

THE ADOPTION INTENTION OF NEAR FIELD
COMMUNICATION (NFC) - ENABLED MOBILE
PAYMENT AMONG CONSUMERS IN MALAYSIA.

BY

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- (1) This postgraduate project is the end result of my own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.
- (2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.
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LIST OF ABBREVIATIONS

MP	Mobile payment
NFC	Near Field Communication
NMP	NFC-enabled mobile payment
RA	Relative advantage
CL	Complexity
CA	Compatibility
AOI	Amount of information
VOS	Variety of services
PFR	Perceived financial resources
ITA	Intention to adopt
DOI	Difussion of Innovation
DIT	Difussion of Innovation Theory

PREFACE

This thesis is submitted in partial fulfillment of the requirements for the degree of Master of Business Administration (Corporate Management). This thesis contains work done from October 2014 to April 2015. This thesis was supervised by Mr. Garry Tan Wei Han and it was solely written by Ms. Dhaarshini Balachandran, B.Com.

ABSTRACT

The emergence of mobile technologies has changed the consumers' life in many ways, especially the way they make payment. The purpose of this study is to identify factors that affect the adoption intention of an innovative payment system called NFC-enabled mobile payment. The Diffusion of Innovation model has been extended in this study in order to accommodate the study in the Malaysian context. The SPSS software was used in this study to analyze the relationship between the independent variables (Relative advantage, Complexity, Compatibility, Amount of information, Variety of services and Perceived financial resources) and dependent variable (Intention to adopt). The results of the study have indicated that Variety of services and Amount of information has a positive significant relationship with Intention to adopt. This study provides valuable information for both theoretical and managerial implication. The findings of this study will be useful for parties such as banks, merchants, practitioners, software developers and government agencies in designing the communication and business strategies.

Keywords: NFC-enabled mobile payment, Diffusion of Innovation model, Malaysia

CHAPTER 1: INTRODUCTION

1.0 Introduction

In this chapter, the research background will be discussed initially and then followed by the research problem. Apart from that, the research objectives, questions and hypotheses also will be developed in this chapter. Besides, this chapter also will cover the significance of the study.

1.1 Research Background

The emergence of new technology has brought many changes to the payment systems used by the consumers. Traditionally, the consumers use notes and coins to complete their economic transactions with the merchants (Shin, 2010). However, the trend has changed now. Consumers nowadays no longer interested in using physical monies to make payment for their purchases. Instead, they prefer to use their mobile devices to make payment (Shin, 2010). Making a payment using a mobile device is known mobile payment (MP). In MP, the consumers make payment using mobile devices such as mobile phones, smartphones and personal digital assistants (PDAs) by utilizing the wireless and other communication technologies (Leong, Hew, Tan, & Ooi, 2013). The NFC-enabled mobile payment (NMP) is another form of MP (Becker, 2007). In NMP, the payment is made by the consumers by tapping their NFC-enabled mobile device to the NFC reader located at the merchant's checkout point (Chen, 2008).

The birth of this modern payment system has enabled consumers to pay for the goods and services they procure in fast, convenient, safe and simple manner from anywhere, at anytime using their handheld mobile phones (Innopay, 2012). The NMP is a fast growing payment method that serves as an alternative method for the

traditional payment system (Tan et al., 2014). The NFC based payment system is beneficial to both consumers and merchants. For instance, according to Innopay (2012), by having this payment system in practice, consumers are able to avoid crowded counters at the checkout points and gives the opportunity to the merchants to improve their customer satisfaction by eliminating their need to wait in long queues to make payment.

As per today's date, Maybank and CIMB are the only commercial bank in Malaysia that offers NMP facilities to consumers. The Maybank provides the service by collaborating with Maxis, VISA and Nokia (Maybank Malaysia, 2012), while CIMB provides the service by collaborating with Maxis and Touch and Go (Maxis, 2012). Though, NMP is simple to use and beneficial to consumers, its adoption among consumers in Malaysia is still at the beginning stage and the adoption rate is relatively lower compared to other countries across the globe (Tan et al., 2014). It is vital to persuade consumers to adopt this payment system since huge amount of money has been spent by various parties such as banks, mobile phone manufacturers and merchants in building up the infrastructure (Tan et al., 2014). Thus, this study is carried out with aim to identify the factors that affect the Malaysian consumers' intention to adopt the NMP.

1.2 Problem Statement

The continuous advancement in technology, especially the mobile technologies has created opportunities for businesses to develop and offer innovative services. According to Zulkefly and Baharudin (2009), mobile phones have become an important part of Malaysian society. In Malaysia, about 85% of the total population owns a mobile phone (Osman, Talib, Sanusi, Shiang-Yen, & Alwi, 2012) and the mobile phone penetration rate in Malaysia is 140% (World Bank, 2012). This indicates that 47% out of 85% of the total hand phone users in Malaysia owns more than one mobile phone (World Bank, 2012).

The high mobile penetration rates have given opportunity to many industries in Malaysia to come up with various mobile based services. For instance, the banking industry in Malaysia uses the mobile technology to provide mobile based banking services to its customers (Amin, Hamid, Lada, & Anis, 2008). Besides that, the retail industry in Malaysia also uses the mobile technology to provide mobile based shopping experience to the shoppers (Wong, Lee, Lim, Chua, & Tan, 2012). The tourism industry in Malaysia also uses the mobile technologies to deliver mobile based tourism services to those visitors who visit Malaysia (Lee, Chew, Goh, Hong, & Khor, 2013).

Despite of the growing use of mobile technologies, making payment for purchases using mobile devices, especially using the NFC-enabled mobile devices is still a fresh idea and not many consumers in Malaysia has adopt it (Leong, Hew, Tan, & Ooi, 2013) . Though, Malaysia is witnessing a high diffusion rate of mobile users, the number of payment made using mobile devices still remains low. According to World Pay (2012), only 0.3% of the mobile phone users in Malaysia use their mobile phones to make payment for their purchases.

1.3 Research Objective

1.3.1 General Objective

To find out which factor(s) has the greatest impact on Malaysian consumers' intention to adopt NMP.

1.3.2 Specific Objectives

1. To study the association between Relative Advantage (RA) and Malaysian consumers' intention to adopt NMP.
2. To study the association between Complexity (CL) and Malaysian consumers' intention to adopt NMP.

3. To study the association between Compatibility (CA) and Malaysian consumers' intention to adopt NMP.
4. To study the association between Amount of information (AOI) and Malaysian consumers' intention to adopt NMP.
5. To study the association between Variety of services (VOS) and Malaysian consumers' intention to adopt NMP.
6. To study the association between Perceived financial resources (PFR) and Malaysian consumers' intention to adopt NMP.

1.4 Research Questions

1.4.1 General Question

Which factor(s) have the greatest influence on the Malaysian consumers' intention to adopt NMP?

1.4.2 Specific Questions

1. Does RA affect Malaysian consumers' intention to adopt NMP?
2. Does CL affect Malaysian consumers' intention to adopt NMP?
3. Does CA affect Malaysian consumers' intention to adopt NMP?
4. Does AOI affect Malaysian consumers' intention to adopt NMP?
5. Does VOS affect Malaysian consumers' intention to adopt NMP?
6. Does PFR affect Malaysian consumers' intention to adopt NMP?

1.5 Hypotheses of Study

H1: There is a significant relationship between RA and Malaysian consumers' intention to adopt NMP.

H2: There is a significant relationship between CL and Malaysian consumers' intention to adopt NMP.

H3: There is a significant relationship between CA and Malaysian consumers' intention to adopt NMP.

H4: There is a significant relationship between AOI and Malaysian consumers' intention to adopt NMP.

H5: There is a significant relationship between VOS and Malaysian consumers' intention to adopt NMP.

H6: There is a significant relationship between PFR and Malaysian consumers' intention to adopt NMP.

1.6 Significance of Study

1.6.1 Theoretical Significance

Previously, many studies have been conducted in Malaysia in terms of MP, but the studies on NMP are limited. Thus, this study will contribute to the existing literature about the factors that affects the consumers' intention to adopt NMP in the Malaysian context. Apart from that, this study also contributes an extended Diffusion of Innovation (DOI) model to the academic world. According to Tornatzky and Klein (1982), the trialability and observability in the DOI model is not useful in predicting the adoption intention. Therefore, the existing DOI model is being extended in this study by dropping two traditional variables (Trialability and Obsevability) and adding three new variables namely AOI, VOS and PFR. The extension is made to the

existing model to provide a meaningful prediction about the adoption intention of NMP among consumers in Malaysia.

1.6.2 Practical Significance

The identification of factors that affects Malaysian consumers' intention to adopt NMP will provide valuable information about Malaysian consumers' intention towards the adoption of the new innovative payment system to those merchants who wish to implement the new payment system in their business operations. Besides, the findings of this study also will provide better understanding to the developers of mobile phone software, mobile phone manufacturers, banking institutions and other related parties on what aspect or feature to pay more attention when coming up with their product or services. The better understanding will guide the related parties to enhance their product and services to meet the needs and wants of the consumers. Producing goods and services that are consistent with the consumers' requirement will help them to enhance their profits in the market, attract more customers and eliminate the risk of bearing loss and producing or delivering unfavorable products or services.

1.7 Conclusion

In conclusion, this chapter has discussed about the research background and the research problems. Besides, the research objectives, research questions, and the hypotheses of the study also was developed in this chapter. Furthermore, the significance of the study and chapter layout also was included in this chapter. In the next chapter, the review of literature that are related to the relevant theoretical models will be discussed.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

The previous chapter has discussed about the research background, problem statement, research questions, objectives, hypotheses as well as the significance of this study. This chapter will be discussing about the theory that will be applied in this study as well as about the relationship between the independent variables and the dependent variable of this study by reviewing the past studies. Besides, the theoretical framework and hypothesis also will be developed in this chapter.

2.1 Review of the Literature

2.1.1 Dependent variable (Intention to adopt)

The term intention is often defined as the perceived notion between oneself and some action (Liang, Illum, & Cole, 2008). The term intention is always referred as the future behavior of someone (Venkatesh et al., 2003). Most of the studies that are related to the technology or innovation implementation have studied the intention as a predictor of associated adoption (Irani, Dwivedi, & Williams, 2008). Moreover, Ajzen (1991) also stated that the intention directly influences the adoption of a new innovation or technology. On the other hand, the adoption is often defined as the acceptance and continued use of a product, service or idea (Rogers, 2003). Sometimes, adoption is also defined as the decision to make full use of an innovation.

The adoption also can be defined in terms of implementation, usage, utilization, or satisfaction. The satisfaction is one of the most widely used single measures of adoption (Liu & Guo, 2008). Generally, consumers go through a process of knowledge, persuasion, decision and confirmation before they adopt a product or

service (Rogers, 2003). Previously, many studies have used the “Intention” to predict the adoption intention of mobile based services. For instance, Yu (2012) has used intention to study about the adoption intention of mobile banking among Taiwanese consumers. On the other hand, Alkhunaizan and Love (2012) has used intention to investigate about the intention to adopt mobile commerce among consumers in Saudi Arabia. Apart from that, Kim, Chan, and Gupta (2007) also have used intention to predict the adoption intention of mobile internet among consumers in Japan.

2.1.2 1st Independent variable (Relative Advantage)

RA refers to the extend in which an innovation is perceived to be better than its previous version or its competing products (Tidd, 2010). The RA is often measured using social image and economic profitability (Tidd, 2010). According to Ho and Wu (2011), an innovation that provides a superior advantage will have a greater acceptability and a higher diffusion rate among the adopters. On the other hand, Roach (2009) has indicated that RA is one of the best and consistent predictors when it comes to predicting the adoption of innovation. A past study conducted by Ondrus and Pigneur (2006) has revealed that there is a positive relationship between RA and the adoption rate of new innovation or technology. When it comes to NMP, the users’ are more likely to adopt the new payment system if it has more benefit compared to the previous system they are using (Lin, 2011).

The NFC technology in the NMP enables the consumers to make payment in secure manner. In NMP, the consumers payment information is transferred through a secure channel and those sensitive information are encrypted using encryption (Becker, 2007). The NFC technology in the NMP also enables the consumers to save their time when making payment for their purchases. With the use of NMP, the consumers are able to make payment for their purchases in fraction of seconds by just tapping their NFC-enabled mobile device to the NFC reader located at the merchant’s check out point (Leong, Hew, Tan, & Ooi, 2013). Apart from that, the use of NMP

also would increase the consumers' convenience in terms of payment process. The innovative payment system reduces the need of consumers to carry the physical monies to make payment (Smart Card Alliance Mobile and NFC Council, 2012). Thus, the RA that the consumers can enjoy by using NMP over the traditional payment system is the time saving, improved convenience, and grater security (Begonha et al., 2002).

2.1.3 2nd Independent variable (Complexity)

According to Cheung et al. (2000), CL refers to the extend a new innovation or technology is difficult to understand and not easy to use. CL also can be defined as the degree an individual believes that using a particular system will cause them to use a lot of mental effort (Davis, 1989; Sim, Kong, Lee, Tan, and Teo, (2012). The efforts spent in using a system is an important predictor towards its acceptance and subsequent usage (Tan, Sim, Ooi, & Kongkiti, 2012). Researches such as Tan, Ooi, Hew and Lin (2014), and Tan, Chong, Ooi, and Chong (2010) have proven that the harder the system to be used, the lower is the chances of the system to be accepted. CL is considered to be the most important determinant in term of the adoption intention of information technologies such as mobile commerce (Safeena et. al., 2011), mobile banking (Teo, Tan, Cheah,,Ooi, & Yew, 2012), and MP (Aw et al., 2009). A past study by Mallat (2007) has found out that there is a negative relationship between CL and adoption rate of new innovation or technology.

Unlike the previous versions of MP, the NMP can be easily used to make payment. The NFC technology in this innovative payment system enables the consumers to make payment with less mental and physical efforts (Tan et al., 2014). A simple waving or tapping by the consumers using their NFC-enabled mobile device to the NFC reader is sufficient to complete the entire payment transaction. Meanwhile, in the previous versions of MP, the consumers have to go through several steps manually in their mobile device to get their payment process done. The NFC

technology in the NMP also has eliminated the consumers need to use the small display and keypads in their mobile device to key in the purchase information as part of payment process (Tan et al., 2014). The NFC based MP does not require the consumers to key in any data. Instead, all the necessary data are automatically exchanged between the parties involved with the help of NFC technology (Becker, 2007). In terms of the NMP, consumers are more likely to adopt it as it exerts ease of use.

2.1.4 3rd Independent variable (Compatibility)

According to Chen et al. (2004), CA refers to the extend an innovation or technology is consistent with the adopter's existing values, beliefs, habits, and past and present experiences. CA is an important feature of innovation as its conformance with adopters' lifestyle can result in a rapid rate of adoption (Wong, Tan, Ooi, & Lin, 2015). In some diffusion research, RA and CA were viewed as similar, although they are conceptually different. The lack of CA in the new innovation or technology with the potential adopters needs may negatively affect the adopters use or adoption of that particular innovation or technology (McKenzie, 2001). According to Hoerup (2001), each and every new innovation influences the user or the potential adopters opinions, beliefs, values, and views about the innovation. If an innovation or technology is compatible with an individual's needs, then the uncertainty of using it or adopting it will decrease and the rate of its adoption or its usage will increase (Rogers, 2003).

A past study by Wu and Wang (2005) has indicated that CA will lead to lower CL. This phenomenon is possible because when a user or an adopter is compatible with an innovation, they will only put in less effort in operating the innovation. Some past studies also suggested that consumers are more likely to adopt an innovation or technology that is compatible to their job and their job related tasks (Moore & Benbasat, 1991; Taylor & Todd, 1995). According to Shatskikh (2013), if a person already has the experience of using mobile devices, then he or she are more likely to

adopt the mobile based payment system. In terms of NMP, the consumers are more likely to adopt the payment system if they have experience of using the NFC technology in their mobile devices to perform functions such as data sharing, real-time check in, transportation ticketing and etc. The consumers also are likely to adopt the new innovative payment system if the system can be integrated into their daily life activities, purchase transactions, habits and preferences (Ding et al., 2004).

2.1.6 4th Independent variable (Amount of Information)

According to Pikkarainen et al. (2004), the AOI refers to the availability of sufficient and precise information about the new innovation or technology. Adoption refers to the acceptance and continued use of a product, service or idea (Rogers, 2003). According to Sathye (1999), users go through a process of “knowledge, persuasion, decision and confirmation” before they adopt an innovation or technology. The adoption or rejection of an innovation or technology begins when the consumer becomes aware of the innovation or technology (Sathye, 1999). Hence, in order to promote the adoption of a new innovation or technology, it is always necessary to make the potential adopters aware about the availability of such a product and explain how it adds value compared to its substitute products or its competing products (Sathye, 1999). The AOI consumers have about the new innovation or technology has been identified as a major factor impacting its adoption (Rogers, 2003). According to Sathye (1999), new innovation or technology is fairly a new experience for many people. The lack of information about such products or services will cause the consumers to have a low awareness about it and a low awareness will cause the consumers to not to adopt the new innovation or technology.

According to Rogers (2003), the important factor that the consumers consider before adopting a new innovation or technology is the AOI they have about it. Furthermore, Polatoglu and Ekin (2001) also stated that the more knowledge and skills a consumer have about an innovation or technology, the easier it is for the

consumer to utilize it. Therefore, consumers who are more aware of a new innovation or technology are more likely to perceive that the new innovation or technology is more useful, easy to use and more reliable. According to Pikkarainen et al. (2004) there is a positive relationship between the AOI and the adoption rate of the new innovation or technology. In terms of the NMP, users are more likely to adopt it if they have adequate information about it. In the context of NMP, it is crucial for the consumers to have the information about the advantages and disadvantage involved, how it works, what are its characteristics, who are the service providers and etc.

2.1.7 5th Independent variable (Variety of services)

VOS refer to the ability of a new innovation or technology to perform various services along with its primary functions (Balachandran, 2014). VOS are typically measured in terms of the number of functions that could be performed using a particular innovation or technology. An innovation or technology that provides a greater number of functions is said to have a greater acceptability and higher diffusion rate (Chong, Chan, & Ooi, 2012). According to Agarwal, Wang, Xu, and Poo (2007), in today's context, the VOS is considered to be the most useful predictor when it comes to predicting the adoption intention an innovation. A past study conducted by Chong (2013) has revealed that there is a positive relationship between VOS and the adoption rate of new innovation or technology. An innovation or technology that offers a wide range of functions and services will attract the potential adopters to adopt it (Chong et al., 2012) On the other hand, according Chong (2013), increasing the number of services in an innovation or technology in the post-adoption stage will cause the adopters to continue to use it.

According to Agarwal et al. (2007), the wider the range of services offered by an innovation or technology, the more powerful it is. The consumers are said to be less price sensitive when it comes to the adoption of a new innovation or technology that offers huge amount of value added services (Chong, Darmawan, Ooi, & Lin,

2010). According to Chong et al. (2012), if a particular innovation or technology offers more services along with its primary function, the adopters will not bother much about the cost and security issue associated with it. . When it comes to NMP, the users' are more likely to adopt the new payment system if it allows the adopters to perform other additional services along with its main function. Apart from the payment function, the NFC technology in the mobile device also can be used by the adopters to perform additional services such as real-time check-ins, automatic transportation ticketing, collecting loyalty program points, downloading promotion information from smart billboards and etc. (Smart Card Alliance Mobile and NFC Council, 2012).

2.1.5 6th Independent variable (Perceived financial resources)

PFR refer to the cost that involved in the adoption or usage of a new innovation or technology (Sim, Tan, Wong, Ooi & Hew, 2014). Many scholars in the past have concluded that cost as an important factor in affecting the adopters' intention to adopt or use a new innovation or technology (Hung et al., 2003; Leong, Hew, Tan, & Ooi (2013); Luarn & Lin, 2005). In a study conducted by Luarn and Lin (2005), PFR was concluded to have a significant negative effect on users' intention to adopt a new innovation or technology. PFR are also considered to be one of the most important predictor used in the research field to predict the adoption intention of various new innovations, not only new the technologies (Mathieson et al., 2001). The users are more likely to adopt the new innovation or technology if the cost involved in its adoption is low (Ong, Poong, & Ng, 2008).

According to Constantinides (2002), the process of adopting a new innovation or technology will cause various costs such as equipment cost, access cost and conversion cost. On the other hand, a past study by He (2009) has indicated that PFR has a negative relationship with CL and a positive relationship with RA. An innovation or technology with high PFR would have a high RA and low CL (Liang,

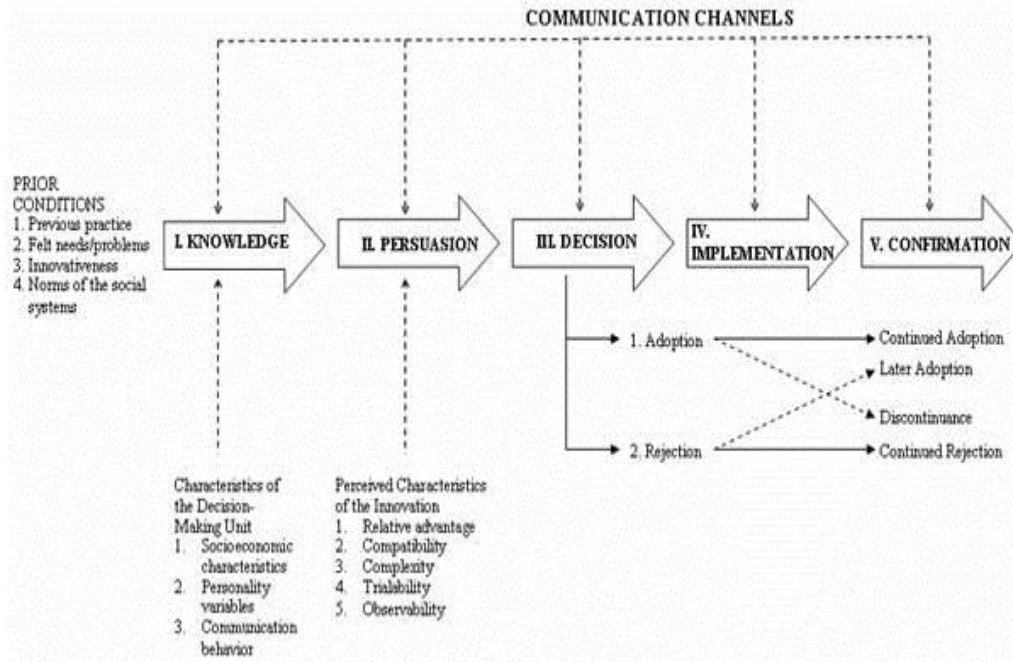
Chen, & Turban, 2009). In the context of NMP, the PFR is the cost that's involved in purchasing a mobile phone, subscription fee, service fee, communication and transaction fee and the maintenance cost (Tan, Ooi, Chong, & Hew, 2014). In terms of NMP, the consumers' are more likely to adopt the new payment system if the cost involved in its adoption and usage is low.

2.2 Review of Relevant Theoretical Models

2.2.1 Diffusion of Innovation Theory

The diffusion of innovation theory (DIT) is considered to be one of the most popular theories that often used by researchers in the past to explore the factors that affect an individual's intention to adopt a new innovation or technology. The DIT helps to explain how, why, and at what rate new ideas and technology spread through cultures. Rogers (2003) defined the term diffusion as the adoption of an innovation over time by the given social system. According to Rogers (2003), there are several attributes of an innovation that influences the adoption behavior of the potential adopter. Those attributes are known as RA, CO, CA, trialability, and observability. A number of studies in the past have used these factors to examine in the adoption and diffusion of various new technologies. The results of those studies have concluded that these attributes, particularly the RA, CL, and CA is very significant in predicting the adoption of new technologies (Liu & Li 2010; Papies & Clement 2008; Park & Chen 2007; Vijayasarathy 2004). Rogers (2003) also further explained that, under the DIT, the adopters of a new idea or technology can be divided into five categories, namely innovator, early adopter, early majority, late majority and laggards. According to the DIT, the users' will go through a process of knowledge, persuasion, decision and confirmation before they are ready to adopt a new innovation or technology (Rogers, 2003).

Figure 2.1 Diffusion of Innovation Theory



Source: Rogers (1995)

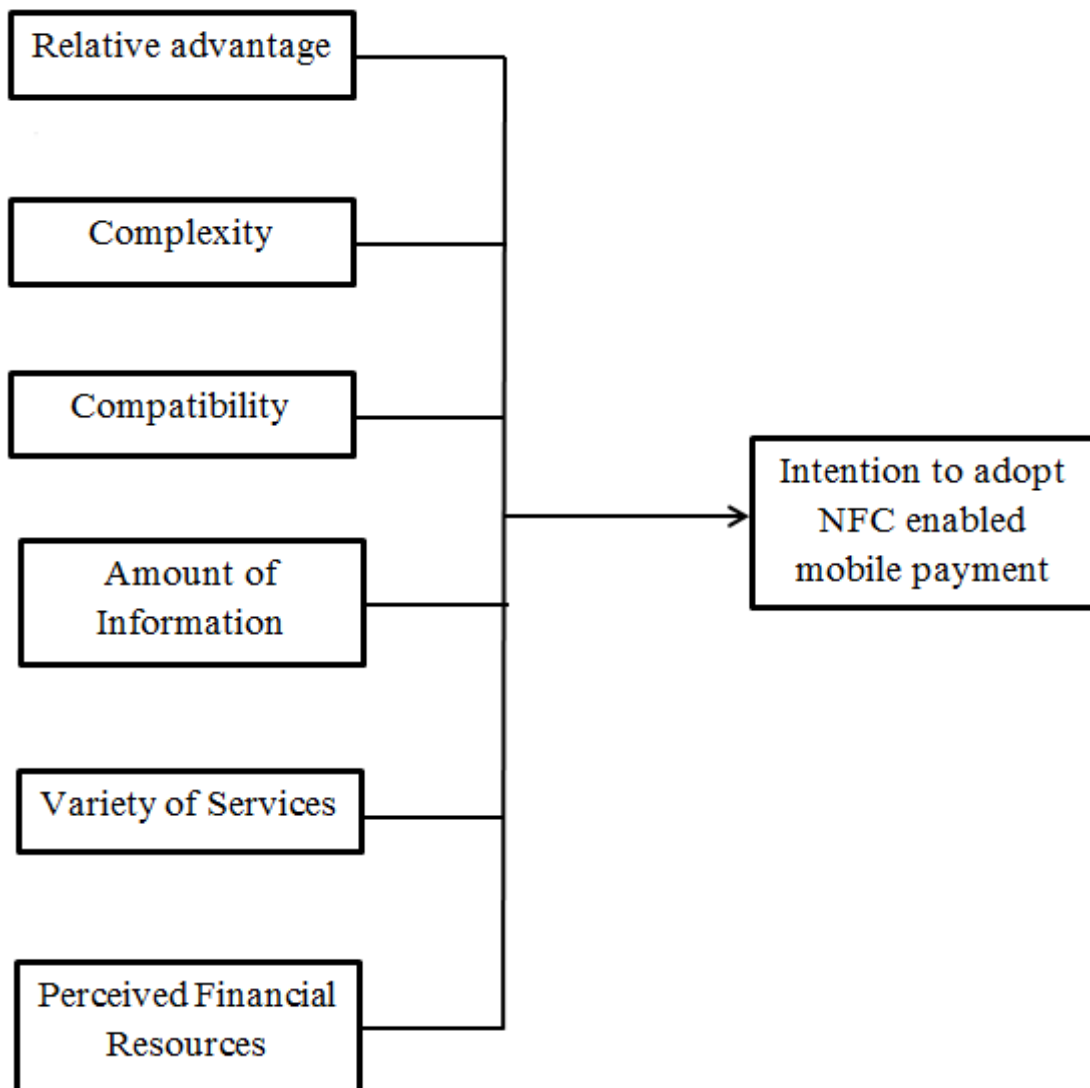
2.2.2 NFC-enabled Mobile Payment

There are two types of MP approaches. These approaches are known as the remote MP and proximity MP (Becker 2007; Chen 2008). In remote MPs, the payments are conducted by using the SMS or WAP/Internet. While, in proximity MPs, the payments are made by holding the payment devices near to each other. The proximity mobile payment, is also called as contactless mobile payment (Becker 2007; Chen 2008). Nowadays, the proximity MP is typically related to the NFC-based MP (Becker 2007; Chen 2008). NFC is a set of close-range wireless communication standards, which is built upon short-range radio-frequency identification (RFID) technology that allows a two-way communication between endpoints. In NMP, the NFC technology enables the consumers to exchange the payment information between their mobile device and the merchant's POS terminal by simply touching or waving the mobile devices close to the terminal (typically

under 20 cm) (Becker 2007; Chen 2008). The act of touching or waving the mobile device near the terminal will launch the encrypted near-field ad-hoc network connection. Some of the NFC payment system may require the user to input a secure PIN or password to approve the transaction, but in most of the cases, a PIN or password is not required to approve the transaction (Becker 2007; Chen 2008).

2.3 Proposed Conceptual Framework

Figure 2.2 Proposed Conceptual Framework



Adapted from: Rogers (2003); Wu and Wang (2005); Pikkarainen et al. (2004); Chong et al. (2010).

The research model of this study was developed from the Diffusion of Innovation theory (DIT). The DIT was developed by Rogers (2003) and it is often used in research to study about the adoption intention of new innovation or technology. However, in this study, not all the constructs in DIT are used. According to Tornatzky and Klein (1982), the trialability and the observability construct included in the DIT are not useful in predicting the adoption intention of a new innovation or technology. Therefore, in this study, these two constructs was dropped and replaced with another three constructs namely AOI, PFR and VOS. These three constructs were adopted because the past study by Mallat (2007) and Chong (2013) has concluded that the AOI, PFR and VOS are good predictors in terms of predicting the adoption intention of new innovation, especially those inventions related to mobile technologies. This modification is made to the model in order to accommodate the study in the context of Malaysian consumers'.

2.4 Conclusion

The review of past studies was provided in this chapter. The research model and hypotheses of the study were developed based on the literatures reviewed. The next chapter will be discussing about the research methodology of this study.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

In the previous chapter, the research model and the hypotheses of the study were developed after reviewing the literatures. This chapter will be discussing about the research design, the data collection methods, the sampling design, the research instrument, the variables and measurement, and data analysis techniques that will be used in this study.

3.1 Research Design

According to Burns and Bush (2010), research design is a systematic plan that guides a research to achieve its objective. Research design outlines necessary methodologies that are required to be carried out in order to obtain the information needed to solve the marketing research problems (Malhora, 2002).

3.1.1 Types of Research Design

A research can be either a single qualitative or quantitative research design or a multiple method research design (Sekaran & Bougie, 2010). The type of research design that has been used in this study is Quantitative research design. The primary focus of quantitative research design is to gather numerical data and analyze it using statistical tools to interpret the phenomena that being studied. The quantitative research design is used in this study as this research design enables the study to test the significance of the hypotheses that being developed (Sekaran & Bougie, 2010). Apart from that, this research design also enables the study to identify the association between the independent variables and the dependent variable (Sekaran & Bougie,

2010). Since, the research design of this study is quantitative, questionnaires will be used to collect relevant information from the target respondents.

3.1.2 Nature of Research Design

The nature of a research design can be descriptive, exploratory, explanatory or a combination of these (Sekaran, 2003). Since, the purpose of this study is to identify the Malaysian consumers' intention to adopt NMP, the nature of this research design is descriptive. According to Sekaran and Bougie (2010), a study is said to be descriptive if it intends to study or describe about a problem, phenomena or society's attitude towards an issue. Descriptive study enables researchers to gain insight about target respondents' attitude or opinion towards something with the use of questionnaires (Sekaran & Bougie, 2010).

3.1.3 Time Horizon of Research Design

A study can be either a cross-sectional study or longitudinal study (Sekaran & Bougie, 2010). A cross-sectional study has been adopted in this research design as the time horizon available to conduct this study was less than 6 months. According to Saunders et al. (2009), a cross-sectional study should be adopted in a research when the study intended to look at a phenomenon at only one point of time and when there is a time constraint in conducting the study. Since, this is a cross-sectional study, the information collected in terms of consumers' intention towards the adoption of NMP will only reflect the consumers' adoption intention that exist at the point they fill up the survey questionnaires.

3.2 Data collection methods

Data collection method refers to the techniques that being used in research to gather primary and secondary data. The research questions and the hypotheses of study are answered using both primary and secondary data (Malhotra, 2008).

Table 3.1 Data collection methods

Methods
<p><u>Primary data</u></p> <p>Primary data refer to the information that being collected for the first time to serve a specific purpose or address a specific problem in the hand (Malhotra, 2008). The primary data can be collected using methods such as observations, interviews, surveys and etc. The time and cost involved in collecting primary data are relatively higher compared to those involved in collecting secondary data (Malhotra, 2008). In this study, the primary data were collected by using the survey method. Questionnaires were used to gather the information from the target respondents. According to Sekaran and Bougie (2010), the questionnaire is a set of reformulated questions with various scales that being used in research to collect information from target respondents. The survey method was used in this study as it provides huge savings in terms of time and cost.</p>
<p><u>Secondary data</u></p> <p>According to Sekaran (2003), secondary data refer to the information that was previously collected by some other person to serve or address another issue rather than the issue in the hand currently. Secondary data are often collected using methods</p>

such as search retrieval. The cost involved in gathering the secondary data is relatively low or sometimes secondary data are freely available (Malhotra, 2008). Secondary data can be collected from sources such as journals, articles, published books and other online resources. In this study, majority of the secondary data was collected from various publications that are available in the UTAR Digital Library. Apart from that, some of the secondary data also was collected from the published books that are available at the UTAR Perak Campus Library. These sources were selected in this study to collect the secondary data as the access to these resources is free of charge. The Google search engine also was used in this study to collect the secondary data.

3.3 Sampling design

According to Malhotra and Peterson (2006), sampling is the process of selecting a small number of sample or units from the target population to represent the total population. The sample is the subset of the target population (Sekaran & Bougie, 2010). Therefore, the sample can be used to study the characteristics of the target population. The sample of a study can be obtained using methods such as probability sampling and non probability sampling (Zikmund, Babin, Carr, & Griffin, 2010). The sampling process will help a study to outline the population of study, location of sampling, sampling elements, sampling techniques, as well as the size of the sample (Malhotra & Peterson, 2006).

3.3.1 Target population

According to Malhotra (2009), target population is the collection of total elements in a group. In research, the collection of elements is used to make inferences that are related to the study (Saundres et al., 2009). The target population of this study is consumers. According to Federation of Malaysian Consumers Association (n.d.),

consumer is a person who consumes goods and services for personal satisfaction and well being. The consumers will consume goods and services on a daily basis and they will pay for the goods and services they consume (Federation of Malaysian Consumers Association, n.d.). Since, this study is intended to study about the adoption intention of a new payment system, the consumers are the one who are apt for this study as they are the one who frequently involved in the payment process. The results of this study are expected to be generalized in the Malaysian context, therefore the focus of this study was on the consumers who are Malaysian citizens.

3.3.2 Sampling size

The sampling size refers to the number of samples in a study. The sample is the subset of the population of interest in a study (Sekaran & Bougie, 2010). The sample size of this study is 500. According to Zikmund, Babin, Carr, and Griffin (2009), a study should have a sample size within the range of 300 to 500 if there is no sampling frame for the study. Since, this study does not have the sampling frame, the sample size is decided based on the specific range that is suggested by the past researchers. The largest sample size within the suggested range was selected for this study because according to Malhotra and Peterson (2006), a larger sample size will lead to a greater generalizability.

3.3.3 Sampling element

The sampling element refers to an individual person or object or item within a group of sample (Hair et al., 2006). Each and every sampling element is the subset of the sample of the study. The sampling elements are the target respondents of a study (Malhotra & Peterson, 2006). The sampling elements of this study are consumers who are Malaysian citizens, owns a smartphone and a credit card, who is 18 years old and above, and earns a minimum income of RM2000 per months. In this study,

preference was given to consumers who are the Malaysian citizens so that the results of this study can be generalized in the Malaysian context. Apart from that, this study also has placed an important emphasis on consumers who owns smartphone and credit card because these are the people who are more likely to adopt the NMP. On the other hand, the consumers with the age of 18 years old and above and earns a minimum income of RM2000 per month was selected for this study as they are the eligible consumer group in Malaysia that can own a credit card (HSBC Bank Malaysia, n.d.).

3.3.4 Sampling location

Sampling location refers to the place or area that being chosen in a research to collect the intended information from the target respondents. According to Leong, Hew, Tan and Ooi (2013), most of the previous studies that are related to the adoption intention of mobile payment were conducted at Selangor and not many studies have been conducted in the other states of Malaysia. Therefore, as an innovative step, this study was conducted at Perak. Perak is one of the top three states in Peninsular Malaysia with the highest number of smartphone users (Malaysian Communications and Multimedia Commission, 2012). Among the top three states, Selangor holds the first place (19.3%), then followed by Johor in the second place (11.7%) and Perak in the third place (8.2%) (Malaysian Communications and Multimedia Commission, 2012).

Though, Perak only holds the third place in terms of number of smartphone users, it was still selected as the sampling location for this study due to the fact that it holds the second place in terms of the adoption rate among the top three states with the highest number of smartphone users. In terms of adoption rate, Selangor still holds the first place (58%), then followed by Perak in second place (28.7%) and Johor in the third place (27.4%) (Malaysian Communications and Multimedia Commission, 2012). The high adoption rate of smartphone since year 2008 to 2012 provides an

indication that the consumers in the state of Perak are more willing to adopt a new innovation or technology when it is introduced. Thus, the consumers in Perak are considered to be the most valid sampling population for the purpose of this study.

In this study, importance was given to the number of smartphone users and adoption rate when it comes to the selection of sampling location. These two factors were given important consideration as consumers with the ownership of smartphone and willingness to adopt the new innovation or technology are very crucial for this study. In Perak, the Ipoh city was particularly selected to conduct this study. The Ipoh city was selected due to the fact that it is the centre of commerce, where most of the selling and buying in Perak takes place here (Department of Statistics Malaysia, 2010).

Since, this study intended to study about the adoption intention of a new innovative payment system, Ipoh is the right place as most of the payment transactions takes place here. In Ipoh, the questionnaires were particularly distributed in the shopping malls. Shopping malls were selected to conduct this study since it is very populous and consumers from various backgrounds can be identified there. The consumers from various backgrounds were targeted in this study in order to enable this study to be generalized in the Malaysian context (Leong et al., 2011). In a nutshell, the sampling location of this study is shopping malls in Ipoh, Perak.

3.3.5 Sampling period

Sampling period refers to the duration in which survey questionnaires are distributed to the target respondents to collect the information that are needed or the purpose of the study. The sampling period for this study was from 24/11/2014 to 04/01/2015. This period was chosen as it is the year end school holidays in Malaysia and consumers from both Perak and other states of Malaysia are expected to visit the shopping malls in Ipoh during that time period. The school holidays was chosen as shopping is one of the favorite activities for Malaysians during holidays (Lee, 1995).

3.3.6 Sampling frame

A sampling frame refers to the complete list of each and every element in the population of interest (Malhotra & Peterson, 2006). The samples are the subset of the sampling frame (Hair et al., 2006). There is no sampling frame for this study as the complete list of consumers who visit the shopping malls in Ipoh are not available.

3.3.7 Sampling technique

Sampling technique refers to the method that being used in a study to obtain the sample of the study (Zikmund, 2003). According to Sekaran and Bougie (2010), there are two types of sampling design which is probability sampling and non probability sampling. In this study, the non probability sampling design was used to obtain the samples, since, this study does not have sampling frame (Sekaran & Bougie, 2010). There are four sampling techniques under the non probability sampling design. Those sampling techniques are judgement sampling, quota sampling, snowball sampling and convenience sampling (Sekaran & Bougie, 2010).

Firstly, in this study, the judgement sampling was used to obtain the samples for the shopping malls in Ipoh. Secondly, once the sample of shopping malls was obtained, the convenience sampling was used to distribute the questionnaires to the consumers who visit the selected shopping malls. In the judgement sampling, the samples are selected based on the researcher's personal judgement (Sekaran & Bougie, 2010). In this study, three shopping malls in Ipoh were selected as the sampling location. The selected shopping malls are the AEON Station 18, Jusco Kinta City and Ipoh Parade.

These three shopping malls were selected as these are the top three biggest shopping malls in Ipoh. On the other hand, in convenience sampling, the samples are selected randomly based on the researcher's convenience (Sekaran & Bougie, 2010). In this study, the questionnaires were randomly distributed to those consumers who

visit the selected shopping malls in Ipoh. Those members of the population who were freely available were approached to fill in the questionnaires.

3.4 Research instrument

Research instrument refers to the tool that being designed to collect and measure the primary information that is relevant to purpose of the study (Sekaran & Bougie, 2010). Example of research instruments are questionnaire, interview, observation and etc. The validity and the reliability of a study highly depends on the research instrument used (Malhotra & Peterson, 2006). Therefore, it is important to choose the right research instrument.

3.4.1 Questionnaire

The research instrument that has been used in this study is questionnaire. The questionnaire is a set of questions that being used in a study to gather the target respondents opinion or behavior towards the topic of interest (Sekaran & Bougie, 2010). Questionnaires were used in this study as it is the most efficient and resourceful instrument when it comes to collecting information from large sample for the purpose of quantitative analysis (Saunders et al., 2009). Apart from that, the questionnaires also were used in this study due to their nature of high response rate and high effectiveness (Sekaran & Bougie, 2010). There are two types of questionnaire which are structured questionnaire and unstructured questionnaire.

In this study, structured questionnaire was used to collect the information about the Malaysian consumers' intention to adopt NMP. All the questions in the questionnaire are close ended and the target respondents were requested to select a response which is closest to their viewpoint from the choice of response given. The structured questionnaire was used in this study for two main reasons. First, its usage will cause less time consumption when the target respondents answer the

questionnaire and second, it will provide a meaningful information when it is analyzed using statistical tools (Hair, Babin, Money, & Samouel, 2003).

3.4.2 Questionnaire design

Questionnaire design refers to the process of translating the variables of a study into measurement to collect feedback or opinion of the target respondents (Malhotra, 2002). Designing a good questionnaire is an important aspect of a research. A well designed questionnaire will yield data that are required to achieve the purpose of the study (Creswell, 2013). The questionnaire design also strongly affects the validity and the reliability of the data that being collected for the purpose of the study (deVaus, 2002). In research, it is crucial to design the questionnaires in a way it is understandable for the target respondents. The failure to design such questionnaires will lead to research failure (McGuirk & O'Neill, 2005).

The questionnaire that was used in this study was prepared using the English language and all the questions that were used in the questionnaire were adapted from the past studies. The questions were adapted from the past studies to ensure that this study meets its both validity and reliability (Leong, Hew, Tan & Ooi, 2013). Each and every question in the questionnaire was designed in a way it is understandable to the target respondents and straight to the point. The reason why the questions are designed this way is to avoid the target respondents from getting confused with the questions. A clear instruction also was included in the questionnaire at the beginning of the each section. These instructions provide guidance to the target respondents when answering the questions in the respective sections. Table below shows the summary of questionnaire design for this study.

Table 3.2 The summary of questionnaire design

Section	Number of Questions	Questions	Type of scales used
A	6	Questions related to the target respondents' demographic profile.	Nominal and Ordinal scales
B	29	Questions related to the independent variables of the study.	Interval scales
C	4	Questions related to the dependent variable of the study.	Interval scales

3.4.3 Pilot test

According to Goeke and Pousttchi (2010), pilot test is a trial data collection procedure conducted in a study to detect the flaws in the research instrument and its design. Pilot testing helps to refine the questions in the questionnaire before it being distributed at the large scale (Zikmund, 2003). Apart from that, pilot testing also helps the study to check its validity and reliability before the actual study is conducted (Zikmund, 2003). According to Monette, Sullivan and DeJong (2002), the ideal sample size for the purpose of pilot testing is 20. Therefore, in this study, a sample of 20 consumers was randomly selected to obtain the critics and suggestions regarding the questionnaire.

Upon receiving the feedbacks, the questionnaire was re-structured by taking the critics and suggestions into the consideration. The collected questionnaires also was analyzed using the SPSS statistical software to find out whether it is reliable. The results of the reliability analysis showed that all the variables used in this study are

reliable (the Cronbach Alpha value is more than 0.70 for all the variables). Other than that, a few questionnaires also were distributed to few Universiti Tunku Abdul Rahman lecturers from the Business and Finance Faculty to obtain the critics and suggestions from them. This was done to ensure that this study meets its face validity.

3.5 Constructs Measurement (Scale and Operational Definitions)

3.5.1 Origin of the questions

Table 3.3 Origin of the questions

Variables	Adapted from
Relative advantage	Al-Jabri and Sohail (2012)
Complexity	Al-Jabri and Sohail (2012)
Compatibility	Al-Jabri and Sohail (2012)
Amount of information	Amin (2008)
Variety of services	Chong et al. (2010)
Perceived financial resources	Luarn and Lin (2005)
Intention to adopt	Luarn and Lin (2005)

3.5.2 Operational definition

Table 3.4 Operational definitions

Variables	Item
Relative advantage	<p>1. I will adopt NFC-enabled mobile payment if it allows me to conduct my payment transactions in a convenient manner</p> <p>2. I will adopt NFC-enabled mobile payment if it allows me to conduct my payment transactions efficiently</p> <p>3. I will adopt NFC-enabled mobile payment if it allows me to conduct my payment transactions effectively</p> <p>4. I will adopt NFC-enabled mobile payment if it gives me greater control over my payment transactions</p> <p>5. I will adopt NFC-enabled mobile payment if it is useful for managing my payment transactions</p>
Complexity	<p>1. I will adopt NFC-enabled mobile payment if it only requires little mental effort in operating the payment system</p> <p>2. I will adopt NFC-enabled mobile payment if it only requires little technical skills in operating the payment system</p> <p>3. I will adopt NFC-enabled mobile payment if the usage of the payment system will not result in frustration</p>

	<p>4. I will adopt NFC-enabled mobile payment if the learning process to use it is simple</p> <p>5. I will adopt NFC-enabled mobile payment if the payment system is extremely easy to be familiarized</p>
Compatibility	<p>1. I will adopt NFC-enabled mobile payment if it fits well with the way I like to manage my payment transactions</p> <p>2. I will adopt NFC-enabled mobile payment if it fits well with my lifestyle</p> <p>3. I will adopt NFC-enabled mobile payment if it fits well with my working style</p> <p>4. I will adopt NFC-enabled mobile payment if it fits well with my daily routine tasks</p> <p>5. I will adopt NFC-enabled mobile payment if it is compatible with other mobile services</p>
Amount of information	<p>1. I will adopt NFC-enabled mobile payment if I have enough information about it</p> <p>2. I will adopt NFC-enabled mobile payment if I have enough information about the benefits I will enjoy upon the adoption</p> <p>3. I will adopt NFC-enabled mobile payment if I receive the information about the payment system from the banking institutions</p> <p>4. I will adopt NFC-enabled mobile payment if I have enough information about the services I could perform</p>

	<p>by adopting it</p> <p>5. I will adopt NFC-enabled mobile payment if I have enough information about what I need to do in order to become its user</p>
Variety of services	<p>1. I will adopt NFC-enabled mobile payment if it allows me to perform many additional functions along with the payment function</p> <p>2. I will adopt NFC-enabled mobile payment if the additional functions it offers are attractive</p> <p>3. I will adopt NFC-enabled mobile payment if the additional functions it offers meet my needs</p> <p>4. I will adopt NFC-enabled mobile payment if the current additional functions it provides are up to my expectation</p>
Perceived financial resources	<p>1. I will adopt NFC-enabled mobile payment if its adoption fees are inexpensive</p> <p>2. I will adopt NFC-enabled mobile payment if its annual fees are inexpensive</p> <p>3. I will adopt NFC-enabled mobile payment if its transaction fees are inexpensive</p> <p>4. I will adopt NFC-enabled mobile payment if its maintenance fees are inexpensive</p> <p>5. I will adopt NFC-enabled mobile payment if the cost involved in purchasing the mobile phone is reasonable</p>

Intention to adopt	<ol style="list-style-type: none"> 1. I intend to adopt NFC-enabled mobile payment in the near future 2. I intend to use NFC-enabled mobile payment frequently in the near future if I have access to it 3. I intend to use NFC-enabled mobile payment to make payments for my purchases in the near future if I have access to it 4. I intend to recommend NFC-enabled mobile payment to my family and friends in the future
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3.5.3 Scale measurement

According to Sekaran (2003), scale is a tool or mechanism used in research to measure the variables of the study. There are four types of scales that can be used in a study to measure and interpret the variables of the study in a meaningful way. Those scales are known as nominal scale, ordinal scale, interval scale and ratio scale (Hair et al., 2007). On the other hand, the concept of measurement refers to the process of assigning numbers to the variables of a study (Hair et al., 2007). These numbers are usually assigned based on certain rules (Hair et al., 2007). Measuring the scales that being used in a study enables the researchers to interpret and draw a conclusion about the study (Hair et al., 2007). The table below shows the type of scales used in this study.

Table 3.5 Type of scales used in the study

Type of scales used in the study
<p><u>Nominal scale</u></p> <p>The nominal scale allows the researchers to assign subject to certain classes or groups. According to Hair et al. (2007), nominal scale does not reflect any quantitative information or ranking. The nominal scale is used in research for the purpose of identification or classification (Sekaran & Bougie, 2010). In this study, nominal scale is used in section A to obtain the information related to the target respondents demographic profile. The type of rating scale that is used to measure the variables in section A is dichotomous scale. The dichotomous scale is usually used in research to obtain a Yes or No answer or gender information (Sekaran & Bougie, 2010).</p>
<p><u>Ordinal scale</u></p> <p>The ordinal scale is a scale that categories the qualitative differences in the variables of interest and rank them in a meaningful way (Sekaran & Bougie, 2010). According to Hair et al. (2007), ordinal scale allows researchers to decide whether a particular object has more or less characteristic than another object. In this study, ordinal scale also is used in section A of the questionnaire to obtain the information about the target respondents' demographic profile. The type of rating scale that is used to measure these variables is category scale. According to Sekaran and Bougie (2010), the category scale uses multiple items to obtain a single response.</p>
<p><u>Interval scale</u></p> <p>The interval scale helps to arrange the objects, people or places in an order by taking the magnitude into consideration and the interval between the orders are always equal (Zikmund et al., 2009). The interval scale has the features of the both nominal and ordinal scales (Zikmund et al., 2009). The interval scale also captures the information about the difference in quantities or distance from one observation to</p>

another (Zikmund, 2003). In this study, the interval scale is used in section B and C of questionnaire to obtain the information about the variables of the study. The type of rating scale that is used in this study to measure the variables of the study are the 5 point-Likert scale. The 5 point-Likert scale is used in this study as it is regarded as the most effective scale among all the Likert scales (Evens, Schuurman, Marez & Verleye, 2010). The 5 point-Likert scale enables researchers to find out how strongly the target respondents agree or disagree with the statements on a five point scale which has the following anchors: “Strongly disagree, Disagree, Neutral, Agree and Strongly agree” (Sekaran & Bougie, 2010).

3.5.4 Summary of the scales used in the questionnaire

Table 3.6 Summary of the scales used in the questionnaire

Items	Type of scale used	Type of rating scale used
Do you own a Credit Card	Nominal scale	Dichotomous scale
Do you own a Smartphone	Nominal scale	Dichotomous scale
Gender	Nominal scale	Dichotomous scale
Age	Ordinal scale	Category scale
Income	Ordinal scale	Category scale
Frequency of credit card use	Ordinal scale	Category scale
Relative advantage	Interval scale	Likert scale
Complexity	Interval scale	Likert scale
Compatibility	Interval scale	Likert scale

Amount of information	Interval scale	Likert scale
Variety of services	Interval scale	Likert scale
Perceived financial resources	Interval scale	Likert scale
Intention to adopt	Interval scale	Likert scale

3.6 Data processing

According to Sekaran (2003), the researchers are required to perform several preliminary activities before the data being collected from the target respondents are analyzed using the statistical tools. These activities are important to ensure that the data are accurate, complete and appropriate for the further analysis. These preliminary activities are known as data processing. The table below describes each and every step in the data processing.

Table 3.7 Data processing steps

Data processing steps
<p><u>Data checking</u></p> <p>This is the first stage in the data processing process. At this stage, those questionnaires that were collected from the target respondents were checked for the completeness. Those incomplete questionnaires were omitted from the further processing at this stage (Malhotra, 2007). According to Malhotra and Peterson (2006), this stage help researchers to detect problems or errors in the early stage itself. This stage also enables researchers to take corrective actions before moving on to the next stage which is data editing.</p>

Data editing

Data editing is the second stage in the data processing process. According to Malhotra (2007), the purpose of this stage is to promote accuracy and precision of the data that was collected. In this stage, the questionnaires with outliers were removed. This measure was taken to ensure that the data are accurate and fit for the data coding stage (Kothari, 2004).

Data coding

Data coding is the third stage in the data processing process. According to Kothari (2004), data coding refers to the process of assigning numerical value to each and every individual response in the questionnaire. The codes are assigned to all the responses in the questionnaire to enable the questionnaires to be analyzed using statistical tools to obtain meaningful interpretations (Malhotra & Peterson, 2006).

Data transcribing

Data transcribing is the fourth stage in the data processing process. According to Malhotra and Peterson (2006), data transcribing refers to the process of transferring coded facts from the questionnaires into the computers via key punching. In this study, the data from the questionnaires were directly entered into the SPSS statistical software once it has been coded.

Data cleaning

Data cleaning is the last stage in the data processing process. According to Malhotra (2007), this stage is quite similar to the data editing stage. However, this stage is more wide-ranging and detailed. Data cleaning helps to identify data which have extreme value, logically inconsistent and out of range (Malhotra, 2007).

3.7 Data analysis

Data analysis refers to the process of transforming the raw data into meaningful information by using various statistical techniques. Later, this information is used by researchers to draw conclusions and get better insights about the study (Zikmund et al., 2010). Data analysis helps researchers' to find out whether the proposed hypotheses are significant or not (Sekaran & Bougie, 2010). In this study, all the raw data was analyzed using SPSS software. The type of analysis that has been conducted in this study is descriptive analysis, reliability analysis and inferential analysis.

3.7.1 Descriptive analysis

According to Zikmund et al. (2010), descriptive analysis is an analysis technique used in research to summarize the study's raw data into a form that is easy to interpret and understand. The descriptive analysis is usually used in research to represent the information or characteristics about the sample of the study (Zikmund, 2003). The table below shows the descriptive analysis techniques that are used in this study.

Table 3.8 The descriptive analysis techniques used in this study

The descriptive analysis techniques
<p><u>Frequency distribution</u></p> <p>Frequency distribution refers to the most common way of summarizing the demographic profiles of the target respondents of a study (Malhotra & Peterson, 2006). The frequency distribution will show the number of observations falling into each of several ranges of values. Frequency distribution enables researchers to generate useful statistics and graphical display (Malhotra & Peterson, 2006). In this study, the frequency distribution is used to summarize the demographic profile of the target respondents.</p>
<p><u>Central tendency</u></p> <p>The central tendency is used in a research to describe about the center of the frequency distribution. The central tendency combines and summarizes all the data in a study to reflect the general trend in the study (Malhotra & Peterson, 2006). The central tendency is often used to measure the mean, the median and the mode of the study (Malhotra & Peterson, 2006). In this study, the measures of central tendency are used to obtain information regarding the mean and mode of each and every question in the questionnaire.</p>

3.7.2 Reliability analysis

Reliability analysis refers to the statistical analysis used in research to find out whether the measurement used in the study is stable and free from errors and mistakes. Reliability is crucial in research as the ability to generate a consistent result

is influenced by the reliability (Zikmund, 2003). Generally, there are three types of reliability test that can be used in research to test the reliability of the study. According to Hair et al. (2007), those three tests are known as the alternative form reliability, test-retest reliability and internal consistency reliability. The type of reliability test that is used in this study is internal consistency reliability. In research, internal consistency reliability is often measured using Cronbach Alpha (Ghauri & Gronhaug, 2010). The value of Cronbach Alpha ranges from 0 to 1. The value 0 means there is no consistency, while the value 1 means complete consistency (Zikmund, Babin, Carr, & Griffin, 2010). The reliability analysis is conducted in this study to find out whether the measuring procedure yields the same results on the repeated trials. The table below shows the rules of thumb for Cronbach Alpha.

Table 3.9 Rules of thumb for Cronbach Alpha

Level of reliability	Alpha ranges
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 (2010)

3.7.3 Inferential analysis

The inferential analysis refers to the use of various statistical techniques and procedures in research to draw conclusion about the population of study by using the data collected from the sample (Sekaran & Bougie, 2010). The inferential analysis is

used in this study to examine the relationship that exists between the independent variables and the dependent variable of the study. The type of inferential analysis that is used in this study is Pearson Correlation Coefficient Analysis, Multicollinearity and Multiple Linear Regression.

3.7.3.1 Pearson Correlation Coefficient Analysis

Pearson Correlation Coefficient Analysis refers to a statistical analysis that measures the strength and direction of a linear relationship between an independent variable and a dependent variable (Malhotra & Peterson, 2006). The value range of Pearson Correlation Coefficient Analysis is between -1 to 1 (Hair et al., 2007). The variables of a study are said to have a perfect positive relationship if the value of correlation coefficient is +1. On the other hand, if the value of correlation coefficient is -1, then the variables of the study are considered to have a perfect negative relationship. In this study, Pearson Correlation Coefficient Analysis is used to identify the strength and direction of each and every independent variable with the dependent variable. The table below shows the rules of thumb for the Pearson Correlation Coefficient Analysis.

Table 3.10 Rules of thumb for the Pearson Correlation Coefficient Analysis

Coefficient ranges for a positive relationship	Strength of association	Coefficient ranges for a negative relationship	Strength of association
+0.91 to +1.00	Very strong	-0.91 to -1.00	Very strong
+0.71 to +0.90	High	-0.71 to -0.90	High
+0.41 to +0.70	Moderate	-0.41 to -0.70	Moderate
+0.21 to +0.40	Small but definite relationship	-0.21 to -0.40	Small but definite relationship
+0.00 to +0.20	Slight, almost negligible	-0.00 to -0.20	Slight, almost negligible

Source: Hair, Money, Samouel, and Page (2007)

3.7.3.2 Multicollinearity test

According to Zikmund et al. (2010), multicollinearity is a situation where the independent variables of a study are highly correlated among each other. In research, Partial Correlation Analysis is often used to identify the existence of the multicollinearity issues. The Partial Correlation Analysis measures the relationship between two independent variable while controlling the third independent variable (Zikmund et al., 2010). If the correlation value of the independent variables in the Partial Correlation Analysis is 0.70 or above, then there is a multicollinearity issue in the study. Meanwhile, if a particular pair of independent variables has a correlation value of more than 0.90, then they are said to be highly correlated among each other (Sekaran & Bougie, 2010). In research, it is always crucial to remove those

independent variables that are highly correlated with each other in order to draw an unbiased conclusion about the study (Sekaran & Bougie, 2010). The multicollinearity test is conducted in this study to find out whether there is a presence of multicollinearity issues among the independent variables of the study.

3.7.3.3 Multiple Linear Regression

According to Hair et al. (2006), multiple linear regression is a type of inferential analysis technique used in research to examine the relationship between one dependent variable and multiple independent variables. The multiple linear regression helps to answer three major questions in research (Hair et al., 2007). First, whether the relationship between the independent variables and the dependent variable are significant. Second, how strong is the association between the independent variables and the dependent variable. Third, the direction of relationship between the independent variables and the dependent variable are positively or negatively related. In this study, the multiple linear regression is used to examine the relationship that exists between the independent variables and the dependent variable. This analysis technique is used because this study has more than one independent variable to be analyzed with the dependent variable of the study. Apart from that, the multiple linear regression also is used in this study to identify which are the independent variables that have the significant relationship with the dependent variable, the strength of the relationship between each of the independent variables and the dependent variable as well as their direction of the relationship. The multiple linear equation for this study are as table below:

Table 3.11 Multiple linear equation

<u>Multiple linear equation</u>
$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$ <p>Y = Dependent Variable = Intention to Adopt NMP</p> <p>X1 = 1st Independent Variable = RA</p> <p>X2 = 2nd Independent Variable = CL</p> <p>X3 = 3rd Independent Variable = CA</p> <p>X4 = 4th Independent Variable = AOI</p> <p>X5 = 5th Independent Variable = VOS</p> <p>X6 = 6th Independent Variable = PFR</p> <p>α = the intercept of the regression line or constant point where the straight line intersects the</p> <p>Y-axis when X equals to zero</p> <p>$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ & β_6 = the slope of the regression line or regression coefficient for X1, X2, X3, X4, X5 & X6</p>

3.8 Conclusion

The crucial part of a research is the research methodology. It helps researchers to systematically resolve the research problem. In overall, the chapter 3 has discussed about the research design, the data collection method, the sampling

design, the research instrument, the construct measurement, and the data analysis techniques that will be adopted in this study.

CHAPTER 4: RESULTS AND INTERPRETATION

4.0 Introduction

In the earlier chapter, the discussions about the research design, the data collection method, the sampling design, the research instrument, the construct measurement, and the data analysis techniques were made. This chapter will be discussing about the results of the various analysis techniques that has been conducted using SPSS software.

4.1 Response Rate

In total, 500 questionnaires were randomly distributed to consumers who visited shopping malls in Ipoh. Out of 500 questionnaires that being distributed, only 493 questionnaires were returned. Thus, the response rate of this study is 98.6%. According to Sekaran and Bougie (2010), a study should have at least a 30% of response rate in order for it to be considered as acceptable. Therefore, this study is acceptable as the response rate exceeded the minimum threshold. However, only 487 questionnaires were analysed using the SPSS software. A total of 6 questionnaires was removed from further analysis due to its incomplete nature.

4.2 Descriptive Analysis

4.2.1 Frequency Distribution

4.2.1.1 Smartphone and Credit Card

Table 4.1 Owns a Smartphone and Credit Card

Details		Frequency	Percentage
Owns a Smartphone	Yes	487	100%
	No	0	0%
Owns a Credit Card	Yes	487	100%
	No	0	0%

Source: SPSS Output

Table 4.1 shows the summary of the number of target respondents who owns a Smartphone and a Credit Card. All the target respondents in this study own a Smartphone and a Credit Card.

4.2.1.2 Gender

Table 4.2 Gender

Details	Frequency	Percentage
Male	180	37%
Female	307	63%

Source: SPSS Output

Table 4.2 illustrates the gender information of the target respondents. The majority of the target respondents in this study is female, where they made up 63% of the total target respondents. Meanwhile, the remaining 37% of the target respondents is male.

4.2.1.3 Age

Table 4.3 Age

Details	Frequency	Percentage
18 years - 28 years	173	35.5%
29 years - 39 years	216	44.4%
40 years – 50 years	71	14.6%
51 years and above	27	5.5%

Source: SPSS Output

Table 4.3 depicts the age information of the target respondents. The majority of the target respondents in this study fall under the age category of 29 years to 39 years. The percentage of target respondents that falls under this age category is 44.4%. While, the second highest age category in this study is 18 years to 28 years (35%), then followed by the age category of 40 years to 50 years (14.6%) at the third place and 51 years and above (5.5%) at the fourth place.

4.2.1.4 Income

Table 4.4 Income

Details	Frequency	Percentage
RM 2,000 – RM 4,000	277	56.9%
RM 4,001 – RM 6,000	83	17%
RM 6,001 – RM 8,000	76	15.6%
RM 8,001 – RM 10,000	37	7.6%
RM 10,001 and above	14	2.9%

Source: SPSS Output

Table 4.4 visualizes the income information of the target respondents. The majority of the target respondents in this study fall under the income category of RM 2,000 – RM 4,000. The percentage of target respondents that falls under this category is 56.9%. While, the second highest income category in this study is RM 4,001– RM 6,000 (17%), then followed by the income category of RM 6,001 – RM 8,000 (15.6%) at the third place and RM 8,001 – RM 10,000 (7.6%) at the fourth place. On the other hand, the remaining 2.9% of the target respondents in this study falls under the income category of RM 10,001 and above.

4.2.1.5 Frequency of Credit Card usage

Table 4.5 Frequency of Credit Card usage

Details	Frequency	Percentage
I don't use credit card every month. I only use the credit card when it is necessary to use it to make the payment.	120	24.6%
1 - 3 times	200	41.1%
4 - 10 times	122	25.1%
11 - 20 times	25	5.1%
21 times and above	20	4.1%

Source: SPSS Output

Table 4.5 shows the summary of the target respondents' frequency of Credit Card usage. The majority of the target respondents in this study stated that they use their Credit Card about 1 – 3 times per month. The percentage of target respondents that falls under this category is 41.1%. Meanwhile, the second highest frequency of Credit Card usage in this study is 4 – 10 times. The percentage of target respondents

that falls under this category is 25.1%. On the other hand, 24.6% of the target respondents in this study have stated that they don't use their Credit Card every month and they only use it when it is necessary to use the Credit Card to make the payment. Apart from that, there are also several target respondents in this study that use their Credit Card for 11 – 20 times per month. The percentage of target respondents that falls under this category is 5.1%. While, the remaining 4.1% of the target respondents in this study has stated that they use their Credit Card for about 21 times or more per month.

4.2.2 Central Tendency

4.2.2.1 Relative advantage

Table 4.6 Central Tendency for RA

No.	Questions	Mean	Mode
RA1	I will adopt NFC-enabled mobile payment if it allows me to conduct my payment transactions in a convenient manner	4.03	4
RA2	I will adopt NFC-enabled mobile payment if it allows me to conduct my payment transactions efficiently	4.08	4
RA3	I will adopt NFC-enabled mobile payment if it allows me to conduct my payment transactions effectively	4.10	4
RA4	I will adopt NFC-enabled mobile payment if it gives me greater control over my payment transactions	4.06	4
RA5	I will adopt NFC-enabled mobile payment if it is useful for managing my payment transactions	4.19	4

Table 4.6 shows the summary of the central tendency for the variable called RA. The mean value for all the questions related to RA in this study falls within the range of 4.03 to 4.19. The RA5 has the highest mean score, while RA1 has the lowest mean score. On the other hand, the mode score for all the questions related to RA in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have “Agreed” to all the questions related to RA.

4.2.2.2 Complexity

Table 4.7 Central Tendency for CL

No.	Questions	Mean	Mode
CL1	I will adopt NFC-enabled mobile payment if it only requires little mental effort in operating the payment system	1.97	2
CL2	I will adopt NFC-enabled mobile payment if it only requires little technical skills in operating the payment system	1.83	1
CL3	I will adopt NFC-enabled mobile payment if the usage of the payment system will not result in frustration	1.78	1
CL4	I will adopt NFC-enabled mobile payment if the learning process to use it is simple	1.69	1
CL5	I will adopt NFC-enabled mobile payment if the payment system is extremely easy to be familiarized	1.70	1

Table 4.7 shows the summary of the central tendency for the variable called CL. The mean value for all the questions related to RA in this study falls within the range of 1.69 to 1.97. The CL1 has the highest mean score, while CL4 has the lowest mean score. On the other hand, the mode score for the majority of the questions related to CL in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have “Strongly Agreed” to all the questions related to CL.

4.2.2.3 Compatibility

Table 4.8 Central Tendency for CA

No.	Questions	Mean	Mode
CA1	I will adopt NFC-enabled mobile payment if it fits well with the way I like to manage my payment transactions	4.18	4

CA2	I will adopt NFC-enabled mobile payment if it fits well with my lifestyle	4.33	5
CA3	I will adopt NFC-enabled mobile payment if it fits well with my working style	4.23	4
CA4	I will adopt NFC-enabled mobile payment if it fits well with my daily routine tasks	4.10	4
CA5	I will adopt NFC-enabled mobile payment if it is compatible with other mobile services	4.16	4

Table 4.8 shows the summary of the central tendency for the variable called CA. The mean value for all the questions related to RA in this study falls within the range of 4.10 to 4.33. The CA2 has the highest mean score, while CA4 has the lowest mean score. On the other hand, the mode score for the majority of the questions related to CA in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have “Strongly Agreed” to all the questions related to CA.

4.2.2.4 Amount of information

Table 4.9 Central Tendency for AOI

No.	Questions	Mean	Mode
AOI1	I will adopt NFC-enabled mobile payment if I have enough information about it	4.13	4
AOI2	I will adopt NFC-enabled mobile payment if I have enough information about the benefits I will enjoy upon the adoption	4.15	4
AOI3	I will adopt NFC-enabled mobile payment if I receive the information about the payment system from the banking institutions	4.19	4
AOI4	I will adopt NFC-enabled mobile payment if I have enough information about the services I could perform by adopting it	4.25	4
AOI5	I will adopt NFC-enabled mobile payment if I have enough information about what I need to do in order to become its user	4.15	4

Table 4.9 shows the summary of the central tendency for the variable called AOI. The mean value for all the questions related to AOI in this study falls within the range of 4.13 to 4.25. The AOI4 has the highest mean score, while AOI1 has the lowest mean score. On the other hand, the mode score for all the questions related to AOI in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have “Agreed” to all the questions related to AOI.

4.2.2.5 Variety of services

Table 4.11 Central Tendency for VOS

No.	Questions	Mean	Mode
VOS1	I will adopt NFC-enabled mobile payment if it allows me to perform many additional functions along with the payment function	4.14	4
VOS2	I will adopt NFC-enabled mobile payment if the additional functions it offers are attractive	4.17	4
VOS3	I will adopt NFC-enabled mobile payment if the additional functions it offers meet my needs	4.33	5
VOS4	I will adopt NFC-enabled mobile payment if the current additional functions it provides are up to my expectation	4.30	4

Table 4.11 shows the summary of the central tendency for the variable called VOS. The mean value for all the questions related to VOS in this study falls within the range of 4.14 to 4.33. The VOS3 has the highest mean score, while VOS1 has the lowest mean score. On the other hand, the mode score for the majority of the questions related to VOS in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have “Strongly Agreed” to all the questions related to VOS.

4.2.2.6 Perceived financial resources

Table 4.12 Central Tendency for PFR

No.	Questions	Mean	Mode
PFR1	I will adopt NFC-enabled mobile payment if its adoption fees are inexpensive	1.67	2
PFR2	I will adopt NFC-enabled mobile payment if its annual fees are inexpensive	1.83	2
PFR3	I will adopt NFC-enabled mobile payment if its transaction fees are inexpensive	1.64	1
PFR4	I will adopt NFC-enabled mobile payment if its maintenance fees are inexpensive	1.65	2
PFR5	I will adopt NFC-enabled mobile payment if the cost involved in purchasing the mobile phone is reasonable	1.70	2

Table 4.12 shows the summary of the central tendency for the variable called PFR. The mean value for all the questions related to PFR in this study falls within the range of 1.64 to 1.83. The PFR2 has the highest mean score, while PFR3 has the lowest mean score. On the other hand, the mode score for the majority of the questions related to PFR in this study is 2. The findings of this study indicate that the majority of the target respondents in this study have “Agreed” to all the questions related to PFR.

4.2.2.7 Intention to adopt

Table 4.13 Cenral Tendency for Intention to Adopt

No.	Questions	Mean	Mode
ITA1	I intend to adopt NFC-enabled mobile payment in the near future	3.99	4
ITA2	I intend to use NFC-enabled mobile payment frequently in the near future if I have access to it	4.08	4
ITA3	I intend to use NFC-enabled mobile payment to make payments for my purchases in the near future if I have access to it	4.02	4

ITA4	I intend to recommend NFC-enabled mobile payment to my family and friends in the future	3.90	4
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Table 4.13 shows the summary of the central tendency for the variable called Intention to Adopt. The mean value for all the questions related to Intention to Adopt in this study falls within the range of 3.90 to 4.08. The ITA2 has the highest mean score, while ITA4 has the lowest mean score. On the other hand, the mode score for the majority of the questions related to Intention to Adopt in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have “Agreed” to all the questions related to Intention to Adopt.

4.3 Reliability Analysis

Table 4.14 Level of Reliability

Variables	Cronbach's Alpha	No. of items	Level of Reliability
Relative advantage	0.909	5	Very good Reliability
Complexity	0.900	5	Very good Reliability
Compatibility	0.795	5	Good Reliability
Amount of information	0.894	5	Very good Reliability
Variety of services	0.913	4	Very good Reliability
Perceived financial resources	0.917	5	Very good Reliability
Intention to Adopt	0.918	4	Very good Reliability

Source: SPSS Output

Table 4.14 shows the results of the reliability analysis of this study. The Cronbach Alpha value for all the variables in this study is more than 0.70. According to Nunnally (1978), the value of the Cronbach Alpha for a variable should be at least 0.70 in order for it to be considered as reliable. Therefore, all the variables in this

study are reliable. The majority of the variables in this study has a very good reliability, where their Cronbach Alpha value is more than 0.81 (Sekaran & Bougie, 2010).

4.4 Inferential Analysis

4.4.1 Pearson Correlation Coefficient Analysis

Table 4.15 Pearson Correlation Coefficient

Variables	RA	CL	CA	AOI	VOS	PFR	ITA
RA	1						
CL	-0.637	1					
CA	0.502	-0.582	1				
AOI	0.337	-0.331	0.388	1			
VOS	0.270	-0.390	0.379	0.614	1		
PFR	-0.294	0.294	--0.352	-0.381	-0.339	1	
ITA	0.290*	-0.335*	0.241*	0.467**	0.529**	-0.305*	1

Source: SPSS Output

* Small but definite relationship with the dependent variable

** Moderate association with the dependent variable

Table 4.15 shows the results of the Pearson Correlation Coefficient analysis of this study. The Pearson Correlation Coefficient for most of the variables in this study is between 0.21 - 0.40. This indicates that the majority (4 out of 6) of the independent variables in this study has a small but definite relationship with the dependent variable (Hair, Money, Samouel, & Page, 2007). On the other hand, the remaining 2 independent variables of this study have a Pearson Correlation Coefficient between the range of 0.41 – 0.70. Therefore, these 2 independent variables are said to have a moderate association with the dependent variable of the study (Hair, Money,

Samouel, & Page, 2007). The majority of the independent variables in this study have a positive relationship with the dependent variable, except for the variables called CL and PFR. The CL and PFR have a negative, small but definite relationship with Intention to Adopt NMP.

4.4.2 Multicollinearity Test

Table 4.16 Partial Correlation Analysis

Variables	RA	CL	CA	AOI	VOS	PFR
RA	1					
CL	-0.599	1				
CA	0.466	-0.548	1			
AOI	0.238	-0.209	0.321	1		
VOS	0.144	-0.26	0.306	0.490	1	
PFR	-0.225	0.214	-0.301	-0.284	-0.220	1

Source: SPSS Output

Table 4.16 shows the results of the Multicollinearity test of this study. The correlation value of all the variables in this study is less than 0.70. According to Sekaran and Bougie (2010), there is no multicollinearity issue in a study if the correlation values between its independent variables are less than 0.70. Therefore, there is no multicollinearity problem in this study.

4.4.3 Multiple Linear Regression

Table 4.17 Model summary

Model	R	R Square	Adjusted R Square
1	0.584	0.341	0.333

Source: SPSS Output

Table 4.17 shows the model summary of this study. The R square value of this study is 0.341. The R Square value in the model summary is used to explain the variation in the dependent variable of a study due to the study's independent variables (Sekaran & Bougie, 2010). According to Donald (1975), the R square value for most of the research that is related to behavioral intention are between the range of 0.10 – 0.50. The R square value for these researches is lower due to the fact that human behaviours are difficult to predict and changes from time to time. In this study, 34.1% of the variation in Intention to Adopt NMP can be explained by using RA, CL, CA, AOI, VOS and PFR. In other words, 65.9% of the variations in the Intention to Adopt NMP can be explained by other variables that are not included in this study.

Table 4.18 Anova

Model	F Statistic	Sig.
1	41.445	0.000

Source: SPSS Output

Table 4.18 shows the results of the F-Statistics of this study. The value of F-Statistics is used in a study to examine the overall statistical significance of the regression model (Sekaran & Bougie, 2010). The regression model is said to be significant if it has a P-Value which is less than 0.05 (Sekaran & Bougie, 2010). The F-Statistics value for this study is 41.445 and it has a P-Value of 0.000. Therefore, the

regression model of this study is statistically fit to predict the dependent variable of the study using the independent variables.

Table 4.19 Coefficients

Model	Unstandardized Coefficients	P – Value	Significant or Insignificant
1 (Constant)	2.037	0.000	
Relative advantage	0.108	0.094	Insignificant
Complexity	-0.140	0.028	Significant
Compatibility	- 0.159	0.024	Significant
Amount of information	0.244	0.000	Significant
Variety of services	0.383	0.000	Significant
Perceived financial resources	-0.118	0.029	Significant

Source: SPSS Output

Table 4.19 shows the summary of the Multiple Linear Regression of this study. The majority of the independent variables of this study have a significant relationship with the dependent variable. According to Sekaran and Bougie (2010), an independent variable is said to have a significant relationship with the dependent variable if it has a P-Value of less than 0.05. Apart from that, most of the independent variables in this study also have a positive relationship with the dependent variable. The Multiple Linear Regression equation for this study and its explanation are as table below:-

Table 4.20 Equation and Explanation

Equation
$Y = 2.037 + 0.108 X1 - 0.140 X2 - 0.159 X3 + 0.244 X4 + 0.383 X5 - 0.118 X6$ <p>Y = Dependent Variable = Intention to Adopt NMP</p> <p>X1 = 1st Independent Variable = RA</p> <p>X2 = 2nd Independent Variable = CL</p> <p>X3 = 3rd Independent Variable = CA</p> <p>X4 = 4th Independent Variable = AOI</p> <p>X5 = 5th Independent Variable = VOS</p> <p>X6 = 6th Independent Variable = PFR</p> <p>α = the intercept of the regression line or constant point where the straight line intersects the Y-axis when X equals to zero</p> <p>$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ & β_6 = the slope of the regression line or regression coefficient for X1, X2, X3, X4, X5 & X6</p>
Explanation
<p>RA = β_1 = 0.108</p> <p>There is a positive relationship between RA and Intention to Adopt NMP. When the RA increases by 1 unit, the Intention to Adopt NMP will increase by 0.108 units.</p> <p>CL = β_2 = -0.140</p>

There is a negative relationship between CL and Intention to Adopt NMP. When the CL increases by 1 unit, the Intention to Adopt NMP will decrease by 0.140 units.

$$\text{CA} = \beta_3 = -0.159$$

There is a negative relationship between CA and Intention to Adopt NMP. When the CA increases by 1 unit, the Intention to Adopt NMP will decrease by 0.159 units.

$$\text{AOI} = \beta_4 = 0.244$$

There is a positive relationship between AOI and Intention to Adopt NMP. When the AOI increases by 1 unit, the Intention to Adopt NMP will increase by 0.244 units.

$$\text{VOS} = \beta_5 = 0.383$$

There is a positive relationship between VOS and Intention to Adopt NMP. When the AOI increases by 1 unit, the Intention to Adopt NMP will increase by 0.383 units.

$$\text{PFR} = \beta_3 = -0.118$$

There is a negative relationship between PFR and Intention to Adopt NMP. When the PFR increase by 1 unit, the Intention to Adopt NMP will decrease by 0.118 units.

4.5 Hypothesis Testing

Table 4.21 Hypothesis Testing

Hypothesis	Accepted / Rejected	Reason
H1: There is a significant relationship between RA and Malaysian consumers' intention to adopt NFMP.	Rejected	P-Value more than 0.05
H2: There is a significant relationship between CL and Malaysian consumers' intention to adopt NMP.	Accepted	P-Value less than 0.05
H3: There is a significant relationship between CA and Malaysian consumers' intention to adopt NMP.	Accepted	P-Value less than 0.05
H4: There is a significant relationship between PFR and Malaysian consumers' intention to adopt NMP.	Accepted	P-Value less than 0.05
H5: There is a significant relationship between AOI and Malaysian consumers' intention to adopt NMP.	Accepted	P-Value less than 0.05
H6: There is a significant relationship between VOS and Malaysian consumers' intention to adopt NMP.	Accepted	P-Value less than 0.05

Table 4.21 shows the summary of the hypothesis that has been accepted and rejected. The majority of the hypothesis of this study has been accepted since its P – Value is less than 0.05.

4.6 Conclusion

In summary, this chapter has discussed about the results of the various data analysis techniques that has been conducted in this study using the SPSS software. The next chapter will be discussing about the major findings of the study, the implications of the study, the limitations of the study, as well as the suggestions for the future studies.

CHAPTER 5: CONCLUSION AND POLICY IMPLICATIONS

5.0 Introduction

The previous chapter has discussed about the results of the various analysis techniques has been conducted using the SPSS software. This chapter will be discussing about the major findings of the study, the implications of the study, the limitations of the study, as well as the recommendations for the future studies.

5.1 Summary of Statistical Analysis

The total number of questionnaires that being analyzed in this study using the SPSS software is 487. The summary of statistical analysis of this study is as below:

5.1.1 Descriptive Analysis

Table 5.1 Summary of Descriptive Analysis

Descriptive Analysis
<p><u>Frequency Distribution</u></p> <p>All the target respondents in this study own a smartphone and a credit card. The majority of the target respondents of this study is female, where they made up 63% of the total target respondents. Most of the target respondents of this falls under the age category of 29 to 39 years and income category of RM 2,000 to RM 4,000. The percentage of target respondents that falls under this category is 44.4 and 56.9% respectively. The highest frequency of credit card usage among the target respondents of this study is 1 – 3 times per month. The percentage of target respondents that falls under this category is 41.1%.</p>
<p><u>Central Tendency</u></p> <p>The majority of the target respondents in this study have “Agreed” to almost all the questions in the questionnaire. In this study, RA5, CL1, CA2, AOI4, VOS3, PFR2 and ITA2 has the highest mean score, while RA1, CL4, CA4, AOI1, VOS1, PFR3 and ITA4 have the lowest mean score. The mode score for the majority of the questions in this study is 4.</p>

5.1.2 Reliability Analysis

Table 5.2 Summary of Reliability Analysis

Reliability Analysis
All the variables in this study are reliable since their Cronbach Alpha value is more than 0.07. The majority of the variables of this study have a very good reliability.

5.1.3 Inferential Analysis

Table 5.3 Summary of Inferential Analysis

Inferential Analysis
<u>Pearson Correlation Analysis</u> The majority of the independent variables in this study has a small but definite relationship with the dependent variable as their Pearson Correlation Coefficient falls between the range of 0.21 – 0.40. The relationship direction for most of the independent variables with the dependent variable is positive.
<u>Multicollinearity Test</u> There is no multicollinearity issue in this study since the Partial Correlation value for all the independent variables in this study is less than 0.70.

Multiple Linear Regression

The independent variables that being studied in this study is able to predict 34.1% of the variance in the dependent variable. The regression model that being used in this study is statistically fit to predict the dependent variable using the independent variables of the study. The majority of the independent variables of this study have a significant relationship with the dependent variable.

5.2 Discussions of Major Findings

5.2.1 Relative advantage and Intention to Adopt

H1: There is a significant relationship between RA and Intention to Adopt NMP.

The hypothesis for RA was not supported in this study since its P-Value is more than 0.05. It is statistically proven that there is no significant relationship between RA and Intention to Adopt. The direction of the relationship between these two variables in this study is positive. The results for RA in this study contradict with the results of the previous studies related to the technology adoption in terms of the significance. The results of previous studies have concluded that there is a significant positive relationship between RA and Intention to Adopt (Jeong & Yoon, 2013; Kim, Mirusmonov & Lee, 2009; Saeidipour, Ranjbar & Ranjbar, 2013). The findings of this study suggest that the RA is not an essential predictor in this study in terms of predicting consumers Intention to Adopt NMP since the majority of the target respondents in this study is young consumers. Generally, young people don't give much importance for benefits when using or adopting something. Instead, they just use or adopt something because it is the current trend. If the current trend is making

payment using NFC-enabled mobile device, then the young consumers will adopt it regardless the benefits they would enjoy from the adoption.

5.2.2 Complexity and Intention to Adopt

H2: There is a significant relationship between CL and Intention to Adopt NMP.

The hypothesis for CL was supported in this study since its P-Value is less than 0.05. It is statistically proven that there is a significant relationship between CL and Intention to Adopt. The relationship direction between these two variables in this study is negative. The results for CL in this study are consistent with the results of previous studies conducted in terms of technology adoption (Jeong & Yoon, 2013; Kim, Mirusmonov & Lee, 2009; Saeidipour, Ranjbar & Ranjbar, 2013). The results of previous studies have concluded that there is a significant negative relationship between CL and Intention to Adopt. The findings of this study suggest that the consumers would not adopt the NMP if they perceive it is difficult to learn and not easy to use or understand it.

5.2.3 Compatibility and Intention to Adopt

H3: There is a significant relationship between CA and Intention to Adopt NMP.

The hypothesis for CA was supported in this study since its P-Value is less than 0.05. It is statistically proven that there is a significant relationship between CA and Intention to Adopt. The relationship direction between these two variables in this study is negative. The results for CA in this study is contradict with the results of

previous studies conducted in terms of technology adoption. The results of previous studies have concluded that there is a significant positive relationship between CA and Intention to Adopt (Jeong & Yoon, 2013; Kim, Mirusmonov & Lee, 2009; Mallat, 2007). The findings of this study suggest that the consumers would not adopt the NMP if it is consistent with their existing values, beliefs, habits, and past and present experiences. One of the possible reasons for this result is the age of the target respondents in this study. The majority of the target respondents in this study is young consumers. Usually, the young people love to find new experiences, therefore they may not try something that is familiar to them and have experience about. The young consumers would adopt the NMP if they could experience new experiences, values, beliefs and habits from the adoption.

5.2.4 Amount of information and Intention to Adopt

H4: There is a significant relationship between AOI and Intention to Adopt NMP.

The hypothesis for AOI was supported in this study since its P-Value is less than 0.05. It is statistically proven that there is a significant relationship between AOI and Intention to Adopt. The relationship direction between these two variables in this study is positive. The results for AOI in this study are consistent with the results of previous studies conducted in terms of technology adoption. The results of previous studies have concluded that there is a significant positive relationship between AOI and Intention to Adopt (Safeena, Abdullah & Date, 2010; Amin, 2008; Saeidipour, Ranjbar, & Ranjbar, 2013). The findings of this study suggest that the consumers would adopt the NMP if they have sufficient and precise information about it.

5.2.5 Variety of Services and Intention to Adopt

H5: There is a significant relationship between Variety of Service and Intention to Adopt NMP.

The hypothesis for Variety of Service was supported in this study since its P-Value is less than 0.05. It is statistically proven that there is a significant relationship between Variety of Service and Intention to Adopt. The relationship direction between these two variables in this study is positive. The results for Variety of Service in this study are consistent with the results of previous studies conducted in terms of technology adoption. The results of previous studies have concluded that there is a significant positive relationship between the Variety of Service and Intention to Adopt (Chong et al. 2010; Chong, 2013; Chong et al., 2012). The findings of this study suggest that the consumers would adopt the NMP if it allows them to perform various services along with the payment function. The Variety of Service is the most significant predictor in this study in terms of predicting the Intention to Adopt the NMP.

5.2.6 Perceived financial resources and Intention to Adopt

H6: There is a significant relationship between PFR and Intention to Adopt NMP.

The hypothesis for PFR was supported in this study since its P-Value is less than 0.05. It is statistically proven that there is a significant relationship between PFR and Intention to Adopt. The relationship direction between these two variables in this

study is negative. The results for PFR in this study are consistent with the results of previous studies conducted in terms of technology adoption. The results of previous studies have concluded that there is a significant negative relationship between Perceived Financial Resource and Intention to Adopt (Jeong & Yoon, 2013; Mallat, 2007; Saeidipour, Ranjbar, & Ranjbar, 2013). The findings of this study suggest that the consumers would adopt the NMP if the cost involved in its adoption, usage and maintenance is low. The PFR is the least significant predictor in this study in terms of predicting the Intention to Adopt the NMP.

5.3 Implications of the Study

5.3.1 Theoretical Implication

Previously, not many studies have been conducted in terms of the adoption of NMP, especially in the Malaysian context. Thus, this study has contributed to the existing literature world by examining the intention to adopt NFC-enabled in the Malaysian context. Besides, this study also has successfully extended the existing DOI model by adding three new variables (AOI, VOS and PFR) and dropping two traditional variables (Observability and Trialability). The extended DOI model is believed to provide a more accurate prediction on the adoption intention compared to the traditional DOI model. This study also provides an insight on the factors that are significant in predicting the adoption intention of NMP in the Malaysian context. Apart from that, the extended model used in this study also can be used to study the adoption intention of NMP on other technological devices such as advanced mobile phones and personal digital assistants (PDAs).

5.3.2 Managerial Implication

In order to encourage more consumers to adopt NMP, it is crucial to build the payment system using factors that encourage them to adopt it. The findings of this study provide a valuable information to parties such as banking institutions, software developers and mobile phone manufacturers regarding what are the features that they should focus on when coming up with their goods and services. The findings of this study showed that the RA is not significant in predicting the Malaysian consumers Intention to Adopt. Therefore, the parties involved should not give much importance to the features that are related to RA when developing the goods and services related to the payment system. On the other hand, the results of this study indicate that CA, CL and PFR have a significant negative relationship with the Intention to Adopt.

Since, there is a negative relationship between CA and Intention to Adopt, the software developers and the mobile phone manufacturers should avoid offering goods and services that are consistent with the adopters' current and past beliefs, values, lifestyles and experiences. Instead, the parties involved should come up with an offering that offers the potential adopters new experiences, values, beliefs and lifestyle upon the adoption. Other than that, the software developers and the mobile phone manufacturers also should focus on developing user friendly mobile phones and software which can be purchased at an affordable price by the potential adopters. In other words, the parties involved should focus on developing a payment system that requires adopters to impose less mental effort, little technical skills and enables the users to learn and be familiarized with the system easily. Besides that, the banking institutions also should focus on delivering their services at a reasonable price. An inexpensive mobile phone, adoption fees, annual fees and transaction fees would attract consumers to attract NMP.

Meanwhile, the results of this study show that the VOS and AOI have a significant positive relationship with Intention to Adopt. Thus, the parties involved should provide sufficient and precise information to the adopters on how the payment system works. The banking institutions must ensure that the potential adopters have

the information regarding the benefits they will enjoy upon the adoption, the services they could perform by adopting it and the procedures they need to follow in order to become a registered user. Lastly, the related parties also should give high importance to the features that related to VOS as it is the most significant predictor in predicting Intention to Adopt in this study. The mobile phone manufacturers and the software developers also should focus on providing additional functions that are attractive to the adopters, meets their needs and up to their expectation.

5.4 Limitations of the Study

There are three limitations in this study. First, the samples used in this study. The results of this study cannot be generalized to all the consumers in Malaysia since this study was only conducted in the Perak state and the data used in this study were only gathered from those consumers who own a smartphone and a credit card. Those consumers from other states of Malaysia and does not own a smartphone and credit card were omitted in this study. Second, the variables used in this study. The results of this study cannot be considered as an ideal outcome since the R Square value of this study is only 34.1%. This means that the 65.9% variation in the Intention to Adopt is well explained by other variables that this study fails to include in its design. Third, the journals used in this study. The majority of the journals that has been used in this study to write the literature review were from overseas. Therefore, the variables that have been adopted from those journals may not be suitable to predict the Intention to Adopt among Malaysian consumers.

5.5 Recommendations for Future Research

In future, the researchers are suggested to conduct the study in other states of Malaysia or in all the states in Malaysia if the time permits them. The future studies also should focus on consumers who do not own a smartphone and a credit card. This particular suggestion is made to increase the generalizability of the future samples to the population of study. Apart from that, the future researchers also are encouraged to use other variables such as risk, availability of substitutes and security as the independent variable to predict the Intention to Adopt. Including the variables with higher predictive power into the model of study would increase the R Square value of the future studies. On the other hand, the future researchers also are advised to use more journals from Malaysia when choosing the variables of the study and when writing the literature review. The usage of Malaysia based journals would help the future studies to adopt those variables that are significant in predicting the Intention to Adopt among consumers in Malaysia.

5.5 Conclusion

The purpose of this study is to examine the factors that affect the intention to adopt NMP among consumers in Malaysia. An extended DOI model has been used in this study to predict the intention to adopt. The findings of this study suggest that the CL, CA, AOI, VOS and PFR have a significant relationship with the Intention to adopt. The findings of this study provide a contribution to both practical and academical world. The results of this study can be used as a guideline by various parties such mobile phone manufacturers, bank decision makers, merchants, software developers, governments, and practitioners to formulate their communication and business strategies related to NMP adoption.

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APPENDICES

Appendix 3.1 Reliability Analysis for Pilot Test

Variables	Cronbach's Alpha	No. of items	Level of Reliability
Relative advantage	0.960	5	Very good Reliability
Complexity	0.935	5	Very good Reliability
Compatibility	0.987	5	Very good Reliability
Amount of information	0.967	5	Very good Reliability
Variety of services	0.983	4	Very good Reliability
Perceived financial resources	0.917	5	Very good Reliability
Intention to Adopt	0.954	4	Very good Reliability

Appendix 3.2 Questionnaire



UNIVERSITI TUNKU ABDUL RAHMAN
Faculty of Business and Finance

MASTER OF BUSINESS ADMINISTRATION
(CORPORATE MANAGEMENT)

FINAL YEAR PROJECT

TITLE OF TOPIC:

**The Adoption Intention of Near Field Communication (NFC) -
enabled Mobile Payment among Consumers in Malaysia.**

Survey Questionnaire

Dear respondent,

I'm a final year MBA student from Universiti Tunku Abdul Rahman. I'm conducting this survey to collect information about the factors that leads consumers to adopt NFC enabled mobile payment. Thank you for your participation.

Definition of NFC-enabled mobile payment:

NFC is a set of close-range wireless communication standards, which is built upon short-range radio-frequency identification (RFID) technology that allows a two-way communication between endpoints. In NFC enabled mobile payment, the NFC technology facilitates the consumers to exchange the payment information between the consumer's mobile device and the merchant's POS terminal through simply touching or waving the mobile devices close to the terminal (typically under 20 cm).

Instructions:

- 1) There are **THREE** (3) sections in this questionnaire. Please answer ALL questions in ALL sections.
- 2) Completion of this form will take you approximately 5 to 10 minutes.

Section A: Demographic Profile

Please place a tick “√” or fill in the blank for each of the following:

1. Do you own a smartphone ?

- ☐ Yes
- ☐ No

2. Do you own a Credit Card ?

- ☐ Yes
- ☐ No

3. Gender:

- ☐ Male
- ☐ Female

4. Age:

- ☐ 18 years – 28 years
- ☐ 29 years – 39 years
- ☐ 40 years – 50 years
- ☐ 51 years and above

5. Monthly income:

- ☐ RM 2,000 – RM 4,000
- ☐ RM 4,001 – RM 6,000
- ☐ RM 6,001 – RM 8,000
- ☐ RM 8,001 – RM 10,000
- ☐ RM 10,001 and above

6. Frequency of credit card use (per month):

- ☐ I don't use credit card every month. I only use the credit card when it is necessary to use it to make the payment.
- ☐ 1 to 3 times
- ☐ 4 to 10 times
- ☐ 11 to 20 times
- ☐ 21 times and above

Section B: Factors affecting the adoption intention of NFC enabled mobile payment

Please circle your answer to each statement using 5 Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree]

Relative advantage

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
RA1	I will adopt NFC mobile payment if it allows me to conduct my payment transactions in a convenient manner	1	2	3	4	5
RA2	I will adopt NFC mobile payment if it allows me to conduct my payment transactions efficiently	1	2	3	4	5
RA3	I will adopt NFC mobile payment if it allows me to conduct my payment transactions effectively	1	2	3	4	5
RA4	I will adopt NFC mobile payment if it gives me greater control over my payment transactions	1	2	3	4	5
RA5	I will adopt NFC mobile payment if it is useful for managing my payment transactions	1	2	3	4	5

Complexity

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CL1	I will adopt NFC mobile payment if it only requires little mental effort in operating the payment system	1	2	3	4	5
CL2	I will adopt NFC mobile payment if it only requires little technical skills in operating the payment system	1	2	3	4	5
CL3	I will adopt NFC mobile payment if the usage of the payment system will not result in frustration	1	2	3	4	5
CL4	I will adopt NFC mobile payment if the learning process to use it is simple	1	2	3	4	5
CL5	I will adopt NFC mobile payment if the payment system is extremely easy to be familiarized	1	2	3	4	5

Compatibility

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CA1	I will adopt NFC mobile payment if it fits well with the way I like to manage my payment transactions	1	2	3	4	5
CA2	I will adopt NFC mobile payment if it fits well with my lifestyle	1	2	3	4	5
CA3	I will adopt NFC mobile payment if it fits well with my working style	1	2	3	4	5
CA4	I will adopt NFC mobile payment if it fits well with my daily routine tasks	1	2	3	4	5
CA5	I will adopt NFC mobile payment if it is compatible with other mobile services	1	2	3	4	5

Amount of information

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
AOI1	I will adopt NFC mobile payment if I have enough information about it	1	2	3	4	5
AOI2	I will adopt NFC mobile payment if I have enough information about the benefits I will enjoy upon the adoption	1	2	3	4	5
AOI3	I will adopt NFC mobile payment if I receive the information about the payment system from the banking institutions	1	2	3	4	5
AOI4	I will adopt NFC mobile payment if I have enough information about the services I could perform by adopting it	1	2	3	4	5
AOI5	I will adopt NFC mobile payment if I have enough information about what I need to do in order to become its user	1	2	3	4	5

Variety of services

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
VOS1	I will adopt NFC mobile payment if it allows me to perform many additional functions along with the payment function	1	2	3	4	5
VOS2	I will adopt NFC mobile payment if the additional functions it offers are attractive	1	2	3	4	5
VOS3	I will adopt NFC mobile payment if the additional functions it offers meet my needs	1	2	3	4	5
VOS4	I will adopt NFC mobile payment if the current additional functions it provides are up to my expectation	1	2	3	4	5

Perceived financial resources

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PFR1	I will adopt NFC mobile payment if its adoption fees are inexpensive	1	2	3	4	5
PFR2	I will adopt NFC mobile payment if its annual fees are inexpensive	1	2	3	4	5
PFR3	I will adopt NFC mobile payment if its transaction fees are inexpensive	1	2	3	4	5
PFR4	I will adopt NFC mobile payment if its maintenance fees are inexpensive	1	2	3	4	5
PFR5	I will adopt NFC mobile payment if the cost involved in purchasing the mobile phone is reasonable	1	2	3	4	5

Section C: Intention to adopt NFC enabled mobile payment

Please circle your answer to each statement using 5 Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree]

Intention to adopt

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ITA1	I intend to adopt NFC mobile payment in the near future	1	2	3	4	5
ITA2	I intend to use NFC mobile payment frequently in the near future if I have access to it	1	2	3	4	5
ITA3	I intend to use NFC mobile payment to make payments for my purchases in the near future if I have access to it	1	2	3	4	5
ITA4	I intend to recommend NFC mobile payment to my family and friends in the future	1	2	3	4	5

Thank you for your time, opinion and comments.

~ The End ~