companies that has been introduced to the Malaysia market from 2017 to 2019. There are more new mobile wallet companies joined the market

from 2017 to 2018 (Oppotus, 2019). It makes the mobile wallet market more competitive and creates more mobile wallet choice for consumers.

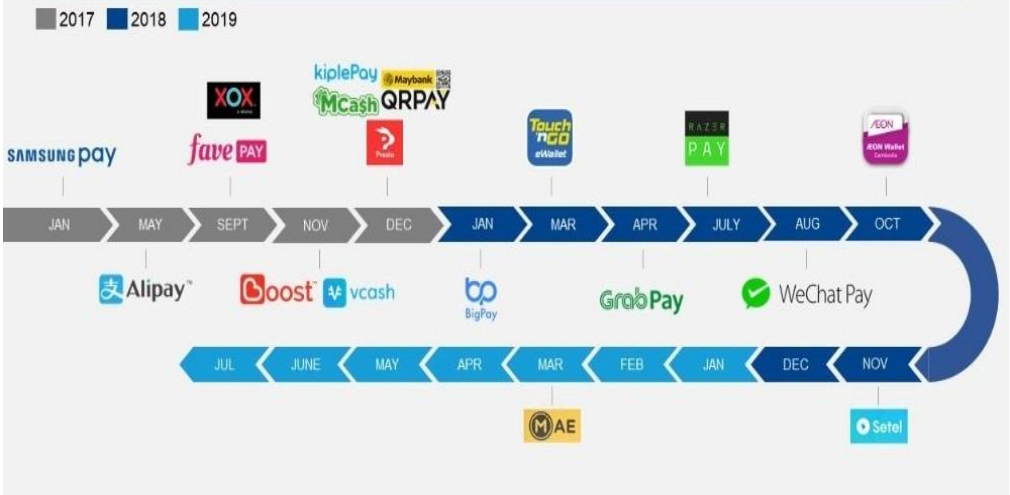


Figure 1.2.: Entry of Each Mobile Wallet Company into Malaysia, 2017-2019 (Oppotus, 2019)

1.2.1 Global Perspective of Mobile Wallet

Based on Figure 1.2.1, more people started to use the mobile wallet to enhance their daily life and work performance in recent years. Based on the report titled of "Mobile Wallet Market (NFC, Remote Wallet) for Retail Payments Vending Machines Public Transportation, Restaurants and Other Application - Global Industry Perspective, Comprehensive Analysis, Size, Share, Growth, Segment, Trends and Forecast, 2016 - 2022", the global mobile wallet market revenue was estimated at approximately USD 594.00 billion in 2016 and is expected to achieve approximately USD 3,142.17 billion by 2022 (Zion Market Research, 2017). It showed growth at a compound annual growth rate (CAGR) of around 4.29 times between 2016 and 2022 in Figure 1.2.1. Worldwide adoption of smartphones

and technological advancements are affecting the growth of the mobile wallet market. It indicated that more consumers would adopt the mobile wallet in the future. Nowadays, the technology is developing at the fast rate and transforming the consumers' lifestyle and living conditions. For example, Ant Financial company launched the new facial-recognition payments technology, which called 'Smile to pay' for commercial use in China (Tom, 2017). It allows the consumers no need to bring wallet and mobile when going to purchase goods in the merchant shop.

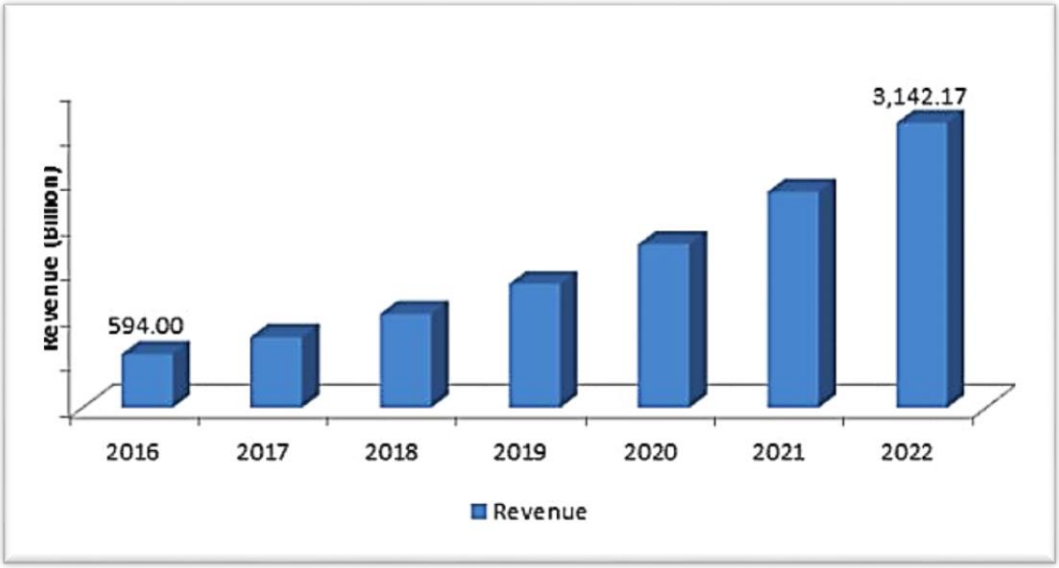


Figure 1.2.1: Global Mobile Wallet Market Revenue (USD Billion), 2016-2020 (Zion Market Research, 2017)

1.2.2 Malaysian Perceptive on Mobile Wallet

According to a finding in Digital News Asia, Malaysia consumers believed that using a mobile wallet would be free of effort or fewer difficulties. They found the values in the usage of the mobile wallet. Malaysians preferred the mobile wallet usage due to it is convenient, quick, and easy, with no need to carry cash and time-saving in transaction payment in Figure 1.2.2. The mobile wallet showed a significant growth opportunity for small businesses, retailers, and mobile service providers (Digital News Asia, 2013). 63% of Malaysian consumers think that mobile wallet usage is convenient. Based on Figure 1.2.2, there are 60% of Malaysian consumers stated that mobile wallet usage can be quick, easy and not need to carry cash.

There are 54% of Malaysia consumers think that low time consumption when making payment by a using mobile wallet. For instance, 33% and 36% of Malaysian consumers feel that the mobile wallet was more secure than using cash and not need to bring credit and debit cards, respectively. 45% of them think that the mobile wallet can receive immediate confirmation completed purchase based on Figure 1.2.2. They are 34% of Malaysian consumers like using the latest technology of this mobile wallet. On other hand, 28% of them can freeze or disable function if their phones being displaced and stolen. 25% of Malaysian consumers consider that the mobile wallet is more secure rather than using the credit and debit card. Figure 1.2.2 showed that mobile wallet drivers in terms of Malaysia developed Asia, and global. It also revealed that Malaysian consumers had high motivation and enthusiasm for mobile wallet adoption if compared to

global and developed Asian. In Malaysia, it indicated that willingness to adopt mobile wallet might be high and positive in the future.

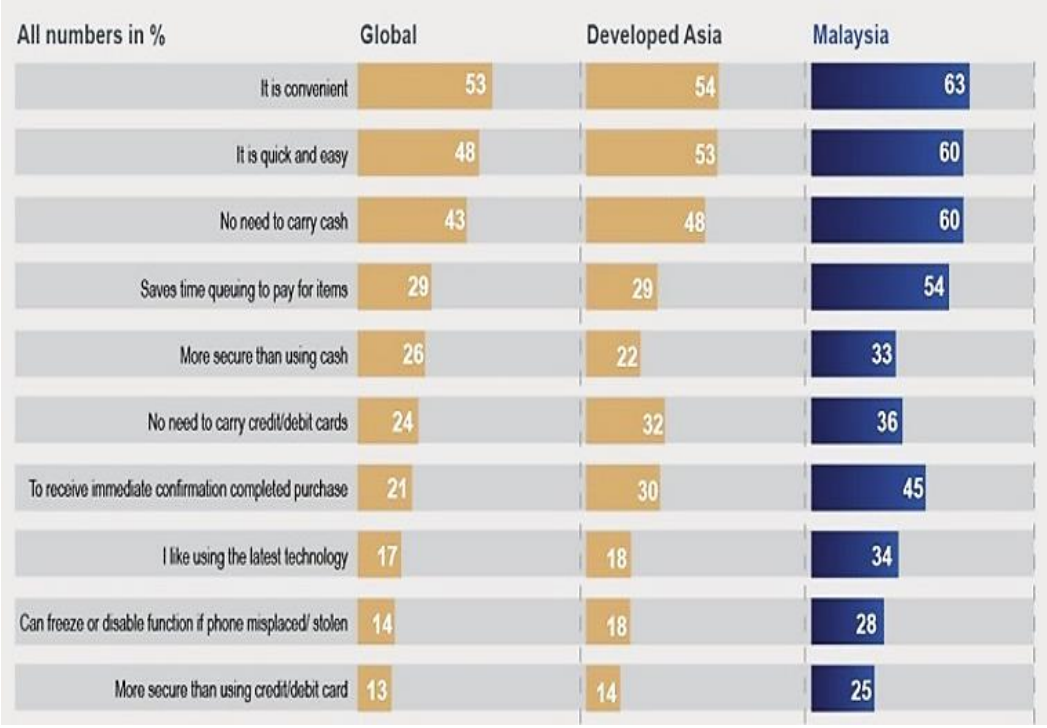


Figure 1.2.2: Mobile Wallet Drivers of Malaysia, Developed Asia and Global (Digital News Asia, 2013)

1.2.3 Malaysian Mobile Internet

Social influence may affect Malaysia consumers behavioural such as conformity, socialization, peer pressure, persuasion, and marketing. According to Statista (2017), the number of mobile internet users in Malaysia from 2015 increase to 2022 with the amount of 4.83 million and around 28.72% of growth. In 2017, 19.06 million people accessed the internet through their mobile phones in Figure 1.2.3.1. In 2021, this figure is projected to amount to 21.29 million mobile phone internet users. From 2015 to 2022, the increasing population of

mobile phone internet users indicated that more people would use a mobile wallet with internet accessibility if these products and services are popular soon in Malaysia. In Figure 1.2.3.2, the Basic Statistics 2019 showed that the high proportion of Malaysia population covered by the mobile network for 2G, 3G, and LTE/ WiMax, which are 96.2, 96.2, and 92.0 respectively. Malaysian consumers can use the mobile wallet easily with the support of mobile networks in almost all locations. Besides that, Malaysia's mobile network rate also the lowest among the Singapore, China, and Thailand population coverage (Basic Statistics, 2019).

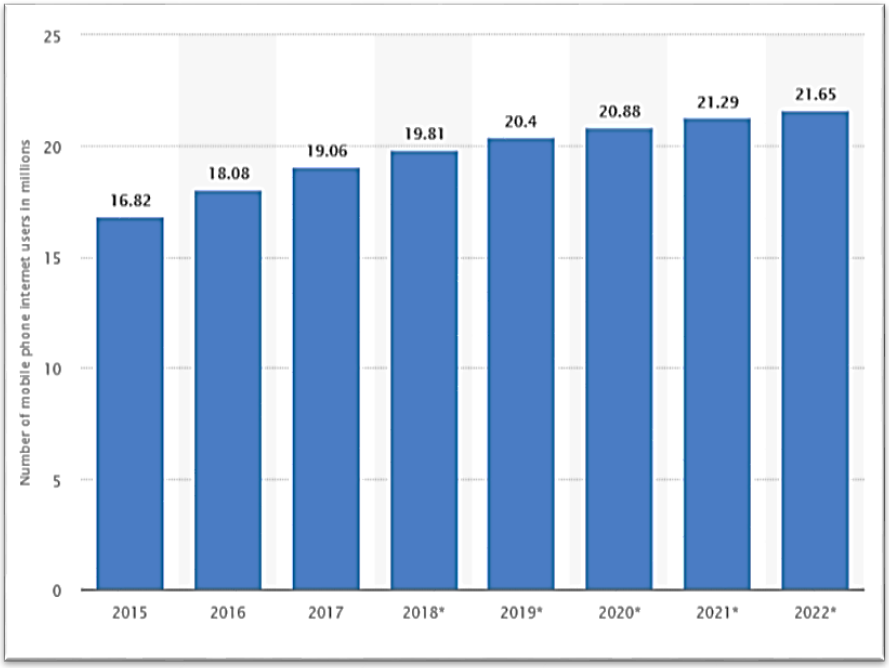


Figure 1.2.3.1: Total Number of Mobile Phone Users with Internet Access in Malaysia (million), 2015 – 2022 (Statista, 2017)

Countries	Proportion of Population Covered by Mobile Network		
	2G	3G	LTE/ WiMax
Malaysia	96.2	96.2	92.0
Singapore	100.0	100.0	100.0
China	100.0	99.0	99.0
Thailand	98.0	98.0	98.0

Figure 1.2.3.2: Basic Statistics 2019 (Basic Statistics, 2019)

1.2.4 Malaysian E-Payment and Mobile Payment

The mobile wallet usage can encourage the public to move toward a cashless society. Furthermore, the cashless society can reduce the crime rate and shadow economy (Mohanty & Pawar, 2019; Pal, Tiwari, & Khandelwal, 2019). If the advantages of adopting a mobile wallet are more significant than the financial cost, then the price value is positive on the consumer's usage intention. Figure 1.2.4 showed that the basic payments indicator of Bank Negara Malaysia from 2014 to 2018. The increasing of 18.60% of E-payment transaction from RM 563,894.6 million to RM 668,785.3 million in the year of 2014 to 2018, respectively (Basic Payments Indicator, 2019). In Figure 1.2.4, the increase of 3.4 times of mobile payment from RM 0.5 million to RM 2.2 million from the year 2017 to 2018. But, it also indicated that a limited number of people use mobile wallet services and products to make payments. In 2017 and 2018, the mobile payment amount occupied a small portion of the total e-

payments transaction, which means the low adoption and transaction of mobile wallets in Malaysia.

	2014	2015	2016	2017	2018
Population (million)	30.7	31.2	31.6	32.1	32.4
GDP (RM million)	1,106,442	1,158,513	1,231,021	1,353,381	1,429,842
Cash in circulation (CIC) (RM million)	68,029.4	76,687.4	85,479.6	92,387.6	94,307.2
Transaction Value Per Capita (RM):					
CIC	2,215.3	2,459.0	2,702.1	2,882.6	2,912.1
Cheque[1]	63,115.6	57,555.8	52,645.9	50,324.9	44,215.1
E-payments:	563,894.6	549,657.8	550,702.9	613,675.8	668,785.3
Credit card	3,435.4	3,612.6	3,746.8	3,918.5	4,175.5
Charge card	278.8	286.3	308.2	342.5	385.2
Debit card	481.5	635.9	713.5	929.1	1,243.8
E-money	172.1	192.2	243.1	283.8	338.7
Other cashless instruments[2]	3.2	3.3	4.8	3.1	1.9
Interbank GIRO	14,085.0	20,411.9	24,266.0	29,055.0	32,461.3
Instant Transfer	827.0	1,664.4	3,398.3	5,390.9	8,594.7
Interbank direct debit	481.8	619.2	798.4	997.1	1,186.6
ATM[3]	1,232.9	1,308.2	1,296.0	1,228.6	1,307.0
Internet banking[4]	87,188.1	102,888.5	100,424.6	126,745.6	142,659.9
Mobile banking[4]	395.0	533.3	774.5	1,033.0	1,828.6
Mobile payment[5]	-	-	-	0.5	2.2
RENTAS - Third party transactions[6]	443,175.6	407,481.8	404,468.0	433,095.2	465,053.8
Intrabank direct debit and standing instructions	12,138.2	10,020.2	10,260.8	10,652.6	9,546.1

Figure 1.2.4: Basic Payments Indicator of Bank Negara Malaysia (Million), 2014 – 2018 (Basic Payments Indicator, 2019)

The establishment of the Digital Free Trade Zone (DFTZ) had a significant effect on the development of Malaysia's mobile wallet market in 2017 (Yean, 2018). Maybank and CIMB will collaborate with Ant Financial Services Group, which is Alibaba's financial payments company enable the Alipay mobile wallet services available in Malaysia. The development of mobile wallet market can encourage the public toward the cashless society. In January 2018, Touch 'n Go Sdn Bhd (TNG) and partner Ant Financial Services Group formed a joint venture called Touch 'n Go Digital Sdn Bhd. They launched the new mobile wallet called Touch n" Go ewallet (The Star, 2018). Besides that, Grab company also collaborated with MayBank to launch the GrabPay mobile wallet

in Malaysia market in 21st May 2018 (The Sundaily, 2018). There are unknown opportunities between the collaboration of mobile wallets companies, and the banks may bring more surprises to consumers and Malaysia market. Maybank also has a partnership with other 3rd party payment gateways aggressively, such as AliPay. It has launched the first batch of Alipay-enabled merchant terminals in Malaysia as emphasizes the increasing number of China tourists who expense RM9 million (The Star, 2017). More than 400 million Chinese consumers used this Alipay mobile wallet brand globally. Malaysia is known as the ninth largest market worldwide for Chinese tourists for overseas spending that using online payment platform Alipay (The Star, 2018). Now, Alipay accepted by more than 18,000 merchants in Malaysia.

MOL AccessPortal Sdn Bhd launched its mobile wallet application called 'One2pay' and targets to expand One2pay acceptance touchpoints to more than 6,000 in a year (Ee, 2018). The merchants only need to scan the One2Pay user's unique barcode or QR code for payment, which brings convenience to consumers. Existing users of the One2Pay application will have their application automatically upgraded to Razer Pay, which designed by MOL AccessPortal Sdn Bhd (PR Newswire, 2018). The mobile wallet supports and promote the retail payment system by providing a high-speed, simple, and secured payment process. The entry of global mobile wallet companies causes high competition in the mobile wallet market of Malaysia, such as Alibaba and Tencent companies. Furthermore, there are expected enhancements, knowledge transfers, and innovations such as possibilities of mobile wallet analytics in Malaysia financial technology industry. Mobile wallet providers can utilize data analytics and data

mining for targeted marketing purpose. It supports their ability to collect user data by tracking and connecting their behaviours across several services and retailers. The usage of data analytics will transform the marketing strategy for Malaysia businesses in the future. Besides that, it supports accessing the consumer's creditworthiness and consumption patterns.

1.3 Problem Statement

Mobile wallet adoption of Malaysian consumers still in the infant stage with lower adoption rate as compared with other countries such as China and India (Tang, Lai, Law, Liew, & Phua, 2014; Mun, Khalid, & Nadarajah, 2017). Based on the research of PricewaterhouseCoopers (PWC) Malaysia, the mobile wallet adoption rate of Malaysia in 2018 is 22% (PWC, 2018). However, only 9% of the respondents used the wallet more than six times per week. In addition, financial technology (Fintech) products such as mobile wallet still in the young and developing stage in the market of Malaysia (Jin, Seong, & Khin, 2019), and their costs and benefits for the consumers and businesses are remained inadequately explored and new by many research studies now. Hence, it is crucial and urgent to investigate mobile wallet adoption circumstances in Malaysia. There are only RM 2.2 million of the mobile payment transaction value, which is the lowest e-payment transaction in Malaysia in 2018 (Basic Payments Indicator, 2019). Furthermore, several factors that affected Malaysian behavioural intention towards mobile wallet adoption. The studies that related the factors affecting the mobile wallet adoption in the Malaysia context are less (Mun *et al*., 2017; Al-Amri,

Maarop, Jamaludin, Samy, Magalingam, Hassan, & Daud, 2018; Chong, Mok, Nah, Su & Wee, 2018). It is important to identify the unknown factors affecting the mobile wallet payment adoption from the perspective of Malaysian consumers. The viewpoints of consumers have been insufficient explored, although they have significant implications on the adoption rate of mobile wallet in Malaysia.

The mobile wallet will become a major trend in financial services and business in future. Maybank and CIMB have an agreement with Ant Financial Services Group and launched the Alipay mobile wallet in Malaysia (Kashmirjit, 2017). SME Corp Malaysia is targeting 100,000 SMEs to move into cashless transactions in 2018 (Ee, 2018). SME Corp Malaysia will have collaborations with industry players and launch the awareness programs with SMEs. Sarawak state government already launched their Sarawak Pay mobile wallet for their citizens to make payments in local council and merchants (The Star, 2017). Malaysia is the ninth largest global market for Chinese tourists' overseas spending by using Alipay (The Star, 2018). There are insufficient studies to identify the consumer behavioural towards mobile wallet adoption in Malaysia situation. The findings can serve as useful information for the academic researchers, local business groups, policy makers, and mobile wallet consumers in understanding the mobile wallet market. The success of China mobile wallets such as Alipay and Wechat Pay have further consolidated their consumer popularity (Maggie, 2018). These two mobile wallets ranked as the top two preferred payment options among China individuals. The mobile wallet trend now is coming to Malaysia market. In August 2018, Tencent Group launched WeChat Pay in Malaysia with the partnership of Hong Leong Bank (Ellia, 2018). WeChat pay became the first markets outside of China

with the wallet localized to Malaysia currency. It can support the current 20 million WeChat users in Malaysia. In addition, Malaysia consumers will have their favourite mobile wallet in the future. This study can provide an understanding of the mobile wallet services development in Malaysia by examining the key factors that influence the consumers' behavioural towards using the mobile wallet services. Hence, the Fintech firm and policy makers need to address consumer concern and possible side-effects when implementing this mobile wallet service. In conclusion, it is significant to conduct this research to understand the willingness adoption of the mobile wallet in Malaysia from the consumer perspective.

1.3.1 Knowledge Gap

Knowledge gap of this study is unknown factors that exactly influenced the consumer behavioural intention towards mobile wallet adoption in Malaysia (Mun *et al*., 2017; Al-Amri *et al*., 2018; Chong *et al*., 2018). The mobile wallet adoption may have considered as a relatively new phenomenon in Malaysia (Tang *et al*., 2014; Jin *et al*., 2019). It is important for the stakeholders to understand the factors that affected the consumer behavioural intention and willingness to adopt mobile wallet. The mobile wallet companies can design a more personalised mobile wallet application based on Malaysian consumers' preferences. Besides, the consumers can be aware of which factors that affected other consumers' behavioural intention and willingness to use the mobile wallet in Malaysia. The government and policy makers can make better rules and regulations that can motivate more mobile wallet adoption based on

the Malaysian consumers' behavioural intention. There is a lack of comprehensive research model to determine the mobile wallet adoption in Malaysia situation. Therefore, this study would develop a conceptual model according to the Technology Acceptance Model in investigating the behavioural intention to use toward the willingness to adopt mobile wallet in Malaysia. It is significance to have a better comprehensive research model to study the mobile wallet and other financial technology products in Malaysia. The researchers and business owners can get a better understanding of the perception of Malaysian consumers on the mobile wallet usage. The other researchers could further expand and adapt the model developed in this study onto other financial technology products and services. There are no studies that add in the social media and brand image variables into the Technology Acceptance Model (TAM) in investigating the willingness to adopt mobile wallet. The study of Technology Acceptance Model (TAM) which includes the social media and brand image towards mobile wallet adoption hasn't explored. It is important for the mobile wallet companies to know the impact of brand image and social media towards the mobile wallet adoption. They can design better business development strategies by putting more efforts in building the mobile wallet brand or social media marketing.

1.4 Research Objectives

The research objectives have been developed to study and understand the research topic efficiently. The objectives that have developed will show the assessment of the motivating and preventing factors that affect the willingness to adopt mobile wallet in Malaysia soon.

1. To identify the factors affecting the consumers' willingness to adopt mobile wallet in Malaysia.
2. To analyse the relationships between perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, brand image, and behavioural intention to use with the willingness to adopt mobile wallet.
3. To investigate the relationship between the behavioural intention to use mobile wallet and willingness to adopt mobile wallet in Malaysia.

1.5 Research Questions

The research questions have been developed to investigate and understand the research topic efficiently. The questions that have designed will support to assessment of the motivating and preventing factors that affect the willingness to adopt mobile wallet in Malaysia.

The research questions of this research are as follows:

1. What are the factors affecting the consumers' willingness to adopt mobile wallet in Malaysia?
2. What are the relationships between perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, brand image, and behavioural intention to use mobile wallet in Malaysia?
3. Is there a relationship between the behavioural intention to use mobile wallet and the willingness to adopt mobile wallet in Malaysia?

1.6 Significant of Study

1.6.1 Theoretical Significance

Technology acceptance model (TAM) is an information systems theory that showed how the users accept and adopt the technology. This study contributes a new comprehensive model to determine the adoption of model wallet in Malaysia. Furthermore, this study contributes a new extended version of the TAM in understanding the consumer behavioural intention to use towards the willingness to adopt mobile wallet. The two main constructs of TAM have perceived usefulness and perceived ease of use (Davis, 1989). The technical factors included the variables of perceived usefulness, perceived ease of use and perceived security. The extended TAM included the marketing factors, which are social influence, price value, social media, and brand image variables. Based on the preliminary study, these seven variables are important. These variables will be discussed further in chapter 2 and 3. This extended version of TAM has developed to provide a complete prediction about the willingness to adopt mobile wallet in Malaysia.

1.6.2 Practical Significance

The identification of factors that affect the mobile wallet adoption of Malaysia will provide valuable information to the stakeholders in the mobile wallet ecosystem. The findings would support the mobile wallet companies to make the appropriate marketing strategy decision by introducing a more personalized mobile wallet to the customers in Malaysia. This study could support the mobile wallet companies in gaining more market share and meet their potential clients effectively. The willingness to adopt mobile wallet services will create more business opportunities and enhance the country economy process. The findings could support the government in generating formative digital payment policies to motivate the mobile wallet adoption in Malaysia. The findings of study could provide a better understanding of the Malaysian consumer behavioural in mobile wallet adoption for mobile wallet companies and government. It could support the mobile wallet development and the E-payment system usage toward a cashless society in Malaysia

1.7 Conclusion

The research background, problem statement, and knowledge gap have been discussing in the initial stage. Furthermore, the research objectives and research questions have been establishing. The contribution and significance of this study already briefly explained in this chapter. Chapter 2 will continue to assess the literature that is related to this research.

CHAPTER II

LITERATURE REVIEW

Chapter II studied the theoretical and empirical reviews based on technology theories and analyses such as the Theory of Reasoned Action (TRA) by (Fishbein, 1967), and Technology Acceptance Model (TAM) by (Davis, 1989). This chapter also summarizes the empirical reviews to find out the gap between the study and related to the mobile wallet with the research methods, then briefly concludes the chapter.

2.1 Theoretical Reviews

2.1.1 Theory of Reasoned Action

In 1967, the theory of Reasoned Action (TRA) was developed by (Fishbein, 1967). It used to determine the action of individuals based on their behavioural intention and past existing attitude. TRA stated that attitude and subjective norms toward a particular behaviour which help in predicting the intention to carry out a behaviour (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). TRA explained that decision of individual in performing a specific behavior based on the expected outcome of the behavior (Gillmore, Archibald, Morrison, Wilsdon, Wells, Hoppe, Nahom, & Murowchick, 2002). In Figure 2.1.1, the behavioural intention was the function of both attitudes and subjective

norms toward the behaviour. TRA suggested that the higher intention will lead to the effort enhancement to perform the behaviour. The subjective norms and attitudes are impossible to be determined relatively in predicting the behaviour based on Figure 2.1.1. Miller (2005) stated that factors such as individual and situation had a distinct influence on the behavioural intention.

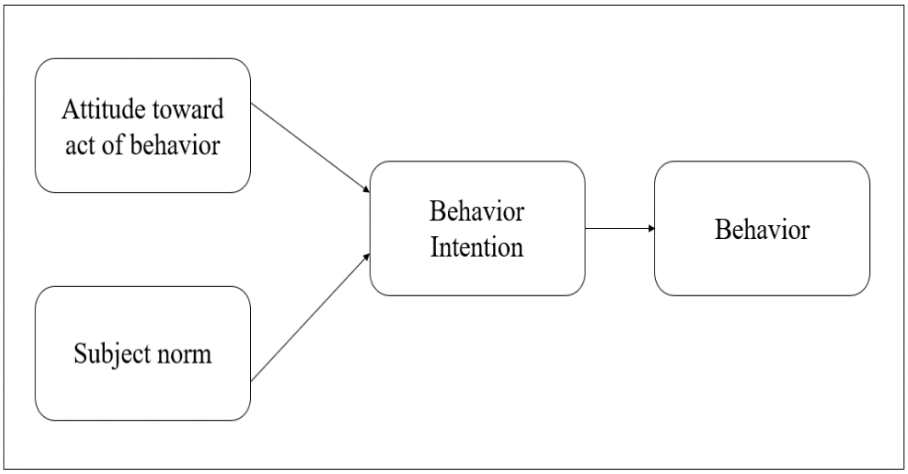


Figure 2.1.1: Theory of reasoned action (TRA) (Fishbein, 1967)

TRA had three circumstances which can affect the relationship between the behavioural intention and behaviour (Madden, Ellen, & Ajzen, 1992). The first condition is the behavioural intention must be reasonably specific when come to predict a particular behaviour. The second circumstance is the intention must remain no different among the time that provided and the time that the behaviour to be fulfilled. Besides that, the third circumstance is the individuals have the volitional control when carrying out the intention. There are many types of studies involved with TRA such as communication, health care and marketing (Hausenblas, Carron, & Mack, 1997; Lyong Ha, 1998; Ho, Hsu, & Oh, 2009).

Based on the TRA, Ajzen (1985) developed the theory of planned behaviour (TPB). Davis (1989) also developed this Technology Acceptance Model (TAM).

Limitation of TRA is the difference between a targeted intention, and a behavioural intention emphasizes on achieving an intention capability. It includes various variables, then providing huge uncertainty. Ajzen (1985) stated that some behaviour is more intent to act like the problems of controls than others. We are impossible to confirm that we will be able to perform our intentions. Sheppard, Hartwick and Warshaw (1988) stated that behavioural intention estimated the performance of each voluntary act according to the behavioural criterion in terms of operation, aim, period, and content. Terry, Gallois, and McCamish (1993) stated that also TRA could not obtain the social processes of change and the social nature of the move itself. In TRA, the intention has directly affected the behaviour in the short run only. There are several studies analyzed by TRA (Pookulangara, Tanoff, & Nix, 2017; Lee, Lin, Wu, Lin, & Huang, 2018; Brodowsky, Stewart, & Anderson, 2018; Karnowski, Leonhard, & Kümpel, 2018).

2.1.2 Technology Acceptance Model (TAM)

Davis (1989) developed this Technology Acceptance Model (TAM) based on the Theory of Reasonable Action by (Fishbein & Ajzen, 1975; Ajzen and Fishbein, 1980). TAM had a conceptual framework with a theoretical foundation which used to predict the behavioural intention of consumers

toward the acceptance and adoption of information technology. Many studies have used TAM to predict and explain the technology adoption (Adams, Nelson, & Todd, 1992; Davis, 1989; Taylor & Todd, 1995; Van der Heijden, Verhagen, & Creemers, 2003; Igbaria, Zinatelli, Cragg, & Cavaye, 1997). In Figure 2.1.2, Davis (1989) replaced the TRA's attitude measures with the two technology acceptance measures, which are perceived usefulness and perceived ease of use. According to Figure 2.1.2, the perceived usefulness is the standard of a person who trusts a certain system will enhance his job performance. The perceived usefulness can enhance the perceived ease of use. Thus, the perceived usefulness and attitude had a significant influence on behavioural intention. In Figure 2.1.2, TAM model is explained about the perceived ease of use is defined as the standard to which a person trusts that the system adoption would be free of effort (Davis, 1989). If higher the perceived ease of use on a particular technology, then it showed a positive attitude of users towards technology adoption. Same with TRA, the TAM recommended that external variables directly influenced the users' perceived usefulness and perceived ease of use on specific technologies.

TAM found to be the most influential, normally used, and highly predictive model of information technology adoption (Lee, Kozar, & Larsen, 2003; Venkatesh & Bala, 2008). Mathieson (1991) stated TAM had stronger theoretical and empirical support if compared with the theory of Planned Behaviour (Ajzen, 1985). It is due to TAM is a simple and easy implication model, which only provide a very general information to the technology users.

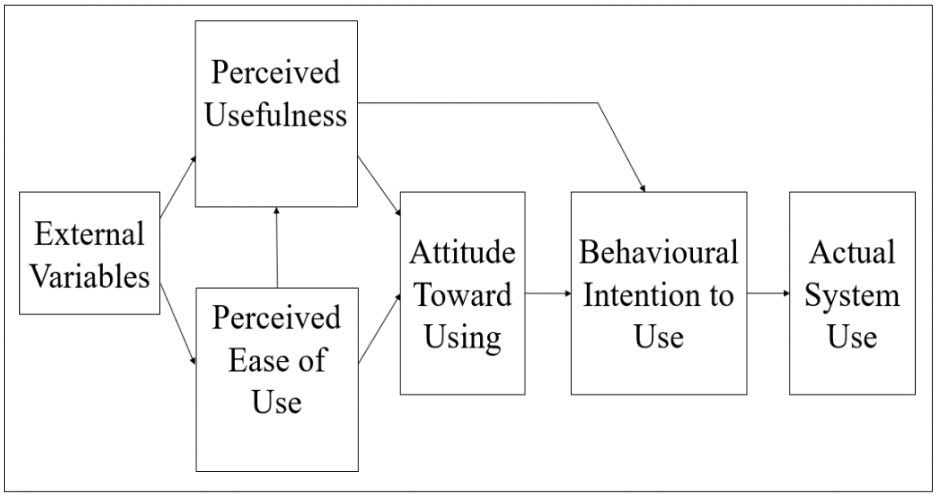


Figure 2.1.2: Technology Acceptance Model (Davis,1989)

The fundamental TAM predicted and explained the user intention towards technology acceptance by perceived usefulness and perceived ease of use. The flexibility of TAM can fix any different technologies (Hong, Thong, & Tam, 2006). TAM can be used rapidly in empirical research to predict user behaviour without mentioning additional factors for several technologies. In Figure 2.1.2, TAM has designed for usage behaviour of information technology. Hence, its main purpose is clear. Its overall suitability across several user and technology contexts can allow the researchers to have practical benefits. Adoption of technology products and services has hugely predicted by TAM, such as mobile payment, online banking, and e-learning systems (Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Lee, Hsieh, & Hsu, 2011; Zhong, Dhir, Nieminen, Hämäläinen, & Laine, 2013). Chuttur (2009) stated that TAM is a lack of accuracy and insufficient relevance to determine the user behavioural intention toward technology acceptance. He revealed that the study of TAM might have achieved the saturation level. Therefore, this study should focus on developing a model that can use the TAM strength and overcome the weakness of TAM. Legris, Ingham, and Collerette (2003) stated that empirical analysis by adopting

TAM revealed that the findings of studies are not consistent or obvious. Thus, they proposed that important factors are not included in this TAM. Variables such as human social change and innovation model adoption should add to this TAM. Hence, the study will focus on overcoming these TAM challenges by adding appropriate variables into the conceptual model. Furthermore, there several studies of Fintech products and services adoption that have examined in TAM perspective (Chuang, Liu, & Kao, 2016; Lee & Park, 2016; Folkinshteyn & Lennon, 2016; Wilson & Mbamba, 2017). Alaeddin, Rana, Zainudin and Kamarudin (2018) stated that TAM is applicable to explore the mobile wallet switching behaviour among Malaysian customers.

2.2 Empirical Reviews

2.2.1 The Willingness of Adoption of Mobile Wallet

There are fewer studies on consumer behaviour toward mobile wallet adoption in Malaysia context (Al-Amri *et al.*, 2018). Hence, it is significant to study the willingness to adopt the mobile wallet in Malaysia. The mobile wallet can store the owner personal information and then can be used to do money transaction on many sites. Several studies had carried out for examining the willingness to adopt the mobile wallet by consumers in other countries.

Apart from this, quantitative research directed by Wadhwa, Kalyan, Thakkar, and Patel (2018) which examined the factors influencing the use of a digital payment system among the healthcare professionals in Vadodara, India. The research data collected through a structured questionnaire. Thus, the data

collection analysed by using the analysis of variance (ANOVA). The findings stated that healthcare professionals are the most suitable professionals for enhancing the digital payment adoption in India. The healthcare professionals can encourage their digital payment adoption through the professional organizations and patients who make an appointment with them.

Besides that, quantitative research conducted by Al-Amri *et al* (2018) which studied the correlation analysis between factors affecting the usage intention of NFC mobile wallet payment. This study conducted through the survey questionnaire in Kuala Lumpur. They collected the data and then analysed it by using correlation analysis. The research findings showed that perceived ease of use and perceived usefulness had a significant positive effect on intention towards the NFC mobile wallet adoption.

For instances, conceptual research conducted by Shankar and Datta (2018), which studied the factors influencing the mobile payment adoption intention in India. This study conducted through a structured questionnaire. They analysed the data by structural equation modelling (SEM) technique. The findings revealed that perceived usefulness and perceived ease of use have positively and significantly affected the mobile payment adoption intention. The subjective norms and personal innovativeness have not significantly affected mobile payment adoption intention.

Apart from this, quantitative research conducted by Reddy *et al* (2017), which studied the factors that influence the consumer's choice to adopt a mobile wallet to access the m-commerce industry in India. They conducted this research through questionnaires. The data collection is analysed using logistic regression and structural equation modelling (SEM). The findings stated that perceived convenience, direct bill, fast services, and promotions have significantly affected the consumer acceptance of mobile wallet.

Also, Rathore (2016) conducted quantitative research and studied the adoption of the digital wallet by consumers in India. The study aims to determine the factors influencing their choice and the challenges faced when adopting a digital wallet. This research collected data through a structured questionnaire. He analysed the data by adopting the multiple regression analysis. The results showed that perceived convenience when online shopping, perceived usefulness and brand loyalty are the factors that affect the adoption of the digital wallet. The digital wallet users are satisfied with the services received to them.

Manikandan and Jayakodi (2017) conducted quantitative research to examine the consumer adoption of the mobile wallet in Chennai city. The research conducted by structured questionnaires. The data analysis conducted by using analysis of variance (ANOVA). The research findings stated that brand loyalty and convenience of shopping had a significant influence on mobile wallet adoption. The perceived security and safety of funds inside the mobile wallet was a serious issue for the users.

Furthermore, Mittal and Kumar (2018) conducted quantitative study which investigated the adoption of mobile wallets in India. They held this research by using the survey. The data collection analysed by using multiple regression analysis. The findings found that customers make payments by using mobile wallets for different services and products. The ease of use, the utility of innovation and usefulness of mobile wallet had significantly affected the adoption of the mobile wallet. The attractive deals, rebates and cashback have motivated many people to use the mobile wallets.

In addition, quantitative research was conducted by Dixit, Singh, and Chaturvedi (2017), which examined the mobile wallet adoption for the cashless economy in India. The data collection of this research conducted through the online self-administered questionnaires. Then, the data collection analysed by using Kruskal Wallis test. The results revealed that significant difference between the different education level, age groups and pre and post demonetization users towards the mobile wallet adoption. Besides, the findings supported in forecasting the significance of mobile ecosystem sustainable environment.

Besides, Shaw and Kesharwani (2019) conducted a quantitative research which studied the moderating effect of smartphone addiction on mobile wallet payment adoption in India. They conducted the research through the structured questionnaire. The data collection is analyzed through confirmatory factor analysis and structural invariance analysis. The findings showed that perceived usefulness, perceived ease of use and subjective norm had a significant positive influence on the behavioral intention to adopt mobile wallet payment. Besides,

the study also found that perceived financial cost had a significant negative impact on the behavioral intention to adopt mobile wallet payment.

2.2.2 Behavioural Intention to Adopt Mobile Wallet

There are insufficient past studies focus on the mediating effect of behavioural intention towards mobile wallet adoption (Qu, Rong, Ouyang, Chen, & Xiong, 2015). Ajzen (1991) revealed that behavioural intentions are motivational elements that capture how complicated people are willing to try to carry out the behavior. A simple and direct intention measure can make up for a massive variance in actual behaviour (Ajzen, Czasch, & Flood, 2009). Besides that, the relatively low intention–behaviour correlations frequently show a direction for intentions to overestimate readiness to perform desirable behaviour socially (Ajzen, Brown, & Carvajal, 2004). Several studies have adopted the behavioural intention to predict the adoption of technology and innovation product.

For instance, Bailey, Pentina, Mishra, and Ben Mimoun (2017) conducted quantitative research which studied the consumers' attitude that influences the consumers' intention toward the mobile payment adoption in the United States. The purpose of this study has used the combination of perceived self-efficacy, perceived privacy concerns, new technology anxiety into the basic TAM model to determine the consumers' intention toward mobile payment adoption. The data collection done by online survey and then analysed by factor analysis. This study showed that attitudes had an important and positive effect on the intention of

adopting mobile payment. The privacy concerns have an impact on the use intention of mobile payment.

In addition, quantitative research led by Kim, Mirusmonov, and Lee (2010) which studied the factors that affecting the intention to adopt mobile payment in the United States. The data collection conducted through questionnaires. They analysed the data by using structural equation modelling (SEM). Hence, the findings indicated that the perceived usefulness and perceived ease of use have a significant influence on the user's intention towards mobile payment adoption. The compatibility of the mobile wallet cannot affect the user's intention.

On the other hands, Lu, Yang, Chau, and Cao (2011) conducted quantitative research to examine the dynamics of the trust transfer process and intention to adopt the mobile payment services in China. This study conducted through the online self-administered questionnaires. They carried out the data analysis by adopting the structural equation modelling (SEM). Thus, the findings revealed that trust, in combination with the positive and negative valence determinants, is directly and indirectly affected the behavioural intention of users toward mobile payment adoption. These effects on the workers and students from the magnitude were significantly from each other.

Besides that, Thakur (2013) conducted quantitative research which investigated the factors that influenced consumer's intention towards mobile payment adoption in India. The author did this research with self-administered

questionnaires. The data collection analysed through the exploratory factor analysis and reliability test. This research stated that performance expectancy, effort expectancy, social influence, and facilitating condition had an important effect on the intention of consumers toward adopting mobile payment services. The study showed that behavioral intention is an important indicator of actual mobile payment usage.

Apart from this, quantitative research was conducted by Wang and Li (2016), which determined the factors that affect the adoption of third-party mobile payment services in China. This research conducted through survey questionnaires. The authors analysed the data collection by using the factor analysis, reliability analysis, and multiple regression analysis. The research findings showed that customer perceived value and perceived deals have positively influenced the usage intention of third-party mobile payment services in China.

Moreover, Schierz, Schilke, and Wirtz (2010) conducted quantitative research, which investigated the factors that affect the consumer acceptance of mobile payment services in German. They held this research through a standardized online questionnaire and analzyed through the structural equation modelling (SEM). The findings revealed that the perceived compatibility had the most substantial influence on the consumer intention of mobile payment services usage, while individual mobility has significantly influenced consumer intention.

For instances, quantitative research conducted by Yang, Lu, Gupta, Cao, and Zhang (2012) which studied the mobile payment services adoption with the effects of the behavioural beliefs, personal traits and social influences in China. This research conducted through a questionnaire with potential adopters and current mobile payment services users. Yang *et al* (2012) analysed the data collection by adopting the structural equation modelling (SEM). The study stated that social influences, personal traits, and behavioural beliefs have a significant impact on the mobile payment services adoption. The influence towards the behavioural intention of the adoption is a change in different stage.

Apart from this, quantitative research was conducted by Kalinic and Marinkovic (2016), which studied the determinants of users' intention toward mobile commerce adoption in the Republic of Serbia. They led the data collection through the online self-administered questionnaires. The data analysis conducted using structural equation modelling (SEM). Hence, the findings revealed that perceived usefulness and perceived ease of use had a direct positive influence on the consumer behavioural intention towards mobile commerce adoption.

Furthermore, Mahwadha (2019) carried out a quantitative research which investigated the behavioural intention of young consumers towards e-wallet adoption in Indonesia. The author collected the data by using online questionnaires. The data collection is analysed by using structural equation modelling (SEM). The findings revealed that perceived usefulness and perceived trust can affect attitude toward using which then directed to the behavioural intention to adopt e-wallet among young consumers. Therefore, it suggested that

H_8: Behavioural intention to use has a significant positive effect towards the willingness to adopt mobile wallet.

2.2.3 Perceived Usefulness

Perceived usefulness had 50% more potent in determining consumer technology usage than perceived ease of use (Davis, 1993). Perceived usefulness defined as the level of an individual trust the particular system will enhance his or her performance (Davis, 1989). Several studies have adopted the perceived usefulness to predict the adoption of technology and innovation product.

For instances, quantitative research was conducted by Kim *et al* (2010), which examined the factors affecting the intention to adopt mobile payment in United States. This research conducted through questionnaires. They analysed the data with structural equation modelling (SEM). The research findings stated that the perceived usefulness significantly affected the user's intention toward using mobile payment. The late mobile payment adopters respond very positive towards the perceived usefulness of the payment.

Furthermore, Chang, Lan, and Zhu (2018) conducted quantitative research which studied the intention to remain using mobile payment in China. They collected the data through questionnaires. They analysed the data by using structural equation modelling (SEM). The results showed that perceived usefulness has significantly and positively influenced the consumer trust toward a

mobile payment service. Therefore, mobile payment providers should emphasize on winning the consumers' trust with the usefulness of the payment.

Another quantitative research is done by Yadav (2017), which examined the active determinants for mobile wallet adoption in India. This study conducted through a well-structured questionnaire. The author did the data analysis by using logistical regression analysis. The findings revealed that perceived usefulness had a significant influence on the people intention toward mobile wallet adoption. The future subscription of mobile wallet will increase due to the stakeholders will share the usefulness of the mobile wallet payment and services.

Besides that, Qu *et al* (2015) conducted quantitative research which examined the acceptance of WeChat mobile payment service in China. The purpose of this study is to determine the variables which affected the popularity of WeChat payment. This study directed through the questionnaires of respondents chosen randomly among the WeChat payment users. The data collection analysed by structural equation modelling (SEM). The research findings concluded that perceived usefulness had a strong influence on the behaviour intention to adopt WeChat payment. This stated that the markets more emphasize on the usefulness oriented technologies.

On another hand, quantitative research is conducted by Zhong *et al* (2013), which studied the important factors that determine the consumer to use the mobile payments in China. The authors adopted the online survey questionnaires in the research. The data analysis conducted by using structural equation modelling (SEM). The research showed that perceived usefulness

directly had a positive influence on consumer intention toward adopting the mobile payment service. The various usefulness of mobile payment will increase the users' needs and product compatibility.

Besides, Liébana-Cabanillas, Marinkovic, de Luna, and Kalinic (2017) conducted quantitative research to examine the determinants of consumer mobile payment acceptance in Spain. The authors did the research through online questionnaires. Then, the author conducted data analysis using structural equation modelling (SEM). The results revealed that the perceived usefulness has significantly affected the Spanish users toward mobile payment adoption. The promotional campaign should focus on telling the public about the usefulness of mobile payment services such as faster shopping, transaction security, and performance improvement.

Mun *et al* (2017) conducted quantitative research to examine the millennials' perception of mobile payment services in Malaysia. The study aims to investigate the factors that influence the consumers' intention to use mobile payment. Then, they can encourage the development of mobile payment. They conducted this study through the online self-administered questionnaires. The data collection analysed by using multiple regression analysis. This research showed that perceived usefulness had a highly significant influence on the consumers' intention toward mobile payment services adoption. In addition, the consumers will be more likely to use the mobile payment if they found it has more advantage than current payment methods.

Quantitative research was directed by Seetharaman, Kumar, Palaniappan, and Weber (2017), which study the factors that affect the behavioural intention toward the mobile wallet adoption in Singapore. This research conducted through the online self-administered questionnaires. The data analysed by using confirmatory factor analysis (CFA). The findings showed that perceived usefulness had a powerful impact on the consumers toward adopting the mobile wallet. The industry players should focus on enhancing the perceived usefulness of mobile wallet with establishing a quicker transaction speed during the nominal transaction rate.

Besides, Karim, Haque, Ulfy, Hossain, and Anis (2020) conducted a quantitative research to examine the factor affecting the use of E-wallet as a payment method between Malaysian young adults. The data collection conducted by using the survey questionnaire. The authors analysed the data through partial least squares structural equation modeling (PLS-SEM). The findings indicated that perceived usefulness has a significant and positive influence on behavioural intention to use e-wallet. The results support the digital marketplace service providers can have a better understanding of the helpfulness of e-wallet usage.

Swilley (2010) conducted quantitative research that examines the technology rejection on the wallet phone in the USA. The author collected the data through the questionnaire survey. The data collection analysed using structural equation modelling (SEM). The result of this study revealed that the perceived usefulness did not positively affect the attitude of consumer toward

wallet phones usage. The findings showed that consumers do not perceive the value of a wallet phone.

Besides that, quantitate research directed by Islam, Khan, Ramayah, and Hossain (2011), which studies the adoption of mobile commerce service among employed mobile phone users in Bangladesh. They used the survey questionnaire for data collection among the respondents. Then, the data analysis completed by the reliability analysis and regression analysis. The findings stated that the perceived usefulness was not significantly affected the consumer toward mobile commerce services adoption.

Moreover, Li, Liu, and Heikkilä (2014) conducted quantitative research that understanding the factors that are driving NFC-enabled mobile payment adoption in China. The data collection performed through the survey. They analysed the data by using structural equation modelling (SEM). The findings revealed that the perceived usefulness did not have a significant effect on the consumers' intention towards the NFC mobile payment usage. The perceived usefulness is not an issue for the consumers in considering NFC mobile payment adoption. Hence, it proposed that

H_1: Perceived usefulness has a significant positive effect and no effect on behavioural intention to use mobile wallet, respectively.

2.2.4 Perceived Ease of Use

Venkatesh (2000) stated that perceived ease of use has significantly affected the behavioural intention toward technology usage and acceptance. Davis *et al* (1989) stated perceived ease of use is known as the level of a person trusts that adopting certain system would be fewer difficulties. Several studies have taken the perceived ease of use to predict the adoption of technology and innovation product.

Aydin and Burnaz (2016) directed quantitative research to examine the adoption of the mobile payment system in Turkey. The research aimed to determine the factors that influencing consumer attitude development towards an intention to adopt mobile payment systems. They conducted this research through the questionnaires. The authors carried out the data analysis by using the partial least squares structural equation modelling. The results showed that perceived ease of use has positively influenced the users' attitudes towards adopting the mobile wallet payment. Furthermore, the most significant factor influencing users' attitudes is the ease of use of the mobile wallet.

On the other hands, quantitative research conducted by Ozturk, Bilgihan, Nusair, and Okumus (2016), which examined the users' loyalty intentions toward mobile hotel booking technology in United States. The research aimed to determine the users' mobile shopping loyalty in a hotel booking context. The study conducted through the questionnaires. Ozturk *et al* (2016) analysed the data by using the structural equation modelling (SEM).

This research revealed that perceived ease of use has significantly influenced the users' loyalty intentions on the mobile hotel booking adoption. Besides that, the perceived ease of use had a significant impact on the users' loyalty and convenience of using the mobile hotel booking. The mobile hotel booking should save the credit card for ease of use in the future reservation.

Apart from this, Zhong *et al* (2013) conducted quantitative research which studied the main factors that influenced the consumers toward adopting mobile payment in China. The research purpose is to provide the essential theoretical contributions and associated direction of China mobile payment services. They collected the data through online survey questionnaires. This data collection analyzed through the structural equation modelling (SEM). This study showed that the perceived ease of use significantly affected the adoption of mobile payment among consumers in China market.

Furthermore, quantitative research conducted by Leong, Hew, Tan, and Ooi (2013), which studied that factors affecting the adoption of Near Field Communication (NFC)-enabled mobile credit card in Perak, Malaysia. The authors conducted the study through the self-administered questionnaires. Then, the data analysis used the statistical analysis and artificial neural networks (ANN) analysis. The results concluded that perceived ease of use has significantly affected the intention to adopt Near Field Communication (NFC) mobile payment. The policy makers, bankers and mobile phone manufacturers should ensure the highest level of mobile payment product for their consumers.

In addition, Cao, Dang, and Nguyen (2016) conducted quantitative research which examined the consumer intention to use mobile payment services in Vietnam. They collected the data by using the questionnaires. They carried out the data analysis by using multiple regression analysis. The research findings revealed that perceived ease of use had a significant effect on consumer intention to use mobile payment services. In addition, the researchers can investigate the perceived ease of use of mobile payment in the future emerging market.

Furthermore, Mun *et al* (2017) conducted quantitative research to investigate the factors that are influencing the consumers' intention to use the mobile payment, which can encourage the development of mobile payment. They held the data collected through the online self-administered questionnaires. They analysed the data collection by using multiple regression analysis. This study showed that perceived ease of use has significantly affected the consumers' intention to adopt mobile payment services.

For instances, quantitative research conducted by Kim, Park, and Choi (2016), which investigated the adoption of mobile payment services for "Fintech" in South Korea. They performed this study through the questionnaires. The authors analysed the data by using the Elaboration Likelihood Model. The findings showed that perceived ease of use directly had an impact on the consumer adoption of mobile payment services for "Fintech".

Johnson, Kiser, Washington, and Torres (2018) conducted quantitative research which examined the impact of privacy risk on mobile payment services in the United States. The research conducted through the online self-

administered questionnaires. The data collection analysed by using the partial least squares (PLS). The findings showed that perceived ease of use had a positive impact on the consumers' intention toward mobile payment adoption. The study revealed that perceived ease of use is the most important element of mobile payment adoption.

Another research conducted by Singh, Sinha and Liébana-Cabanillas (2020), which studied factors in the adoption and recommendation of mobile wallet services in India. They used the online questionnaire to conduct the research. Singh *et al* (2020) analysed the data by using structural equation modeling (SEM). The findings showed that the perceived ease of use had a significant positive effect on the intention to use a mobile wallet. Then, it also affected the consumer's perceived satisfaction and recommendation towards mobile wallet adoption.

Moreover, Chong *et al* (2018) conducted quantitative research which explored the mediating effect of behavioural intention on consumer adoption of Alipay in Malaysia. The authors collected the data from respondents by using the survey questionnaire. The data collection is analysed by the partial least squares and the structural equation modelling (PLS-SEM). The results indicated that the perceived ease of use did not have a significant effect on the Alipay adoption from the consumer through behavioural intention. The consumers felt that Alipay is not applicable in the majority of shops that they visited.

Liébana-Cabanillas, Ramos de Luna, and Montoro-Ríos (2017) led quantitative research which determined the intention to adopt new mobile payment systems in Spain. They used the self-administered questionnaires to collect the data in the study. The authors analysed the data collection with the structural equation model (SEM). The finding showed that perceived ease of use did not significantly influence the consumer intention towards the new mobile payment system adoption. The perceived ease of use has a positive impact on the perceived usefulness of the mobile payment system.

Furthermore, quantitative research is directed by Yadav (2017), which studied the active determinants for mobile wallet adoption in India. The data collection used a well-structured questionnaire. The author analysed the data collected through the logistical regression analysis. The research findings revealed that perceived ease of use did not have a significant impact on the people intention toward mobile wallet adoption. Based on the literature reviews, it proposed that

H_2: Perceived ease of use has a significant positive effect and no effect on behavioural intention to use mobile wallet, respectively.

2.2.5 Perceived Security

Perceived security is one of the main issues for online consumers who want to purchase the product or service (Kim *et al*., 2011). Perceived security is a threat that causes a condition that would make economic hardship to data or

network resource in the form of fraud, waste and destruction (Kalakota & Whinston, 1997). Besides that, the information security concern is the buyer's perception of a seller's unwillingness and inability to safeguard financial information (Oliveira, Thomas, Baptista, & Campos, 2016).

Al-Amri *et al* (2018) conducted quantitative research which examined the correlation analysis between factors influencing the usage intention of NFC mobile wallet payment. This study conducted by the survey questionnaire in Kuala Lumpur. The authors conducted data analysis by the correlation analysis. The findings revealed that perceived security has significantly influenced the intention of the NFC mobile wallet adoption. The adoption is still not fast due to some weakness and security concern among consumers.

Liébana-Cabanillas *et al* (2017) conducted quantitative research, which studied the intention to adopt new mobile payment systems in Spain. The authors used the self-administered questionnaires for data collection. They held the data analysis with structural equation model (SEM). The finding showed that perceived security had a significant influence on the consumer intention of the new mobile payment system adoption. The consumers with a greater level of perceived security will display a higher propensity to receive the new mobile payment systems.

Furthermore, a quantitative research conducted by Wu and Zhang (2017), which examined the factors that influence the primary customer trust in the mobile payment service providers in China. They conducted the research by using the questionnaire. Besides that, they analysed the data collection by

exploratory factor analysis, validity and reliability test. The results showed that perceived security has significantly influenced customer ability and benevolence in the mobile payment service providers. The customers quite worry their privacy information may leak due to the service providers' technical reasons or illegal usage.

Besides that, Ogbanufe and Kim (2018) conducted a quantitative study which investigates the traditional authentication methods versus fingerprint-based biometrics authentication in the e-payment. They adopted the questionnaire to collect the data from a large public university in the United States. Moreover, the authors analysed the data collection with analysis of variance (ANOVA). The research findings revealed that the biometrics authentication significantly affected the consumer security concern on the e-payment method. The individuals showed the lowest security concern in the biometrics authentication payment method.

Also, Arvidsson (2014) conducted quantitative research to examine consumer attitudes on mobile payment services in Sweden. The author did the study through the quantitative survey. The data collection analysed by using multiple regression analysis. The research findings showed that the low perceived security risks have significantly influenced the Sweden consumer attitudes on the adoption of mobile payment services.

Apart from this, quantitative research in examining the adoption of Apple Pay in the United States was conducted by (Huh, Verma, Rayala, Bobba, Beznosov & Kim, 2017). They collected data through the online survey questionnaire through Amazon Mechanical Turk. The data analysis conducted using the Mann-Whitney U test. The findings revealed that perceived security significantly affected the adoption of consumer toward Apple Pay adoption. The technology adoption rates could enhance with increased the awareness of security protections of Apple Pay services.

In addition, quantitative research conducted by Zhong *et al* (2013) which exploring consumer mobile payment adoption in China. The authors did this research by using the questionnaire. The data collection analysed by the confirmatory factor analysis. The results showed that perceived security had a significant influence on the consumer adoption of mobile payments in the China market.

Moreover, Mbogo (2010) conducted quantitative research which studying the influence of mobile payments on the growth and success of micro-business in Kenya. The author directed the research through a survey questionnaire. Mbogo (2010) analysed the data collected through factor analysis. The findings of the study showed that the behavioural intention to use the mobile payment is significantly affected by the perceived security.

Moreover, Mombeuil (2020) carried out a quantitative research which investigated the factors influencing and best predicting the renewed adoption of mobile wallets in China. They collected the data through the questionnaire survey. The author analysed the data through analysis of variance (ANOVA) and factor analysis. The findings stated that perceived security had a significant impact on the renewed adoption of mobile wallets between experienced users. The mobile wallet companies can guide the users in data privacy and transaction protection to reduce security risk.

Chern, Kong, Lee, Lim, and Ong (2018) conducted quantitative research which examined the factors affecting the adoption of e-wallet among undergraduate students in Universiti Tunku Abdul Rahman Kampar Campus, Malaysia. The authors designed the self-administered questionnaire for data collection. They analysed the data with partial least squares and the structural equation modelling (PLS-SEM). The research findings illustrated that the perceived security insignificantly affected the adoption of e-wallet among the students. The students do not have much money inside the wallet. Hence, they do not worry about the security of E-wallet.

Moreover, Lau, Lam, Cheung, and Leung (2019) conducted quantitative research that investigated the understanding determinants of customer behavioural intention in using mobile payment at convenience stores of Hong Kong. The data collection did by the questionnaire survey. The authors analysed the data through multiple regression analysis. The result of this research indicated that perceived security did not have a positive and

significant influence on the consumer intention to use mobile payment. The current users seem to stress more on suitability, functionality and usability of mobile payment instead of its security concerns.

In addition, Lim, Kim, Hur, and Park (2018) carried out quantitative research that studied the impacts of perceived security and knowledge toward the continuous intention to use mobile Fintech payment services in Korea. The data collection of this research conducted by the survey. They analysed the data through the partial least squares and the structural equation modelling (PLS-SEM). The findings demonstrated that perceived security did not significantly influence consumer satisfaction and continuous intention to use the Fintech services. The service providers can high concentrate on the data security and protection, which can make the consumers feel safe and attract more potential consumers.

Quantitative research was conducted by Khalilzadeh, Ozturk, and Bilgihan (2017), which examine the security-related factors for NFC based mobile payment in the restaurant industry. They conducted this research by using the online and self-administered questionnaire in Africa. The data collection analysed by the factor analysis. The findings showed that perceived security has significantly affected the customer behavioural intentions toward NFC-based mobile payment usage in restaurants. The mobile payment consumers will feel scared if their information exposed to the third parties. Hence, it proposed that

H_3: Perceived security has a significant positive effect and no effect on behavioural intention to use mobile wallet, respectively.

2.2.6 Social Influence

Graf-Vlachy, Buhtz, and König (2018) stated that social influence has significantly affected the technology adoption in particular and human behaviour in general. Social influence is the level of a person becomes aware that is significant on others who trust he or she should adopt the new system (Venkatesh, Morris, Davis & Davis, 2003). Several studies have taken the social influence to predict the adoption of technology and innovation product.

Thakur (2013) conducted quantitative research which investigated the factors that influenced the consumers' intention towards mobile payment adoption in India. He did this research with self-administered questionnaires. He analysed the data collected through the exploratory factor analysis and reliability test. The research stated that social influence had a significant influence on the intention of consumers toward adopting mobile payment services.

For instances, Tan, Ooi, Chong, and Hew (2014) conducted quantitative research to examine the mobile credit card adoption in the merging market perspective. They led the research through the self-administered questionnaires. Then, structural equation modelling (SEM) used for data analysis. This research revealed that social influence has significantly influenced the consumer towards adopting the mobile credit card in Malaysia. The banks can hire the key opinion

leaders, organize advertising campaign, bring word-of-mouth effects and celebrity endorsements towards promoting the mobile credit card adoption.

On another hand, quantitative research is directed by Kim *et al* (2016) which investigated the adoption of mobile payment services for "Fintech" in South Korea. They conducted this study through the questionnaires. The authors analysed the data by using path analysis of multiple regression analysis. The results showed that social influence directly and positively affected the consumer adoption of mobile payment services for "Fintech". Besides, the mobile payment installed base with different services increases; then more users would use it.

Furthermore, Yang *et al* (2012) conducted quantitative research which studied the mobile payment services adoption across time. The study aimed to identify the effects of social influences, behavioural beliefs, and personal traits towards the consumer behavioural intention towards the mobile payment services adoption in different stages. This study conducted through the questionnaires. The data analysis conducted by structural equation modelling (SEM). This research revealed that the social influence in the form of subjective norm and image has directly affected on the potential adopter's intention to adopt mobile payment services, and current users' intention to continue adopting it. The great motivation from the social influences towards the intention is by increasing relative advantage perceptions and reducing risk of current mobile payment users.

Apart from this, quantitative research conducted by Lin and Xie (2014) which studied the adoption of third-party online payment in China. The research aimed to identify the factors that influence the users' acceptance of Alipay among the Chinese business to consumer (B2C) customers. This study conducted through an online survey. Lin & Xie (2014) analysed the data collection by using structural equation modelling (SEM). Hence, the findings showed that social influence had affected the behavioural intention to adopt Alipay on B2C sites. Alipay can initiate the social network marketing to increase the number of potential customers.

Furthermore, Chong, Chan, and Ooi (2012) conducted quantitative research to investigate the consumer's decision in adopting mobile commerce in China and Malaysia. The research purpose aims to determine the factors that influence China and Malaysian consumers' intention toward mobile commerce adoption. They conducted this research through the survey. They led the data analysis using the hierarchical regression analysis. The findings concluded that social influence has significantly influenced the consumer mobile commerce adoption in China and Malaysia. The companies should emphasize on enhancing their marketing strategies by social network channels, adopting word of mouth and informal forums towards attracting the consumers. The mobile commerce service providers should develop creative promotional and pricing strategies to get more price-conscious customers.

Besides that, a quantitative research conducted by Oliveira *et al* (2016), which examined the determinants of customer adoption and intention to recommend the mobile payment technology. The authors conducted the study

through the online survey in Portugal. They analysed the data collection by adopting structural equation modelling (SEM). The research findings showed that social influence had a significant effect on the consumer intention to adopt mobile payment. The consumers are supporting the recommendations of mobile payment in social marketing campaign. Therefore, it can boost the social influence among customers towards more new adoption and intention to recommend the mobile payments.

Moreover, Koenig-Lewis, Marquet, Palmer, and Zhao (2015), which studied the enjoyment and social influence in examining the mobile payment adoption in France. They collected the data through the online self-administered questionnaires. The data collection analysed by structural equation modelling (SEM). Therefore, findings showed that the social influence has positively affected the consumer behavioural intention towards mobile payment adoption. In addition, motivation with the word of mouth in both offline and online will persuade the young consumers to show high level of social influence to use mobile payment.

In northeast India, a quantitative research was conducted by Deka (2020) which studied the factors that affecting the intention to use mobile wallet by youths. The author carried out the research with the questionnaire. The data collection analysed by using partial least square based structural equation modelling. The results showed that social influence has significantly affected the use intention of mobile wallet among the youths.

In addition, Aydin and Burnaz (2016) which studied the adoption of the mobile payment system in Turkey. They conducted the data collection through the questionnaires. They carried out the data analysis by using the partial least squares structural equation modelling (PLS-SEM). The results showed that social influence did not affect the users' attitudes towards adopting the mobile wallet payment. There is a small number of mobile wallet users, especially at the beginning of its life cycle.

Moreover, Alkhunaizan and Love (2012) carried out quantitative research which studied the factors that drive mobile commerce in Saudi Arabia. The data collection completed by adopting the online survey and manually from the respondents. They analysed the data through the regression analysis. The findings showed that social influence has insignificantly affected the usage intention of mobile commerce.

Teo, Tan, Ooi and Lin (2015) directed quantitative research that examined why consumers should adopt mobile payment in Malaysia private university. The authors collected the data through survey and analysed it by adopting the partial least squares structural equation modelling (PLS-SEM). Thus, the findings found that social influence did not have an impact towards the mobile payment adoption. The users' decision always based on the needs of users rather than their friends and family influence. Therefore, it proposed that:

H_4: Social influence has a significant positive effect and no effect on behavioural intention to use mobile wallet respectively.

2.2.7 Price Value

If the advantages of adopting technology are higher than the financial cost, then the price value is positive (Dodds, Monroe, & Grewal, 1991). For instances, price value is known as the consumers' cognitive tradeoff among the perceived value of the application and its financial cost when adoption. Besides, several studies have adopted the price value to predict the adoption of technology and innovation product.

Besides that, Chong *et al* (2012) performed quantitative research which examined the factors that influence China and Malaysian consumers' intention toward mobile commerce adoption. They conducted this research through the survey questionnaires. The data analysis did by using the hierarchical regression analysis. The research findings showed that cost has significantly influenced consumer mobile commerce adoption in China and Malaysia.

In addition, Lu *et al* (2011) conducted quantitative research and studied dynamics between the trust transfer process and intention toward mobile payment services adoption. This study conducted through the questionnaires. They analysed the data by structural equation modelling (SEM). The results showed that the perceived cost has negatively influenced the customer's intention toward mobile payment adoption. The mobile payment companies should minimize the customers' negative views on their product cost.

For instances, quantitative research conducted by Wang and Li (2016), which determined the factors that affect the adoption of third-party mobile payment services in China. The research conducted through survey questionnaires. The data analysis completed by using factor analysis, reliability analysis, and multiple regression analysis. The customer perceived value had a positive effect on the user intention of third-party mobile payment services. The findings revealed that financial cost has negatively and significantly influenced the customer perceived value of the third-party mobile payment services. It is acceptable on a proper increase of the charge fee as it can enhance user experience and provide well support services from the third party mobile payments.

Apart from this, Mbogo (2010) conducted quantitative research that examined the influence of mobile payments on micro-business success and growth. The purpose of this paper is to determine the success factors that influence mobile payment adoption in Kenya. This study conducted through the survey questionnaires. The author collected the data and then analysed it by the factor analysis. This result revealed that the cost negatively influences the behavioural intention to use the mobile payment. The micro-business operators will identify that usage of mobile payment services is beneficial to them with its suitable service cost.

Besides that, quantitative research was conducted by Yang *et al* (2012), which examined the mobile payment adoption across time. They directed the research through questionnaires. They carried out the data analysis by structural equation modelling (SEM). Hence, the findings showed that the perceived fee had a strong influence on the potential user towards mobile payment adoption.

The perceived fee commonly can be good controlled and managed by current mobile payment users' budget. Therefore, it can cause an insignificant effect on their behavioral intention to use.

Another quantitative research was conducted by Zhao and Xi (2015), which studied the factors that influence the users in the third-party mobile payment service adoption in China. The authors conducted the study through the field survey and E-mail questionnaire survey. Zhao and Xi (2015) conducted data analysis by structural equation modelling (SEM). The study stated that the perceived cost had a negative influence on the consumer perceived value of the mobile payment. It means that the higher the cost of mobile payment, then lower the value the user will use these services.

On the other hands, Cao (2016) conducted quantitative research and studied the main factors that influencing the acceptance of the all-in-one payment method (Plastc Card) in Finland. The research purpose is to determine the possible variables that can affect the user adoption rate in terms of the unique features on the financial technology (FinTech) products. This research conducted through online questionnaires. The author analysed the data collection by factor analysis and structural equation modelling (SEM). The research findings showed that the price value has significantly affected the users' behaviour intention toward financial technology adoption. The price value will negatively affect the behaviour intention to adopt when the perceived benefits are lower than the perceived financial cost of the products.

Besides that, quantitative research is conducted by Feng (2017), which studied the brand choice of China consumers to adopt digital payment platform in Thailand. This research conducted through the online self-administered questionnaires. The data collection analysed by using multinomial logistic regression analysis. The results showed that perceived cost has significantly affected the brand choice of Chinese consumers to use digital payment platform in Thailand. The digital payment of China brands can decrease the cost such as the exchange rate and bank transfer fee, while other payment cannot offer to Chinese customers in Thailand.

Phonthanukitithaworn, Sellitto, and Fong (2016) directed quantitative research which inspecting the mobile payment service in Thailand. The authors collected the data from the respondents though the intercept interview and survey. The data collection analysed by structural equation modelling (SEM). The results revealed that the perceived cost did not have a direct effect on consumer behavioural intention to mobile payment services. Some respondents are employees who have stable monthly income and might not be so worried about the costs.

In addition, quantitative research carried out by Peng and Mi (2018) in studying the usage intention of consumers toward green finance products from Alipay's Ant Forest in China. The authors collected the data through the questionnaire survey. They used the regression analysis to do the data analysis. The findings revealed that the perceived cost has no significant effect on the consumer's usage intention toward green financial products.

Moreover, Tang *et al* (2014) conducted quantitative research which examines the critical determinants of Malaysia mobile wallet adoption intention. The data collection completed by the self-administered and online survey adoption. The authors analysed the data through multiple regression analysis. The result of this research showed that the price value did not have a significant influence on the behaviour intention of Gen Y toward the mobile wallet adoption.

Apart from this, Singh and Sinha (2020) carried out quantitative research that studied how perceived trust mediates the merchant's intention to adopt a mobile wallet technology in India. The data collection of this research conducted by the online questionnaire. They analysed the data through structural equation modelling (SEM). The findings showed that perceived cost did not has a significant and negative effect on the behaviour intention to use a mobile wallet. Based on the results, mobile payment companies can understand appropriate factors to enhance technology adoption in the context of merchants. Hence, it suggested that

H_5: Price value has a significant negative effect and no effect on behavioural intention to use mobile wallet, respectively.

2.2.8 Social Media

Social media networks can create information that can convince consumers to form attitudes toward their purchase intentions (Nunes, Ferreira, de Freitas, & Ramos, 2018). Kaplan and Haenlein (2010) stated that social

media was a set of Internet-based applications that establish on the conceptual and technological basis of Web 2.0. It allowed the construction and exchange of user-generated content. Several studies have adopted social media to predict the adoption of technology and innovation product.

Apart from this, Hajli (2014) conducted quantitative research which examined the impact of social media on consumers in London. This study conducted through the online questionnaires. Then, the author collected data and analysed by structural equation modelling (SEM). This research showed that the social media had a strong influence on the consumer trust. Then, the consumer trust with the support of social media, which has significantly affected the intention to buy. The e-vendors may motivate the consumers to go online and adopt social media to develop trust.

Furthermore, quantitative research was conducted by Erkan and Evans (2016), which study the impact of the electric word of mouth (eWOM) in social media on consumers' purchase intentions in the United Kingdom. Electronic word-of-mouth communication (eWOM) is any statement made by the potential, actual or former customer which is available to all the people through the internet. The study purpose is to determine the effect of these conversations on social media on consumers' purchase intentions. This study conducted through online questionnaires. The authors collected data and then analysed it by structural equation modelling (SEM). The research findings showed that the adoption of the (eWOM) in social media had a positive influence on the consumer purchase intention. The usefulness, quality, credibility, usage, and

requirements of information and attitude towards information are the main factors of eWOM in influencing the consumer purchase intention.

For instances, Hutter, Hautz, Dennhardt, and Füller (2013) conducted quantitative research which studied the effect of user interactions in social media on brand awareness and purchase intention. This study was conducted through the online questionnaires and then the data analysis by using the structural equation modelling (SEM). This study revealed that engagement with a Facebook fan page has positively affected the consumers' purchase intention. Social media activities influence the purchase decision-making process for consumers. The brand managers should adopt the social media as a primary component of their marketing communications.

On another hand, quantitative research conducted by Wang, Yu, and Wei (2012) which examined social media peer communication and its impacts on consumers' purchase intentions in China. They conducted the study through the questionnaires. Then, the data collection analysed by structural equation modelling (SEM). The findings concluded that peer communication through social media had a positive effect on the purchase intentions of consumers. The social media website operators should learn the both information and social functions to give further support for the main function via their website design.

Besides that, Erdoğmuş and Cicek (2012) conducted quantitative research and examined the effect of social media marketing on brand loyalty in Turkey. They performed the study through a structured questionnaire.

Erdoğmuş and Cicek (2012) collected the data and then analysed by adopting multiple regression analysis. The results showed that social media marketing known as a new and rapidly growing platform for establishing relationships with customers and building a positive brand image for them. Brands on social media affected the consumers' brand loyalty. The effectiveness of every first-hand development on social media must be studied and measured to discover and implement decisive marketing strategies.

Another research is conducted by Schivinski and Dabrowski (2016), which examined the impact of social media communication on the consumer perceptions of brands in Poland. The authors conducted this study through questionnaires. Then, the data collection analysed by adopting the structural equation modelling (SEM). This study revealed that social media communication has positively affected the brand attitude and brand equity, which have a positive influence on consumer purchase intention. Furthermore, the purpose of firm-created social media content is to build the brand awareness and brand attitude among consumers in the market.

For instances, Xie and Lee (2015) conducted research which examined the social media and brand purchase, which quantifies the influence of exposures to earned and owned social media activities. The dataset of twelve-month home-scanned brand purchase records of a collection of fast-moving consumer good brands and its Facebook brand fan-page messages. The dataset analysed by using multilevel modelling. The research findings revealed that earned and owned social media activities of brands have significantly and

positively influenced the consumers' likelihood to purchase the brands. The marketing managers can utilize external and owned social media tactics with a combination of in-store advertising to capitalize on the sales revenue.

For instances, quantitative research conducted by Barcelos, Dantas, and Sénécal (2018), which studied the brand's tone of voice on social media affects the consumer responses. This research conducted through the online self-administered questionnaires. In addition, the data analysis conducted by using the mediational analysis. The findings showed that the use of human voice on social media has positively influenced on consumer purchase intentions. Companies can use a human voice in their customer interactions on social media if their products are mainly enjoyment and related to contexts of small situational involvement and risk.

Furthermore, Ahmad, Idris, Mason, and Chow (2019) conducted a quantitative research to investigate the influence of young celebrity endorsements in social media advertisements and brand image towards the purchase intention among young consumers. They collected the data through the questionnaire. The authors analysed the data collection through the partial least squares analysis. The findings stated that celebrity endorsement in social media advertisement had a significant impact on the purchase intention of young consumer.

Lim, Cheah, and Wong (2017) conducted quantitative research that investigated the impact of social media influencers on the purchase intention and the mediation effect of customer attitude in Malaysia. The data collection

completed by adopting the questionnaire survey. They analysed the data using the partial least squares structural equation modelling (PLS-SEM). The findings stated that the source of credibility and attractiveness in social media did not have any impact on consumer purchase intention. The marketers should give attention to choosing a suitable social media influencer to affect the consumer attitude and purchase intention, and attract the potential consumers.

Besides, Bilal, Ahmed and Shehzad (2014) carried out quantitative research that determining the role of social media and social networks in consumer decision making in Pakistan. The authors conducted the data collection through a self-administered and structured questionnaire survey. They analysed the data through the logistic regression analysis. The findings showed that Twitter did not have a positive effect on the consumer buying behavioural. In Pakistan, the small city consumers are more familiar with YouTube due to total shares of YouTube videos mainly get from Facebook.

In addition, Chatzigeorgiou (2017) directed quantitative research that investigated the impact of social media influencers towards the behavioural intentions of millennials about the tourism of rural areas in Greece. The authors collected the data through structured questionnaires. The data collection analysed by adopting structural equation modelling (SEM). Hence, the results indicated that the authentic experience of influencer marketing communicates in the social media did not have influences on the trust of millennials in the influencer marketing. The factors that influenced millennials' trust in influencer marketing are the total followers of the influencer marketing, the behavior

showed through social media posts, and the activities presented via photos, videos and posts. As a result, it proposed that

H_6: Social media has a significant positive effect and no effect on behavioural intention to use mobile wallet, respectively.

2.2.9 Brand Image

Brand image has hugely studied in consumer purchasing behavior (Yagci, Biswas, & Dutta, 2009). Apart from this, the brand image revealed a significant role in the decision making of the consumer. A consumer will engage in several inductive inferences to form a perceptual image of an object or event (Riezebos, Riezebos, Kist, & Kootstra, 2003). Keller (1993) stated that brand image is a brand perception that retained in the memory of consumers.

Furthermore, Wu (2015) conducted a quantitative research, which studied the consumers' attitude towards the brand image, athletes' endorsement, and purchase intention in Taiwan. The author conducted the study through the questionnaire survey. The data analysis conducted by adopting structural equation modelling (SEM). Hence, the findings stated that the attitude of consumers toward brand image has positively affected the consumer purchase intention. The company should enhance their own brand image, then enable the consumers to initiate their perceived brand value and further develop the brand identity.

In addition, Wu, Yeh, and Hsiao (2011) conducted quantitative research to investigate the influence of store image and service quality on brand image and purchase intention for private label brands in Taiwan. This study conducted through the questionnaires. Then, the authors conducted data analysis by using structural equation modelling (SEM). Therefore, this study concluded that the service quality of the brand image has positively affected the consumer purchase intention of a private label brand.

On another hand, quantitative research was conducted by Aghekyan-Simonian, Forsythe, Kwon, and Chattaraman (2012), which studied the role of product brand image and online store image on the perceived risks and online purchase intentions for apparel. This study conducted through the survey questionnaire. The data collection analysed by structural equation modelling (SEM). Thus, the research findings revealed that product brand image has directly and indirectly affected the consumers' online purchase intentions by reducing different risk perceptions. A strong brand image product appears as the most valuable strength for online retailers who were selling apparel.

Apart from this, Wang and Tsai (2014) conducted quantitative research and studied the relationship between brand image and purchase intention in Taiwan. They conducted the study through the self-administered questionnaires. Besides, the author conducted the data analysis by adopting the structural equation modelling (SEM). The findings stated that brand image enhanced the investors' purchase intention. Furthermore, the purchase intention of investors is influenced mostly by perceived quality while not through the perceived risk.

For instances, Malik, Ghafoor, Iqbal, Ali, Hunbal, Noman, and Ahmad (2013) conducted quantitative research which investigated the influence of brand image and advertisement on consumer buying behaviour in Pakistan. They directed this study through the questionnaire survey. Then, the data analysis conducted through multiple regression analysis. Therefore, the results showed that brand image had a positive influence on consumer buying behaviour. The brand image will be stronger in consumers' mind and become their buying behavioural if they are aware of the brand and have the good brand perception and loyalty.

In addition, quantitative research was conducted by Bhakar, Bhakar, & Bhakar (2013), which examined the relationship between country of origin, brand image and customer purchase intentions. This study conducted through the self-administered questionnaires. The authors collected the data and then analysed by multiple regression analysis. This research revealed that brand image has significantly influenced the customer purchase intentions. The country of origin cannot influence the purchase intentions of the customer if a strong positive brand image of the products has built-in their mind.

Another research conducted by Lien, Wen, Huang, and Wu (2015) which studied the effects of brand image, price, trust and value on purchase intentions of the online hotel booking in Taiwan. This study conducted through a survey questionnaire. Lien *et al* (2015) analysed the data by structural equation modelling (SEM). Hence, the findings stated that brand image had a positive influence on the consumer purchase intention. The hotel should concentre their efforts in maintaining and enhancing its brand image.

Besides, a quantitative research carried out by Chi (2018) to examine the Chinese consumer adoption of apparel mobile commerce in China. The data collection conducted by using the online questionnaire survey. The author analysed the data through factor analysis. The findings stated that the brand image had a significant effect on the Chinese consumer perceived ease of use of apparel mobile commerce.

Halim, Swasto, Hamid and Firdaus (2014) conducted quantitative research that studied the influence of product quality, brand image, and quality of service to customer trust and implication on customer loyalty in Indonesia. They collected the data through the survey. The authors analysed the data by adopting the generalized structured component analysis (GSCA). The findings stated that brand image did not significantly affect the consumer loyalty.

As well, quantitative research is conducted by Rageh Ismail and Spinelli (2012), which examined the effects of brand love, personality and image on word of mouth in the United Kingdom. The authors collected the data through a questionnaire survey. They used structural equation modelling (SEM) to analyse the data collection. The results showed that the brand image did not significantly affect the word-of-mouth (WOM) of young consumers.

Furthermore, Gul, Jan, Baloch, Jan and Jan (2012) directed quantitative research that examined the brand image and brand loyalty in Peshawar city. They used the survey to collect the data. The data collection analysed by the Chi-Square test. Hence, the research findings showed that brand image and loyalty

was hugely insignificant with the age group and level of education of consumers. The insignificant relationship between brand image and loyalty and repeat purchase duration of consumers has found in this research. The age group can generate instability challenge toward a product loyalty and image no matter the product will be well-known and maintaining very well quality.

In addition, quantitative research was conducted by Ayutthaya (2018), which examined the influence of perceived service on brand image and repurchase intentions of Thailand passengers towards low-cost carriers. The data collection conducted through the online self-administered questionnaires. The data collection analysed by using the reliability test. The results stated that the airline brand image has significantly influenced the repurchase intention of Thailand passengers. The airline managers can advance the brand image by the service quality enhancement. Hence, it suggested that

H_7: Brand image has a significant positive effect and no effect on behavioural intention to use mobile wallet, respectively

2.2.10 Demographic characteristics

Gender had a significant role in determining technology adoption (Morris & Venkatesh, 2000; Venkatesh & Morris, 2000; Venkatesh, Morris, & Ackerman, 2000; Venkatesh *et al*., 2003). The moderating effect of perceived usefulness towards intention should be larger for older men than for older women (Venkatesh & Morris, 2000; Ong & Lai, 2004). Venkatesh and Morris (2000) stated women were more hugely affected by perceptions of ease of use and subjective norm.

Venkatesh *et al* (2000) stated that gender differences in personal usage and sustained adoption of technology in the workplace. In this study, women are significantly affected by social norms and perceived behavioural control towards new technology adoption while men are significantly affected by their attitude. Arumugam (2012) found that Malaysian male students have higher computer usage than female students. Sioson (2019) stated that Malaysia can relatively reduce the gaps between men and women of digital payments usage in Fintech. Perceived easefulness has significantly affected women toward online travel reviews and user-generated-content usage (Assaker, 2020). Fan and Miao (2012) conducted quantitative research which studied the influence of electronic word-of-mouth on consumer purchase intention in the perspective of gender differences. The data collection conducted through the online self-administered questionnaires. They analysed the data collection by using the multiple regression analysis. Hence, the findings revealed that female and male customers have different e-commerce shopping behaviour.

Education level had a significant role in different technologies adoption (Kolodinsky, Hogarth, & Hilgert, 2004). Ruiz Mafé and Sanz Blas (2006) found that internet-dependent users are majorly and highly educated users. Higher education level correlated with the willingness to buy green electricity (Wiser, 2007; Ek, & Söderholm, 2008). The higher the education of the Malaysian woman, then more probably she had a more significant role in making decisions towards important family purchases (Samsinar, Sidin, Zawawi, Yee, Busu, & Laili Hamzah, 2004). Lower education households are less likely to use electronic devices with internet (Madden, Lenhart, Duggan,

Cortesi, & Gasser, 2013). The teachers' autonomy behaviours did not change based on their education levels (Serin, 2020). Apart from this, quantitative research conducted by Ataran and Nami (2011), which examined the acceptance of information technology. The authors conducted this study through self-administered questionnaires. They did the data analysis by adopting structural equation modelling (SEM). The findings stated that education level has significantly influenced on perceived ease of use towards technology acceptance.

Apart from this, TAM with an original construct which is perceived usefulness is found that sensitive to age (Venkatesh *et al*., 2003). The findings showed that a younger person being more simply to adopt technology (Trocchia & Janda, 2000; Karjaluoto, Mattila, & Pento, 2002). Age had a significant influence on users' intention toward using electronic banking technologies (Karjaluoto *et al*., 2002). Age differences in consumer behaviour influenced user purchasing behaviour and decision making (Homburg & Giering, 2001; Evanschitzky & Wunderlich, 2006). Acceptance of e-banking service among different age groups is significantly affected by privacy, security and convenient determinants in Malaysia (Poon, 2007). Gulamhuseinwala, Bull and Lewis (2015) stated the FinTech early adopters tend to be young and high-income customers in the markets of Australia, Canada, Hong Kong, Singapore, United States and the United Kingdom from now and predictable future. Manis and Choi (2019) stated that older consumers are less likely to perceive virtual reality hardware easy to use. Kirk, Chiagouris, and Gopalakrishna (2012) investigated the roles of interactivity, age and perceived usefulness of print in

the consumption of digital information products by conducting a quantitative study. They conducted the research through the online self-administered questionnaires. The data collection analysed by using the regression analysis. The findings showed that perceived usefulness found that sensitive to age.

Furthermore, the income level is expected to have a strong influence on consumer decision making (Shin, 2009). Rogers (2003) stated that earlier adopters of technological innovations as typical people that have higher incomes. The youth who are living in lower-income households are less likely to use the internet (Madden *et al*., 2013). The lower-income users did not perceive the Internet as useful to them (Porter, & Donthu, 2006). Smith (2013) stated that income level has an influence towards the internet assessment, text messaging usage and the downloading of apps in United State. Besides that, the income level will be the most significant factors of online shopping (Naseri & Elliott, 2011). The higher the monthly income of consumer, the higher the internet banking usage (Nayanajith & Damunupola, 2019). Mengistu, Simane, Eshete, and Workneh (2016) examined the factors that are influencing the households' decisions toward the biogas technology adoption in Africa. They conducted this research by using the self-administered questionnaires. Furthermore, the data collection analysed by the logistic regression and discriminant analysis. The findings showed that the income level has significantly affected the on the adoption of technology.

2.3 Conclusion

In Chapter II, the literature reviews on each different variable that related to the mobile wallet are important in identifying the unknown factors that exactly influenced the consumer behavioural intention towards willingness to adopt mobile wallet in Malaysia. It is significant for the stakeholders to know the factors that influenced the consumers' behavioural intention and willingness, especially policy makers, mobile wallet companies and the consumers who can stimulate the mobile wallet adoption and market. The literature reviews can support in developing the comprehensive research model to measure the willingness of mobile wallet adoption in Malaysia situation. In the future, the researchers can investigate other financial technology products through this mobile wallet research model and can further develop it from time to time.

Chapter II had explained the theoretical reviews on technology acceptance model and followed by the empirical reviews on the variables. Based on the preliminary studies, perceived usefulness, perceived ease of use, perceived security, price value, social influence, brand image and social media have a positive significant and insignificant effect on the behavioural intention to use mobile wallet, respectively. Besides that, behavioural intention to use has a significant effect on the willingness to adopt mobile wallet. In addition, the willingness to adopt mobile wallet is affected by several factors based on the preliminary studies. The demographic variables such as gender, education level, age and income level have a significant effect on the willingness to adopt

mobile wallet. Hence, it is significant to study the relationship between the variables for better understanding of the willingness of consumers to adopt mobile wallet in Malaysia.

CHAPTER III

RESEARCH METHODOLOGY

This chapter will explain the systematic procedure used to conduct research accurately. It covers the aspects of research design, model specification, data collection, sampling, and the analysis of the data.

3.1 Variable

Numerous of studies have adopted the perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, brand image, and behavioural intention to predict the adoption of technology and innovation products, respectively. Besides, several studies of technology and innovation product adoption had conducted. A number of studies have predicted the technology and innovation product adoption by gender, education level, age, and income level.

3.2 Conceptual Framework

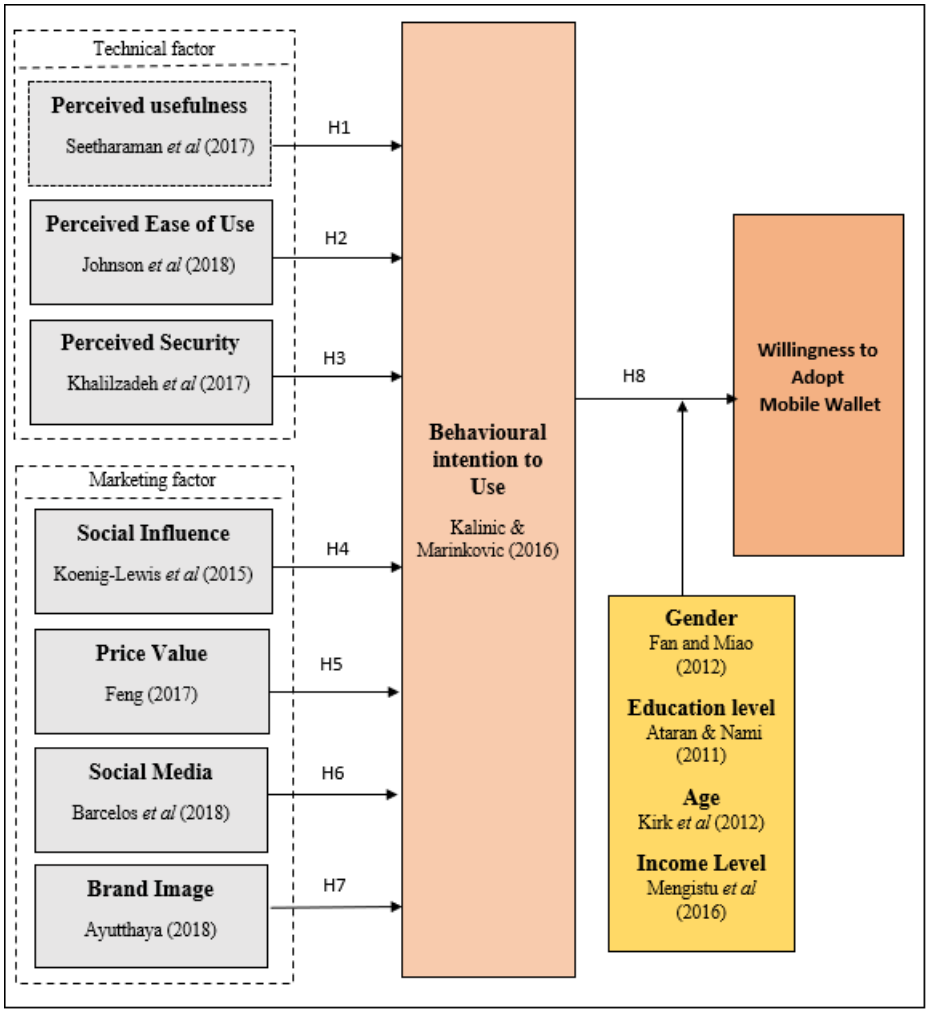


Figure 3.2: Conceptual Framework of Willingness to Adopt Mobile Wallet in Malaysia

Figure 3.2 displays the proposed conceptual framework for this research. Both perceived usefulness and perceived ease of use from the technical factors are the main constructs of TAM. Another technical factor is perceived security. Based on the original TAM, an additional of four new variables from marketing factors included in the conceptual framework, which are the social influence, price value, social media, and brand image known as the independent variables. The moderating variables which known as demographic variables, included the gender,

education level, and age. Besides that, the willingness to adopt mobile wallet in Malaysia is the dependent variable in this conceptual framework.

3.3 Hypothesis Development

There are seven independent variables in the conceptual framework, which are perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, and brand image. The hypotheses of this research study are as follows:

H_{O1}: Perceived usefulness has no significant positive effect on behavioural intention to use mobile wallet.

H_{A1}: Perceived usefulness has a significant positive effect on behavioural intention to use mobile wallet.

H_{O2}: Perceived ease of use has no significant positive effect on behavioural intention to use mobile wallet.

H_{A2}: Perceived ease of use has a significant positive effect on behavioural intention to use mobile wallet.

H_{O3}: Perceived security has no significant positive effect on behavioural intention to use mobile wallet.

H_{A3}: Perceived security has a significant positive effect on behavioural intention to use mobile wallet.

H_{O4}: Social influence has no significant positive effect on behavioural intention to use mobile wallet.

H_{A4}: Social influence has a significant positive effect on behavioural intention to use mobile wallet.

H_{O5}: Price value has no significant negative effect on behavioural intention to use mobile wallet.

H_{A5}: Price value has a significant negative effect on behavioural intention to use mobile wallet.

H_{O6}: Social media has no significant positive effect on behavioural intention to use mobile wallet.

H_{A6}: Social media has a significant positive effect on behavioural intention to use mobile wallet.

H_{O7}: Brand image has no significant positive effect on behavioural intention to use mobile wallet.

H_{A7}: Brand image has a significant positive effect on behavioural intention to use mobile wallet.

H_{O8}: Behavioural intention to use has no significant positive effect towards the willingness to adopt mobile wallet.

H_{A8}: Behavioural intention to use has a significant positive effect towards the willingness to adopt mobile wallet.

3.4 Data Collection and Sources of the Data

There are various methods to collect data, and different sources can be used to answer the research questions. Data collection is significant in this research to collect, analyse, and interpret to form the final facts. The hypotheses of this study are developed through primary sources by the literature reviewing.

3.4.1 Primary Data

Primary data is the information collected first-hand by the researcher on the variables of interest for the particular purpose of the study (Sekaran & Bougie, 2016). Primary data is also known as raw data. Sources of primary data are focus groups, individuals, and panels of respondents, especially established by the researcher and from whom opinions have sought on specific issues from time to time. Primary data is the data that has not been manipulated by individuals or software programs. Zikmund, Babin, Carr and Griffin (2013) stated that primary data collected by a researcher in finding the interpretations for research questions. The researchers collected the primary data and then can fulfill those samples of the population that they want to examine. The primary data provide the information to the researchers who are insufficient detail on their research. In quantitative research, the survey is a general instrument for collecting a large amount of information. In this research, the primary data of the willingness to adopt mobile wallet in Malaysia collected through the questionnaire survey method.

3.4.2 Secondary Data

Secondary data is the data collected from the individuals, while the data does not collect by the user (Sekaran & Bougie, 2016). Generally, the sources of secondary data for social science consist of books, databases, organisational files, censuses, government data collection, and research centre. Sources of secondary data provide much information for research and problem-solving. The information collected in the research gained from the journal articles written by specialists in their field. Hence, information collection is usually reliable and valid. The benefits that are using secondary data are time and cost-efficient for the researchers. It is important to refer to the secondary data sources that provide up-to-date information which can meet the research's specific needs and avoid the information obsolete. From this research, the secondary data collected from the websites of Zion Market Research, Market Research Store, Statista, Bank Negara, and so on since the year 2015 to 2018.

3.5 Research Design

According to the research questions in the study, a research design is a blueprint for the data collection, data measurement, and data analysis (Sekaran & Bougie, 2016). The research design involved study purpose, research strategy, study setting, and the extent of research interference, time horizon, and unit of analysis. However, the decision has to make for the sampling design, measurement of variables, and data analysis. The appropriate design alternatives

that are being chosen by the researcher will affect the quality of the research study. The careful attention to the research details required for ensuring the study has exactness and acceptable confidence level. Besides that, the nature of studies may be either exploratory or descriptive or causal.

Apart from this, a descriptive study is always developed to collect data. It describes the characteristics of a person, events, or situations. It can be either qualitative or quantitative research in nature. The descriptive research may consist of quantitative data collection, which is satisfaction ratings, production figures, or demographic data, while it may imply the qualitative information collection. Besides that, qualitative data might be gathered to describe how consumers will go through a decision-making process. Descriptive studies may support the researcher in understanding the characteristics of a group in a given situation and think systematically about aspects in a given case.

The descriptive study may help to give ideas for further explore and research. On another hand, it also supports in making particular decisions. In this study, we used a descriptive study to determine the factors that affect the consumer adoption of the mobile wallet. Thus, some variables may affect the adoption of the mobile wallet. The independent variables that investigated are perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, and brand image of the mobile wallet. All the hypotheses will be used to test, while the empirical quantitative data will collect through an online survey questionnaire. The following Figure 3.5 is the research design of this study.

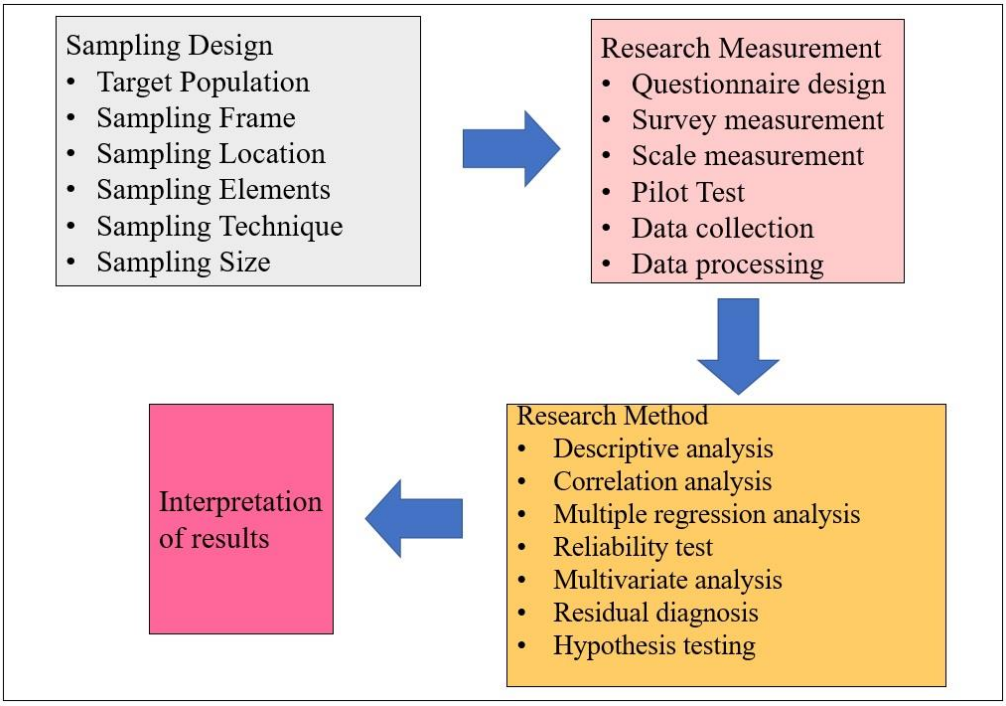


Figure 3.5: Research Design of Willingness to Adopt Mobile Wallet in Malaysia

In Figure 3.5, the sampling design of this research included the targeted population, sampling frame, sampling location, sampling element, sampling technique, and sampling size. Based on Figure 3.5, research measurements included the questionnaire design, survey measurement, scale measurement, pilot test, data collection, and data processing in this research. Furthermore, research methods in this study consist of descriptive analysis, correlation analysis, multiple regression analysis, reliability test, multivariate analysis, residual diagnosis, and hypothesis testing. Hence, the interpretation of the result will conduct later on.

3.5.1 Time horizon

The time horizon involved cross-sectional and longitudinal studies (Sekaran & Bougie, 2016). Cross-sectional studies can undertake in which data are gathered just once, such as for days, weeks, or months to answer a research question. Longitudinal studies defined as data on the dependent variable are gathered at two or more points in time to answer a research question. In this research, the authors will use the cross-sectional studies in data collection of willingness to adopt mobile wallet in Malaysia.

3.6 Sampling Design

A sampling design prefers for any possible sample its probability of being picked up in the theory of limited population sampling. Crossman (2012) stated a sample is a subset of a population used to estimate the inference about the larger population by collecting the population information. The main steps in sampling involve determining the population, sample frame, sampling technique, appropriate sample size, and execute the sampling process. In this research, a sample is a group of Malaysia population for measurement (Sekaran & Bougie, 2016). The sample should be representative of Malaysia population, which may sum up the findings from this research sample to the population as a whole.

3.6.1 Target Population

The target population is the entire group of individuals from which the sample might draw. A sample is a group of individuals who take part in the investigation. In general, it refers to the authors can apply the findings of their research to the target population they are interested in. The target population in this study is Malaysian consumers aged from 20 years old and above, who have not used the mobile wallet before as mobile wallet services may have considered as relatively new phenomena to Malaysian. Therefore, the existing study concentrated on the Malaysian consumers' behavioural intention to use mobile wallet instead of the actual adoption of the mobile wallet. The study aimed to predict the early stage of mobile wallet adoption intention in Malaysia. This data collection approach is same as with Amin (2009), in finding the mobile wallet adoption intention among Bank customers in Sabah. If a study considers the current mobile wallet users as the target population, then it only can investigate the continuous usage intention of mobile wallet adoption and their actual adoption. It cannot accurately determine the consumer behavioural intention due to they already used the mobile wallet.

3.6.2 Sampling Frame and Sampling Location

The sampling frame is representative of all the elements in the population from which the sample is drawn (Sekaran & Bougie, 2016). The sampling frame is the device or source material for the sample to be taken. It is useful in giving a listing of each element in the population while it is not

always a current document. Besides that, the sampling frame may be available in many cases but may not always be entirely accurate. The research can solve the problem with some methods. For example, they can redefine the target population in terms of the sampling frame, adjust the data collection with a weighting scheme to counterbalance the coverage error, and screen the respondents for important characteristics to make sure that they meet the criteria for the target population. In this research, the screening question will use to ensure that the respondents who do not use a mobile wallet will participate in the questionnaire survey. The sampling location is the location area that chose by the researcher to collect the information from the target respondents. The sampling location of this study is in Malaysia.

Besides that, the actual mobile wallet users are not suitable to be our target population due to they already adopted the mobile wallet. They do not consider they have behavioural intention towards the adoption. This study does not aim to study the re-adopt mobile wallet or continuous of the mobile wallet adoption again. Our research is to investigate the willingness to adopt mobile wallet while not the continuance to use the mobile wallet in Malaysia. The sample frame is the Malaysian consumer aged from 20 years old and above who have not to use the mobile wallet before. This research targeted the respondents who are not using mobile wallet before participating in the questionnaire survey.

3.6.3 Sampling Elements

The sampling element is the analysis unit or the population case that can be an individual, a team, and an organisation that is measured. There is a fair chance of being chosen to be involved in the research sample. It is possible when researchers can determine and contact any individual in a target population. The target population is the respondents that not use the mobile wallet with the age of 20 years old and above in Malaysia. The research targeted to have a minimum of 350 respondents who are not using the mobile wallet from Malaysia population to be my sampling element. The 300 sample sizes are considered sufficient to represent a big population (Saunders, Lewis, & Thornhill, 2015). A sample size of 300 is considered large enough for statistical testing. The data of 350 respondents collected by using the online survey questionnaire. Then, the data collection arranged in a cluster based on their income groups.

3.6.4 Sampling Technique

Sekaran and Bougie (2016) stated that there are two main types of sampling design, which are probability sampling and non-probability sampling. In the population, the elements have many known, nonzero chance or probability of being selected as a sample subject is known as probability sampling. The margin mean of sampling error can calculate by probability sampling. Besides, their confidence level in survey estimates reported.

Probability sampling gives the greatest chance to generate a sample that is truly representative of the population. Probability sampling adopts the statistical theory to select a sample randomly from an existing huge population. Then, it can forecast that all their responses together, which will match the overall population. The advantages of probability sampling are cost-effective, simple, and easy to conduct, and non-technical. Furthermore, the probability sampling will cause the chances of selecting a specific class of samples only. In non-probability sampling, the elements do not have a known or predetermined opportunity of being selected as subjects. It used when the time or the factors become critical rather than generalizability. The elements of the population are without any probabilities attached to their chosen as sample subject in non-probability sampling designs. Hence, this study will choose non-probability sampling as the sampling technique in this research. The advantage of non-probability sampling is the possibility to reflect the descriptive comments about the sample. Besides, it is cost and time effectiveness if compared to probability sampling. The non-probability sampling is impractical to conduct probability sampling. The disadvantages of the non-probability sampling lack representation of the entire population and lower level of generalization of research findings compared to probability sampling.

The purposive sampling is one type of non-probability sampling. This study will use purposive sampling for the online questionnaire survey. The objective of purposive sampling is to emphasize specific characteristics of a population that are of interest. It will enable the respondents to answer the research questions effectively. Purposive sampling can yield results that are

available in real-time. Besides, the respondents have an appropriate level of understanding and knowledge about the subject had assessed, which reduces the downtime involved. In the purposive sampling method, the judgment sampling has used in this research. It includes the choice of the subjects who are most advantageously placed to provide the information required. Furthermore, judgment sampling design had used when a small number or category of people who have the information that sought. This sampling may reduce the generalizability of the findings because we are using a sample of experts who are conveniently available to us. For instances, judgement sampling makes for special efforts to locate and gain access to the individuals who do have the necessary information. It may be the only useful one for answering several types of the research question. The research questionnaire included the question to identify mobile wallet users and non-users from respondents. Apart from this, the online questionnaires survey will present as a Google Form, and its link will share through email and social media platforms such as WhatsApp and Facebook.

3.6.5 Sampling Size

The sample size is important in this study which, aimed to make an inference based on a sample of a population. 300 sample sizes are considered enough to represent a large population (Saunders *et al*., 2015). This study has targeted a minimum sample size of 350 respondents. Furthermore, the sample size of 350 is considered big enough for statistical testing. The respondents have been selected randomly from the people who have not to use a mobile wallet in

Malaysia. The actual data collection in this study is 539 respondents who user and non-user mobile wallet during the time of the survey. After extracted the mobile wallet user data from the total data collection, only 350 respondents remained, who are respondents that haven't used the mobile wallet before for data analysis of this study.

G*Power is a software used to calculate statistical power. It provides the ability to calculate power for several different statistical tests consisting of t-tests, F-tests, and chi-square-tests. The the F-test (ANOVA: Fixed effects, omnibus and one-way) calculation with the number of groups is 7 (independent variables). The study targeted sample size will be approximately 350 as a result from Figure 3.6.5.

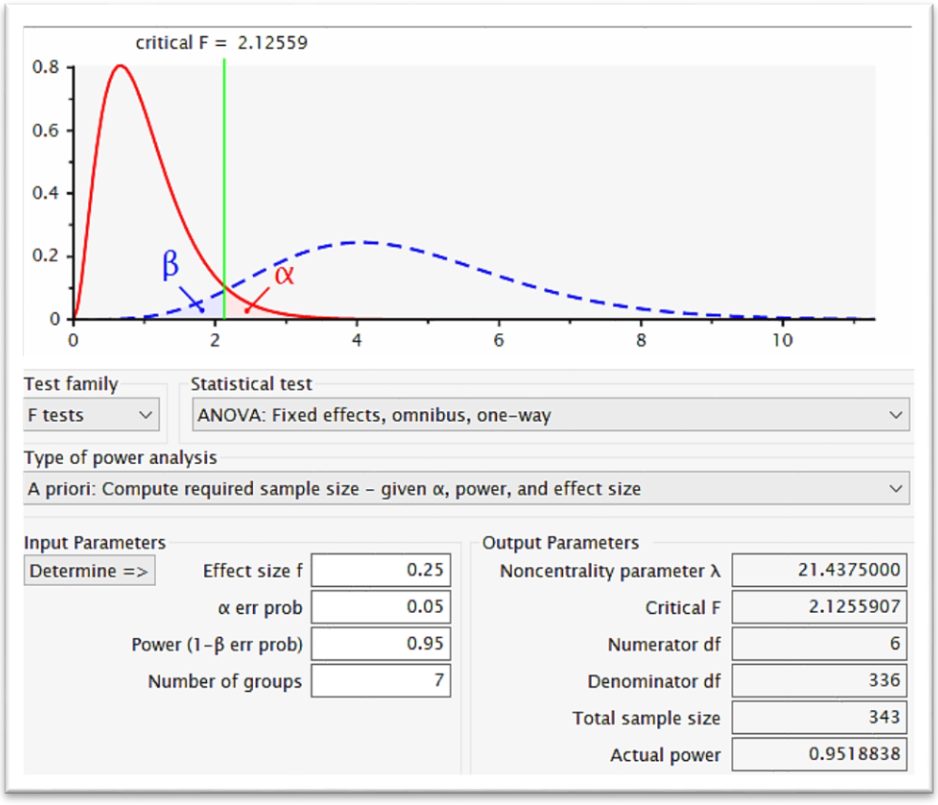


Figure 3.6.5: Result of G*Power for the Study

3.7 Research Measurement and Instruments

Research measurement is a procedure of observing and recording the observations for data collection in research. Measurement reliability in a study is taking consideration of different reliability estimators and true score theory. There are four large categories of measurements which scaling, qualitative research, unobtrusive measures, and survey research. Scaling consists of the think over of the primary ways of scale development and implementation. In general, qualitative research is primarily exploratory research that offers a non-numerical measurement approach range. Unobtrusive measures are known as data collection method that is often looking for unusual data sources and does not interfere with the research context. Survey research is a way of sociological investigation that adopts questionnaires, interview or statistical surveys in data collection about people behavioural intention. In this study, survey research is used to find the date of adoption of the mobile wallet in Malaysia.

The research instrument is the tools used to collect the data information in research. In this study, the primary data that needed to collect is the adoption of the mobile wallet in Malaysia. A questionnaire is known as the research instrument involving a set of questions formulated and aimed to gather information from the targeted respondents about their behavioural intention toward mobile wallet adoption. The distribution of questionnaires is cost efficiency and easefulness in collecting the responses from the fairly large sample in the quantitative research. The research instrument used in this study is

questionnaires. The online questionnaires survey receives the primary data in this study. In addition, the questionnaire survey can be an effective method to enhance the response rate and decrease several uncertainties. The questionnaire survey always involved in asking a given subject to respond to a set of written questions. It developed a cooperative mood to the target respondents in providing their information. It is significant in using the correct research instruments because the reliability and validity of a study highly depend on it. This study uses Statistical Package for the Social Science (SPSS) to analyse the quantitative data collected from the questionnaire.

3.8 Constructs Measurement

Some prior studies have analysed for developing a reliable construct in this research. Table 3.8.1 reveals the measurement of the construct for the research and the sources used in designing the questionnaire.

3.8.1 Questionnaire Design

In this study, the methodology based on the questionnaire approach. The preparation of the questionnaire is to attain the study objectives. A questionnaire is a pre-formulated written set of questions for the respondents to record their answers (Sekaran & Bougie, 2016). These are efficient data collection mechanism when a descriptive or explanatory study. Furthermore, questionnaires are usually less costly and time-consuming than observation and interview while

it may cause nonresponse error. The purpose of a design questionnaire usually is to collect a huge number of quantitative data. Questionnaires can be in personally administered questionnaires, electronic mail questionnaire, and electronic questionnaires. In the research, the online questionnaire survey had used. It can reach wide geographical regions, and the respondents can take more time to respond and high anonymity. The challenges of the online questionnaires are low response rate, and respondents cannot clarify questions.

There are some guidelines for questionnaire design. Firstly, the content and purpose of the questions must be appropriate. The language and wording of the questionnaire should approximate the understanding level of the respondents. For instance, the type of question is either open-ended or closed, while the question form is whether negatively or positively worded. In this research, a closed question had used as the respondents can make choices in a set of alternatives in the questionnaire. The questionnaire also required to avoid creating the double-barrelled questions, ambiguous questions, recall-dependent questions, leading questions, and loaded questions. The length of the questionnaire should not more than 20 words and not to be too long. The sequence of questions in the questionnaire should lead the respondents from questions that are relatively easy until more difficult questions or from general questions until a more specific question. Besides that, the questionnaire will seek the respondents' personal information such as age, income level, gender, and other information in this research. Design and formulation a set of the reliable questionnaire are very significant in this study to understand the willingness to adopt mobile wallet in Malaysia. A total of 54 questions had designed, which covers the general information and opinion questions. It included all the seven independent variables,

one BIN variable, four moderating variables, and one dependent variable, which showed in Table 3.8.1. The seven independent variables are perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media, and brand image. The BIN variable is behavioural intention to use. Furthermore, the moderating variables are gender, education level, and age. The dependent variable is the willingness to adopt mobile wallet in Malaysia.

Table 3.8.1: Summary of Questionnaire Design

Section	Questions
A	Related to the demographic characteristics (moderating variables in this study) and the opinions of the respondents
B – H	Related to the independent variables in this study
I	Related to the mediating variable in this study
J	Related to the dependent variable in this study

3.8.2 Survey Measurement

Measurement is the assignment of numbers or other symbols to characteristics of objects based on a pre-specified set of rules (Sekaran & Bougie, 2016). Five item scales measured the perceived usefulness of mobile wallet in terms of usefulness, easefulness, productivity, advantageous, and helpfulness (Krishanan, Khin, & Teng, 2015). Besides that, the measurement of perceived ease of use has used the scale developed by (Zhong *et al*., 2013) for the five dimensions of easefulness, learning, using process, registration, and

convenient. The perceived security has measured in terms of the bank card number, password security, private information security, adoption, and system security (McKnight, Choudhury, & Kacmar, 2002). Scales of Zhong *et al* (2013) were used to measure the social influence of Malaysian consumers in terms of recommendation, friend influence, beneficial, community, and mass media. Furthermore, the scale used to measure the price value of the mobile wallet was adapted from (Zhong *et al*., 2013) in terms of price reasonability, incentives, changing new electronic devices and phone numbers, and registration fee. Apart from this, the scale used to measure social media adapted from (Tsiros, Mittal, & Ross, 2004) in terms of satisfaction in finding and receiving mobile wallet information and usage experience, and the usefulness and acceptance of the information. In addition, the brand image of a mobile wallet was measured by five-item scales in terms of experiential, social status, and usage expectation (Sondoh, Omar, Wahid, Ismail, & Harun, 2007). The scale used to measure the behavioural intention to use a mobile wallet in terms of likeliness, opportunity, willingness, thinking, and intention towards mobile wallet adoption (Tan *et al*., 2014). Furthermore, the scale used to measure the willingness to adopt mobile wallet in terms of frequency, timing, and period of adopting mobile wallet (Fathema, Shannon, & Ross, 2015). In this study, a small modification of the questions from other questionnaires was applied to ensure the questionnaires are fitting into the Malaysia context.

3.8.3 Measurement Scale

Measurement is gathering data in the form of numbers. A scale is a tool used to distinguish how they differ from one another on the variables of interest (Sekaran & Bougie, 2016). Besides that, scaling includes the creation of a continuum on which objects located. The Likert scale is a scale designed to examine how strongly respondents will agree or disagree with the statement. It serves as an instrument for determining the statement range of the questionnaires that are agreed or disagreed by the respondents. As shown in Table 3.8.3.1, the Likert scale had five choices that involved strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, and strongly disagree. This scale measurement is being applied in section C to section J of the questionnaire to collect detailed feedback from the respondents. In this measurement usage, respondents can rate from one to five to represent their own opinions, beliefs, and attitudes towards the mobile wallet. The following Table 3.8.3.1 showed the Likert scale measurement for this study.

Table 3.8.3.1: Likert Scale Measurement

Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
1	2	3	4	5

Source: (Sekaran & Bougie, 2016)

In general, there are four different of measurement scale in a variable of research which is nominal, ordinal, ratio, and interval. In this study, three types of scale have adopted, which are nominal, ordinal, and interval scales. These scales can be used to examine the consistency, reliability, and validity of the hypotheses and data. The nominal scale is a scale that can assign subjects to some groups or categories. The scale measurement has adopted in section A for gender, education level, age, marital status, and employment status, as well as the opinion questions in section B. Ordinary scale categorizes the variables while it rank-orders the categories in several important methods. The measurement scale has been used in section B. Also, the interval scale allows researchers to perform some arithmetical operations on the data collected from the respondents. This interval scale will use in section A, which is to measure the online spending level and monthly income. The following Table 3.8.3.2 showed ta summary of the questionnaire design for this study with the type of scale used.

Table 3.8.3.2: Summary of Questionnaire Design with the Type of Scale Used

Section	Number of Questions	Questions	Type of Scale Used
A	9	Related to the general information of the respondents and the opinions of the respondents	Nominal Scale and Interval Scale
B - G	30	Related to the independent variables in this study	Ordinal Scale
H - I	10	Questions related to the mediating variable and dependent variable in this study	Ordinal Scale

3.8.4 Pre-testing

Pre-testing is important for an online survey questionnaire to verify that there have no uncertainties or inexactness of meaning in the questionnaires (Sekaran & Bougie, 2016). The respondents could understand the designed questionnaires, as well. This test helps in correcting any inadequacies before sending the questionnaires to the respondent to reduce the bias. Moreover, the possibility of poor data quality and the deletion of items in the measurement model assessment are lack of understanding in the pre-testing. The main focus of the pre-test is to solve problems and prevent measurement errors. The objectives of pre-testing are aimed to ensure the wording questions, and sequences of the questionnaires are correct, the respondents have clearly understood all the questionnaires, instructions are clear and sufficient, and some questionnaires should delete (Kumar, Talib, and Ramayah, 2013). Apart from this, the developed scales and items should be pre-tested to confirm whether the questionnaires work accurately in a new setting with the new respondents.

3.8.5 Pilot Study

The pilot test is a trial data collection order conducted in a study to determine the loopholes in the research design and research instruments. Pilot testing will be used in checking its validity and reliability of a study before conducted the actual study (Zikmund *et al*., 2013). The objectives of pilot test are aimed to examine adequacy of research instruments, identify whether the research protocol is workable and realistic, evaluate the feasibility of a full-scale project,

indicating reveal logistics issues, collect the preliminary data, assure the technique are effective, determine the sample size, and convince funding bodies that the main study is practical and worth funding (Van Teijlingen & Hundley, 2002). Besides that, the pilot study using questionnaire-based the survey might not be realistic or necessary when the respondents are relatively difficult to get, or the target population is relatively small.

The sample size should be 10 percent of the sample projected for the main study (Connelly, 2008). In this study, the researcher targeted to get 350 respondents, hence the pilot test may have 35 respondents, which are 10% of the sample value. In addition, a pilot test gives a pre-test for the questionnaires from 30 respondents to ensure the target respondents can clearly understand these questionnaires (Zikmund *et al*., 2013). It also helps the researcher to gain more reviews and suggestions based on the questionnaire from the respondent. Apart from this, (George, 2011) revealed a reliability analysis of variables is aimed to test the internal consistency of the constructs in a study. Moreover, the sample size could be determined based on the type of analysis at the preliminary stage (Cooper, Schindler, & Sun, 2006). The coefficient alpha normally is calculated to examine the internal consistency reliability of the measures. Thus, a sample of 35 individuals is always encouraged. The number comes from the Central Limit Theorem, which makes a distributional assumption of the sample size of 30 or more. This can ensure any sample mean from the target population will be approximately equal to the population.

The collected questionnaires analysed using SPSS Statistics to examine its reliability. The questionnaire was restructured and amended by taking into the respondents' consideration and opinions based on their feedback after the pilot testing. According to the pilot study, the Cronbach's alpha value of 0.70 for all the variables should obtain. Hence, the reliability analysis will reveal all the variables that used are reliable in this study. It is the same as the requirement of Cronbach's alpha value, which is more than 0.70. There is an internal consistency of the survey.

3.9 Data Processing

Sekaran and Bougie (2016) stated that researchers needed to use some preliminary activities before the data analysis. It can ensure the data are accurate, suitable, and complete for further analysis to test the hypothesis. The first step is data preparation is data coding. It consists of assigning a number of the participants' responses so they can enter into a database. The researcher can use a coding sheet first to transcribe the data from the questionnaire and then key into the data. Apart from this, this method can avoid confusion, especially when there are a large number of questionnaires. Less than ten percent of coded questionnaires needed to check for coding accuracy. All items required to check if any errors found in the sample. Secondly, the researcher can enter the data after the response has coded. The raw data can enter by using a different software program. Each column represents a variable, while each row represents an observation or case. Thirdly, the data needed to edit after key in it. Data editing required to detect and correct those inconsistent, illogical, illegal data or

omissions in the information from the respondents. Moreover, a solution to those problems is looking at the response from the respondent's pattern to infer a logical answer. Another solution is assigning to the mean value item of the responses who responded to that particular item.

Data transformation is the process of changing the real numerical representation of the quantitative value to another value. It also is known as a variety of data coding. Data are typically changed to prevent the problems in the next stage of the data analysis process. For instance, data transformation needed when some questions have been used to determine a single concept. It is more useful to set up a scheme for grouping the responses such that the certain items measuring a concept are all grouped. When all the items are without wrong inclusion, then the questions measuring a concept are not adjacent while scattered over different parts of the questionnaire. Data transformation provides a means of modifying variables for correcting violations of the statistical assumptions underlying the multivariate techniques and enhancing the relationship between the variables. On another hand, the last step of the data processing is data cleaning. Malhotra, Hall, Shaw, and Oppenheim, (2006) revealed that data cleaning is quite the same as the data checking stage. However, this stage is more broad-ranging and detailed. Data cleaning support in identifying the data which have extreme value, logically inconsistent and out of range.

3.10 Research Methods and Data Analysis

In this study, the quantitative analysis had conducted. Statistical or logical techniques were used to figure and appraise the data. The main tools used to analyse the data collected in this study are SPSS Statistic and Microsoft Excel. Sekaran and Bougie (2016) stated that data analysis support in investigating whether the proposed hypotheses are significant in research.

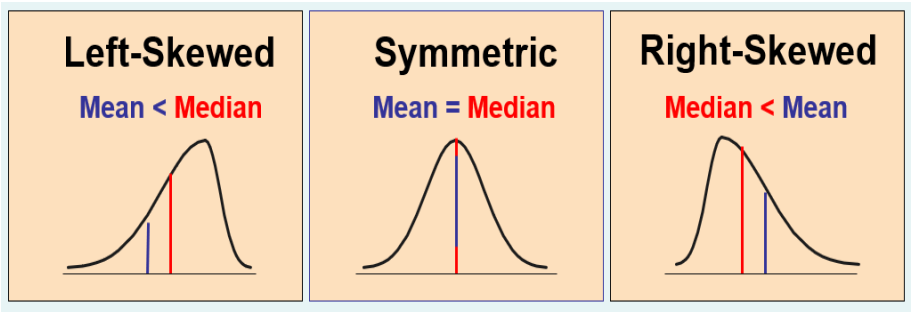
3.10.1 Descriptive Analysis

Descriptive statistics aimed to summarize a sample while not used to describe the population based on the sample (Field, 2009). It is a statistic that quantitatively summarizes and describes a collection feature of information. Moreover, the important population parameters are the population mean, variance, and standard deviation. The main function of descriptive analysis is to describe the information collected in a reasonable approach. The frequency of each question is computed and demonstrated by using an appropriate diagram once all the information is being collected. Descriptive statistics have categorized into the measurement of central tendency and variability. The central tendency is the extent to which every data values group around a central value. The variation is the total dispersion of values. The mean, mode, and median are the central tendencies of the questions that will take into the calculation. The population mean is the sum of the values in the population separated by the population size. Besides that, the arithmetic mean is the most common measure

of central tendency. In an ordered arrangement, the median is the middle number. The mode is the value that occurs most often in the sample.

Furthermore, the measures of variability consist of the standard deviation, variance, minimum variables, maximum variables, kurtosis, and skewness. The calculation of standard deviation and variance are used to identify the outliers in the score distribution. Measures of variation provide information on the variability or dispersion of the data values. These two measures use tables, graphs, and general discussions to support everyone who can understand the implication of the data analysis effectively. Skewness measures the amount of asymmetry in a distribution. Table 3.10.1.1 showed the shape of distribution or skewness:

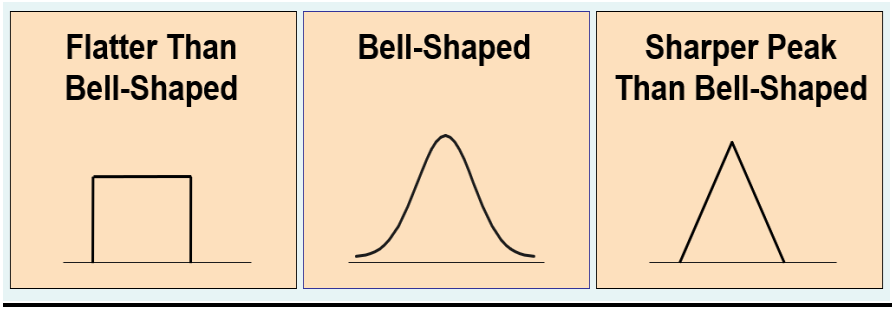
Table 3.10.1.1: The shape of a distribution (skewness)



Source: (Field, 2009)

For instance, Kurtosis measures the relative concentration of values in the centre of distribution as compared with the tails. The measurements are being used to summarise data into useful and precious information. Table 3.10.1.2 showed the shape of distribution or (Kurtosis).

Table 3.10.1.2: The shape of a distribution (Kurtosis)



Source: (Field, 2009)

Table 3.10.1.2 describes the relative concentration of values in the centre as compared to the tails. The covariance measures the strength of the linear relationship between two numerical variables. The coefficient of correlation measures the relative strength of the linear relationship between two numerical variables. In addition, the sample covariance only concerned with the strength of the relationship, while no causal effect has implied. The covariance between two variables:

$Cov(X,Y) > 0$ X and Y tend to move in the same direction

$Cov(X,Y) < 0$ X and Y tend to move in opposite directions

$Cov(X,Y) = 0$ X and Y are independent

The covariance has the main defect, which is impossible to determine the relative strength of the relationship between the size of the covariance.

3.10.2 Pearson's Correlation Coefficient Analysis

Pearson's correlation coefficient analysis is aimed to examine a linear relationship associated with the dependent variable and independent variables. This analysis is used to establish if there are possible connections between the variables of a study. In this study, the dependent variable is the willingness to adopt mobile wallet in Malaysia. Besides that, the independent variables which are perceived usefulness, perceived ease of use, perceived security, social influence, price value, social media and brand image, with the behavioural intention to use variables which used to study the willingness to adopt mobile wallet in Malaysia. Correlation is s a measure related to R square (Douglas, William, & Samuel, 2015). R measures the direction and strength of the linear relationship between two variables. This coefficient can obtain by dividing the covariance of the two variables by their product of standard deviations. Besides that, the covariance measures the strength of the linear relationship between two numerical variables, which are the independent variable, and the dependent variable (X and Y). The sample covariance only concerned with the strength of the relationship and no causal effect has represented. Covariance is more than zero means X and Y move in the same direction. If the covariance is less than zero means X and Y move in the opposite direction. When covariance is equal to zero, it means X and Y are independent.

The range value of Pearson's correlation coefficient analysis is between -1 to 1. If the value of the correlation coefficient is +1, then it will be said to have a perfectly positive relationship or correlation. When the value of the

correlation coefficient is known as -1, then the variables of the study are considered to have a perfectly negative relationship or uncorrelated. It said to have an inverse linear relationship or anti-correlation between the variables. Pearson's correlation coefficient analysis is aimed to determine the strength and direction of every independent variable, and behavioural intention to use variable with the dependent variable in this study. Table 3.10.2 shows the rule of thumb for interpreting the size of a correlation coefficient.

Table 3.10.2: Rule of Thumb for Pearson's Correlation Coefficient Analysis.

Correlation Coefficient, (r)	Strength of Relationship
≤ 0.20	Negligible relationship
0.21 - 0.40	Low correlation
0.41 - 0.70	Moderate correlation
0.71 -0.90	Strong correlation
≥ 0.90	Very Strong correlation

Source: (Douglas *et al*., 2015).

3.10.3 Multiple Regression Analysis

Multiple linear regression is a model used to predict the value of one variable from another. Multiple regression is a natural extension of the model that used it to predict the values of an outcome from some predictors (Tabachnick & Fidell, 2007). Researchers normally use it to predict the values of an outcome from some predictors. Apart from this, it is a hypothetical model of

the relationship between some variables. The relationship of multiple regression described by using a variation of the equation of a straight line. Linear regression is the relationship between the dependent and independent variables that can approximate a straight line. There are hypotheses of the linear regression:

H_0: $\beta_i = 0$ (no linear relationship)

H_1: $\beta_i \neq 0$ (linear relationship does exist between X_i and Y)

The slope coefficient βi measures the direction which indicates a positive or negative relationship, and the strength or magnitude represent low or moderate or high.

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon_t$$

Non-linear regression is the relationship between the dependent and independent variables cannot be with a straight line.

Polynomial: $y = b_1 + b_2 x + b_3 x^2 + \ldots + b_k x^{k-1}$

In multiple regression models, there is one variable to be predicted the dependent variable, while there are two or more explanatory (independent) variables based on economic theory.

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \varepsilon_t$$

Apart from this, the coefficients of the multiple regression models are estimated using sample data. The simplest commonly used measure of overall fit is the coefficient of determination, R^2.

$$R^2 = \frac{ESS}{TSS} = 1 - \frac{RSS}{TSS} = 1 - \frac{\sum e_i^2}{\sum (Y_i - \bar{Y})^2}$$

R^2 is equal to the explained sum of squares (ESS) divided by the total sum of square (TSS). From ordinary least squares (OLS) selects the coefficient estimates that minimize the residual sum of squares (RSS), OLS gives the largest possible R^2 among the class of linear models. The main problem with R^2 is it may never reduce if another independent variable added. When comparing models, it can be a disadvantage. Apart from this, an alternative to R^2 that addresses this issue is the adjusted R^2.

$$R^2_{adj} = 1 - (1 - R^2)\left[\frac{n-1}{n-(k+1)}\right]$$

In the adjusted R^2 equation, (N – K – 1) is known as the degree of freedom. K is the number of regression (independent variables), which involving the intercept while N is the number of observations (actual sample size). The net effect of adding a new variable is a loss of a degree of freedom. The slope of the coefficient intercept measures the strength or magnitude, and direction of the relationship. There are three multiple regression assumptions, which are the model errors are independent; the errors are normally distributed and have a constant variance.

An F-test is every statistical test in which the test statistic has an F-distribution under the null hypothesis. It frequently used when comparing statistical models that have fitted to a data set. It can help to identify the model that best fits the population from which the data was sampled.

$$F = \frac{MSR}{MSE} = \frac{\frac{ESS}{k}}{\frac{RSS}{n-k-1}}$$

The (MSR) is the regression mean square and (MSE) is the mean squared error. K is known as the numerator, and (n – k - 1) is the degrees of freedom. The T-test will be used in the individual variable slopes and show if there is a linear relationship between the variable X_i and Y.

There are several types of regression methods, which are hierarchical regression, force entry regression, and stepwise regression. Hierarchical regression, known as a predictor based on previous research is entered into the regression model first. For instance, the new predictors are then entered in a separate step based on decision making by the experimenter. It is the best method for theory testing. Simple regression can be effective with a sample size of 20 while maintaining power at 0.80 in multiple regression needs a minimum sample of 50 and preferably 100 observations for most research situations. In addition, the minimum ratio of observations to variables is 5 to 1, while the preferred ratio is 15 or 20 to 1, and this should enhance when stepwise estimation has used. Maximizing the degrees of freedom enhances generalizability and solves both model parsimony and sample size concerns. Test overall fit of regression models, which is (50 + 8k), where the k is the number of predictors (Green, 1991). Test the individual predictors is (104 + k) where the k is the number of predictors.

Multiple linear regression is a model that predicts the value of one variable from another (Tabachnick & Fidell, 2007). Researchers usually use it to predict the values of an outcome from some predictors. Multiple regression analysis is the most largely used statistical procedures for both scholarly and applied marketing

research. Rathore (2016) conducted quantitative research which examined the adoption of digital wallet by consumers in India. This research conducted through a structured questionnaire. The author analysed the data by adopting multiple regression analysis. Thus, the results revealed that the perceived usefulness and brand loyalty are the factors that influence the adoption of the digital wallet in India.

Apart from this, Mittal and Kumar (2018) conducted a quantitative study which examined the adoption of mobile wallets in India. They did this research by adopting the survey method. The data collection analysed by using multiple regression analysis. The research findings revealed that customers make payments by using mobile wallets for different services and products. The ease of use, the utility of innovation, and the usefulness of mobile wallet had a significant influence on the adoption of the mobile wallet.

For instance, Wang and Li (2016) conducted quantitative research which investigated the factors that influence the adoption of third-party mobile payment services in China. This research conducted through survey questionnaires. The authors analysed the data collection by using multiple regression analysis. Therefore, the findings revealed that customer perceived value and perceived deals have positively influenced the using the intention of third-party mobile payment services in China.

Mun *et al* (2017) conducted quantitative research which examined the millennials' perception of mobile payment services in Malaysia. They conducted the study by the online self-administered questionnaire adoption. The data analysis used the multiple regression analysis. This research showed that perceived usefulness had a significant influence on the consumers' intention toward mobile payment services adoption.

Besides that, Malik *et al* (2013) conducted quantitative research which examined the influence of brand image and advertisement on consumer buying behaviour in Pakistan. They conducted this study by adopting the questionnaire survey. The data collection analysed through multiple regression analysis. Hence, the findings revealed that brand image has positively influenced consumer buying behaviour.

3.10.4 Multivariate Analysis

Multivariate analysis is virtually the statistical process of simultaneously analysing multiple independent variables with multiple dependent variables using matrix algebra (Hair, Black, Babin, & Anderson, 2010). Moreover, most multivariate analyses are correlated variables. The multivariate is a linear combination of variables with empirically determined weights. Weights (w) are measured to achieve the objective of the specific multivariate technique efficiently. Below is the equation of the variate:

Variate equation: $(Y') = W_1X_1 + W_2X_2 + \ ... + W_eX_n$

Each respondent has a variate value (Y'). The Y' value is a linear combination of the entire set of variables. Besides that, it is the dependent variable. The types of data can separate into two, which are nonmetric data or metric data. Nonmetric data, which is qualitative involves nominal and ordinal scales. The nominal scale is the number size and not related to the total of the character will be measured. Ordinal scale stated large numbers represent less or more of the character measured. Furthermore, the metric data, which is quantitative data involves interval and ratio scales. The interval scale involves ordinal properties and equal differences between scale points. The ratio scale consists of the interval scale properties and a natural zero point.

Furthermore, three factors can be determined by the factors which are effect size, alpha, and sample size. The actual magnitude of the effect of interest is the correlation between variables or the difference between means. Alpha, α is set at smaller levels, and power decreases, normally α equals 0.05. On another hand, when sampling size increases, the power increases. With huge sample sizes, even minimal effects can be statistically significant. This is raising the issue of practical significance versus statistical significance. There are two types of multivariate methods, which are interdependence methods and dependence methods. Interdependence methods consist of the simultaneous analysis of all variables in the set and without distinction between dependent

variables and independent variables. For instance, the dependence methods are a set of variables that determined as the dependent variable to be predicted or explained by other variables known as independent variables.

Guidelines for multivariate analysis are establishing the practical significance as well as statistical significance, sample size influences all results, know the data, strive for model parsimony, observe the errors, and validate the results. A structured approach to the multivariate model building has six stages. The first stage is defining the research problem, research objectives, and multivariate techniques to be used. The second stage is developing the analysis plan. The third stage is evaluating the assumptions underlying multivariate techniques. Apart from this, stage forth is estimating the multivariate model and assessing the overall model fit. The fifth stage is interpreting the variates. Validate the multivariate model is the last stage. Multivariate assumptions involve normality, linearity, homoscedasticity, and non-correlated errors.

3.10.5 Reliability Analysis

In a quantitative study, reliability analysis is used to estimate the internal constructs' consistency. It can examine the reliability, stability, and internal consistency of all the variables. Furthermore, reliability analysis is used to measure a scale or instrument that will produce the same score when administered in several times, locations, or populations (Field, 2009). The purpose of this test is to retest a measure on two occasions with some time interval between them. This test

also wanted to ensure the equivalent because of the second time measurement and obtain the internal consistency estimate. In a study, reliability has measured by the Split-half Coefficient or Cronbach's Alpha Coefficient. The Cronbach's Alpha is one of the most commonly used measurements of the reliability test. The reliability test especially has to be applied to all items of the variables, and its value is Cronbach's alpha value. Thus, it is aimed to determine the correlation in the same construct. This test also revealed the consistency of the item, which represented the construct. The Cronbach's alpha test is appropriate for the calculation of Likert scale-based questions in a questionnaire. The highest statistical value of Cronbach's alpha is one, which shows better reliability of the construct items. Besides that, the Cronbach's alpha value is above 0.70 then will be considered is a good reliability test according to the rule of thumb (George, 2011). The following Table 3.10.5 reveals the rule of thumb for Cronbach's alpha value.

Table 3.10.5: Rule of Thumb for Cronbach's Alpha

Level of Reliability	Alpha Range
Poor Reliability	0.60 and less
Fair Reliability	0.61 to 0.70
Good Reliability	0.71 to 0.80
Very Good Reliability	0.81 to 0.95

Source: Sekaran and Bougie (2016)

3.10.6 Normality

Normality is the degree of sample data distribution (Hair *et al*., 2010). In statistics, normality tests are aimed to identify if a data set is well-modelled by a normal distribution. This test also examines how easy it is for a random variable underlying the data set to normally distributed. The normality test is a form of model selection. Besides that, it can interpret by some methods which are depending on its probability interpretations. The normality analysis can be analysed graphically using P-P or Q-Q Plot or statistically using the Kolmogorov-Smirnov test. If the test reveals in a great variation from the normal distribution, then the result is statistically not valid. Normality analysis of the variables is crucial for any research (Lesaffre, 1983). It will give a guideline for the subsequent data analyses as normally distributed data is a condition factor for parametric testing. Normality of errors in the normal probability plot. There are the hypotheses of normality:

H_o: Samples come from normally distributed population

H_A: Samples not normally distributed population

There are a few reasons that researchers used the normality assumption (Gujarati, 2009). First, the disturbances (u_i) represented the combined influence on the dependent variable of a large number of independent variables that have not explicitly introduced in the regression. Therefore, these omitted or neglected variables is small and at best random. Besides that, a variant of the central limit theorem stated the number of variables is not very large or if these variables are not severely independent, then their sum may still not be normally distributed. The probability of ordinary least square (OLS) estimators has

easily derived due to any linear function of normally distributed variables, that has normally distributed. Apart from this, the normal distribution is a comparatively simple distribution consisting of two parameters only which are mean and variance. The normality distribution assumes a critical role when dealing with the small sample size, such as data that less than 100 observations. It supports us to derive the exact probability distributions of OLS estimators and allow us to use the *t*, *F*, and X^2 statistical tests for regression models. In large samples, the *t* and *F* statistics have approximately the *t* and *F* tests hence the *t* and *F* tests that based on the assumption that the error term normally distributed can still be applied validly.

3.10.7 Homogeneity

Homogeneity is a statistical test that aimed to examine whether two or more multinomial distributions are equal according to the method of chi-square statistic. The principle of homogeneity showed that each dimension in terms of a dimensional equation on both sides is the same. For instances, homogeneity of variance known as homoscedastic, which their random variables in the sequence have a similar finite variance. There are the hypotheses of homogeneity:

H_o: Samples come from populations with the variances are equal.

H_A: Samples come from populations with the variances are unequal.

Homoscedasticity not needed for the unbiased, consistent, and asymptotically normal estimation (Achen & Shively, 1995). For instances, homoscedasticity considerations determine the amount of variability of data values changes in a

dataset. Questions of homogeneity are used to the joint distributions. If the prevention of significant item redundancy, then have an optimal range of item homogeneity (Boyle,1986). Homoscedasticity of errors is the plot standardised residual on the y-axis (ZRESID) against the standardised predicted value (ZPRED).

3.10.8 Multicollinearity

Multicollinearity always encountered statistical phenomenon in which two or more independent variables in multiple regression models are highly correlated (Sekaran & Bougie, 2016). If the correlation between two independent variables is equal to -1 or 1, then the multicollinearity estimates the regression coefficients impossible. The simplest and clearest way to detect multicollinearity is to check the correlation matrix for the independent variables. In addition, the presence of high correlations is the first sign of sizeable multicollinearity which, is 0.70 or above high. When the multicollinearity is the result of complex relationships among some independent variables, then it may not be revealed by this approach. More common measures for identifying multicollinearity are tolerance value and tolerance inflation factor (VIF – the inverse of the tolerance value). These measures show the degree to which the other independent variables explain one independent variable. A common cut off value is a tolerance value of 0.10, which corresponds to the VIF of 10. There are the hypotheses of the multicollinearity:

H_0: Samples are no multicollinearity.

H_A: Samples are multicollinearity.

Multicollinearity is not a serious problem when the purpose of the study is to forecast future values of the dependent variables. Even the estimations of the regression coefficients may be unstable; multicollinearity does not influence the reliability of the forecast. If the objective of the study has reliably estimated the individual regression coefficients, then multicollinearity is a problem. There are some methods can solve this problem which is reducing the set of independent variables to a set that is not collinear, using more sophisticated methods to analyse the data, and creating a new variable that is a composite of the highly correlated variables.

3.11 Conclusion

Generally, this chapter discussed the research methodology applied in this study. It has seen that a systematic data collection and sampling procedures carefully conducted as structured in the research design. The complete data set is then used in continuous stages of descriptive statistics, Pearson's correlation analysis, multiple regression analysis, multivariate analysis, reliability analysis, normality test, homogeneity test, and multicollinearity test.

CHAPTER IV

RESULTS AND INTERPRETATION

In this Chapter 4, the data of 350 respondents is being collected and analysed by using frequency distribution, descriptive analysis, correlation analysis, homogeneity test, reliability test, multiple linear regression, simple linear regression, multivariate analysis of variance (MANOVA), and hypothesis testing follow by the discussion of major findings and conclusion of the chapter.

4.1 Frequency Distribution

The total respondents of the survey are 539, and then the actual number of respondents which filtered for further analysis is 350. These 350 respondents are non-mobile wallet users in Malaysia. The frequency distribution is a representation that displays the number of observations within a particular interval.

Table 4.1: General Information of Respondents

Demographic Profile	Frequency	Percent (%)	Cumulative (%)
Gender			
Male	146	41.7	41.7
Female	204	58.3	100
Education			
High School or below	35	10.0	10.0
Certificate or Diploma	73	20.9	30.9
Bachelor's Degree	212	60.5	91.4
Postgraduate Education	30	8.6	100.0
Age			
21 - 30 years old	311	88.9	88.9
31 - 40 years old	20	5.7	94.6
41 - 50 years old	10	2.8	97.4
51 – 60 years old	9	2.6	100.0
Income			
Below RM 3,000	281	80.3	80.3
RM 3,001 - RM 5,000	44	12.6	92.9
RM 5,001 - RM 8,000	17	4.8	97.7
RM 8,001 or above	8	2.3	100.0

Table 4.1 shows the general information of the 350 respondents collected in Section A of the survey questionnaire. This data information included the gender, education, age, and income level. It will be illustrated graphically in the below section. Figure 4.1 shows the gender of the respondents who have joined in the questionnaire survey. The chart above has clearly indicated that 58.3 percent of female and 41.7 percent of male.

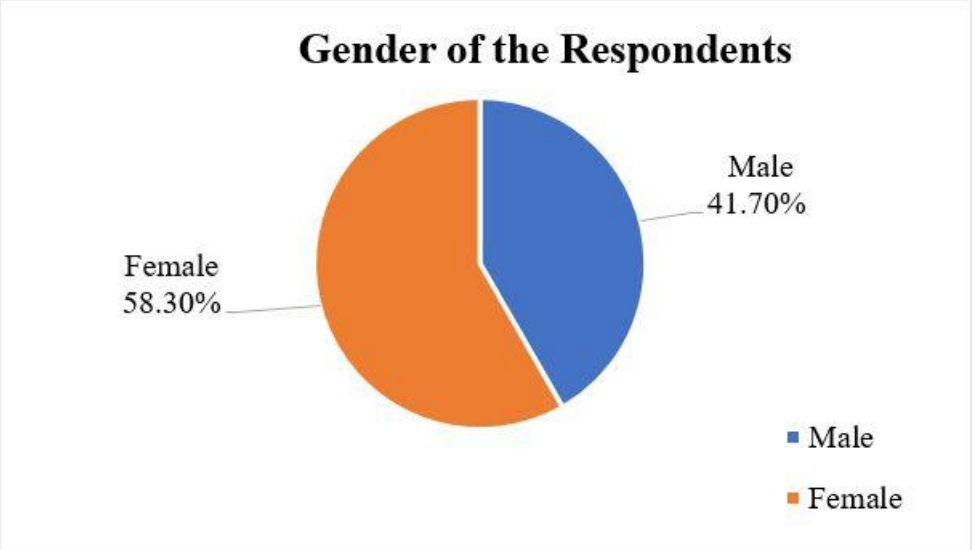


Figure 4.1.1: Gender of the Respondents

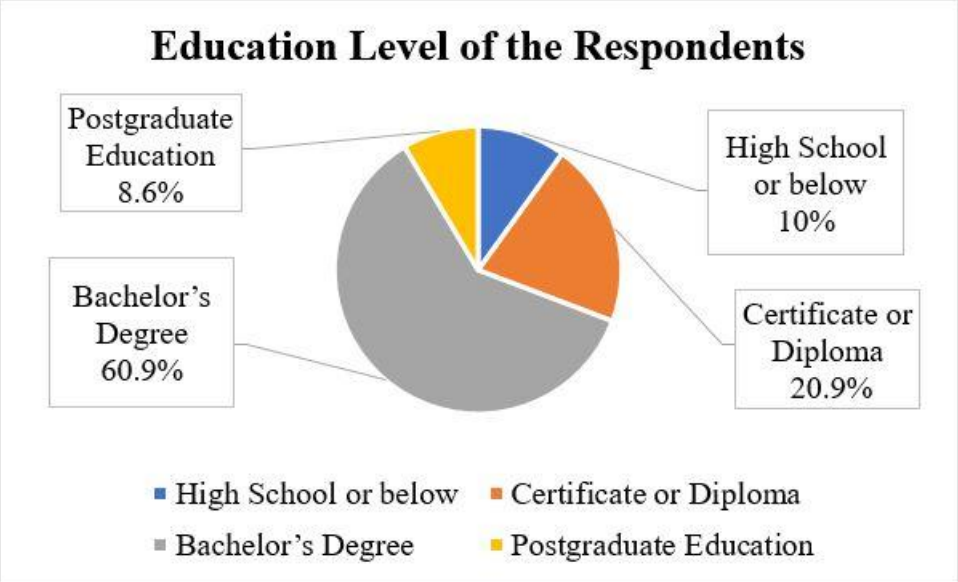


Figure 4.1.2: Education Level of the Respondents

Figure 4.1.2 shows the education level achieved by the respondents who have participated in the questionnaire survey. From the chart above, it shows the percentage of bachelor's degree holder seized the largest proportion of respondents, which is 60.9 percent. Besides that, there is 20.9 percent of certificate or diploma

holders in this survey. The respondents with postgraduate education qualification and high school or below are 8.6 and 10 percent respectively.

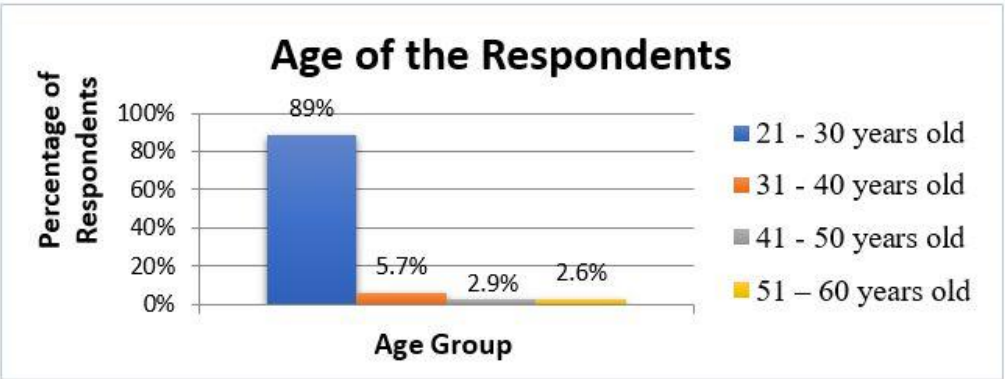


Figure 4.1.3: Age of the Respondent

Figure 4.1.3 shows that the age of the respondents in the survey. From the histogram, there is 89 percent of respondents are 21 – 30 years old, which occupies the largest proportion of respondents. The 31 – 40 years old and 41 -50 years old respondents consist of 5.7 percent and 2.9 percent in this survey, respectively. There is 2.6 percent of respondents with 51 – 60 years old.

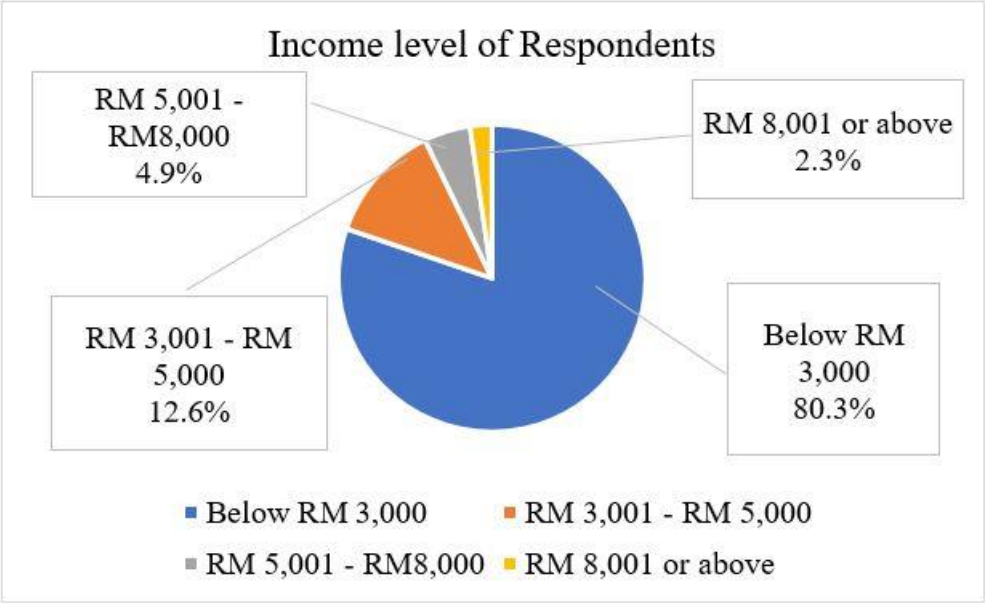


Figure 4.1.4: Income Level of the Respondent

Figure 4.1.4 shows the income level of respondents in the questionnaire survey. There is the smallest group of respondent who earned RM 8,001 or above with an amount of 2.3 percent in the survey. Besides that, 4.9 percent of respondents who are earned RM 5,001 – RM8,000 while 12.6 percent of respondents earned RM 3,001 – RM 5,000 above the chart. The largest proportion of respondents is 80.3 percent who earned below RM 3,000.

It showed that majority of the respondents have a bachelor degree, with age of 21 – 30 years old, and income with below RM 3,000. They have obtained an education in university and university college. They mostly are youth and less income level. In addition, there is a youth group that haven't use the mobile wallet to make payment transaction before in Malaysia. In general, the response rates of the target samples are 64.94%. It showed 350 non-mobile wallet users from a total number of the respondent which is 539.

4.2 Descriptive Analysis

Descriptive analysis is used to summarize and interpret some of the properties of a set of data such as a sample of a population. Table 4.2 shows the results of the descriptive analysis of the factor affecting the adoption of mobile wallet in Malaysia. The Likert Scale Measurement of all constructs' measurement of the study showed in Table 3.8.3.1. From Table 4.2, the mean score for all the constructs are within the range of 1.97 to 3.96. PU has the highest mean score, which is 3.96. PV has the lowest mean score, which is 1.97.

Based on the Table 4.2, the highest median score of among the constructs are 4, which represented by PU, PE and BIN while the lowest median score is two which presented by PV. Besides that, the highest mode score of the four constructs is 4.40, which are PU, PE, SI and BIN in Table 4.2. The standard deviation range is within 0.44 to 0.68. The highest variance score is PS with 0.47, while the lowest variance score is PV with 0.20. The Skewness range is within -0.65 to 0.91 in Table 4.2. The highest Kurtosis score is PV with 2.93, while the lowest Kurtosis score is PU with -0.60. The range score is within 2.60 to 3.60. In Table 4.2, the highest maximum value of the constructs is 5, which presented by PU, SI, and BIN. The PE, PS, SM, BI and WAMW have the same maximum value, which is 4.80. The lowest minimum value score is PV with 1.0.

Table 4.2: Results of the Descriptive Analysis of Factor affecting on the Adoption of Mobile Wallet in Malaysia

	PU	PE	PS	SI	PV	SM	BI	BIN	AMW
Mean	3.96	3.95	3.06	3.72	1.97	3.44	3.49	3.85	3.38
Median	4.00	4.00	3.00	3.80	2.00	3.40	3.40	4.00	3.40
Mode	4.40	4.40	2.80	4.40	2.00	3.40	3.40	4.40	3.40
Std. Deviation	0.54	0.54	0.68	0.64	0.44	0.66	0.63	0.65	0.66
Variance	0.30	0.30	0.47	0.41	0.20	0.43	0.40	0.43	0.43
Skewness	-0.30	-0.50	0.08	-0.40	0.91	-0.42	-0.23	-0.65	-0.10
Kurtosis	-0.60	-0.10	0.10	-0.24	2.93	0.30	0.30	-0.03	-0.11
Range	2.60	2.60	3.60	3.40	3.40	3.60	3.40	3.20	3.40
Minimum	2.40	2.20	1.20	1.60	1.00	1.20	1.40	1.80	1.40
Maximum	5.00	4.80	4.80	5.00	4.40	4.80	4.80	5.00	4.80

Note: PU: Perceived Usefulness, PE: Perceived Ease of Use, PS: Perceived Security, SI: Social Influence, PV: Price Value, SM: Social Media, BI: Brand Image, BIN: Behavioural Intention to Use, WAMW: Adoption of Mobile Wallet.

4.3 Pearson's Correlation Coefficient Analyses

4.3.1 Correlation of Demographic Profile

Correlation analysis is used to measure the strength and direction of the linear relationship between two variables. In Table 4.3.1, it shows the result of a Person's correlation coefficient analysis on the general information of respondents. Based on the rule of thumb for the correlation coefficient values, the correlation of gender and education level with the behaviroural intention to use mobile wallet is not statistically significant. However, the correlation of age and income level with

the behaviroural intention to use mobile wallet is statistically significant at α = 0.05, respectively. Besides that, the correlation of income level and behaviroural intention to use mobile wallet with 0.157 is significant at α = 0.05 level in Table 4.3.1. Based on the result generated, the age is showing a positive and low correlation with behavioural intention to use mobile wallet. In Table 4.3.1, the correlation of age and behaviroural intention to use the mobile wallet with 0.266 is significant at α = 0.05 level. The income level is showing a positive and negligible correlation with behavioural intention to use mobile wallet.

Table 4.3.1: Result of Correlation Analysis between the Demographic Profile of Respondents

	Behavioural Intention to Use Mobile Wallet	Willingness to Adopt Mobile Wallet
Willingness to Adopt Mobile Wallet	0.656**	1.000
Gender	0.015 ns	0.031 ns
Education Level	0.063 ns	0.072 ns
Age	0.266**	0.200***
Income Level	0.157**	0.102*
Behavioural Intention to Use Mobile Wallet	1.000	0.656**

Note:

N = 350

* - Correlation is significant at α = 0.10 level (2-tailed).

** - Correlation is significant at α = 0.05 level (2-tailed).

*** - Correlation is significant at α = 0.01 level (2-tailed).

ns - Correlation is not significant.

Based on the rule of thumb for the correlation coefficient values, the correlation of gender and education level with the willingness to adopt mobile wallet is not statistically significant. However, the correlation of age and income level with the willingness to adopt mobile wallet is statistically significant at α = 0.01 and 0.10 level, respectively. In Table 4.3.1, the correlation of age with the willingness to adopt mobile wallet with 0.200 is significant at α = 0.01 level. Based on the result generated, the age is showing a positive and low correlation with the willingness to adopt mobile wallet. Besides that, the correlation of income level and the willingness to adopt mobile wallet with 0.102 is significant at α = 0.10 level. The income level is showing a positive and negligible correlation with the willingness to adopt mobile wallet.

4.3.2 Variables Correlation

Table 4.3.2 shows the result of Pearson's correlation coefficient analysis on dependent, independent and behavioural intention to use variables. The correlation of perceived usefulness, perceived ease of use, perceive security, social influence, price value, social media, brand image (independent variables) and willingness to adopt mobile wallet (dependent variable) with the behavioural intention to use is significant at α = 0.05 level respectively.

Based on the result generated from Table 4.3.2, the perceived security is a positive and low correlation with the behavioural intention to use mobile wallet. The perceived usefulness, perceived ease of use, social influence, social media, brand image, and willingness to adopt mobile wallet are the positive

and moderate correlation with the behavioural intention to use mobile wallet. Furthermore, the price value is a negative and negligible correlation with the behavioural intention to use mobile wallet.

Table 4.3.2: Result of Person's Correlation Coefficient Analysis between the Factors affecting on the Willingness to Adopt the Mobile Wallet in Malaysia

	Behavioural Intention to Use Mobile Wallet	Willingness to Adopt Mobile Wallet in Malaysia
Willingness to Adopt Mobile Wallet in Malaysia	0.579***	1.000
Perceived Usefulness	0.547**	0.405***
Perceived Ease of Use	0.441**	0.351***
Perceived Security	0.351**	0.350***
Social Influence	0.605**	0.475***
Price Value	-0.200**	- 0.113**
Social Media	0.406**	0.354***
Brand Image	0.532**	0.446***
Behavioural Intention to Use Mobile Wallet	1.000	0.579***

Note:

N = 350

* - Correlation is significant at α = 0.10 level (2-tailed).

** - Correlation is significant at α = 0.05 level (2-tailed).

*** - Correlation is significant at α = 0.01 level (2-tailed).

ns - Correlation is not significant.

In Table 4.3.2, the correlation of perceived usefulness. perceived ease of use, perceived security, social influence, price value, social media, brand image (independent variables) and behavioural intention to use mobile wallet are significant at α = 0.05 level respectively. According to Table 4.3.2, the perceived usefulness, perceived ease of use, social influence, social media and brand image are a positive and moderate correlation with the behavioural intention to use

mobile wallet, respectively. In addition, the perceived security and price value has a low correlation with the behavioural intention to use mobile wallet, respectively.

All the independent correlation variables and the willingness to adopt mobile wallet in Malaysia are significant at $\alpha = 0.05$ level, respectively except for price value which is significant at $\alpha = 0.10$ level respectively. Perceived usefulness, social influence and brand image have a positive and moderate correlation with the willingness to adopt mobile wallet in Malaysia, respectively. While the perceived ease of use, perceived security and social media have positive and low correlation with the willingness to adopt mobile wallet in Malaysia, respectively. The price value has a negative and negligible correlation with the willingness to adopt mobile wallet in Malaysia.

4.4 Homogeneity Test

Homogeneity test is a test that determines whether two or more populations have the variances are equal or not using the independent samples t-test. It includes the Levene's test for testing the population variances and t-test for testing the equality of means of the groups. The means here referred to variance equal test and meant different sample group t-test. Therefore, the hypotheses of the homogeneity test (Levene's test) for the population variances are as below:

H_0: The two population variances are equal

H_A: The two population variances are no equal

Table 4.4.1: Result of Independent Samples Test of Gender

Independent Samples Test							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
WAMW	Equal variances assumed	0.002	**0.962**	0.796	348	**0.426**	0.057
	Equal variances not assumed			0.799	326.06	0.425	0.057

Table 4.4.1 shows the result of the independent sample test of the gender group. As shown in the table, the F-value for Levene's test is 0.002, with a significant p-value of 0.962, which is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. The two population variances are equal in the gender group.

Moreover, t-test for equality of means of the group is used to determine whether the groups are statistically significant differences or not. Therefore, the hypotheses of the test are as below:

H_0: There is no statistically significant difference in the gender group.

H_A: There is a statistically significant difference in the gender group.

In the Table 4.4.1, the t-test value is 0.796 with a significant p-value 0.426 is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. There is no statistically significant difference in the gender group. This result

supported by Sioson (2019) who stated that Malaysia is able to moderately reduce the gaps between the gender on the Fintech digital payments usage.

Similarity, Table 4.4.2 shows the result of the independent sample test of education level. As shown in the table, the F-value for Levene's test is 0.057, with a significant p-value of 0.812, which is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. The population variances are equal in the education group.

Table 4.4.2: Result of Independent Samples Test of Education Level

Independent Samples Test							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
WAMW	Equal variances assumed	0.057	**0.812**	-1.246	101.00	**0.216**	-0.16731
	Equal variances not assumed			-1.260	55.419	0.213	-0.16731

Table 4.4.2 shows the result of the independent sample test of the education group. In Table 4.4.2, the T-test value is -1.246 with a significant p-value 0.216 is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. There is no statistically significant difference in the education group.

Table 4.4.3: Result of Independent Samples Test of Age

Independent Samples Test							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
WAMW	Equal variances assumed	0.001	**0.975**	0.677	28.000	**0.504**	0.110
	Equal variances not assumed			0.668	17.529	0.513	0.110

Moreover, Table 4.4.3 shows the result of the independent sample test of age group. As shown in the table, the F-value for Levene's test is 0.001, with a significant p-value of 0.975, which is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. The population variances are equal in the age group. In the Table 4.4.3, the T-test value is 0.677 with a significant p-value 0.504 is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. There is no statistically significant difference in the age group.

Furthermore, Table 4.4.4 displays the result of the independent sample test of income group. As shown in the table, the F-value for Levene's test is 0.010, with a significant p-value of 0.920, which is more than $\alpha = 0.05$ level. Therefore, do not reject the null hypothesis. The population variances are equal in the income group. In the Table 4.4.4, the T-test value is 2.629, with a significant p-value 0.009 is less than $\alpha = 0.01$ level. Therefore, reject the null hypothesis. There is a statistically significant difference in the income group.

The income group is only statistically significant on the willingness to adopt mobile wallet in Malaysia between each group.

Table 4.4.4: Result of Independent Samples Test of Income Level

Independent Samples Test							
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
WAMW	Equal variances assumed	0.010	**0.920**	2.629	323.00	**0.009**	0.331
	Equal variances not assumed			2.507	55.48	0.015	0.331

4.5 Reliability Test

Reliability test mentions to the degree to which a test is constant and stable in measuring what it is intended to measure. Table 4.5.1 indicates the result of the reliability test with 9 items that generated using SPSS. All items' Cronbach's Alpha values are above 0.7. It means that the data have the internal consistency of the survey. The variables are the good reliability. If their Cronbach' Alpha range is within 0.60 and below, it indicated that the variables are poor reliability.

Table 4.5.1: Result of Reliability Test with 9 Items

Reliability Statistics	
Cronbach's Alpha	N of Items
0.887	9

According to the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.1, the Cronbach's Alpha value is 0.887 with nine items. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.2: Item-Total Statistics with 9 Items

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PU	0.638	0.875
PE	0.563	0.880
PS	0.557	0.882
SI	0.717	0.868
PV	0.572	0.880
SM	0.575	0.880
BI	0.699	0.869
BIN	0.753	0.864
WAMW	0.688	0.870

Besides that, Table 4.5.2 displays the item-total statistics with nine items. Based on the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.2, all the Cronbach's Alpha value of 9 items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.3: Item-Total Statistics with Perceived Usefulness

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PU1	0.525	0.744
PU2	0.525	0.745
PU3	0.596	0.703
PU4	0.515	0.787
PU5	0.519	0.745

In addition, Table 4.5.3 shows the item-total statistics with PU items. Based on the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.3, all the Cronbach's Alpha value of the five PU items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.4: Item-Total Statistics with Perceived Ease of Use

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PE1	0.602	0.706
PE2	0.541	0.773
PE3	0.528	0.738
PE4	0.520	0.786
PE5	0.562	0.702

Likewise, Table 4.5.4 shows the item-total statistics with PE items. According to the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.4, all the Cronbach's Alpha value of the five PE items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.5: Item-Total Statistics with Perceived Security

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PS1	0.612	0.747
PS2	0.549	0.767
PS3	0.598	0.751
PS4	0.541	0.769
PS5	0.588	0.754

Table 4.5.5 shows the item-total statistics with PS items. Based on the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.5, all the Cronbach's Alpha value of the five PS items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.6: Item-Total Statistics with Social Influence

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SI1	0.593	0.717
SI2	0.539	0.734
SI3	0.527	0.738
SI4	0.602	0.712
SI5	0.577	0.757

Above and beyond, Table 4.5.6 shows the item-total statistics with SI items. Based on the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.6, all the Cronbach's Alpha value of the five SI items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.7: Item-Total Statistics with Price Value

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PV1	0.564	0.780
PV2	0.570	0.778
PV3	0.546	0.728
PV4	0.517	0.747
PV5	0.550	0.790

Moreover, Table 4.5.7 displays the item-total statistics with PV items. According to the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.7, all the Cronbach's Alpha value of the five PV items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.8: Item-Total Statistics with Social Media

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SM1	0.579	0.723
SM2	0.598	0.716
SM3	0.506	0.748
SM4	0.586	0.754
SM5	0.577	0.726

Furthermore, Table 4.5.8 shows the item-total statistics with SM items. Based on the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.8, all the Cronbach's Alpha value of the five SM items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it considered good reliability.

Table 4.5.9: Item-Total Statistics with Brand Image

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BI1	0.593	0.713
BI2	0.554	0.724
BI3	0.548	0.727
BI4	0.535	0.731
BI5	0.586	0.746

Also, Table 4.5.9 shows the item-total statistics with BI items. According to the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.9, all the Cronbach's Alpha value of the five BI items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.10: Item-Total Statistics with Behavioural Intention to Use

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BIN1	0.682	0.751
BIN2	0.582	0.782
BIN3	0.598	0.776
BIN4	0.491	0.808
BIN5	0.654	0.759

As well, Table 4.5.10 shows the item-total statistics with BIN items. Along with the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.10, all the Cronbach's Alpha value of the five BIN items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

Table 4.5.11: Item-Total Statistics with the Willingness to Adopt Mobile Wallet in Malaysia

Item-Total Statistics		
Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
WAMW1	0.517	0.742
WAMW2	0.297	0.726
WAMW3	0.565	0.719
WAMW4	0.580	0.711
WAMW5	0.398	0.791

Table 4.5.11 shows the item-total statistics with WAMW items. As stated by the rule of thumb for interpreting the Cronbach's alpha in Table 4.5.11, all the Cronbach's Alpha value of the five WAMW items is more than 0.7, respectively. Therefore, the data have the internal consistency of the survey, and it is also considered good reliability.

4.6 Multiple Linear Regression

4.6.1 Regression Analysis between Independent Variables and Behavioural Intention to Use Mobile Wallet (Equation 1)

Table 4.6.1 shows the model summary of multiple linear regression analysis between independent variables and behavioural intention to use mobile wallet. Table 4.6.2 shows the result of ANOVA between the independent variables and behavioural intention to use mobile wallet.

The ANOVA hypotheses are below:

H_0: $\mu_1 = \mu_2 = \mu_3 = \ldots \mu_e$

H_A: No all population means are the same

As shown in Table 4.6.2, the F-value for ANOVA test of overall significance is 50.351 with a significant p-value of 0.000, which is less than $\alpha = 0.05$ level. Therefore, reject the null hypothesis. There is no all population means are the same.

Table 4.6.1: Model Summary of Multiple Linear Regression Analysis between Independent Variables and Behavioural Intention to Use Mobile Wallet

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.712[a]	0.508	0.497	0.4641	1.723
a. Predictors: (Constant), PU, PE, PS, SI, PV, SM, BI					
b. Dependent Variable: BIN					

Table 4.6.2: Result of Analysis of Variance between Independent Variables and Behavioural Intention to Use Mobile Wallet

ANOVA[a]						
Model		Sum of Square	df	Mean Square	F	Sig
1	Regression	75.903	7	10.843	50.351	0.000[b]
	Residual	73.651	342	0.215		
	Total	149.554	349			
a. Dependent Variable: BIN						
b. Predictors: (Constant), PU, PE, PS, SI, PV, SM, BI						

Table 4.6.3: Coefficient of Multiple Linear Regression between Independent Variables and Behavioural Intention to Use Mobile Wallet

Coefficient[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	C	0.247	0.271		0.910	0.364		
	PU	0.295	0.058	0.245	**5.110*****	**0.000**	0.629	1.590
	PE	0.099	0.056	0.082	**1.789***	**0.074**	0.681	1.469
	PS	0.028	0.041	0.029	0.678	0.498	0.769	1.300
	SI	0.338	0.050	0.329	**6.793*****	**0.000**	0.613	1.631
	PV	-0.064	0.058	-0.044	-1.117	0.265	0.942	1.062
	SM	0.018	0.046	0.018	0.378	0.706	0.664	1.506
	BI	0.220	0.051	0.211	**4.312*****	**0.000**	0.602	1.661
a. Dependent Variable: BIN								

Note:

N = 350

* - Correlation is significant at $\alpha = 0.10$ level (2-tailed).

** - Correlation is significant at $\alpha = 0.05$ level (2-tailed).

*** - Correlation is significant at $\alpha = 0.01$ level (2-tailed).

^{ns} - Correlation is not significant.

Equation 1:

$$BIN_i = 0.247 + \mathbf{0.295\ PU_i} + \mathbf{0.099\ PE_i} + 0.028\ PS_i + \mathbf{[5.110^{***}]} \quad \mathbf{[1.789^{*}]} \quad [0.678^{NS}]$$

$$\mathbf{0.338\ SI_i} - 0.064\ PV_i + 0.018\ SM_i + \mathbf{0.220\ BI_i} + 0.271\ e_i$$

$$\mathbf{[6.793^{***}]} \quad [-1.117^{NS}] \quad [0.378^{NS}] \quad \mathbf{[4.312^{***}]}$$

$R^2 = 0.508$; Adjusted $R^2 = 0.497$; d = 1.723

Furthermore, Table 4.6.1 and 4.6.3 shows the model summary of multiple linear regression analysis between independent variables and behavioural intention to use mobile wallet. In Table 4.6.1, the explanatory variable accounted for about 50.8 percent of the variation in this regression equation model 1. Estimation reveals that the explanatory variables, perceived usefulness (PU), perceived ease of use (PE), social influence (SI) and brand image (BI) are the important explanatory variables with statistical significance at $\alpha = 0.10$ and $\alpha = 0.01$ level. On the contrary, the perceived security (PS), price value (PV) and social media (SM) is not the explanatory variables in this regression equation model 1 because their p-values are greater than statistical significance at $\alpha = 0.10$ level. However, social influence (SI) is the most important explanatory variable follow by PU, BI and PE in model 1.

Table 4.6.3 shows the coefficients of multiple linear regression analysis between independent variables and behavioural intention to use mobile wallet. Therefore, 1 percent increase in the perceived usefulness (PU), on average, has a positive relationship effect of increasing the behavioural intention to use mobile wallet by 29.5 percent with statistical significance at $\alpha = 0.01$ level, holding constant with other variables.

Secondly, 1 percent increase in the perceived ease of use (PE), on average, has a positive relationship effect of increasing the behavioural intention to use mobile wallet by 9.9 percent with statistical significance at $\alpha = 0.01$ level, holding constant with other variables.

Thirdly, 1 percent increase in the social influence (SI), on average, has a positive relationship effect of increasing the behavioural intention to use mobile wallet by 33.8 percent with statistical significance at $\alpha = 0.01$ level, holding constant with other variables.

Lastly, 1 percent increase in the brand image (BI), on average, has a positive relationship effect of increasing the behavioural intention to use mobile wallet by 22.0 percent with statistical significance at $\alpha = 0.01$ level, holding constant with other variables.

Next, normality test is used to determine whether sample data been drawn from a normally distributed population. The normality hypotheses are below:

H_0: Residuals are normally distributed

H_A: Residuals are not normally distributed

Figure 4.6 shows the distribution of the error terms in a histogram. The figure is illustrating a symmetric histogram with most of the frequency counts fall in the middle and with counts reducing off in the tails. Based on the Central Limit Theorem, as long as the sample size is greater 30 and the data is approximately normally distributed with classical bell-shaped. Therefore, the residual is assumed normally distributed.

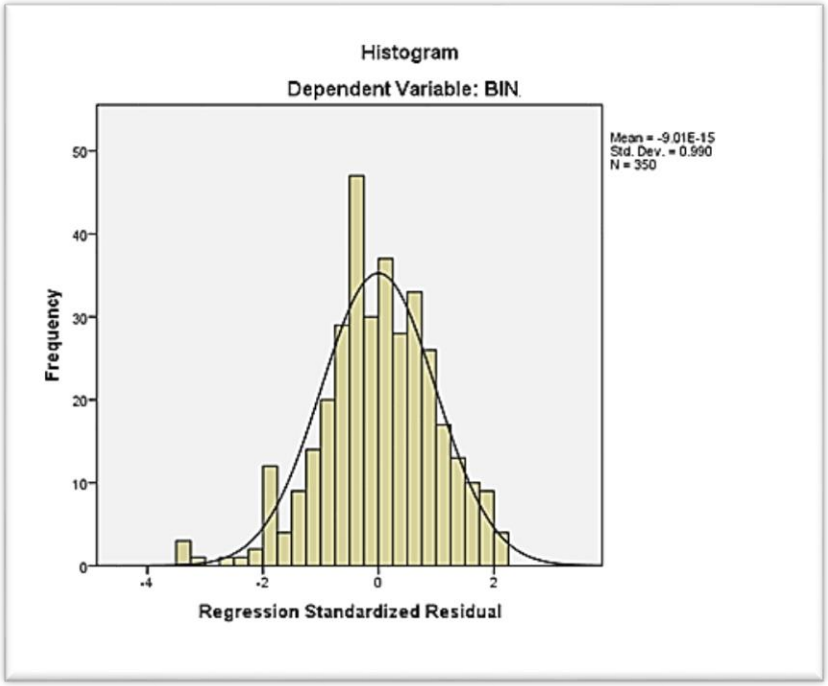


Figure 4.6: Normality of Residual Histogram of Independent Variables and Behavioural Intention to Use

4.7 Simple Linear Regression

4.7.1 Regression Analysis between Behavioural Intention to Use and Willingness to Adopt Mobile Wallet in Malaysia (Equation 2)

Table 4.7.1 displays the model summary of simple linear regression analysis between behavioural intention to use and willingness to adopt mobile wallet in Malaysia. Table 4.7.2 shows the result of ANOVA between the independent variables and behavioural intention to use mobile wallet.

From the Table 4.7.2, the F-value for ANOVA test of overall significance is 175.260 with a significant p-value of 0.000, which is less than $\alpha = 0.05$ level. Therefore, reject the null hypothesis. All population means are significant differences.

Table 4.7.1: Model Summary of Simple Linear Regression Analysis between Behavioural Intention to Use and Willingness to Adopt Mobile Wallet

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.579[a]	0.335	0.333	0.537	1.697
a. Predictors: (Constant), BIN					
b. Dependent Variable: WAMW					

Table 4.7.2: Result of Analysis of Variance between Behavioural Intention to Use and Independent Variables (Model 2)

ANOVA[a]						
Model		Sum of Square	df	Mean Square	F	Sig
2	Regression	50.598	1	50.598	**175.260**[***]	**.000**[b]
	Residual	100.469	348	.289		
	Total	151.068	349			
a. Dependent Variable: WAMW						
b. Predictors: (Constant), BIN						

Table 4.7.1 and 4.7.3 shows the model summary of simple linear regression analysis between behavioural intention to use and independent variables. In Table 4.7.1, the explanatory variable accounted for about 33.5 percent of the variation in this regression equation model 2. Estimation reveals that the explanatory variables of behavioural intention to use are the important explanatory variables with statistical significance at $\alpha = 0.01$.

Table 4.7.3: Coefficient of Simple Linear Regression between Independent Variables and Behavioural Intention to Use Mobile Wallet

Coefficient[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	C	1.140	0.172		6.644	0.000		
	BIN	0.582	0.044	0.579	**13.239****	**0.000**	1.000	1.000
a. Dependent Variable: WAMW								

Note:

N = 350

* - Correlation is significant at α = 0.10 level (2-tailed).

** - Correlation is significant at α = 0.05 level (2-tailed).

*** - Correlation is significant at α = 0.01 level (2-tailed).

ns - Correlation is not significant.

Equation 2:

$$WAMW_i = 1.140 + 0.582\ BIN_i + 0.172\ e_i$$
$$[13.239^{***}]$$

$R^2 = 0.335$; Adjusted $R^2 = 0.333$; $d = 1.697$

Table 4.7.3 shows the coefficient of simple linear regression analysis between independent variables and behavioural intention to use mobile wallet. Therefore, 1 percent increase in the behavioural intention to use, on average, has a positive relationship effect of increasing the willingness to adopt mobile wallet by 58.2 percent with statistical significance at α = 0.01 level, holding constant with other variables. Figure 4.7 shows the distribution of the error terms in a histogram. The figure is illustrating a symmetric histogram with most of the frequency counts fall in the middle and with counts reducing off in the tails.

Based on the Central Limit Theorem, as long as the sample size is greater 30 and the data is approximately normally distributed with classical bell-shaped. Therefore, the residual is assumed normally distributed.

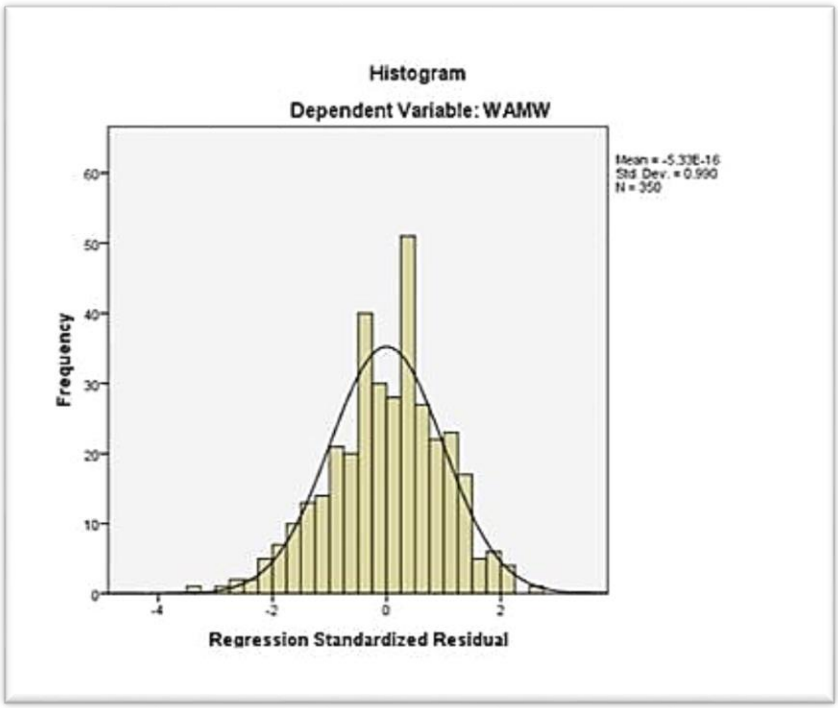


Figure 4.7: Normality of Residual Histogram of Independent Variables and Behavioural Intention to Use

4.8 Multivariate Analysis

Multivariate analysis is the statistical process of simultaneously analysing multiple independent variables with multiple dependent variables using matrix algebra. Among the four demographic variables, the gender, education, age and income groups are significant in the Levene test in Table 4.4.1, 4.4.2, 4.4.3, and 4.4.4 respectively. Furthermore, the gender, age and education groups are not statistically significant on the willingness to adopt

mobile wallet in the independent test in Table 4.4.1, 4.4.2, and 4.4.3, respectively. Only the income group is statistically significant on the willingness to adopt mobile wallet in the independent test in Table 4.4.4. Furthermore, the age and income also correlated on the willingness to adopt mobile wallet at the significant level of $\alpha = 0.01$ level and $\alpha = 0.10$ level, respectively, in Table 4.3.1. Below are the hypotheses of the multivariate test in the age and income effect:

H_0: There is no statistically significant multivariate effect of age and income on the adoption of the mobile wallet.

H_A: There is a statistically significant multivariate effect of age and income on the adoption of the mobile wallet.

Table 4.8.1 shows the multivariate tests of age and income group. As shown in Table 4.8.1, F-value of age for the Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root effect are [2.354, 2.352, 2.350 and 3.439] respectively with significant p-values which are less than $\alpha = 0.05$ significant level. As a result, reject H_0. There is a statistically significant multivariate effect of age on the adoption of the mobile wallet. Based on the Table 4.8.1, F-value of income level for the Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root effect are [2.105, 2.101, 2.097 and 2.745] respectively with significant p-values which are less than $\alpha = 0.05$ significant level. Therefore, reject H_0. There is a statistically significant multivariate effect of income level on the adoption of the mobile wallet.

Lastly, the F-value of age and income for Roy's Largest Root effect is 2.745 with a significant p-value, which is less than 0.05 significant level. Therefore, reject $H_{0.}$ There is a statistically significant multivariate effect of age and income on the adoption of the mobile wallet.

Table 4.8.1: Multivariate Tests

Multivariate Tests[a]						
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.698	**383.025**[b***]	2.000	332.000	**0.000**
	Wilks' Lambda	0.302	**383.025**[b***]	2.000	332.000	**0.000**
	Hotelling's Trace	2.307	**383.025**[b***]	2.000	332.000	**0.000**
	Roy's Largest Root	2.307	**383.025**[b***]	2.000	332.000	**0.000**
Age	Pillai's Trace	0.042	**2.354**[**]	6.000	666.000	**0.029**
	Wilks' Lambda	0.959	**2.352**[b**]	6.000	664.000	**0.030**
	Hotelling's Trace	0.043	**2.350**[**]	6.000	662.000	**0.030**
	Roy's Largest Root	0.031	**3.439**[c**]	3.000	333.000	**0.017**
Income	Pillai's Trace	0.049	**2.105****	8.000	666.000	**0.033**
	Wilks' Lambda	0.951	**2.101**[b**]	8.000	664.000	**0.034**
	Hotelling's Trace	0.051	**2.097**[**]	8.000	662.000	**0.034**
	Roy's Largest Root	0.033	**2.745**[c**]	4.000	333.000	**0.028**
Age * Income	Pillai's Trace	0.064	1.233	18.000	666.000	0.228
	Wilks' Lambda	0.936	1.237[b]	18.000	664.000	0.225
	Hotelling's Trace	0.068	1.242	18.000	662.000	0.221
	Roy's Largest Root	0.055	**2.050**[c**]	9.000	333.000	**0.034**

a. Design: Intercept + Age + Income + Age * Income

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Test of between-subjects effects is an analysis of variance table. The whole model and each term of the model tested for its ability to account for variation in the dependent variable. Table 4.8.2 shows that the test of between-subject effects.

Table 4.8.2: Test of Between-Subjects Effects

Tests of Between-Subjects Effects					
Source	Dependent Variable	Type III Sum of Squares	df	F	Sig.
Corrected Model	WAMW	19.092[a]	16	2.097***	0.008
	BIN	23.271[b]	16	2.996***	0.000
Intercept	WAMW	269.005	1	472.737***	0.000
	BIN	355.644	1	732.494***	0.000
Age	WAMW	3.888	3	2.278*	0.079
	BIN	4.998	3	3.431**	0.017
Income	WAMW	5.425	4	2.383*	0.051
	BIN	5.082	4	2.617**	0.035
Age*Income	WAMW	6.226	9	1.216	0.284
	BIN	8.912	9	2.039**	0.035
a. R Squared = 0.092 (Adjusted R Squared = 0.048)					
b. R Squared = 0.126 (Adjusted R Squared = 0.084)					

The corrected model with 16 degrees of freedom is the overall model. It includes the variance due to the two main effects and the interaction, hence the 16 degrees of freedom. In Table 4.8.2, the F-value of WAMW in the corrected model is 2.097 with a significant p-value of 0.008, which less than $\alpha = 0.05$ level. Also, the F-value of BIN in the corrected model is 2.996 with a significant p-value of 0.000, which less than $\alpha = 0.01$ level. Therefore, WAMW and BIN achieved statistically significant differences among the groups. Therefore, it is a corrected model.

Pairwise comparisons of the group are the statistical method that is used to determine relationships between pairs of means when making group comparisons. Least significant difference (LSD) is the value at a certain level of statistical probability when surpassed by the difference between two varietal means for a certain characteristic; then the two varieties are assumed to be dissimilar for that characteristic at that or slighter levels of probability. Moreover, the hypotheses of the pairwise comparisons of age and WAMW as below:

H_0: There are no mean differences among the age group and WAMW
H_A: There are mean differences among the age group and WAMW

Table 4.8.3 shows that pairwise comparisons of age group. The mean difference of 21 - 30 years old and 31 - 40 years old for WAMW is 0.2693 with the significant value is 0.075, which less than $\alpha = 0.10$ level. Therefore, reject H_0. There are mean differences among the age group of 21 - 30 years old and 31 - 40 years old and WAMW.

Table 4.8.3: Pairwise Comparisons of Age Group

Multiple Comparisons					
LSD					
Dependent Variable	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.
WAMW	21 - 30 years old	31 - 40 years old	0.2693	0.15102	**0.075***
		41 - 50 years old	0.3793	0.21032	**0.072***
		51 – 60 years old	0.4860*	0.22135	**0.029****
	31 - 40 years old	21 - 30 years old	-0.2693	0.15102	**0.075***
		41 - 50 years old	0.1100	0.25354	0.665
		51 – 60 years old	0.2167	0.26276	0.410
	41 - 50 years old	21 - 30 years old	-0.3793	0.21032	**0.072***
		31 - 40 years old	-0.1100	0.25354	0.665
		51 – 60 years old	0.1067	0.30079	0.723
	51 – 60 years old	21 - 30 years old	-0.4860*	0.22135	**0.029****
		31 - 40 years old	-0.2167	0.26276	0.410
		41 - 50 years old	-0.1067	0.30079	0.723
BIN	21 - 30 years old	31 - 40 years old	0.3190*	0.14679	**0.030****
		41 - 50 years old	0.2990	0.20444	0.144
		51 – 60 years old	0.8101*	0.21516	**0.000*****
	31 - 40 years old	21 - 30 years old	-0.3190*	0.14679	**0.030****
		41 - 50 years old	-0.0200	0.24645	0.935
		51 – 60 years old	0.4911	0.25541	**0.055****
	41 - 50 years old	21 - 30 years old	-0.2990	0.20444	0.144
		31 - 40 years old	0.0200	0.24645	0.935
		51 – 60 years old	0.5111	0.29237	**0.081***
	51 – 60 years old	21 - 30 years old	-0.8101*	0.21516	**0.000*****
		31 - 40 years old	-0.4911	0.25541	**0.055***
		41 - 50 years old	-0.5111	0.29237	**0.081***
Based on observed means. The error term is Mean Square(Error) = 0.405.					
***. The mean difference is significant at the 0.01 level (2-tailed).					
**. The mean difference is significant at the 0.05 level (2-tailed).					
* The mean difference is significant at the 0.10 level (2-tailed).					

Furthermore, the mean difference of 21 - 30 years old and 41 - 50 years old for WAMW is 0.3793 with the significant value is 0.072, which less than $\alpha = 0.10$ level. Therefore, reject H_0. There are mean differences among the age group of 21 - 30 years old and 41 - 50 years old and WAMW.

In Table 4.8.3, the mean difference of 21 - 30 years old and 51 - 60 years old for WAMW is 0.4860 with the significant value is 0.029, which less than $\alpha = 0.05$ level. Therefore, reject H_0. There are mean differences among the age group of 21 - 30 years old and 51 - 60 years and WAMW.

Furthermore, the hypotheses of the pairwise comparisons of age and BIN as below:

H_0: There are no mean differences among the age group and BIN.

H_A: There are mean differences among the age group and BIN.

The mean difference of 21 - 30 years old and 31 - 40 years old for BIN is 0.3190 with the significant value is 0.030, which less than $\alpha = 0.05$ level. Therefore, reject H_0. There are mean differences among the age group of 21 - 30 years old and 31 - 40 years old and BIN.

In addition, the mean difference of 21 - 30 years old and 51 - 60 years old for BIN is 0.8101 with the significant value is 0.000, which less than $\alpha = 0.01$ level. Therefore, reject H_0. There are mean differences among the age group of 21 - 30 years old and 51 - 60 years old and BIN.

In Table 4.8.3, the mean difference of 31 - 40 years old and 51 - 60 years old for BIN is 0.4911 with the significant value is 0.055, which less than $\alpha = 0.10$ level. Therefore, reject H_0. There are mean differences among the age group of 31 - 40 years old and 51 - 60 years old and BIN.

Lastly, the mean difference of 41 - 50 years old and 51 - 60 years old for BIN is -0.5111 with the significant value is 0.081, which less than $\alpha = 0.10$ level. Therefore, reject H_0. There are mean differences among the age group of 41 - 50 years old and 51 - 60 years old and BIN.

In addition, the hypotheses of the pairwise comparisons of income and WAMW as below:

H_0: There are no mean differences among the income group and WAMW

H_A: There are mean differences among the income group and WAMW

Table 4.8.4: Pairwise Comparisons of Income Group

Multiple Comparisons					
LSD					
Dependent Variable	(I) Income	(J) Income	Mean Difference (I-J)	Std. Error	Sig.
WAMW	Below RM 3,000	RM 3,001 - RM 5,000	0.1615	0.10614	0.129
		RM 5,001 - RM 8,000	0.2795*	0.16351	**0.088***
		RM 8,001 or above	0.2706	0.23472	0.250
	RM 3,001 - RM 5,000	Below RM 3,000	-0.1615	0.10614	0.129
		RM 5,001 - RM 8,000	0.1179	0.18695	0.529
		RM 8,001 or above	0.1091	0.25161	0.665
	RM 5,001 - RM 8,000	Below RM 3,000	-0.2795*	0.16351	**0.088***
		RM 3,001 - RM 5,000	-0.1179	0.18695	0.529
		RM 8,001 or above	-0.0088	0.28067	0.975
	RM 8,001 or above	Below RM 3,000	-0.2706	0.23472	0.250
		RM 3,001 - RM 5,000	-0.1091	0.25161	0.665
		RM 5,001 - RM 8,000	0.0088	0.28067	0.975
BIN	Below RM 3,000	RM 3,001 - RM 5,000	0.2859**	0.10317	**0.006****
		RM 5,001 - RM 8,000	0.3720**	0.15893	**0.020****
		RM 8,001 or above	0.3382	0.22816	0.139
	RM 3,001 - RM 5,000	Below RM 3,000	-0.2859**	0.10317	**0.006****
		RM 5,001 - RM 8,000	0.0861	0.18172	0.636
		RM 8,001 or above	0.0523	0.24458	0.831
	RM 5,001 - RM 8,000	Below RM 3,000	-0.3720**	0.15893	**0.020****
		RM 3,001 - RM 5,000	-0.0861	0.18172	0.636
		RM 8,001 or above	-0.0338	0.27282	0.901

	RM 8,001 or above	Below RM 3,000	-0.3382	0.22816	0.139
		RM 3,001 - RM 5,000	-0.0523	0.24458	0.831
		RM 5,001 - RM 8,000	0.0338	0.27282	0.901
Based on observed means. The error term is Mean Square(Error) = 0.405.					
***. The mean difference is significant at the 0.01 level (2-tailed).					
**. The mean difference is significant at the 0.05 level (2-tailed).					
* The mean difference is significant at the 0.10 level (2-tailed).					

Table 4.8.4 shows that the pairwise comparisons of income group. The mean difference of below RM 3,001 and RM 5,001 - RM 8,000 for WAMW is 0. 2795 with the significant value is 0.088 which less than $\alpha = 0.10$ level. Therefore, reject H_0. There are mean differences among the income group of below RM 3,001 and RM 5,001 - RM 8,000 and WAMW. As well, the hypotheses of the pairwise comparisons of income and BIN as below:

H_0: There are no mean differences among the income group and BIN

H_A: There are mean differences among the income group and BIN

Furthermore, the mean difference of below RM 3,001 and RM 3,001 - RM 5,000 for BIN is -0.2859 with the significant value is 0.006, which less than $\alpha = 0.05$ level. Therefore, reject H_0. There are mean differences among the income group of below RM 3,001 and RM 3,001 - RM 5,000 and BIN. In Table 4.8.4, the mean difference of below RM 3,001 and RM 5,001 - RM 8,000 for BIN is -0.3720 with the significant value is 0.020 which less than $\alpha = 0.05$ level. Therefore, reject H_0. There are mean differences among the income group of below RM 3,001 and RM 5,001 - RM 8,000 and BIN.

Estimated marginal means is a mean found in the margins of a contingency table. It also is known as the average scores from a group. Figure 4.8.1 shows the estimated marginal means of the willingness to adopt mobile wallet in the age group. In Figure 4.8.1, the estimated marginal means decrease when the age group increase. In this study, the willingness to adopt mobile wallet decrease when the age group increase. 21 – 30 years old group have the highest estimated marginal mean value. 51 – 60 years old group have the lowest estimated marginal mean value. This finding is supported by (Gulamhuseinwala *et al.*, 2015) who stated the FinTech early adopters tend to be young customers in certain countries from now and foreseeable future.

The Figure 4.8.2 shows that the estimated marginal means of the willingness to adopt mobile wallet in the income group. The estimated marginal means increase when the income group increase. In this study, the willingness to adopt mobile wallet increase when the income group increase. RM8,001 or above income group have the highest estimated marginal mean value. Below RM3000 income group have the lowest estimated marginal mean value. This finding is supported by (Gulamhuseinwala *et al.*, 2015). In the markets of Australia, Canada, Hong Kong, Singapore, United States and the United Kingdom, they found that the FinTech primary adopters were more likely to be high-income customers in current and predictable future.

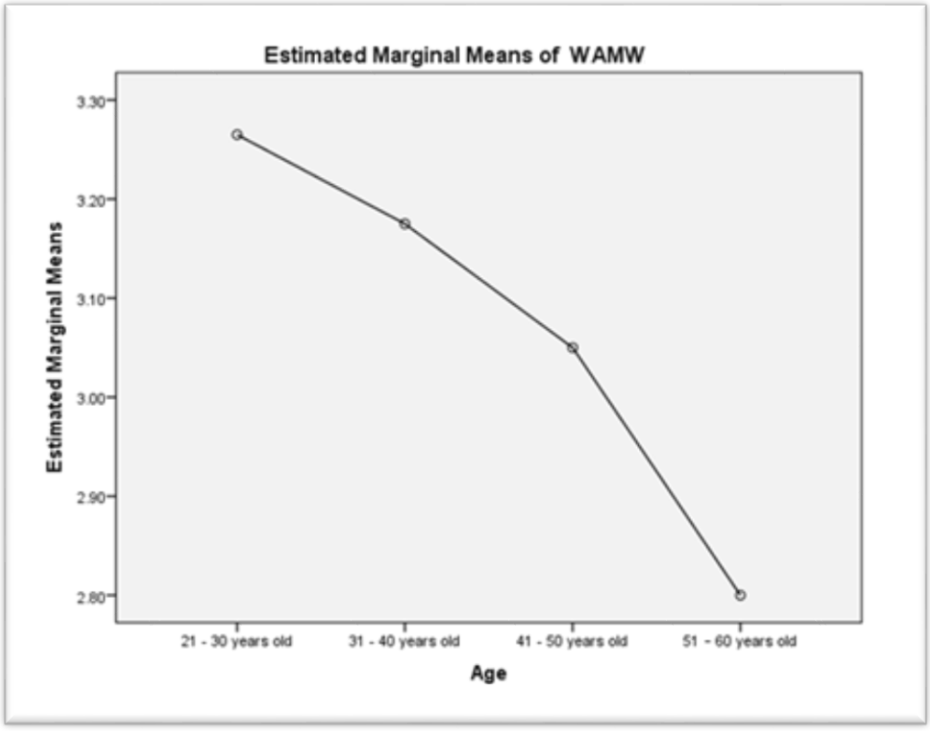


Figure 4.8.1: The Estimated Marginal Means of Willingness to Adopt Mobile Wallet in Age Group

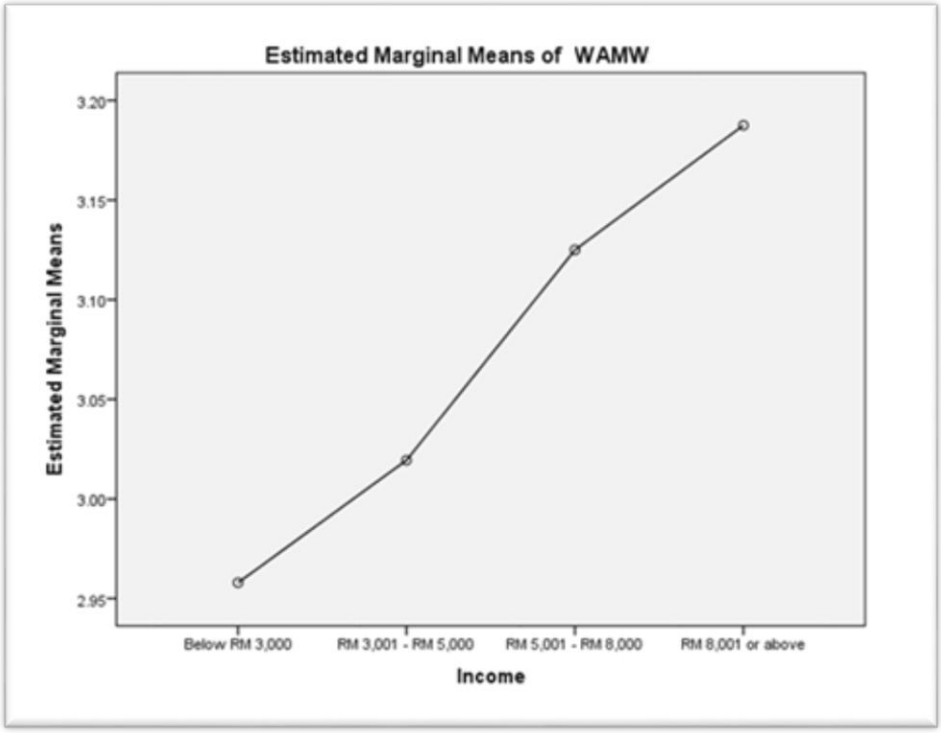


Figure 4.8.2: The Estimated Marginal Means of Willingness to Adopt Mobile Wallet in Income Group

4.9 Hypothesis Testing

4.9.1 Hypothesis Testing based on Multiple Regression Analysis

Table 4.9.1 shows a summary of the hypothesis testing based on multiple regression analysis and simple linear regression analysis based on Table 4.6.1 and Table 4.7.1. Majority of the hypotheses of this study have been supported by rejecting the null hypotheses except for the perceived security, price value and social media.

Table 4.9.1: Summary of Hypotheses Testing

Hypothesis	Conclusion
HA1: There is a significant positive relationship between perceived usefulness and behavioural intention to use mobile wallet.	5.110 (**0.000*****) Supported
HA2: There is a significant positive relationship between perceived ease of use and behavioural intention to use mobile wallet.	1.789 (**0.074***) Supported
HA3: There is a significant positive relationship between perceived security and behavioural intention to use mobile wallet.	0.678 (0.498^{ns}) Not Supported
HA4: There is a significant positive relationship between social influence and behavioural intention to use mobile wallet.	6.793 (**0.000*****) Supported
HA5: There is a significant negative relationship between price value and behavioural intention to use mobile wallet.	-1.117 (0.265^{ns}) Not Supported
HA6: There is a significant positive relationship between social media and behavioural intention to use mobile wallet.	0.018 (0.706^{ns}) Not Supported
HA7: There is a significant positive relationship between brand image and behavioural intention to use mobile wallet.	4.312 (**0.000*****) Supported
HA8: There is a significant positive relationship between behavioural intention to use mobile wallet and willingness to adopt mobile wallet.	13.239 (**0.000*****) Supported

4.9.2 Discussions of Major Findings of the Hypothesis Testing

4.9.2.1 Perceived Usefulness and Behavioural Intention to Use Mobile Wallet

HA1: There is a significant positive relationship between perceived usefulness and behavioural intention to use mobile wallet.

From Table 4.9.1, perceived usefulness has a significant p-value of 0.000, which is lesser than $\alpha = 0.01$ level. Hence, the hypothesis for perceived usefulness has supported by this research.

Thus, perceived usefulness has a positive relationship effect of increasing the behavioural intention to use mobile wallet among Malaysian respondents with statistical significance at $\alpha = 0.01$ level, holding constant with other variables. Therefore, the higher the degree to which the Malaysian consumers trust that using mobile payment will enhance their performance, the more positively the Malaysian consumers will think about the behavioural intention to use mobile wallet.

The finding from this research indicates that majority of the respondents would have a positive behavioural intention to use mobile wallet if the overall using mobile wallet is advantageous. They can get more benefits when using the mobile wallet. They did not need to bring cash in making a payment. All their payment transaction can be tracked down in the mobile wallet. Mobile wallet payment transaction can avoid the cashiers' fraud in returning the payment balance to consumers. The result is consistent with the findings from the previous studies conducted by (Qu *et al*., 2015; Yadav, 2017; Chang *et al*., 2018).

4.9.2.2 Perceived Ease of Use and Behavioural Intention to Use Mobile Wallet

H_A2: There is a significant positive relationship between perceived ease of use and behavioural intention to use mobile wallet.

According to Table 4.9.1, perceived ease of use has a significant p-value of 0.074, which is lesser than $\alpha = 0.10$ level. Hence, the hypothesis for perceived ease of use has supported by this research.

As a result, perceived ease of use has a positive relationship effect of increasing the behavioural intention to use mobile wallet among Malaysian respondents with statistical significance at $\alpha = 0.10$ level, holding constant with other variables. Hence, the higher the degree to which the Malaysian consumers trust that using mobile payment will free of difficulties, the more positively the Malaysian consumers will think about the behavioural intention to use mobile wallet.

The finding from this research indicates that majority of the respondents would have a positive behavioural intention to use mobile wallet if the registration of the mobile wallet application is easy. They think it is easy in learning how to use mobile wallet. The process of using mobile wallet is easy for them. Besides, it is convenient to use mobile wallet. The result is consistent with the findings from the previous studies conducted by (Aydin & Burnaz, 2016; Ozturk *et al.*, 2016; Mun *et al.*, 2017).

4.9.2.3 Perceived Security and Behavioural Intention to Use Mobile Wallet

H_A3: There is a significant positive relationship between perceived security and behavioural intention to use mobile wallet.

In Table 4.9.1, perceived security has an insignificant p-value of 0.498, which is greater than $\alpha = 0.05$ level. Hence, the hypothesis for perceived security has not supported by this research. Then, there is no relationship between perceived security and behavioural intention to use mobile wallet with statistical significance at $\alpha = 0.05$ level. Hence, the finding from this research indicates that the majority of the Malaysian respondents would have an insignificant behavioural intention to use mobile wallet since they will not keep a lot of money inside the mobile wallet. They think that safe and secured in inputting bank card numbers, password and private information when using mobile wallet are non-important. They didn't care about the safety of mobile wallet system from the service provider.

The result is inconsistent with the findings from the previous studies conducted by (Arvidsson, 2014); Wu & Zhang, 2017; Al-Amri *et al*., 2018). In contrast, Chern *et al* (2018) found that perceived security did not significantly affect the adoption of e-wallet by the university student in Kampar, Malaysia. The students did not have much money to save inside the e-wallet. Therefore, they will not worry about the e-wallet security problem. Thus, it might contribute to the insignificant effect of perceived security on the intention to use mobile payment.

Besides that, Lau *et al* (2019) stated that the current Hong Kong mobile payment users more focus on the suitability, functionality and usability of mobile payment than the security concerns of the payment. The well-known banks and credit card companies secured the mobile payment system. Thus, it might cause to the insignificant effect of perceived security on the intention to use mobile payment.

Lim *et al* (2018) revealed that the perceived security of this mobile service indirectly affected the confirmation, perceived usefulness and satisfaction of consumers. The consumers highly like to use the mobile Fintech payment service in term of the product usefulness and their own satisfaction. The perceived security did not significantly influence the continuous intention to adopt mobile Fintech payment services.

4.9.2.4 Social Influence and Behavioural Intention to Use Mobile Wallet

H_A4: There is a significant positive relationship between perceived security and behavioural intention to use mobile wallet.

From the Table 4.9.1, social influence has a significant p-value of 0.000, which is lesser than $\alpha = 0.01$ level. Hence, the hypothesis for social influence has supported by this research.

Therefore, social influence has a positive relationship effect of increasing the behavioural intention to use mobile wallet among Malaysian respondents with statistical significance at $\alpha = 0.01$ level, holding constant with other variables. The

higher the degree to which the Malaysian consumers perceived social trust and pressure to use mobile payment, the more positively the Malaysian consumers will think about the behavioural intention to use mobile wallet.

In this research, the findings indicated that the majority of the respondents would have a positive behavioural intention to use mobile wallet as word of mouth can motivate the consumers to use mobile wallet. They will start to use mobile wallet when recommended by someone who has experienced it. The respondents also will adopt mobile wallet when my friends started to use it or hugely benefited from it. When the mobile wallet becomes popular in their community, then they will start to use it. The result is consistent with the findings from the previous studies conducted by (Thakur, 2013; Tan *et al.*, 2014; Lin & Xie, 2014).

4.9.2.5 Price Value and Behavioural Intention to Use Mobile Wallet

H_A5: There is a significant negative relationship between price value and behavioural intention to use mobile wallet.

The price value has a significant p-value of 0.265, which is greater than $\alpha = 0.05$ level in Table 4.9.1. Hence, the hypothesis for price value has not supported by this research. As a result, there is no relationship between price value and behavioural intention to use mobile wallet with statistical significance at $\alpha = 0.05$ level. Based on this study, the findings indicated that the majority of the respondents would have an insignificant behavioural intention to

use mobile wallet since the mobile wallet is given free with a cash rebate and discount when using it. They didn't care the bonuses and discounts from the mobile wallet. They also didn't concern on the high price in mobile wallet transaction and registration fees.

The result is inconsistent with the findings from the previous studies conducted by (Chong *et al*.,2012; Yang *et al*., 2012; Zhao & Xi, 2015). Phonthanukitithaworn *et al* (2016) indicated that the fifty percent of the respondent have a stable income. Hence, they will not concern the cost of the mobile payment services. Thus, it might cause to the insignificant effect of the perceived cost toward consumer behavioural intention to adopt mobile payment services in Thailand.

Peng and Mi (2018) perceived that the consumers did not pay much attention to the safety cost in the use of ant forest due to good safety guarantee of Alipay in China. Besides that, they did not need to pay more time and capital cost toward this product. Hence, it might make the insignificant effect of perceived cost on the usage intention of consumers toward Alipay's green finance products. The consumers were not necessary to give more financial and time cost on the product.

Furthermore, Tang *et al* (2014) stated that the respondents did not get sufficient information to make a proper price value and perceived benefits evaluation of mobile wallet. Hence, it might contribute to the insignificant effect of price value towards the mobile wallet adoption intention in Malaysia. In future planning, a society that takes long term orientation that possibly will

categorize the cost of an innovation adoption as being an insignificant element (Hofstede & Hofstede, 2005).

4.9.2.6 Social Media and Behavioural Intention to Use Mobile Wallet

H_A6: There is a significant positive relationship between social media and behavioural intention to use mobile wallet.

According to Table 4.9.1, social media has a significant p-value of 0.706, which is greater than $\alpha = 0.05$ level. Hence, the hypothesis for social media has not supported by this research. Therefore, there is no relationship between social media and behavioural intention to use mobile wallet with statistical significance at $\alpha = 0.05$ level. Hence, the finding from this research indicates that majority of the Malaysian respondents would have an insignificant behavioural intention to use mobile wallet since the unfocused content and fail to deliver the key messages of using mobile wallet to the public in social media marketing. They might not have further intention to understand and adopt the mobile wallet. They think the information above mobile wallet that they received via social media is normal. Majority of the respondents didn't care the information provided and user experience feedback of the mobile wallet users in social media.

The result is inconsistent with the findings from the previous studies conducted by (Wang *et al*., 2012; Hajli, 2014; Schivinski & Dabrowski, 2016). Lim *et al* (2017) found that the consumers think the source of credibility and attractiveness in social media did not have any impact on their purchase

intention. The major factor of the credibility problem is social media influencers' insufficient expertise understanding about the recommended product. Besides that, the attractiveness of social media cannot become the dominant component to create the consumer purchase intention. Then, it might contribute to the insignificant effect of source of attractiveness in social media towards the consumers' purchase intention in Malaysia.

Besides that, Bilal *et al* (2014) found that Twitter has an insignificant influence on consumer buying behaviour in Pakistan. The consumers less likely towards Twitter usage compared to other social media sites. The small city people more familiar with the Youtube. It caused the consumer buying behavioural did not affect by Twitter and other non-popular social media usage.

Chatzigeorgiou (2017) found that the trust of millennials in influencer marketing did not influence by the authentic experience of the influencer marketing communicates in social media. Based on the study, the millennials' trust in influencer marketing formed by the number of followers and popularity of the influencer marketing, and the activities presented through the video and photos, and the daily social media usage of the millennials.

4.9.2.7 Brand Image and Behavioural Intention to Use Mobile Wallet

H_A7: There is a significant positive relationship between brand image and behavioural intention to use mobile wallet.

In the Table 4.9.1, brand image has a significant p-value of 0.000, which is lesser than $\alpha = 0.01$ level. Hence, the hypothesis for the brand image has supported by this research.

Then, brand image has a positive relationship effect of increasing the behavioural intention to use mobile wallet among Malaysian respondents with statistical significance at $\alpha = 0.01$ level, holding constant with other variables. Therefore, the higher the degree to which the Malaysian consumers perceived the brand of the mobile wallet, the more positively the Malaysian consumers will think about the behavioural intention to use mobile wallet.

The finding from this research indicates that the majority of the Malaysian respondents would have a positive behavioural intention to use mobile wallet if they trust the brand as the mobile wallet service will meet their expectation. They will feel good and satisfied with the mobile wallet's brand if it can perform the payment transactions well. The mobile wallet's brand enhances their social status and the way they perceived by others. The result is consistent with the findings from the previous studies conducted by (Wu *et al*., 2011; Malik *et al*., 2013; Wang & Tsai, 2014).

4.9.2.8 Behavioural Intention to Use Mobile Wallet and Adoption of Mobile Wallet

H_A8: There is a significant positive relationship between behavioural intention to use and willingness to adopt mobile wallet.

Based on the Table 4.9.1, behavioural intention to use has a significant p-value of 0.000, which is lesser than $\alpha = 0.01$ level. Hence, the hypothesis for behavioural intention to use has supported by this research.

Therefore, behavioural intention to use has a significant positive relationship effect of increasing the willingness to adopt mobile wallet among Malaysian consumers with statistical significance at $\alpha = 0.01$ level, holding constant with other variables. Hence, the higher the degree to which the Malaysian consumers have the direct intention to use the mobile wallet, the more positively the willingness to adopt mobile wallet among Malaysian consumers.

The finding from this research indicates that the majority of the Malaysian respondents would adopt the mobile wallet if they use the mobile wallet soon. They are willing and likely to use the mobile wallet in future. They will use the mobile wallet if given the opportunity. They will think about using the mobile wallet soon. The result has consisted of the findings from the previous studies conducted by (Kim *et al*., 2010; Lu *et al*., 2011; Bailey *et al*., 2017).

4.10 Conclusion

As a conclusion, this chapter has presented the result of various analyses generated by using the SPSS Statistics. Based on the multiple regression analysis in Table 4.6.3, the perceived usefulness, perceived ease of use, social influence and brand image have significant influence toward the behavioural intention to use mobile wallet, respectively. Furthermore, the behavioural intention to use has a significant effect on the willingness to adopt mobile wallet in Table 4.7.3. Chapter V will discuss the implications, limitation of the study, as well as the recommendations for future research.

CHAPTER V

DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

The previous chapter has discussed the results of the data analyses generated by using SPSS Statistics. This chapter will discuss the implications, limitations and the recommendations for future research.

5.1 Summary of the Study

Mobile wallet adoption of Malaysian consumers still in the newborn stage and its lower adoption rate as compared with other countries. The research identified the factors affecting the consumers' willingness to adopt the mobile wallet in Malaysia, which are perceived usefulness, perceived ease of use, social influence, brand image and behavioural intention to use mobile wallet. The findings showed that perceived usefulness, perceived ease of use, social influence and brand image have significant and positive effects on the behavioural intention to use mobile wallet. The perceived security, price value, and social media did not have significant effects on the behavioural intention to

use the mobile wallet. Furthermore, the behavioural intention to use mobile wallet has positive and significant effects on the willingness to adopt mobile wallet adoption in Malaysia. The identification of factors that affect the adoption of mobile wallet in Malaysia will provide valuable information to the stakeholders in the mobile wallet ecosystem.

Technology Acceptance Model (TAM) who established by Davis has used in this research. The TAM model extended into the research conceptual framework model. The target respondents are Malaysian consumer aged from 20 years old and above who have not used the mobile wallet. The sample size of the study is 350 respondents. Besides, the data collection is through the online questionnaire survey by the purposive sampling. The data analyses involve descriptive analysis, correlation analysis, homogeneity test, reliability test, multiple linear regression and multivariate analysis.

For the demographic variables, the age and income level correlated on the willingness to adopt mobile wallet at a significant level of $\alpha = 0.01$ and 0.10 level, respectively in Table 4.3.1. All the independent variable which are PU, PE, PS, SI, PV, SM and BI correlated with the BIN at the significant level of $\alpha = 0.01$ and 0.05 level, respectively in Table 4.3.2. Furthermore, the BIN also correlated with WAMW at the significant level of $\alpha = 0.01$. For homogeneity test, the gender, education, age and income groups are significant in the Levene test in Table 4.4.1, 4.4.2, 4.4.3, and 4.4.4, respectively. Moreover, the gender, education, and age groups are not statistically significant on the willingness to adopt mobile wallet in the independent test in Table 4.4.1, 4.4.2, and 4.4.3,

respectively. Only the income group is statistically significant on the willingness to adopt mobile wallet in the independent test in Table 4.4.4.

In the reliability test, the Cronbach's alpha value of the nine items (seven independent variables, BIN, dependent variable) is 0.887, which is good reliability, according to Table 4.5.1. The R^2 of the multiple regression analysis is 0.508, while for the simple regression analysis is 0.335. In Table 4.6.3, the perceived usefulness, perceived ease of use, social influence and brand image have significant influence on the behavioural intention to use mobile wallet. The social influence (SI) is the most important explanatory variable follow by PU, BI and PE. In Table 4.7.3, the behavioural intention to use have a significant effect on the willingness to adopt mobile wallet. In multivariate test in Table 4.8.1, F-value of the independent age and income level for the Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root effect are multivariate statistically significant on the BIN and WAMW with p-values which less than $\alpha = 0.05$ level respectively. In the test of between-subjects effects in Table 4.8.2, the WAMW and BIN achieved statistically significant differences among the groups and proved that it is a corrected model.

5.2 Implications of the Study

5.2.1 Theoretical Implications

The existing TAM has extended in this research study by successfully including five new variables which are perceived security, social influence, price value, social media and brand image. Based on the research finding, the factors affecting the consumers' willingness to adopt mobile wallet in Malaysia are perceived usefulness, perceived ease of use, social influence, brand image, and behavioural to use mobile wallet. The findings of this research have statistically proven that social influence has the highest significant positive relationship on the behavioural intention to use mobile wallet among Malaysian consumers. Furthermore, the perceived usefulness, perceived ease of use and brand image have significant and positive relationship on the behavioural intention to use mobile wallet in Malaysia. The perceived security, price value and social media did not significantly affect the relationship with behavioural intention to use mobile wallet. Besides that, the behavioural intention to use has a significant positive relationship with the willingness to adopt mobile wallet. The income group is only statistically significant on the willingness to adopt mobile wallet in the independent test. Moreover, the age and income also significantly and positively correlated on the willingness to adopt mobile wallet. The higher the income group, the higher the willingness to adopt mobile wallet. The higher the age group, the lower the willingness to adopt mobile wallet.

There are fewer studies that have been conducted on this mobile wallet research with Malaysian consumers as the targeted respondents. Therefore, this study can contribute to the existing literature on the willingness to adopt mobile wallet in Malaysia. In addition, this study contributes an extension of the TAM in understanding the consumer behavioural on the willingness to adopt mobile wallet. Based on the Davis *et al* (1989), the acceptance and usage of technologies and innovations are determined by perceived usefulness and perceived ease of use. Moreover, the extension of the TAM is made to attempt to provide a complete prediction about the willingness to adopt mobile wallet among Malaysian consumers. The research findings supported that adoption of Fintech services can investigate in TAM perspective. These findings are supported by (Chuang *et al*., 2016; Wilson & Mbamba, 2017). In addition, the extended model might be applying for the adoption of new and future innovation and technological products in Malaysia.

5.2.2 Practical Implications

The identification of factors that affect the behavioural intention to use mobile wallet in Malaysia will provide the valuable information to the stakeholders in the mobile wallet ecosystem which are consumers, mobile wallet companies, government, banking industry, software developers and merchants (Tang *et al*., 2014; Mun *et al*., 2017). These findings can provide a better understanding of the significant factors that consumers consider in adopting the mobile wallet to the stakeholders. These findings might be represented by Malaysian respondents' opinions toward acceptance of the early

mobile wallet adoption. The consumers will more understand the factors that might motivate and discourage them from using the mobile wallet. The findings will be the consumer references or suggestions in decision making of mobile wallet adoption in Malaysia. The software developers and banks can design custom-made mobile wallet features based on these findings. Moreover, the findings might support the government initiative in transforming Malaysia towards a cashless society and economy by strengthening the understanding of consumer behavioural towards the mobile wallet payment. It might support the government in generating formative digital payment policies to motivate the mobile wallet adoption by Malaysian consumers. The cashless society can reduce the crime rate and shadow economy with implantation of digital payment (Mohanty & Pawar, 2019, Pal *et al*., 2019).

The mobile wallet companies can make the appropriate marketing decision in designing a more personalized mobile wallet to Malaysian consumers based on the research findings. Their future new personalized mobile wallet will meet the consumers' need and want. It can motivate more consumers to start using the mobile wallet in purchasing goods and services. Hence, the companies can meet their potentials clients and gain the market share effectively. It can create more business cooperation and opportunities in the market, such as merchants and banking industry. Besides that, the findings can enable the mobile wallet companies to continue to gain the profits by introducing favourable mobile wallet product and services into the market. The findings also lower the risk of introducing the unfavourable products or services into the market will cause a loss in profit for the companies. The business expansion of the mobile wallet company can create more job opportunities for the market.

The findings showed that perceived usefulness, perceived ease of use, social influence and brand image have significant and positive effects on the behavioural intention to use mobile wallet. The mobile wallet companies should give more attention toward the perceived usefulness of mobile wallet. The companies should focus on adding more useful features into mobile wallet product and services. An example such as create merchant promotion feature to the mobile wallet users based on their nearby location, which can help them to save the money when purchasing goods and services. Furthermore, the mobile wallet companies can introduce the utility bill payment feature, which can save the users' time in making utility payment in specific locations monthly. More consumers will adopt the mobile wallet when they found the usefulness of the wallet toward their daily life.

Perceived ease of use has a significant and positive effect on the behavioural intention to use mobile wallet. The mobile wallet companies should focus on the perceived ease of use of mobile wallet. They can design or upgrade the mobile wallet products and services that can let the consumers lower their efforts in using it. An example, they can reduce the control buttons of the mobile wallet application for the user-friendly purpose. More control buttons will make the application more difficult to use. Furthermore, the companies can share the short, simple and effective mobile wallet user tutorial video in mass media and social media. It can motivate more consumers to use the mobile wallet when they perceived the product and services are fewer difficulties in using it.

Social influence of mobile wallet has the strongest significant and positive influence toward the behavioural intention to use mobile wallet from the study. Therefore, the stakeholders should give more attention to the social influence of mobile wallet. It is more important to educate the merchants and consumers about the value and benefits of using the mobile wallet in society. An example, such as the companies can share the short, simple and impressive content that explain the benefits of mobile wallet through digital marketing activities. When the stakeholders educating the consumers in the broader sense, then more consumers become aware that is significant others trust they should adopt the mobile wallet. Furthermore, mobile wallet companies can use emotional advertising to stimulate mobile wallet adoption. The mobile wallet companies can create publicity content of mobile wallet based on the family and friend theme, which make the customers and potential users feel belonging to their home and friend network when using the mobile wallet. The Malaysian consumers will have a great intention to use mobile wallet when their surrounded friends and family members started to use the mobile wallet. Lastly, the mobile wallet company can use the referral incentive and reward program to encourage mobile wallet adoption. When the mobile wallet users introduce and refer the mobile wallet usage to their friends and family members, then the users will get the promotional code and rewards in their mobile wallet.

From the study, the brand image has a significant and positive effect on the behavioural intention to use the mobile wallet. The mobile wallet companies should focus on building the brand image of mobile wallet in Malaysia. The companies can strongly define the focus and personality of their mobile wallet brand in the market. Example, the mobile wallet company can

build unique and influential messaging statements that represent their brand and company from their information analysis of client needs and market development. The companies can establish a positive mobile wallet brand which able to solve problems and give benefits to the user in daily life such as no need to bring so much cash, while do not use the hard sell strategies to promote the mobile wallet adoption. A good mobile wallet brand image will highly enhance the confidences and assurances of consumers toward the mobile wallet adoption in Malaysia.

In addition, the findings also show that perceived security, price value and social media are not statistically significant in predicting the willingness to adopt mobile wallet in Malaysia. Therefore, the stakeholders involved might not be giving too much attention to the perceived security, price value and social media aspects when promoting the mobile wallet services in Malaysia. However, the mobile wallet companies can find social media influencers that have better user experience and deep knowledge about the recommended mobile wallet. This can enhance the credibility of the mobile wallet advertisement and brand trust in social media by the public. Therefore, the adjustment of social media marketing strategies might encourage more people toward the mobile wallet adoption and support the companies to meet their potential users.

The government can launch mobile wallet awareness campaign to send a clear message about the usefulness and easefulness of mobile wallet adoption in the society. The government can promote the advantage of adopting mobile wallet in the short and long run to the universities and the public. The government can enhance the social influence of mobile wallet by sharing the

positive mobile wallet consumers' recommendations to the public. The government can hire the key opinion leaders, bring word-of-mouth effects and celebrity endorsements towards promoting the use case of the mobile wallet. It also can motivate the intention of current mobile wallet users to recommend the mobile wallet to their friends and family. The government can motivate the mobile wallet companies to do corporate social responsibility activities to build their mobile wallet brand. In future, the government should have the rules and regulation in managing and monitoring the mobile wallet market to protect the benefits of consumers. It can ensure the consumers to continue to use the mobile wallet. In addition, the government can provide tax relief and incentives to the mobile wallet companies. It can support the dynamic development of the mobile wallet market toward a cashless nation in South East Asia region.

5.3 Limitation of the Study

These are limitation related to this research has highlighted in this study. Firstly, there are 88.9 percent of the respondents with age of 21 - 30 years' old which known as generation Y in this research. In Malaysia, Generation Y occupies 40 percent in the total of 11 million of Malaysia population (Department of Statistics Malaysia, 2011). Among the income groups of this study, the income below RM3000 is the highest group with, 80.3% in the sample size. The sample size of this study cannot be generalised to represent all the consumers in Malaysia. Based on the data collection, the age group and income group is very limited. Furthermore, the gender percentage of the total respondent in this research are 41.7 male and 58.3 female. Based on the

(Department of Statistics Malaysia, 2018), the gender percentage of total Malaysia population is 51.63 male and 48.37 female. Hence, the sample size might not generally represent the gender population in Malaysia. Secondly, most of the journals that have used in this research are from overseas. The independent variables that developed might not be sufficient to predict the actual willingness to adopt mobile wallet in Malaysia. TAM has the limitation to predict the actual willingness to adopt mobile wallet due it did not include all factors in the model. Example, the human social changes aspects, business situation, innovation condition, alternative forms of making a payment transaction, and so on.

5.4 Recommendation for Future Research

In future research, the researchers should extend the sample size toward big data. The data collection of the age and gender group should be almost equal ratio to the current Malaysia population ratio. This can ensure the data sample can have a better generalization of the population. Besides, future research can include the factor analysis for offering a direct understanding of the interrelationships among variables. It will provide a clear image of which variables are highly correlated and will act in concert in other analysis. The factor analysis results avoid the problems related to highly correlated variables. Besides that, other additional variables should be considered in future research to enhance the accuracy of the research model further. It will support the researcher to develop a more reliable research instrument to examine mobile

wallet adoption of Malaysia. Moreover, the F-test value and the predictive power of future research can be enhanced.

Future research might be conducted in a qualitative manner to collect more in-depth information from the respondents about the willingness to adopt mobile wallet. The qualitative research can use smaller sample sizes, which are cost-friendly. The open-ended and flexible research process allows the researchers to better access the exact feelings and experience of consumers toward the mobile wallet issues. The qualitative research can allow the researchers to collect detail-orientated data. The qualitative manner can provide the findings that are reliable, valid, and generalizable to a larger population in the future study. It can avoid the research findings of mobile wallet adoption being an artefact of the method has used in previous studies. Furthermore, the qualitative research on the consumer willingness to adopt mobile wallet service might provide some beneficial suggestions to clarify and recommend the development of service generalizability.

The researchers can use the partial least square (PLS) regression for data analysis. This latest method can simplify and combine features from the main component analysis and multiple regression. Furthermore, PLS-SEM can use to study possible relationships with less stress on the measurement model. Development of PLS regression into a preference instrument in the social sciences as a multivariate technique for non-experimental data. The future study has examined the difference of behavioural intention of mobile wallet users and non-users toward the mobile wallet adoption. This study can determine what factors encourage the non-user to use the mobile wallet, and

motivate the current mobile wallet user to continue using the mobile wallet in Malaysia. To have the multi-group analyses between the mobile wallet users and non-users, PLS is considered to be more suitable to discover the differences between the two distinct groups.

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Appendix

Public Survey on Adoption of Mobile Wallet

Introduction

Thank you for willing to take part in this survey. I am a postgraduate student who currently pursuing the course of Master of Philosophy at Universiti Tunku Abdul Rahman (UTAR). I am conducting a thesis titled of "Adoption of Mobile Wallet in Malaysia". Mobile wallet refers to an electronic device that enables an individual to make electronic transactions. Before you start to answer the questionnaire, here are the examples of mobile wallet:

- Alipay, WeChat Pay, MaybankPay, CIMB Pay, MCash, WECONNECT, Boost, Samsung Pay, Razer Pay, Touch 'n Go eWallet and so on.

The purpose of this survey is to understand the consumer behaviour, intention and opinions on the factors affecting the mobile wallet adoption. This survey will take approximately 10 minutes. Your participation is highly appreciated. All your identity and responses in this survey will be kept completely confidential and anonymous. Thank you. If there are any inquiry related to the survey, please kindly email me at martinccj@1utar.my.

Section A: Demographic Profile of the Respondent

Instruction: Please tick (✓) in the appropriate bracket or fill in the blank for each of the questions below.

A1. What is your **gender**?

( ) Male ( ) Female

A2. What is your **age group**?

( ) 21 - 30 years old ( ) 51 - 60 years old

( ) 31 - 40 years old ( ) 60 years old above

( ) 41 - 50 years old

A3. What is your current **highest educational level**?

( ) High School or below
( ) Certificate or Diploma Education
( ) Bachelor's Degree
( ) Postgraduate

A4. What is your current **employment status**?

( ) Private Sector Employee
( ) Public Sector Employee
( ) Self Employed
( ) Unemployed
( ) Student
( ) Househusband/ Housewife
( ) Retired

A5. What is your **average monthly income**?

( ) Below RM 3,000
( ) RM 3,001 - RM 5,000
( ) RM 5,001 - RM 8,000
( ) RM 8,001 - RM 15,000
( ) RM 15,001 or above

A6. What is your **average monthly online expenditure**?

( ) Below RM 500
( ) RM 500 - RM 1,000
( ) RM 1,001 - RM 2,500
( ) RM 2,501 - RM 5,000
( ) RM 5,001 or above

A7. Do you think that mobile wallet will become a **popular** payment method in Malaysia within the **next 3 to 5 years**?

( ) Yes
( ) No

A8. Have you performed any mobile wallet payment before?

( ) **Yes**, please kindly *proceed* to *Section **B***.

( ) **No**, please kindly *proceed* to *Section **B***.

Instruction: Kindly circle the number which best represents your opinion based on a scale of 1 (strongly disagree) to 5 (strongly agree).

No	Section B: Perceived Usefulness	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
B1.	I think that using mobile wallet is **useful** in performing payment transactions.	**1**	**2**	**3**	**4**	**5**
B2.	I think that using mobile wallet would be **easier** in conducting payment transactions.	**1**	**2**	**3**	**4**	**5**
B3.	I think that using mobile wallet will improve my daily **productivity**.	**1**	**2**	**3**	**4**	**5**
B4.	I think overall using mobile wallet is **advantageous**.	**1**	**2**	**3**	**4**	**5**
B5.	I think that using mobile wallet is **helpful** in conducting payment.	**1**	**2**	**3**	**4**	**5**

No	Section C: Perceived Ease of Use	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
C1.	I think it is **easy to use** mobile wallet.	**1**	**2**	**3**	**4**	**5**
C2.	I think it is easy in **learning how to use** mobile wallet.	**1**	**2**	**3**	**4**	**5**
C3.	I think it is easy in the **process** of using mobile wallet.	**1**	**2**	**3**	**4**	**5**
C4.	I think it is easy in the **registration** of the mobile wallet application.	**1**	**2**	**3**	**4**	**5**
C5.	I think it is **convenient to use** mobile wallet.	**1**	**2**	**3**	**4**	**5**

No	Section D: Perceived Security	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
D1.	I think it is **safe** and **secured** in inputting **bank card numbers** when using mobile wallet.	**1**	**2**	**3**	**4**	**5**
D2.	I think it is **safe** and **secured** in inputting **password** when using mobile wallet.	**1**	**2**	**3**	**4**	**5**
D3.	I think it is **safe** and **secured** in inputting **private information** when using mobile wallet.	**1**	**2**	**3**	**4**	**5**
D4.	I think it is **safe** and **secured** when using mobile wallet.	**1**	**2**	**3**	**4**	**5**
D5.	I think it is **safe** and **secured** with mobile wallet **system** of the service provider.	**1**	**2**	**3**	**4**	**5**

No	Section E: Social Influence	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
E1.	I would like to **use** mobile wallet when **recommended** by **someone** who has **experienced** it.	**1**	**2**	**3**	**4**	**5**
E2.	I would like to **use** mobile wallet when my **friends started** to use it.	**1**	**2**	**3**	**4**	**5**
E3.	I would like to use mobile wallet when my friends have benefited a lot from it.	**1**	**2**	**3**	**4**	**5**
E4.	I would like to **use** mobile wallet when it becomes popular in my **community** (e.g. company/ university/ family/ institution)	**1**	**2**	**3**	**4**	**5**
E5.	I would like to **use** mobile wallet when it has been greatly promoted via **mass media** (e.g. TV, radio, Facebook, YouTube and website).	**1**	**2**	**3**	**4**	**5**

No	Section F: Price Value	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
F1.	I would like to use mobile wallet as the **transaction fee** is **expensive**.	**1**	**2**	**3**	**4**	**5**
F2.	I would like to use mobile wallet as it is not providing **bonuses** and **discounts**.	**1**	**2**	**3**	**4**	**5**
F3.	I would **change** my **phone number** for using mobile wallet.	**1**	**2**	**3**	**4**	**5**
F4.	I would **change** my **electronic device** for using mobile wallet.	**1**	**2**	**3**	**4**	**5**

F5.	I would like to use mobile wallet as the **registration** is **expensive**.	**1**	**2**	**3**	**4**	**5**

No	Section G: Social Media	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
G1.	I would like to **find** information of mobile wallet in social media.	**1**	**2**	**3**	**4**	**5**
G2.	I would like to **receive** information of mobile wallet in social media.	**1**	**2**	**3**	**4**	**5**
G3.	I would like to **receive** the **user experience feedback** of the mobile wallet users in social media.	**1**	**2**	**3**	**4**	**5**
G4.	I think the information of mobile wallet that I received via social media is **useful**.	**1**	**2**	**3**	**4**	**5**
G5.	I think the information of mobile wallet that I received via social media is **acceptable**.	**1**	**2**	**3**	**4**	**5**

No	Section H: Brand Image	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
H1.	I will feel **good** with the mobile wallet's brand.	**1**	**2**	**3**	**4**	**5**
H2.	I will feel **satisfy** with the mobile wallet's brand.	**1**	**2**	**3**	**4**	**5**
H3.	I think mobile wallet's brand enhances **social status.**	**1**	**2**	**3**	**4**	**5**
H4.	I think mobile wallet's brand **improves** the way I perceived by others.	**1**	**2**	**3**	**4**	**5**

H5.	I think mobile wallet's brand will **perform** the payment transactions **well**.	**1**	**2**	**3**	**4**	**5**

No	**Section I: Behaviour Intention Towards Using Mobile Wallet**	**Strongly Disagree**	**Somewhat Disagree**	**Neither Agree Nor Disagree**	**Somewhat Agree**	**Strongly Agree**
I1.	I am **likely** to use the mobile wallet in the near future.	**1**	**2**	**3**	**4**	**5**
I2.	I am **willing** to use the mobile wallet in the near future.	**1**	**2**	**3**	**4**	**5**
I3.	I will use the mobile wallet if given the **opportunity**.	**1**	**2**	**3**	**4**	**5**
I4.	I will **think** about using the mobile wallet in the near future.	**1**	**2**	**3**	**4**	**5**
I5.	I **intend** to use the mobile wallet services when the **opportunity arises**.	**1**	**2**	**3**	**4**	**5**

No	**Section J: Willingness to Adopt Mobile Wallet**	**Strongly Disagree**	**Somewhat Disagree**	**Neither Agree Nor Disagree**	**Somewhat Agree**	**Strongly Agree**
J1.	I think I will use mobile wallet **frequently**.	**1**	**2**	**3**	**4**	**5**
J2.	I think I will use mobile wallet many **times** in a **day**.	**1**	**2**	**3**	**4**	**5**
J3.	I think I will use mobile wallet at least once within **1 week**.	**1**	**2**	**3**	**4**	**5**
J4.	I think I will use mobile wallet at least once within **1 month**.	**1**	**2**	**3**	**4**	**5**
J5.	I think I will use mobile wallet at least once within **2 months**.	**1**	**2**	**3**	**4**	**5**

The survey has ended. Thank you for sharing your precious opinions with us!