ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

FACTORS AFFECTING MOBILE PAYMENT ADOPTION BY MERCHANTS IN ETHIOPIA

By

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Declaration

This thesis has not previously been accepted for any degree and is not being concurrently submitted in candidature for any degree in any university.

I declare that the thesis is a result of my own investigation, except where otherwise stated. I have undertaken the study independently with the guidance and support of my research advisor Lemma Lessa. Other sources are acknowledged by citations giving explicit references. A list of references is appended.

Signature: _____

Firehiwot Abebe

This thesis has been submitted for examination with my approval as a university advisor.

Advisor's Signature: _____

Lemma Lessa (Ph.D.)

Dedication

In memory of my father

To my mother
With love and eternal appreciation

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First and foremost, I would like to praise and thank GOD Almighty and MOTHER MARY for giving me the strength, knowledge, ability and opportunity to undertake this research study and to persevere and complete it successfully. Without God blessings, this achievement would not have been possible.

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Firehiwot Abebe
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ABSTRACT

Nowadays the world witnessed a rapid growth in mobile commerce and widespread use of mobile devices. The growth of mobile commerce depends on widely accepted mobile payment systems. However, this trend is not well experienced in developing countries like Ethiopia. Even though merchants somehow benefited from the rapid growth in electronics commerce and use of mobile devices in e-commerce, they still hesitate to effectively employ in their day to day transactions. Little research has been conducted to examine and explain the merchants' views on the new payment technology.The purpose of this study is to identify factors affecting merchants' adoption of mobile payment in Ethiopia considering CBE Birr and M-birr as a case. Accordingly, it is tried to answer the question "*What are the factors that affect merchants' adoption of mobile payment in Ethiopia?*" The study employed a descriptive survey and adopted a research model from ÖRS (2018). The model is build based on the most frequently used constructs affecting the latent variable in the mobile payment system. The variables reflected in this study are usefulness, ease of use, security, cost, compatibility, social influence, enjoyment, anxiety, knowledge, and innovativeness. Thus, this study reviews different models and pick this model since it is best for the study area with respect to merchants' adoption of mobile payment.Data was gathered from merchants in Addis Ababa and Oromia special zone, surrounding Addis Ababa who are using CBE Birr and M-birr mobile payment system. The survey was conducted using a self-administered questionnaire. Out of 376 questionnaires that have been distributed to participants, 363 valid questionnaires were collected and used for data analysis. The proposed mobile payment model was tested using a partial least square with the help of the SmartPLS software. The proposed mobile payment model explained 94.8% overall variance in adoption. The empirical evidence of the study indicated that ease of use, usefulness, relative advantage, trust, risk, attitude and cost are influencing factors for mobile payment adoption whereas compatibility was found to have an insignificant effect on merchants' mobile payment adoption. Attitude is the most influencing factor of the merchant's mobile payment adoption. The study provides a wide-ranging understanding of the factors that affect merchants' adoption of mobile payment technology in Ethiopia. This can help the service providers to understand merchants' intentions and make strategy accordingly to ensure financial inclusion. Considering the shortage of literature that currently exists in general about technology adoption, in particular about mobile payment adoption in Ethiopia, the study can be considered as an addition to mobile payment-related literature and can serve as a springboard for future researchers on the topic. Since this study was conducted in Addis Ababa, Ethiopia further studies may also consider selecting respondents from other areas outside of Addis Ababa, as well as incorporating additional social and cultural beliefs in understanding the affecting factors to adopt mobile payment.

Keywords: Mobile payment, Merchants, CBEBirr, M-Birr, Technology acceptance model

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Conference website: https://digitalcommons.kennesaw.edu/acist/

Table of Contents

List of Tables

List of Figures

List of Acronyms

AML	Anti-Money Laundering
AMP	Adoption of Mobile Payment
AT	Attitude
ATM	Automatic Teller's Machine
AVE	Average Variance Extracted
BI	Behavioural Intention
CBE	Commercial Bank of Ethiopia
CM	Compatibility
DIT	Diffusion of Innovations Theory
DOI	Diffusion of Innovation
DSTV	Digital Satellite Television
EMPS	Electronic Mobile Payment System
MNO	Mobile Network Operator
MPSP	Mobile Payment Service Provider
NFC	Near Field Communication
PC	Perceived Cost
PDA	Personal Digital Assistant
PEU	Perceived Ease of Use
PIN	Personal Identification Number
PLS	Partial Least Square
POS	Point-of-Sale

PR	Perceived Risk
PT	Perceived Trust
PU	Perceived Usefulness
PLS	Partial Least Squares
QR	Quick Response
RA	Relative Advantage
RFID	Radio-frequency identification
SEM	Structural Equation Modelling
SMS	Short Messaging Services
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
WAP	Wireless Application Protocol

CHAPTER ONE

INTRODUCTION

The main aspects of this research are briefly introduced in this chapter. Accordingly, an overview of the study, statement of the problem, research questions, objectives, significance, and the scope of the study are discussed.

1.1. Background

People carry out many transactions by using physical money in terms of notes, coins and bills for so long and still significantly relay on it throughout the world and still more in the developing world. But since the diffusion of IT, people have the comfort of choosing how to carry out payment transactions using IT instruments and services like mobile phones, credit cards, etc... Nowadays the world witnessed a rapid growth in electronics commerce likewise widespread use of mobile devices in e-commerce has a role in this growth. Mobile technologies have not only become widespread rapidly but they currently also have the advantage of reaching the customers for companies. Mobile technologies have lots of advantages against other technologies, such as interacting with anybody anywhere, being in use independently, customized information and services, and getting quick answers from users (Dastan, 2016). Mobile commerce is a form of electronic commerce where at least part of the transaction is conducted via a mobile device, most often a mobile telephone (Coursaris & Hassanein, 2002).

Mobile commerce is expected to provide merchants with the ability to sell products and services to customers at any time from anywhere. This enables companies to create more contact points with customers and to bring products and services directly to customers (Coursaris & Hassanein, 2002). The universal availability and purchase possibilities are estimated to bring impulsive purchases to bring new customers to the company and increase incomes. Extensive use of mobile devices in e-commerce has a role in this growth.

According to Ramezani (2008), mobile payment is defined as paying for goods or services with a mobile device such as a phone, Personal Digital Assistant (PDA), or other such devices. Thus mobile payment can be defined as the process of two parties exchanging financial value using a mobile device in return for goods and services (Ramezani, 2008).

The term mobile payment and mobile banking are different in their concept. The word "mobile banking" has been defined in many ways by different researchers. According to Barnes & Corbitt (2003), mobile banking is a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or PDA. Pousttchi & Schurig (2004), define mobile banking as a way of running financial transactions through mobile communication technologies. Mobile banking is a subcategory of electronic banking, the type of execution of financial services in the course of which within an electronic procedure the customer uses mobile communication techniques in conjunction with mobile devices (Pousttchi & Schurig, 2004). Therefore mobile phones are providing an extraordinary opportunity for expansion of financial activity in developing countries like Ethiopia where the number of phone users can exceed the number of those having bank accounts (Nurhussen, 2016). It is also much less expensive than opening bank branches especially in rural areas (Pidugu, 2015).

Mobile payments on the other hand can be referred to as two-sided markets, where retailers or merchants accepting mobile payments represent one side, and customers using the service form another side. Both sides express certain expectations about the benefits of mobile payments (Apanasevic, 2013). So, consumers expect an easy-to-use solution, better quality, and personalization of the service, guaranteed security, low service costs, and ubiquitous infrastructure (Apanasevic, 2013). In turn, when adopting mobile payments, retailers or merchants expect: to make payment process quicker and easier; low investment and service costs; compatibility and integration of all payment solutions with existing infrastructure like a point of sale terminals; reliable, secure and trusted service; and customization of service like adding loyalty schemes (Apanasevic, 2013).

There are three different models available for mobile payment solutions based on payment (Ramezani, 2008): Bank account-based, Credit card-based, Telecommunication Company billing based. Mobile payments can also be categorized based on the technology used as either one of two type's proximity transactions or remote transactions (Ramezani, 2008). A proximity transaction is a transaction where the mobile device locally communicates. Proximity payments involve the use of short-range messaging protocols such as Bluetooth, infrared, RFID, and contactless chip to pay for goods and services over short distances. In other words, the mobile device acts as a contactless payment card, thus becoming a new payment form factor. Whereas,

remote transactions cover payments that take place either via a mobile web browser or a resident smartphone application, in which the mobile phone is used as a device to authenticate personal information stored remotely. Here transactions are conducted independent of the user's location. Examples include prepaid Top Up services, delivery of digital services, m-tickets, digital cash, peer-to-peer payments, etc. (Ramezani, 2008).

Mobile payment can also be classified based on value-added as micropayment and macro-payment (Ramezani, 2008). Micro-payments are expected to boost mobile commerce as well as pay-per-view/click charging schemas of lowest values. Whereas, macro-payment defined as larger value payments such as online shopping or proximity-based payments for exchange of goods and services (Ramezani, 2008).

An additional kind of classification is based on the entity that holds the account of the customer: bank-centric and non-bank-centric (ISACA, 2011). In the bank-centric, the account of the customer is held by a bank in which issues involving matters such as accountability, transaction monitoring for fraud detection, and compliance fall under the appropriate local, national and international banking laws and regulations (ISACA, 2011). When a payment is initiated, the consumer's bank must authorize the transaction. The payment networks used are the traditional ones such as Visa and Master-card and the major differences are at the endpoints of the transaction (Höhler & Bruck, 2012) . In the nonbank-centric, the account of the customer is held at non-financial organizations such as a third-party payment service or telecommunication. In such a case regulatory, security and even profit-sharing questions arise. For example, which entity will be responsible for the regulation of these services the respective national telecommunication authority or the respective central bank (Höhler & Bruck, 2012). The mobile payment environment has many stakeholders to the transaction interchange process experience, These are financial institutions and banks, payment processing networks, customers, merchants, governments, mobile network operators, mobile device manufacturers, software providers, and mobile payment categories, and each stakeholder has its expectations, motivations, and capabilities.

1.2. Motivation

Mobile payment systems are becoming an important payment mode for today's businesses (Dahlberg, Niina, Jan, & Agnieszka, 2008). There is a growing need for exploring mobile payment systems adoption. Having different stakeholders with different motivation and capabilities create many opportunities. This has led to creating a highly fragmented market that develops at a slower step. There are multiple mobile payment systems in the eco-system, and these solutions are not well-matched. This creates a challenge for the consumers and merchants to adopt any single solution (Pidugu, 2015).

Merchants are vital stakeholders in that, their adoption or expansion of mobile payment services is a pivotal determining factor for mobile payment environment (Pidugu, 2015). Merchants play a dual role in the mobile payment eco-system. From consumers', prospective merchants are service providers as well as merchants themselves being consumers of the service providers like banks and mobile operators as they pay for the system mostly (ISACA, 2011). Irrespective of the possible benefits of merchant adoption of mobile payment, merchants still hesitate to employ mobile payment in their transactions, making the penetration of merchant adoption of mobile payment relatively low compared to other recent forms of cashless, noncontact payment modes, such as credit cards and e-payment systems (Pidugu, 2015).

Merchants are also the first point of contact for a consumer for a mobile payment system, placing further importance on merchant adoption. The literature available from a merchant perspective is limited (Pidugu, 2015). Additionally, there is a gap between academic research and industrial practice in understanding the merchant perspective on, and experience of, these new information systems (Tomi, Jie, & Jan, 2015). In their reviews of mobile payments research, Dahlberg, Guo, and Ondrus (2015) have emphasized the lack of literature on merchant adoption despite more than a decade of research into mobile payments. Previous studies have examined mobile payment adoption based on characteristics of the technology, individual adopters, and organizations (Tomi, Jie, & Jan, 2015). Even though valuable, these studies are often silent on merchants' perceptions about the maturity of mobile technology as a mode of payment and the willingness to adopt (Niina & Kristiina, 2008). This gap demands a theoretical understanding to discover factors for mobile payment adoption by merchants and to incite deeper understanding

and deliver a theoretical clarification of how the adoption of mobile payment improves the payment practice of merchants. Explaining these gaps in the literature will help both researchers and experts to appreciate the key factors that could affect merchants in adopting mobile payments in their business transactions in Ethiopia to make an appropriate model by sampling CBE Birr and M-birr.

1.3. Statement of the Problem

The growth in wireless technology increases the number of mobile device users and gives pace to the rapid development of e-commerce. Mobile phones and handheld devices have been firmly established as an alternative form of payment in most technologically advanced societies (Uchenna Cyril, 2008)**.**

Mobile payment offers several services such as telephone recharges, bill payments, retail payments and more. The advantage of mobile payment is the fact that several functions work with both traditional mobile phones and smartphones. The basic premise is that mobile payments offer a way for people with low income or the unbanked to make financial transactions without getting involved with a traditional financial institution (Mbinkeu, 2013).

The mobile payment is more advantageous to rural populations. This technology will create competition with older money transfer companies and this will continue to reduce the transfer rates between cities and rural areas in developing countries. Developing countries will benefit from local services with relatively low transaction costs, easier access to financial services. The time savings are immeasurable by reducing the movement of people especially those located in inaccessible areas. Mobile payment offers several advantages including simplicity, avoiding theft and accessibility to the service at any time (Mbinkeu, 2013).

Many service providers and mobile network operators around the world launched mobile payment applications in an attempt to universal access to payment for services and goods. Currently, in Ethiopia, there is a poor cashless payment mechanism especially people in rural areas and young people without a bank account have no way of using cashless payment. In 2017 for instance, out of total utility bills paying Ethiopian customers, 99 percent paid using cash only, whereas the corresponding figure was only 12 percent in Kenya, 27 percent in Tanzania, and 59

percent in Sub-Saharan Africa on average. At the same time, out of total Ethiopian wage recipients, only 0.2 percent received through a mobile phone, compared to 37 percent in Kenya, 24 percent in Tanzania, and 19 percent in Sub-Saharan Africa on average (Demirguc-Kunt, Klapper, Singer, Ansar, & Hess, 2018). This shows that the old-style way of cash payment is still high during cash movement from a retailer to the customer causing the life span of the cash minimal. Due to this, the National Bank of Ethiopia is spending more money on availing hard currency through printing, shipping, distributing for commercial banks and then collecting when the money is out of use due to worn-out and destruction of the worn-out cash. As well there is limited access to quicker and easier, compatible, and integrated payment solutions with existing infrastructure, reliable, secure and trusted service for merchants to deliver. With the existing cash-based means of exchange of goods and services, the merchant is exposed to cash theft and consuming time to deposit in banks. Adopting mobile payment by merchants enables them to have anywhere and any time payment for services and goods via mobile devices.

Currently, some service providers in Ethiopia have already introduced mobile payment systems (bank and non-bank based) to achieve effective online service delivery. For instance, Netherlands-based BelCash is offering a technology called helloCash, while MOSS ICT, mainly owned by an Ireland-based firm, is rolling out M-Birr in Ethiopia (Blair, 2015). In addition to these product providers, the Commercial Bank of Ethiopia launched CBEBirr to give service for mobile money or mobile payment services.

Even though financial institutions are doing their best to make mobile payments accepted nationwide, the use of mobile for financial transactions is not well adopted by merchants in Ethiopia. Without merchants adopting mobile payment systems, there will not be consumers using mobile payment services nor mobile payment system. This gives rise to classical analogy to “what came first- the chicken or the egg?” which has been used by researchers to describe the challenge faced by both merchants and the consumers (Pidugu, 2015)

Furthermore, there is rare literature for understanding the factors for merchants’ acceptance and use of mobile payment holding them back from adopting the payment system. Few attempts have been made about merchants’ adoption of mobile payments. prior study on merchants adoption of mobile payments identified ubiquity, personal nature of the devices and services as the drivers (Niina & Kristiina, 2008; Boateng & Afeti, 2019) whereas large financial operations and

investment costs, lack of critical mass or plain non-usage by customers, immaturity of the mobile payment market, trust and security are identified as the barriers for the adoption of mobile payment by merchants. Merchants are considered as those who create the market for financial institutions and other stakeholders by offering mobile payment instruments (Tomi, Jie, & Jan, 2015). Though several studies were conducted on mobile payment adoption in other countries, those in Ethiopia are very limited. The socio-economic differences between Ethiopia and these other countries pose some difficulties in adapting to Ethiopia what is done in other countries. Moreover, ÖRS (2018), also recommend for future researchers the research can be studied at a different time or with a different culture the results might vary. Therefore, this research study is motivated to fill this gap and identify the factors that are affecting the merchant's adoption of mobile payment in Ethiopia.

1.4. Research questions

The research questions this research attempts to answer are the following:

- What are the factors that affect merchants' adoption of mobile payment in Ethiopia?
- Which factors are critical in the Ethiopian context?

1.5. Objective of the study

1.5.1. General objective

The general objective of this study is to identify factors affecting merchants to adopt mobile payment in Ethiopia.

1.5.2. Specific objective

The specific objectives of the study are:

- To review related literature to identify drivers and barriers in the adoption of mobile payment service by merchants in Ethiopia,
- To identify the most influencing factors in the adoption of mobile payment service by merchants in Ethiopia,
- To recommend possible solutions to address drivers and barriers in the adoption of mobile payment by merchants in Ethiopia.

1.6. Significances of the study

Mobile payment service enables the market for professionals and low-segment merchants without POS terminals, cost-effective coverage, providing convenient cashless payment with speed, makes money more secure for being stolen and convenience for the customer, decrease the cost of printing, shipping, distributing of the new currency, collecting and destruction of deteriorated cash which is out of use for the central bank. Moreover, the study help merchants to have more sales opportunities, improve customer service, pay-at-table, loyalty, ability to track customer data, reducing checkout time and improves Cash Flow.

The study fills a significant gap in the literature that is, exploring factors for the adoption of mobile payments by merchants in Ethiopia. Consequently, this study can be used as a stepping stone for further work in this specific area and a start-up for other researchers to focus on the area to work on. Simultaneously, it helps executives of service providers to identify the major factors that determine mobile payment adoption decisions among merchants (retailers). Giving appropriate devotion to the finding of the study will be significant to the success and reliability of mobile payment service providers.

1.7. Scope and limitation of the study

The central aim of this study is to explore key factors for the acceptance and use of mobile payment in Ethiopia by using mobile phones as a key element for paying for goods and services.

This study has focused on merchants of Commercial Bank of Ethiopia from the bank-centric model and M-Birr merchants located in Addis Ababa and Oromia special zone, surrounding Finfinnee that are actively using the system plus customers that are started the payment system but now not an active user of the system.

This study is limited to identifying factors that affect merchants' adoption and use of mobile payment, not to measure the actual rate of adoption. The adoption factor of mobile banking is beyond the scope of this study.

The limitation of the research is the following:

- There is a lack of previous studies in Ethiopia regarding identifying factors that can affect merchants to adopt and use mobile payment. And limited us not to have resources that can guide us to have a starting point to conduct the research. Besides, the are many studies conducted outside Ethiopia the socio-economic differences between Ethiopia and these other countries pose some difficulties in adapting to Ethiopia. This has limited availability of starting point to conduct the research.
- Lack of enough time and cost limited us not to address demographic factors such as knowledge or educational background toward moderating the effect of the mentioned independent variables to the adoption of mobile payment. Also selecting respondents from other areas outside of Addis Ababa.

1.8. Organization of the Thesis

This research is organized in five chapters. Chapter one introduces the background of mobile payment, the category of mobile payment, what stakeholders are included in the mobile payment and how it's different from mobile payment. The chapter also includes a statement of the problem, research questions, and research objectives, significance of the study and scope of the study.

Chapter two presents the review of literature in mobile payment, Mobile payment technologies, Mobile payment stakeholders, Mobile Payments Categories, Economic purpose, Mobile payment in Ethiopia, advantage, and disadvantage of mobile payment, Factors for the adoption of mobile payment discussed thoroughly to provide an overview and explore the topic.

Chapter three describes the research design and methodology used. Thus, the chapter includes research design, source of data, sampling technique, research population, data collection methods, validity, reliability, and Statistical data analysis.

Chapter four presents a summary of the collected data that is analyzed, interpreted, described, and discussed based on the significance of the key findings in light of what was already known about the research problem.

Chapter five finally that provides concluding remarks of the research and recommendations for further investigation as per the findings of the study.

CHAPTER TWO

LITERATURE REVIEW

Many technology adoption studies are conducted in Information Systems, but few studies are there in merchants' adoption of technology in general and mobile payments in particular. In this section, core concepts about mobile payment, major models, and theories related to mobile payment are presented. Moreover, related works are reviewed systematically for the specific area of mobile payment adoption.

2.1. Overview of Mobile payment

Many researchers define mobile payment in different ways. According to Kaw (2014), mobile payment is a transfer of funds in return for goods or services in which a mobile device is functionally involved in executing and confirming payment. It intends to improve the purchasing process by making it faster and more convenient by substituting other kinds of payments and be alternative to cash and card-based payments. But in time it has now evolved into a saving vehicle and a way to transfer money without any good or service accompanied. It is a proven added value for the customer as it enables them to consult their account balance before making a purchase and get rid of all the cash in their pocket (Nurhussen, 2016). Using mobile phones for business to consumer payment transaction processing is also known as mobile payment (Key & Dietmar, 2014).

Furthermore, Mobile payments can be referred to as a two-sided market, where retailers or merchants accepting mobile payments represent one side, and customers using the service another (Eisennman, Parker, & Van Alstyne, 2006). Both sides express certain expectations about the benefits of mobile payments. So, consumers expect easy to use solutions, better quality, and personalization of the service, guaranteed security, low service costs, and ubiquitous infrastructure. According to Hayashi (2012), consumers can make three types of payments with a mobile device such as a cell phone or tablet computer. The first payment type consists of person to person transfers initiated from a mobile device. These transfers include non-commercial payments from one consumer to another and commercial payments from a consumer to a small scale merchant, such as a plumber or gardener. The second is for goods and services purchased over the internet on a mobile device. The third is mobile payments at a point of sale (POS),

which are payments initiated from a mobile device at physical locations, such as a grocery store, restaurant, or gas station (Hayashi, 2012).

For this research, the operational definition of mobile payment is payment service functioned under a financial rule and performed through a mobile device. As a substitute for paying with cash, cheque or credit card, a consumer can use a mobile phone to pay for an extensive range of services and digital or hard goods as well; merchants can sell their products anytime anywhere without cash involvement through mobile payment.

2.2. Mobile payment technologies

Technologies that enable mobile payments are still fragmented where there is no dominant method for making mobile payments (Hayash & Bradford, 2009). The choice of technologies significantly affects requirements for consumer and merchant use, business models, and funding sources. The three main technologies that have emerged for mobile payments are NFC, code-based (for example, barcode and QR code), and cloud-based (Hayash & Bradford, 2009).

a. **NFC** enables wireless devices to communicate over a short distance. A consumer completes a transaction by tapping or waving a mobile device at a merchant's point-of-sale (POS) device.
b. **Barcodes and QR codes** store information that can be read by a scanner or a mobile device that has a code reader application installed. One way to make a payment using these codes is for a consumer's mobile device to display a barcode or QR code containing payment information that is scanned by a POS device.
c. **Cloud technology** uses remote servers to store data, eliminating upfront investments in software and hardware, and removing volume limits on stored data. One way to make a cloud-based mobile payment is to use a consumer's mobile phone number with a personal identification number (PIN) entered into a PIN pad at a merchant's POS. Other cloud-based methods rely on location-based technology that monitors a consumer's location (for example, inside a given store) with a mobile payment application.

Each of the three technologies is used in some existing mobile payment applications, such as Apple Pay, Samsung Pay, QR Pal, QR pay, Android Pay, Google Pay, and Pay Pal (Ramos, Montoro, Liébana, & Gil, 2016; Gao & Mei, 2009; Trütsch, 2016)

2.3. Mobile payment stakeholders

Mobile payment has different stakeholders to the transaction exchange process experience (Karnouskos S. & Fokus F., 2004).

2.3.1. Financial institutions and Banks

According to Karnouskos (2004), banks or financial institutions have managed customers' financial services for decades and that also established a good reputation towards customers with credibility and trustworthiness. Since customers already have their financial details stored within different banks and as an established issuer of prior payment methods, this is seen as a great advantage regarding mobile payments. Banks expect to handle fewer cash transactions and more card payments since they benefit from all transactions. Banks are also considered as leaders when it comes to the overall payment market and expects to even maintain this position in the mobile payment market. Therefore, even with limited knowledge of mobile payments, financial institutions still strive to either develop their payment services applications or become co-developers with other stakeholders (Karnouskos S. & Fokus F., 2004).

2.3.2. Payment processing networks

Payment processing networks are card companies that work as intermediaries between financial institutions and adopters (e.g. merchants). Payment processing networks manage the agreement between affected participants by setting fees and establishing technical functional, branding and certification policies. Payment processing networks have established a payment infrastructure and proven its high security through POS terminals (Ming, 2016).

2.3.3. Customers

The customer is a client; one who purchases or receives a product or service from a business or merchant, or intends to do so. When mobile payments penetrate the market, customers are those that utilize these products and services. Customers expect these products or services to have a

low learning curve (Karnouskos S. & Fokus F., 2004) since switching back to physical money or card payments is easy.

2.3.4. Merchants

A merchant is a person who sells commodities for profit. According to Carr (2007), merchants are those that create the market for other stakeholders since they are willing to pay for mobile payment services to reach out to consumers. Merchants offering mobile payment services expect transactions to be faster and that investment and cost of usage should be low or free.

2.3.5. Government

The government affects mobile payments since it sets laws, legislations, and regulations. Every country has its social condition, which makes it difficult for a successful payment service in one country to become successful in another. Governments are those that expect cooperation between all the mobile payment stakeholders to develop a global open solution (standard), instead of closed services with limited range (Carr, 2007; Nurhussen, 2016).

2.3.6. Mobile network operators

Mobile network operators possess a vast customer base since they control the subscriber identity module (SIM) and the wireless identity module (WIM), an extension file format for wireless application protocols on a SIM card, which also support digital signatures to verify the authenticity of a mobile device (Karnouskos S. & Fokus F., 2004). Tele 2 Sweden, TeliaSonera And KDDI of Japan are some of the well-known mobile payment network operators in the world (Markendahl, Andersson, & Smith, 2010).

2.3.7. Mobile device manufacturers

Mobile device manufacturers play an essential role since they are those that launch mobile devices into the market. Mobile device manufacturer affects both the implementation and deployment of mobile payment services since they control the technology and capabilities of mobile devices (Karnouskos S. & Fokus F., 2004). Samsung, Apple, Nokia, ZTE and LG are some of the famous manufacturers nowadays (Cecere, Andersson, & David, 2015) moreover the

suitability depends on the payment technology and the payment application that a customer is using.

2.3.8. Software providers

Software providers can be related to the payment service provider's intermediate payment services and enable merchants to accept online services for electronic payments (Andersson, Josefsson, & Petterson, 2007). Some major examples included are ExpressPay from American Express, PayPass from MasterCard, PayWave from Visa, Pay Pal from eBay, Apple Pay from Apple Inc and Google wallet from Google (Raina, 2014) .

2.4. Mobile Payments Categories

Mobile payments are categorized according to the basis of payment. A payment transaction has been identified based on various dimensions. A distinction between the different types of payments is based on location, time, size and medium. Mobile payments are typically differentiated by technology, transaction size, location (remote or proximity), and funding mechanism (Raina, 2014).

2.4.1. On the basis of payment location

On the basis of payment location, payments can be classified into remote payments and proximity payments (Raina, 2014).

A) Remote payments

The customer's mobile phone does not directly interact with the merchant's POS hardware. The customer usually uses a mobile application, which is installed on the mobile device to purchase goods or services. Remote payments are often implemented using SMS, mobile application, or mobile browsers (Raina, 2014).

B) Proximity payments

The customer's mobile phone has to interact with the merchant's POS system. Proximity payments are often implemented using fobs, contactless stickers, tags, or NFC-enabled mobile phones (Raina, 2014). The transactions are generally initiated by either placing the mobile device

next to the merchant's POS terminal or scanning the QR code, which is embedded within the mobile device.

2.4.2. Transaction size

According to Raina (2014), transaction sizes are divided into two categories: micropayments and macro payments.

A) Micro payments:

Remote mobile micro payments enable purchases of mobile content and services such as news, games, tickets, and location-based services. Mobile micropayments also provide a potential payment method for e-commerce. In Finland, Helsinki City Transport offers a mobile subway and tram ticket, an example of a successful mobile payment service (Raina, 2014; Andersson, Josefsson, & Petterson, 2007). As Raina (2014) noted, customers can order a one hour SMS ticket via their mobile phones by sending an SMS message to a service number. Mobile micropayments at unmanned POS include applications such as the purchase of soft drinks or items from vending machines, and payments on self-service stations, for example, paying for gas without cash at hand. Mobile micropayments at manned POS include small purchases at shops, kiosks, and fast-food restaurants. The manned POS mobile payments are often more convenient in purchase situations. Merchants accept credit card transactions for small amounts because of transaction fees. Accordingly, mobile payments are attractive substitutes for this type of transaction, especially since most current mobile purchases are news alerts, logos, and ring tones. However, most companies promoting micropayments failed because the margins on small value payments are notoriously low, and sufficient economies of scale are extremely difficult to attain. Micropayments are provided by mobile operators, with payment being made mostly via premium SMS/WAP using mobile operators' billing infrastructures. Such micro-payments have proved to be an extremely lucrative source of revenue. Since payment amounts are low and the merchant's fee for mobile content relatively high, mobile operators have accepted the payment risk, based on their basic authentication of the user and their billing systems, without any collaboration with the banks for on-line authorization (Raina, 2014).

B) **Macro payments**

Mobile macro payments can be used to pay for larger purchases both electronically (e-commerce, mobile ticketing, gaming) and on manned and unmanned POS (restaurants, retail shopping, and so forth) (Bezaalem, 2019; Raina, 2014) Mobile macro payments face more competition from well-established traditional payment instruments. However, solutions developed for user authentication in macro payments provide possibilities for a variety of different services such as passage control, digital signatures, and mobile government services.

There are different researches done by Telecom organizations that are developing a mobile authentication service based on a WPKI solution (Raina, 2014) Mobile authentication can be used for mobile government services and digital signatures both on the Internet and mobile networks. They need stronger security mechanisms because of the large amount of money involved and the greater possibility of fraud. For remote macro payments, the mobile is linked to a payment card (credit/debit card) or an account (bank account and/or store account) through an activation/ enrolment process and is used after ward as an authenticator of remotely-stored information (Raina, 2014; Nurhussen, 2016).

2.4.3. On the basis of Technology

Mobile payments use different technologies to perform a transaction. Remote payments typically rely on text messaging (SMS), a mobile browser, or a mobile application. Proximity payments rely on either bar codes or a contact-less interface to chip-enabled payment technology, such as NFC-enabled mobile phones, contact-less stickers, tags, or fobs (Raina, 2014). According to Raina (2014), The payments are categorized into the following types.

- SMS, a mobile browser, or a mobile application
- Bar codes or a contact-less interface to chip-enabled payment technology, such as NFC-enabled mobile phones, contact-less stickers, tags.

2.4.4. On the basis of the funding mechanism

Based on the funding mechanism, the payments are categorized into the following types (Raina, 2014). Account-based, real-time, pre-paid, postpaid, smart card-based, credit card based, M POS, mobile wallets, P2P Payments.

Real-time payment enables businesses and consumers to make and receive payments in real-time, providing convenience, speed, and faster availability of funds. Whereas smart card-based payment enables a consumer to enter their card details to make purchases. Although M POS is a smartphone, tablet or dedicated wireless device that performs the functions of a cash register or electronic point-of-sale terminal (POS terminal) wirelessly.

2.5. Economic Models for mobile payments

According to Chaxi and Torre (2011), until now four sorts of economic models are discussed and seem to compete for serving as mobile payments:

2.5.1. Bank centric model

A bank is the central node of the economic model for mobile payments, manages the transactions and distributes the property rights. Figure 1 depicts the financial network of banks and mobile payment applications (Chen, 2008).

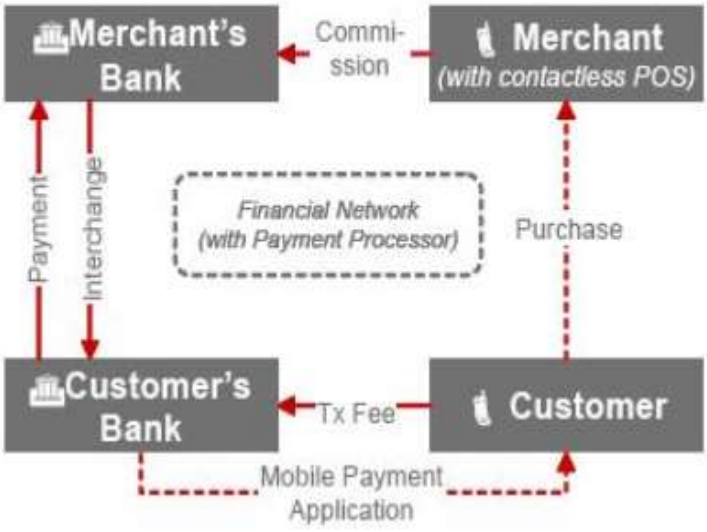

Figure 1: The banks and the payments (Chen, 2008)

2.5.2. Operator centric model

In this model, the telecommunication operator offers the technology, operates the transactions and compensates the system. Before payments, there is a necessity to connect the mobile payment system and banking accounts or cash deposits. After the clearing of the last transactions, there is the same necessity to credit the accounts or to pay in cash the last recipients. At this level, a third party must provide liquidity to the system and be compensated by the operator. This model cannot be adopted because of Ethiopia's financial rules and regulation does not allow financial transactions to be done other than banks. Figure 2 shows the coordinating role of the operator.

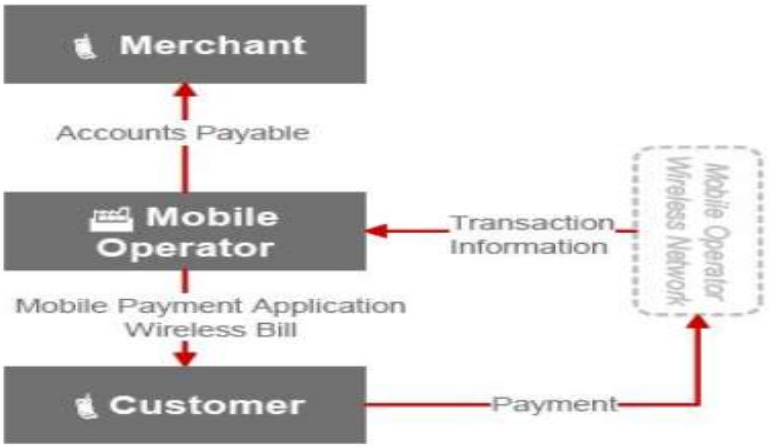

Figure 2: The coordinating role of the operator (Balaban, 2009)

2.5.3. Collaborative model

Financial intermediaries and telephonic operators collaborate in managing tasks and share cooperatively the proprietary rights. This model involves cooperation between operators, banks and the participation of A third party which creates a link between the two main partners. Figure 3 shows a collaborative model for mobile payment.

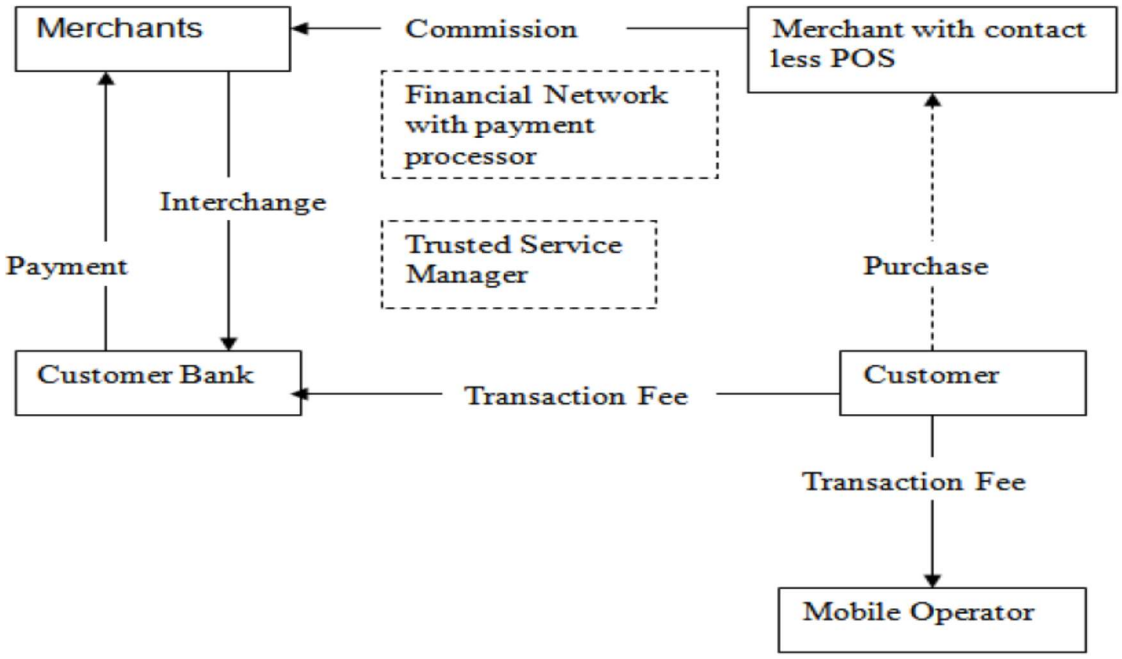

Figure 3: The collaborative model (Chaix & Torre, 2011)

2.5.4. Independent service provider (ISP) model

In this model, the third party of confidence operates as an independent and "neutral" intermediary between financial agents and operators. Google or PayPal is the ISP the most frequently associated with this model. Figure 4 presents independent service providers for mobile payment.

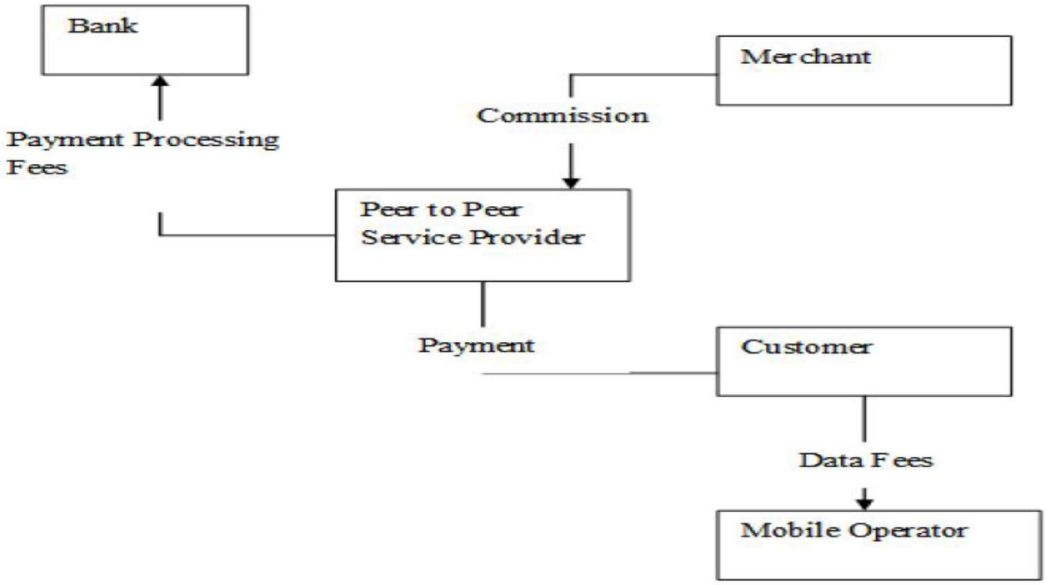

Figure 4: The coordinating role of the independent service provider (Chaix & Torre, 2011)

2.6. Economic purpose and the funding source of mobile payment

The economic and financial activity of mobile payments can be classified into two types (Flood, West, & Wheadon, 2013): purchases and transfers.

a. Purchases – funds are paid to the seller micropayment the buyer to receive goods or services, which are offered by the seller.
b. Transfers/Remittances – payments that do not create or extinguish an obligation between the parties involved. These are generally made up of domestic and cross border remittances, which are common in Third World economies.

As noted by Flood, West, & Wheadon(2013), purchases might be further broken down into point-of-sale purchases, where the payer and the payee are in the same location and typically interact via a payment terminal, and remote purchases, where the payer and payee are in different locations. Mobile point-of-sale purchases might include making a ‘credit card’ or ‘debit card’ payment using a contactless chip in a mobile phone or by sending a Short Message Service (SMS) instruction to purchase a vending machine using the same account. The use by a small merchant of a device attached to a mobile phone to accept card payment for goods and services might also be considered a mobile point-of-sale transaction. A remote purchase might involve a traditional payment type (such as a ‘card’ payment, BPAY or ‘pay anyone’ transaction) initiated

via mobile internet or payment initiated via SMS from a prepaid account held with a network operator of some type ('mobile money'). Mobile transfers/remittances are common in developing economies. This includes both domestic and cross-border worker remittances, often based on a mobile money model. In Australia, some banks and PayPal have also begun offering personal transfers via mobile applications on smartphones.

While discussing the funding source of mobile payment there are generally three sources of funds, which are used in mobile payments (Flood, West, & Wheadon, 2013).

A) Credit account from a financial institution – credit accounts, which are offered by financial institutions such as banks, which enable the holder to buy goods or services on credit from participating merchants around the world. Before the credit account is issued, a risk assessment is performed on the applicant to ensure that they do not exceed a certain limit (WESTPAC, 2015).
B) Deposit account from a financial institution – an account with a financial institution such as a bank that enables the holder to withdraw or deposit money into the account. The withdrawals are limited to the funds that are available in the account.
C) Funds stored by another entity – online entities such as PayPal and PayU that enable individuals to open an account with them and the funds are sourced from this account when an online payment is made.

2.7. Advantage of Mobile Payment

As an emerging payment method, mobile payment technology is perceived as a secure and effective substitute for traditional debit/credit card payment. Scholars claimed that mobile payment technology would become a major future payment method. Compatibility with lifestyle, perceived usefulness, subjective norm, and security are the major predictors of consumers' intention to adopt mobile payment technology (Dennehy & Sammon, 2015).

The potential benefits to consumers of mobile payments can be evaluated by comparing mobile payment methods to traditional payment methods in terms of key payment attributes. Some attributes, such as convenience, cost, security, and acceptance by merchants, Mobile payment technologies could bring many benefits to consumers and merchants. Mobile payment systems

could act as a digital wallet, storing coupons and loyalty information. Because of the growing storage and computing capacity of mobile phones, they could also become repositories for purchases of goods and services. Mobile payment technologies could help customers keep purchase records, and could address the problem of lost receipts and rejected returns (Hayashi, 2012).

There is also the potential for better payment security. In most credit card transactions, consumers use the same number over and over again to effectuate charges, without a Personal Identification Number. Neither consumers nor companies can ensure that the array of individuals who handle credit card numbers keep them securely. Mobile payment technologies could leverage information about the consumer, location information, security features on the device, and one-time account identifiers to more effectively verify buyers' identifies, thereby achieving more secure transactions(Dennehy & Sammon, 2015). Properly implemented, such advances could reduce the harm created by embezzled credit card numbers and make it more difficult to engage in in-person credit card fraud (Dennehy & Sammon, 2015).

Dennehy and Sammon (2015), identified the following advantages to different stakeholders of mobile payment.

A) Financial Institutions

Mobile payments offer financial institutions the opportunity to protect the current account and associated loan products and to avoid further dis-intermediation from the consumer by third parties in the on-line payment space. Mobile payments also offer financial institutions the opportunity to reduce the use of cash and its associated costs, as well as the opportunity to service unbanked and under-banked communities cost-effectively.

B) Mobile Network Operators

Mobile payments provide MNOs with the opportunity to recoup the cost and return on the investment made in infrastructure through increased air time and data usage by consumers. Mobile payments also provide MNOs with the opportunity to create new revenue streams by diversifying into new areas of business based on evolving consumer needs and behaviours.

C) **Merchants**

The benefits of mobile payments for the merchant include; higher throughput at the point-of-sale (POS); the ability to send real-time messaging to consumers; and the reduction of service costs

through unmanned or remote POS locations. Mobile payments using NFC technology can also enable merchants to create deeper customer relationships and richer individualized shopping experiences by offering value-added services such as digitized loyalty cards and coupons.

D) Consumers

Mobile payments could allow consumers to make payments 'anytime, anywhere', becoming less dependent on the need to carry cash which in turn could reduce the risk of theft.

E) Regulators

Regulation can provide secure and efficient payment systems to the delivery of value to the markets. This, in turn, can provide governments with the opportunity to enhance financial services, particularly for the unbanked and under-banked populations.

2.8. Mobile payment in Ethiopia

At present, Netherlands-based BelCash is offering a technology called helloCash, while MOSS ICT, mainly owned by an Ireland-based firm launched M-Birr, since its launch in 2015; it has built a network of more than 1.2 million users nationwide who deposit money at over 7,000 M-Birr locations (Blair, 2015). The service allows people to use their mobile phones to pay for groceries, fuel and various other daily services. Ethiopian Airlines and cable TV provider DSTV are among their partners (Blair, 2015).

In addition to these product providers, and its commercial services, M-Birr is used by Ethiopia's Ministry of Finance to deliver electronic payments for the Productive Safety Net Programs, a government-run initiative that provides financial assistance to poor Ethiopians, including subsistence farmers. That has moved a program that often saw cash being moved around on trucks, to a digital method of distribution. More than 800,000 households, representing over 3 million people, receive money in this way through the M-Birr platform (MOSS.ICT, 2019). The Commercial Bank of Ethiopia (CBEBirr) offers a similar mobile money service, while HelloCash is another competitor. With a 100 million population that makes it the largest country in East Africa, Ethiopia offers a potentially profitable market. Additionally, Dashen Bank one of the nation's leading private commercial banks has launched a digital wallet system. The service, named Amole after an ancient form of currency used in Ethiopia, was developed by Moneta Technologies, which will operate the system (CBE, 2019).

2.9. Technology Adoption Models

Technology is changing dynamically to serve consumers' needs. In this regard how fast users are accepting these technologies depends on several factors. There are different adoption models developed by different researchers addressing the adoption of new technologies. The major ones are discussed below.

2.9.1. Theory of Reasoned Action (TRA)

The Theory Reasoned Action (TRA) model has its roots in psychology and it attempts to elaborate and predict the user's behavioural intentions based on 'attitudes' and 'subjective norms' (Fishbein., 1979). In this theory (see figure 5), it has been argued that individuals are making systematic use of the information which is available to them. In the original conceptualization of this theory, belief, attitudes, behavioural intentions and behaviour were considered as the determinant variables to explain relationships between attitude and behaviour.

According to the theory of reasoned action, individual behavioural intention is due to two variables (Fishbein., 1979); (i) attitude toward the behaviour and (ii), the social influence perception by the individual to perform or not to perform behaviour. Attitudes are described as the sum of beliefs attributed to a particular behaviour. Thus, it could vary depending on the attributions and beliefs while subjective norms are described as mostly situational consisting of user's opinion about the subject's behaviour which could be influenced by a variety of factors such as economy, politics, society and other demographic variables (Fishbein & Ajzen, 1975) . The behavioural intention of a user is described as a user's ability to carry out an intended behaviour.

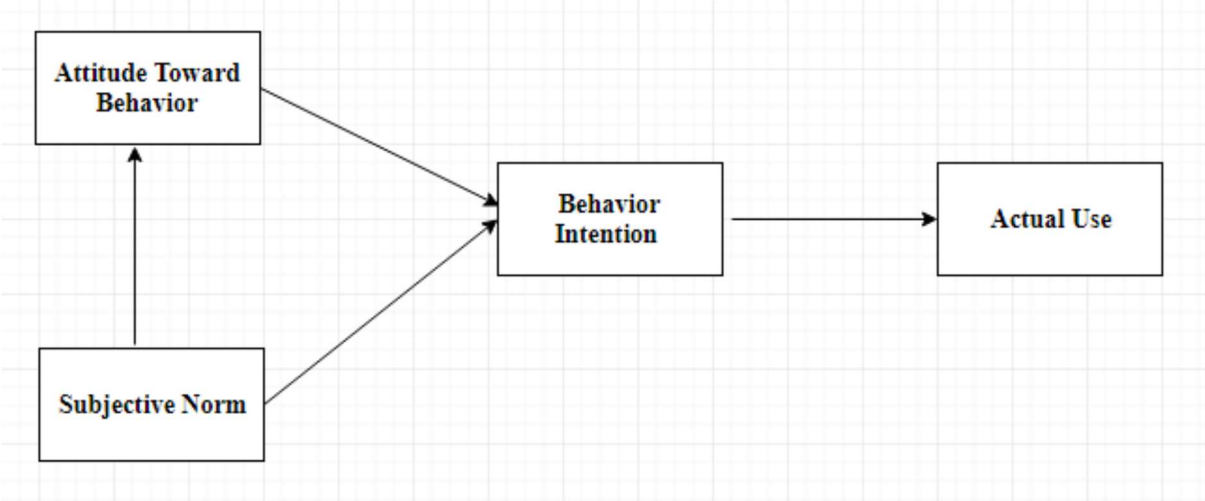

Figure 5: Theory of Reasoned Action (Fishbein., 1979)

2.9.2. Theory of Planned Behaviour (TPB)

Ajzen (1985), extended TPB to determine the behavioural intention of a person's attitude toward behaviour (see figure 6). The theoretical model developed based on TRA with the two factors as same by adding a new factor that is perceived control behaviour which refers to the degree to which a person believes that they control any given behaviour (Ajzen, 1991).

The TPB increased perceived behaviour control that is a mix of two dimensions: self-efficacy is the internal factor and controllability is the external factor. Self-efficacy refers to the level of difficulty that is required to perform the behaviour, or one's belief in its own ability to succeed in performing the behaviour (Ajzen, 1991). Controllability refers to the outside factors and one's belief that they have control over the performance of the behaviour, or if it is controlled by externally, uncontrollable factors (Ajzen, 1991). Attitudes refer to "the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest" (Fishbein & Ajzen, 1975). Behaviour intention is defined as "the motivational factors that influence a given behaviour where the stronger the intention to perform the behaviour, the more likely the behaviour will be performed" (Fishbein & Ajzen, 1975).

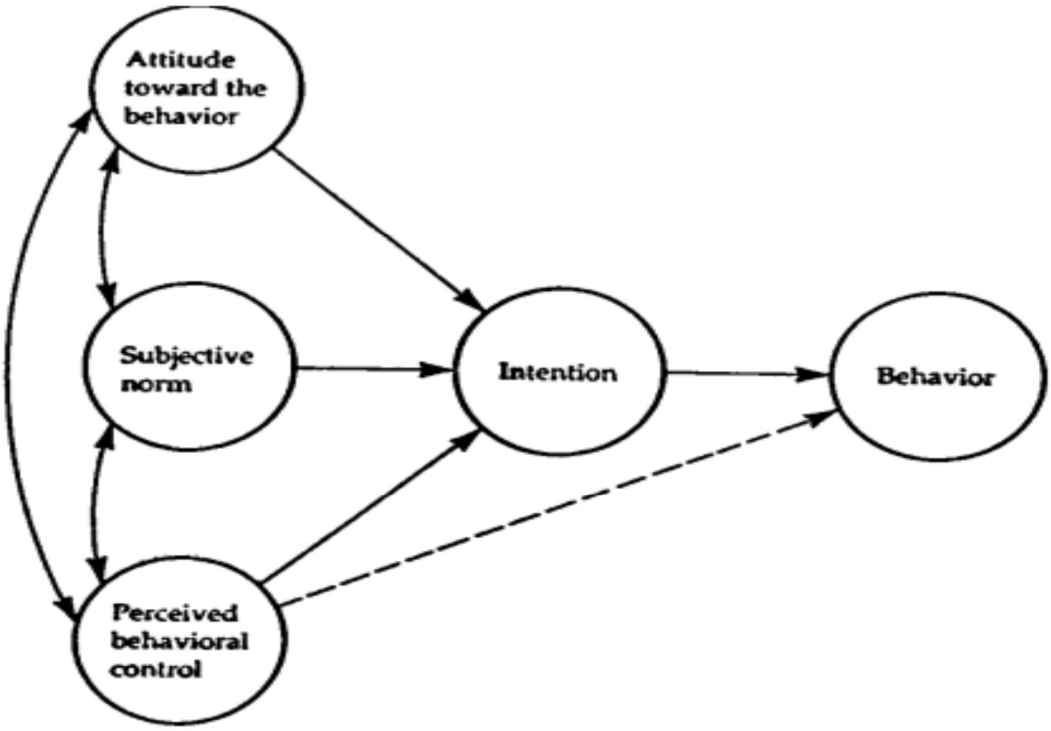

Figure 6: Theory of Planned behaviour (Ajzen, 1991)

2.9.3. The technology of Acceptance Model (TAM)

Postulated by Davis, (1989), is by far the most widely used acceptance theory in Information Systems (IS) research as well as in other fields. In general, figure 7 shows TAM that tries to predict individuals' intentions toward using a technology behaviour based on their perception of its Ease of Use (PEOU) and Perceived usefulness (PU). Perceived usefulness refers to "The degree to which an individual believes that using a particular system would enhance his or her job performance" and perceived ease of use describes "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (Davis, 1989). A successful user interface design has potential implications concerning the perceived ease of use to the users. Can users pay easily and quickly? The system providers have to consider this question, to ensure users can use the systems effortlessly. Usability has been widely used to evaluate information systems (Venkatesh, Morris, Davis, & Davis, 2003). An easy to use interface is important for any application, especially for mobile applications. This is because of the unique characteristics of mobile devices, such as screen size, input mechanisms, and battery

consummation and so on. Systems developers have to give serious consideration to design guidance for mobile applications.

According to Davis, (1989), a user's acceptance of an information system is dependent on two factors: perceived usefulness and perceived ease of use. Together, these factors determine the attitude toward using technology. This, in turn, affects the behavioural intention to use, which then leads to actual system use. A system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship. PEOU refers to the degree to which a prospective user believes that using a particular system would be free of effort. This follows from the definition of "ease": "freedom from difficulty or great effort". An effort is a finite resource that a person may allocate to the various activities for which he or she is responsible. All else being equal, an application perceived to be easier to use than another is more likely to be accepted by users.

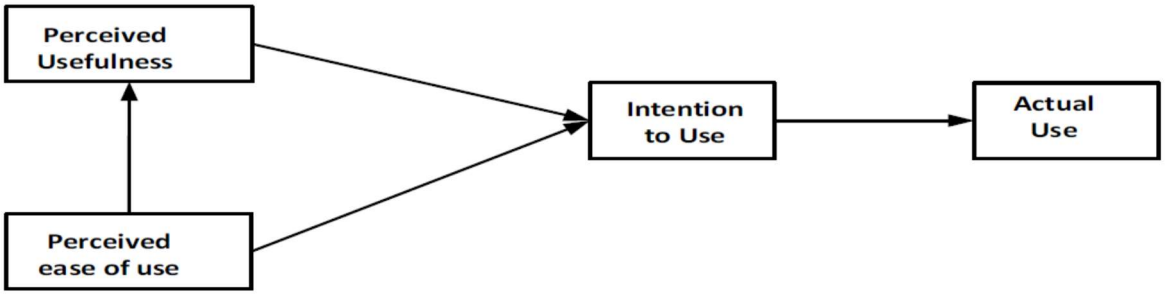

Figure 7: The technology of Acceptance Model (Davis, 1989)

2.9.4. Diffusion of Innovation Theory (DIT)

Diffusion of Innovations Theory (DIT) was developed by Rogers (1995) to explain how the diffusion of innovations takes place in the social system. Adoption is defined by Rogers (1995) as an individual process detailing the series of stages one undergoes from first hearing about a product to finally adopting it. Diffusion signifies a group phenomenon, which suggests how an innovation spreads. As defined by Rogers (1995), there are five stages of the adoption process: knowledge, persuasion, decision, implementation, and confirmation. Also, Rogers (1995) stated

that three valuable insights, the quality of innovation, peer to peer communication and understanding of the need of different user segments might be useful to diffuse and adopt the innovation.

According to Rogers (1995), innovation compatibility with one's usual way of working and behaving is a factor to make individuals more likely to adopt the innovation. Figure 8 represents the Diffusion of Innovation Theory by Rogers. Relative Advantage is to expresses to what degree the new technology or product is perceived as better than the existing product. In relative advantage, there are several sub-dimensions like the degree of economic profitability, low initial cost, a decrease in discomfort, saving in time and effort, and the immediacy of the reward. The relative advantage of an innovation generally, as perceived by members of the social system, is positively related to its rate of adoption (Rogers, 1995).

Compatibility indicates the degree in which the technology service is perceived as consistent with sociocultural values and beliefs; with the previous and present ideas; and with client needs of innovation (Rogers, 1995). When an innovation provides alternative or supplementary products or services little effort is required to learn operation change that potential adopters are likely accepting it.

Complexity defined complexity as the degree to which an innovation is perceived as relatively difficult to understand and use (Rogers, 1995). It's as perceived by members of the social system is negatively related to its rate of adoption. The complexity of innovation was negatively related to their rate of adoption than any other characteristic of the innovation except relative advantage. Some innovations are easily understood by most members of a social system and will be adopted quickly, whereas others may be more complicated and will be adopted more slowly.

Trial-ability described as a degree in which a new invention can be tested out on a limited time frame basis which is positively related to its adoption rate (Rogers, 1995). Potential adopters who are allowed to test with the innovation will feel more comfortable with it and more likely to adopt it.

Observability is described as the extent to which an innovation is visible to the social systems and the same belief can be easily observed and communicated, the more social system will adopt

it; some can be difficult to be observed and communicated (Rogers, 1995).

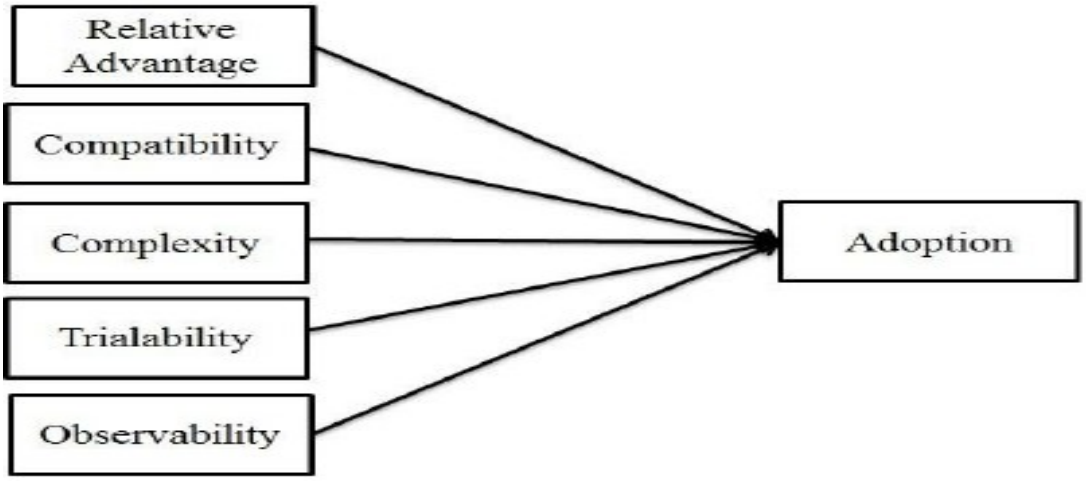

Figure 8: Diffusion of Innovation Theory (Rogers, 1995)

2.9.5. Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al (2003) have taken another initiative by introducing user acceptance of information technology: toward a unified view. They argued that prior research having information technology (IT) acceptance as their central theme of the research introduced many competing models where each of which has a different set of acceptance determinants (prediction variables). Therefore, in their study, they combined several traditional IT acceptance theories to formulate a unified model. In the original UTAUT model, four core determinants of intention and usage and four other moderating variables acting as the key relationships were considered. The aim of formulating this theory is to provide a deeper understanding of individual and organizational acceptance of IT artifacts to researchers and managers. However, they introduced 'Performance Expectancy', 'Effort Expectancy', 'Social Influence', and 'Facilitating Conditions' as the core and direct determinants of user acceptance and usage behaviour. Furthermore, they also introduced 'Gender', 'Age', 'Experience', and 'Voluntariness of Use' as the moderating factors where they can be used to understand the user acceptance and usage behaviour (Venkatesh, Morris, Davis, & Davis, 2003). Figure 9 presents the Unified Theory of Acceptance and Use of Technology by Davis.

Performance Expectancy is the degree to which an individual believes that using a particular system or technology will improve performance (Venkatesh, Morris, Davis, & Davis, 2003). It is

worthwhile mentioning here that, 'Performance Expectancy' is similar to other acceptance models such as Perceived Usefulness in Technology Acceptance Model (TAM). Effort Expectancy is the degree of ease (easiness) of using a particular system or a technology, and it is similar to Perceived Ease of Use in the TAM model. This construct for behavioural intention is strongly influenced by moderating factors such as 'Age', 'Gender, and 'Experience', a plausible reason is that younger women, for instance, are more concerned with the usage of new technology. Moreover, Social Influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system. Social influence is equivalent to subjective Norm in the Theory of Reasoned Action (TRA) and Theory of Planned behaviour (TPB) model. Finlay, Facilitating Conditions are defined as the degree to which an individual perceives that technical infrastructures can support the user to use the technology or a system.

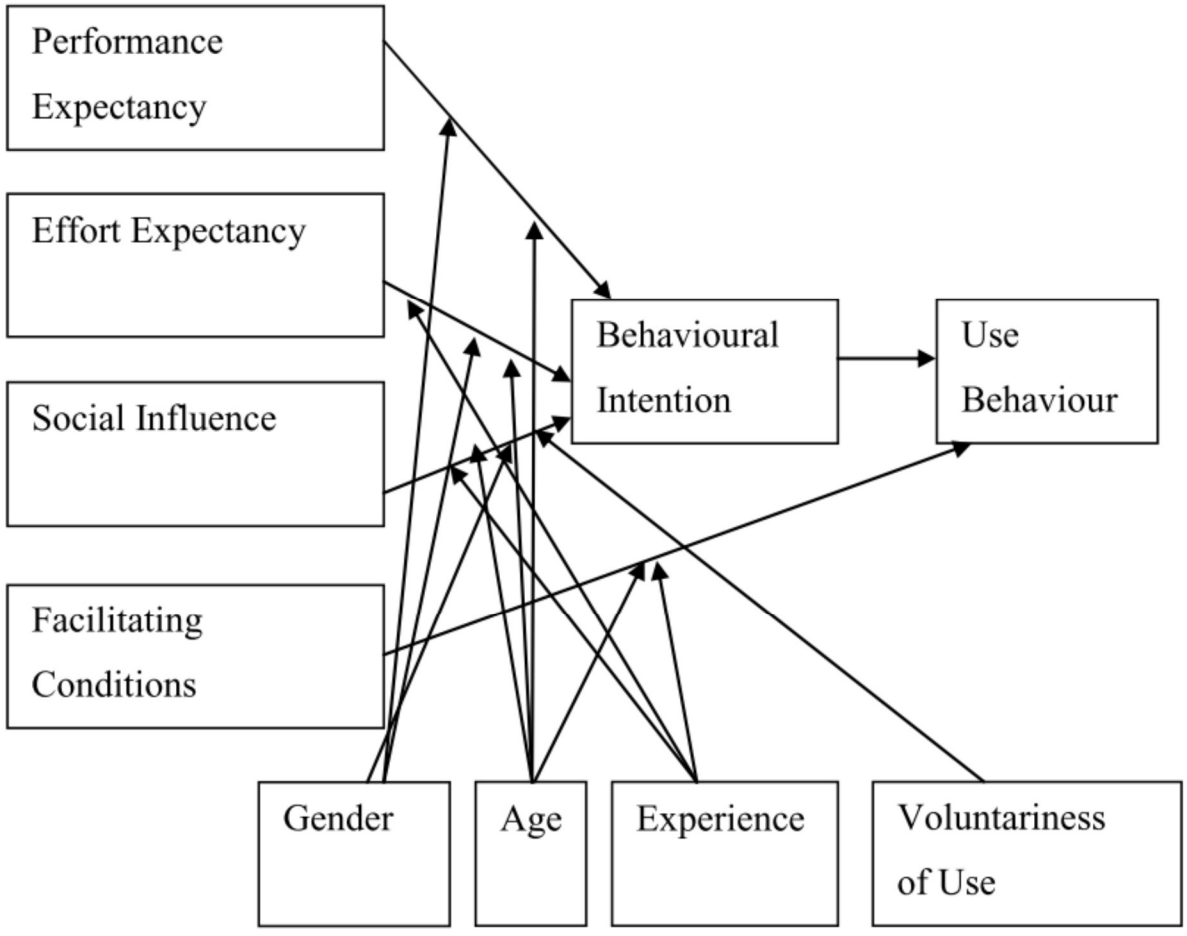

Figure 9: Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003)

2.9.6. Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

UTAUT2 incorporates three constructs into UTAUT: hedonic motivation, price value, and habit. Individual differences name, age, gender, and experience are hypothesized to moderate the effects of these constructs on behavioural intention and technology use. Results showed that compared to UTAUT, the extensions proposed in UTAUT2 produced a substantial improvement in the variance explained in behavioural intention (56 percent to 74 percent) and technology use (40 percent to 52 percent). Further, (V.Venkatesh, Ramesh, & Anne, 2003)also revealed that the impact of hedonic motivation on behavioural intention is moderated by age, gender, and experience, the effect of price value on behavioural intention is moderated by age and gender, and, habit has both direct and mediated effects on technology use, and these effects are moderated by individual differences as shown on figure 10.

The UTAUT2 model, developed by Venkatesh incorporated three new constructs into UTAUT (see figure 10 below): hedonic motivation, price value, and habit. According to Venkatesh hedonic motivation will complement UTAUT's strongest predictor that emphasizes utility. Furthermore, contradictory to workers in an organization, consumers have to pay the costs and these can be of influence on the consumer's decisions. By adding a construct that is related to price and costs will complement UTAUT's existing resource considerations that focus only on time and effort. Finally, habit as another critical predictor of technology use will complement the focus on intentionality as the overarching mechanism and key driver of behaviour (V.Venkatesh, Ramesh, & Anne, 2003).

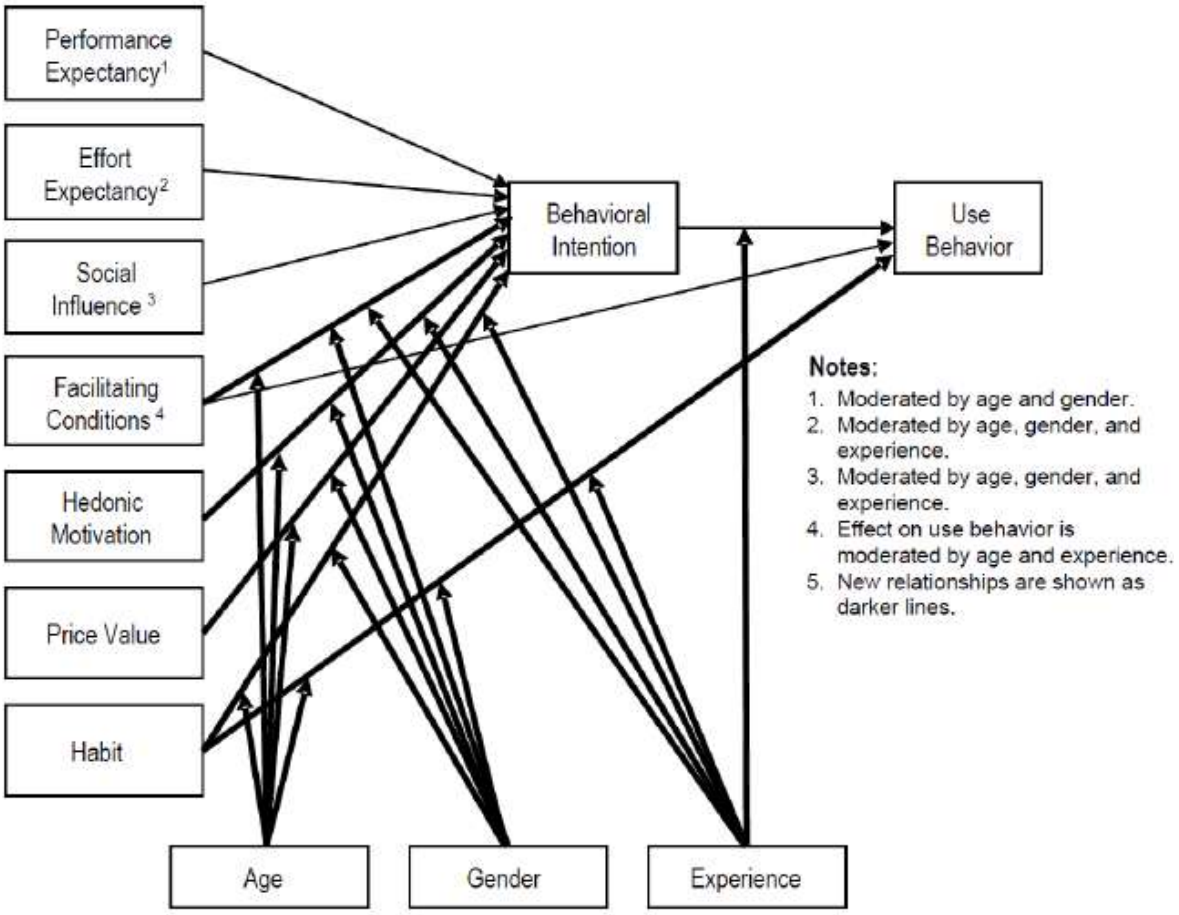

Figure 10: Unified Theory of Acceptance and Use of Technology 2 (Venkatesh, Morris, Davis, & Davis, 2003)

2.9.7. Technology acceptance model or mobile payment systems

The model is examined and proposed by ÖRS (2018). In the study literature of mobile payment, adoption is reviewed systematically. Most of the papers use TAM, DOI or UTAUT as the theoretical background. Among them, TAM has the lead. Therefore, academicians are inclined to use those models. Consequently, ÖRS build a model based on the most frequently used constructs affecting the latent variable in the mobile payment system. As shown in figure 11 below, the variables considered in this model are Usefulness, Ease of use, Use, Security, Compatibility, Social influence, Enjoyment, Anxiety, Knowledge, and Innovativeness. Knowledge, anxiety and Enjoyment are independent variables. The others are dependent.

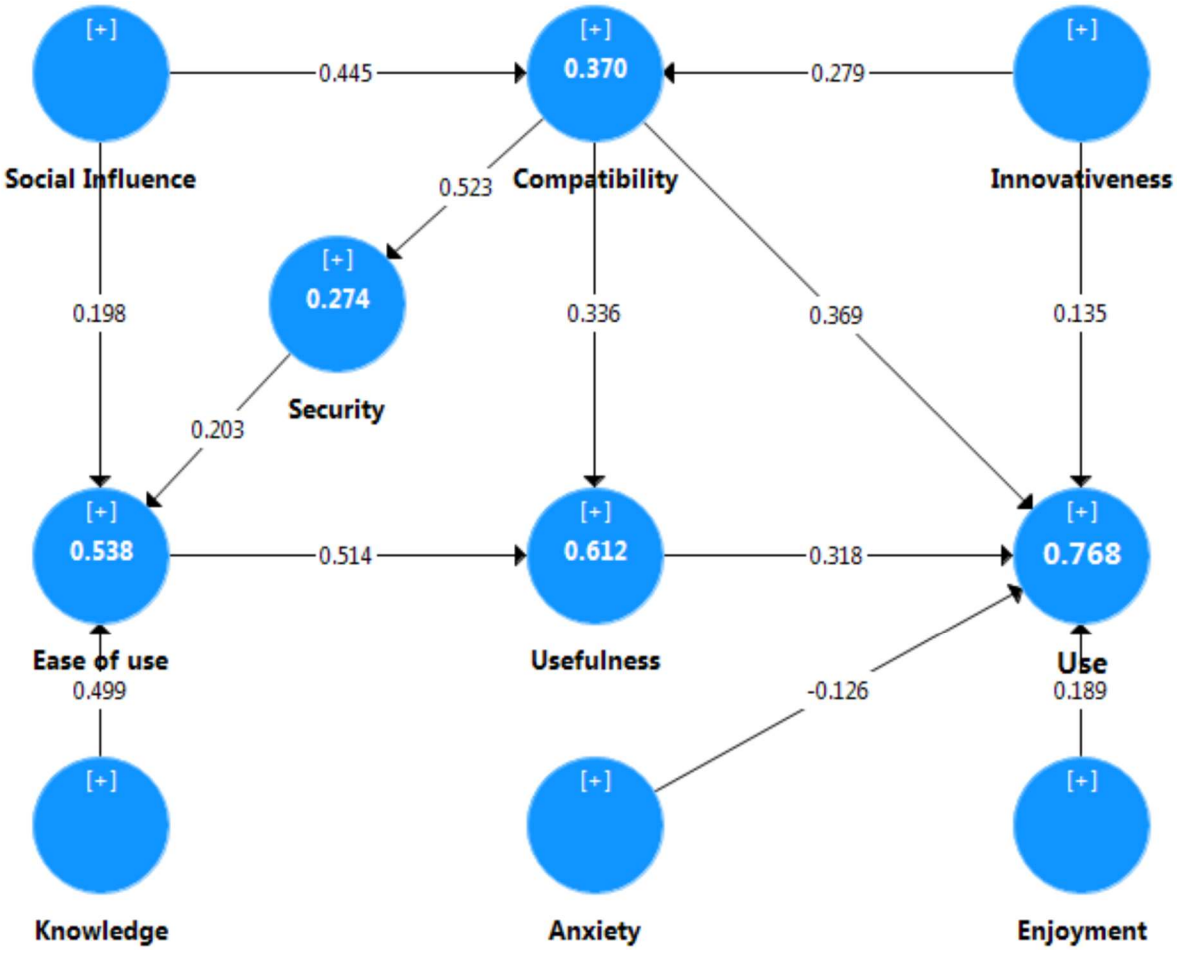

Figure 11:Technology acceptance model for mobile payment systems (ÖRS, 2018)

2.10. Related works

Multiple scholars reveal that research on electronic payment has been more focused on internet banking and mobile banking. Though on mobile payment, because of the nature of the business, it is becoming challenging to find specific finding that fits common as, mobile payment has multiple ecosystems (Dahlberg, Mallat, & Ondrus, 2014; ÖRS, 2018). Mobile payments, performing as a platform providing different mobile services, serves and bring together two groups of users: retailers or merchants on one side and customers from another side. These two different groups are linked to each other by the network effect phenomenon and represent a two-sided market (Eisennman, Parker, & Van Alstyne, 2006). A vast majority of implemented studies have been focused on the adoption of mobile payment and related mobile services (Eisennman, Parker, & Van Alstyne, 2006).

Niina & Kristiina (2008), explored the merchant adoption of mobile payment systems by examining empirically and discuss factors that drive and inhibit the adoption of mobile payment by merchants. The used both qualitative and quantitative methods. Their results suggest that the main adoption drivers are related to the means of increasing sales or reducing the costs of payment processing, while the barriers to adoption include the complexity of the systems, unfavorable revenue sharing models, lack of critical mass, and lack of standardization. Based on the findings, the researchers propose a conceptual framework of adoption enablers, drivers and barriers such as means to increase sales, means to reduce payment processing costs, and to specific benefits provided by the mobile technology, complexity and high costs related to the design of the mobile payment system and to the business model of the payment provider. Additionally, Implications for practice and means to overcome the barriers are suggested.

Richard et al (2019), in a recent study, found that the drivers and barriers of mobile payment adoption by merchants and provided a theoretical explanation of how the adoption of mobile payment improves the payment experience of merchants. The study adopted an exploratory approach by strategically using the case study of two merchants in the retail sector in Ghana. The findings demonstrate that, in Ghana, the business model and nature of the business, contextual factors, and technology type, as well as competition and cost, serve as drivers of merchant adoption of mobile payment. On the other hand, factors such as risk, legal challenges, lack of trust in the expertise of the telecom industry in financial service delivery and lack of skills on the part of some merchants to comprehend mobile payment application were classified as barriers to mobile payment adoption in Ghana. The benefits of mobile payments are important because they form the foundation of the merchant's decision to adopt and implement the technology. Bertrand and Ahmad (2014), argue that the mass adoption of mobile payments will only be triggered when the benefits – both perceived and real - become clear to consumers and merchants. The Small Merchants and Mobile Payments 2013 Survey notes that because mobile payments are still relatively new, the benefits largely pertain to the perceived potential until the service is adopted widely and the benefits accrue to everyone (ControlScan, 2013).

A study by Mohammadi and Jahanshahi (2008), established a framework for evaluating the barriers and drivers of the customer and merchant adoption of mobile payments qualitatively. The distinct four categories of barriers to merchant adoption are relative advantage,

compatibility, complexity, and costs. Network externalities, security, and trustworthiness of the mobile payments were also considered as relevant factors in mobile payment adoption.

There are a limited number of studies conducted in Ethiopia on the adoption of E-payment specifically mobile payment adoption. Wondwossen & Tsegai (Wondwossen & Tsegai, 2005) studied on the challenges and opportunities of E-payments in Ethiopia; their objective was studying E-payment practices in Ethiopia. The authors employed interviews and on-site observation to investigate challenges to E-payment in Ethiopia and found that the main obstacles to the development of E-payments are, lack of customers' trust in the initiatives, unavailability of payment laws and regulations particularly for e-payment, lack of skilled manpower and Frequent power disruption. According to Wondwossen & Tsegai (2005), an adequate legal structure and security framework could foster the use of E-payments. As the authors generalized during the study on the challenges of e-payment not specifically to the technologies of payment since the perception of risk and trust depends on the regulatory or service provider institution.

Kalkidan (2016) has explored factors influencing the usage of mobile banking in Ethiopia. The research used the Technology adoption model and Innovation Diffusion Theory model by integrating perceived risk, trust, and awareness into the established models. Both descriptive and explanatory research methods are used in this study. The research results found relative advantage, compatibility, perceived trust, perceived usefulness, and perceived risk as major influencing factors for mobile banking adoption whereas perceived ease of use and awareness were found to have an insignificant effect on mobile banking usage for bank customers located in Addis Ababa, Ethiopia. Considering these factors support the banking sector for the usage of mobile banking.

Moreover, Brikty (2017), investigate the perceived barriers to adoption of mobile banking among consumers in Addis Ababa Ethiopia, and to assess whether the usage of Mobile Banking is the constraint on the basis of different demographic characteristics such as age, income level, mobile phone usage “experience” and marital status. A research model uses the technology acceptance model and Innovation Diffusion Theory by integrating perceived risk, trust, and awareness into the established models. It’s cross-sectional descriptive research. The research results found, perceived trust in the Mobile bank service emerged as the most significant factor that impacts on

the adoption of mobile bank service following, perceived usefulness, awareness and perceived ease of use as major influencing factors for mobile banking adoption whereas Perceived self-efficacy was found to have an insignificant effect on mobile banking usage for bank customers located in Addis Ababa, Ethiopia.The study recommended banks to consider investing in security and in arranging campaigns information sessions to demonstrate the features of mobile banking services and its benefits over traditional channels. However, their study was not specifically on mobile payment.

Nebat (2016), examined the existing financial system in Ethiopia and presents a framework for Mobile-Payment which can be interoperable with the current financial system. During her research, intensive study has been done on successful mobile payment systems to understand the concept deeply and to learn from their experience. The existing financial system and the legal framework of the country for financial institutions also have been studied in order to make an appropriate mobile payment framework for Ethiopia. The framework was developed to fit into the existing financial system of the country by introducing a new party, which is the Mobile-payment service provider. Currently, the bank system and the financial system are locked. As the finding of the research bank-led type is allowed in the country with the only reason being to enable banks to build their capacity, and it is believed that banks cannot be competent with technology providers. But when the banks have enough capacity and enough awareness is created on the population about Mobile Financial Solution. The framework mobile payment service provider lies in the business process layer between the consumer and the settlement organ. Also, the researcher used one bank, Lion International Bank, for study and suggested adoption and security areas have to be done detail research. The researcher could view mostly the service provider side from the ecosystem but during the development of a framework, each ecosystem enrolment should be in consideration. In addition, it has been a view from the Bank-led perspective of the model. The researcher concluded that developing mobile payment can present a further opportunity for Ethiopia to widen the financial inclusion and improve the financial sector.

Bezaalem (2019) examines the factors affecting customers' adoption of mobile payments with a special focus on the customers of Commercial Bank of Ethiopia, Dashen Bank, and M-Birr. The study is intended to fill the gap in the literature by inspecting different technology adoption

models and with the objective of identifying the factors that affect mobile payment adoption of consumers in Ethiopia qualitatively. The analysis was based on a questionnaire distributed to consumer mobile payment customers of Commercial Bank of Ethiopia, Dashen Bank, and M-Birr. Broad categories of nine factors were selected to assess different factors affecting 32 customers' decision to adopt mobile payments: relative advantage, compatibility, perceived ease of use, perceived usefulness, perceived cost, perceived trust, perceived risk, attitude and behavioural intention. The result of the study modeled mobile payment adoption as a function of the average values of attitude and behavioural intention. Attitude and behavioural Intention are found to be positively and significantly affecting customers' adoption of Mobile payment.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Overview

The nature of any research problem should drive the research methodology to be adopted. The term methodology refers to the overall approaches and perspectives to the research process as a whole and is concerned with the following main issues like why the researcher collected certain data? What data is collected? Where the data collected? And how the collected data analyzed?

This chapter discusses the research design and techniques used to answer the research questions. It covers the research Strategy, approach, data collection methods, and data source, validity and reliability, and data analysis issues. Also, model concepts are defined independently in detail and hypotheses are given.

3.2. Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in a procedure (Kothari, 2004). According to Kothari (2004), research design stands for planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis. It describes the methods used to collect and analyse the data that helps to answer the research question.

Two paradigms characterize much of the research in the Information System discipline: Behavioural science and design science (Goldkuhl, 2016). Behavioural science addresses research through the development and justification of theories (i.e. principles and laws) that explain or predict phenomena related to the identified business need or explain or predict human or organizational behaviour (Goldkuhl, 2016; Hevner, March, Park, & Ram, 2004). Design science addresses research through the building and evaluation of artifacts designed to meet the identified business need (Goldkuhl, 2016). As well this paradigm seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts (Hevner, March, Park, & Ram, 2004). Both paradigms are foundational to the information system

discipline, positioned as it is at the union of people, organizations, and technology. It needs a complete research cycle where design science creates artifacts for specific information problems based on relevant behavioural science theory and behavioural Science anticipates and engages the created technology artifacts" (Hevner, March, Park, & Ram, 2004). Since, this study bases on existing reality with the justification of theories, it follows behavioural research. Subsequently, this research is intended to be conducted within a specified period and place to explore factors that affect merchants' mobile payment adoption, it follows the cross-sectional survey study design.

Based on the study problems and objectives set, an empirical research method with a deductive approach is employed to assess factors influencing mobile payment adoption. Hence, this method is employed to obtain and analyze information about factors affecting merchants' mobile payment adoption with a focus on users of CBE Birr at Commercial Bank of Ethiopia and M-Birr from non-bank centric in Addis Ababa and Oromia special zone, surrounding Addis Ababa. In order to successfully address the aim, and come up with valid and reliable results, the research is designed so as to have a quantitative nature.

3.3. Research Method

According to Ghauri & Gronhaug (2005), research methods refer to the systematic, focused and orderly collection of data to obtain information from it, to solve or answer research problems or questions. The objective of the research is best achieved with a suitable methodology and method. There are two different ways to conduct research: empirical and theoretical (Ghauri & Gronhaug, 2005). This study takes the path of empirical research. Empirical research methods typically involve systematic collection and analysis of data (i.e., observation and evidence). They are used primarily in quantitative research involving the original collection of data, but also in secondary analyses and increasingly in qualitative research (Dan, 2017). The reason why this study takes empirical research is it generates a series of expected results or hypotheses by selection of variables to observe.

Furthermore, empirical studies may be divided into quantitative and qualitative research (Ghauri & Gronhaug, 2005). Qualitative research is commonly referred to as research which extensively utilizes description, concepts and/or theories to investigate the nature of and the relationship

between variables. This research method is utilized when there is a need to understand how issues or factors are related and to obtain in-depth details to answer research objectives. Qualitative research methods provide more emphasis on interpretation and providing consumers with complete views, looking at contexts, environmental immersions and a depth of understanding of concepts. It is more suitable for studying a new problem in its early stage or for exploring new factors of an existing problem (Kothari, 2004; Addo & Eboh, 2014). It entails the collection of numerical data as exhibiting a view of the relationship between theory and research as deductive, a preference for a natural science approach (and of positivism in particular) and as having an objectivist conception of social reality, this type of research can be characterized as linear series of steps moving from theory to conclusions, and its measurement process entails the search for indicators

A quantitative approach also requires the use of standardized measures so that the varying perspectives and experiences of people can be fit into a limited number of predetermined response categories to which numbers are assigned (Addo & Eboh, 2014). The purpose of this research is to identify factors that affect merchants' acceptance and use of mobile payments. To achieve this purpose, we chose a model and developed a research hypothesis. As noted by Addo & Eboh (2014), a quantitative method is best suited when the emphasis is on testing and verifying a hypothesis. Therefore, a quantitative research method is used in conducting this study.

3.4. Study population and sampling

When field studies are undertaken in practical life, considerations of time and cost almost always lead to a selection of respondents i.e., selection of only a few items. The respondents selected should be as representative of the total population as possible to produce a small cross-section (Kothari, 2004; Taherdoost, 2016). The selected respondents constitute what is technically called a 'sample' and the selection process is called 'sampling technique' (Kothari, 2004).

For this study, as of the end of May 2019, the number of business users or merchants for the mobile payment system of CBE is 4,756 that of M-Birr put up at 1,309. Thus, a total of mobile payment accounts of consumer users in the two selected companies have been 6,065. Selecting only registered merchants from Addis Ababa and around is because there are a lot of merchants in the area so including everyone in the population in the data collection may take too long.

In order to determine the sample size, the researcher used the formula recommended by (Yamane, 1967).

$$n = \frac{N}{1 + N * e^2}$$

Where,

- n is a sample size
- N is a total population
- e2 is a probability of an error

Thus, the sample size for this study is determined as follows:

$$n = \frac{6{,}065}{1 + 6{,}065 * 0.5^2}$$

n= 376

Sampling Techniques

The sampling technique is a method for the selection of individuals for data collection. Since this research is aimed to identify and analyze factors for merchants' adoption of mobile payments in Ethiopia, considering all mobile payment service providers in the country would have been better. However; due to the constraints mentioned in the research scope and limitation section, only the following two service providers have been randomly selected from the available ones. These are CBE Birr and M-birr. To make sure the manageability of the research process and guarantee the achievement of the reliable outcome, a simple random sampling technique was used for the selection of banks. Simple random sampling method, each unit included in the sample has an equal chance of inclusion in the sample. This technique provides an unbiased and better estimate of the parameters if the population is homogeneous (Singh & Masuku, 2014). Furthermore, Systematic sampling is a type of probability sampling method in which sample members from a larger population are selected according to a random starting point but with a fixed, periodic interval (Singh & Masuku, 2014). Accordingly, populations of the study which are merchants of mobile payment users at the specified companies are chosen with a systematic random sampling method.

These organizations were government bank (CBE-Birr) and non-bank (M-birr) and registered (active as well as non-active), mobile payment users, as merchants in Addis Ababa and Oromia special zone, surrounding Addis Ababa. The proportion of government bank and non-bank merchants' accounts from the total questionnaires distributed is random. After the data was collected the proportion of valid questionnaries that are returned are 201 form CBE-Birr and 162 from M-birr merchants.

The two organizations are chosen to reflect the interest of different merchants: government bank mobile payments, and non-bank centric mobile payment. Then systematic random sampling technique adopted to select sample respondents from both. In this case, simple systematic random sampling is expected to give an equal chance of selection for each member of the organization and helped avoid biases.

In general, considering these organizations in this study for the above-described reasons is reasonable for identifying factors for merchants' adoption of mobile payment in Ethiopia. Other providers do not have any speciality that enforces to directly include them in this research. However, due to the similar nature of the business, findings of this research are likely to represent others which are not directly included in this study.

3.5. Sources of Data

The task of data collection begins after a research problem has been defined and research design or plan written out. While deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data: primary and secondary (Kothari, 2004). The primary data are those which are collected afresh and for the first time, and thus happen to be original. The secondary data, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process (Kothari, 2004). Both primary and secondary data are used in this study. Commercial Bank of Ethiopia and M-Birr merchants in Addis Ababa and Oromia special zone, surrounding Addis Ababa, were used as sources for primary data. On the other hand, secondary data was obtained from the website and publications of the Commercial Bank of Ethiopia and M-Birr. Also, journals, books, published & unpublished materials and the Internet that contain data related to the adoption of mobile payment of customers were reviewed as secondary data sources.

3.6. Research Techniques

An instrument of Data Collection

According to Kothari (2004), the methods of collecting primary and secondary data differ since primary data are collected from the source, while in the case of secondary data the nature of data is employed to collect available information that supports the study. The collection of data for this research was held via structured questionnaires. It is a set of questions that are definite, concrete and pre-determined (Kothari, 2004). An advantage of using questionnaires is that it can cover a large sample at a modest cost and representative of its population. In addition to that, a standard questionnaire provides quantifiable answers for a research topic that can be scanned straight into a computer for ease of analysis (Kothari, 2004). The questionnaire is adopted based on previous similar studies and personal experiences of the researcher. As stated, this research used a closed questionnaire as a primary data collection. Instrument the questionnaire had two components one for demographic data and another for main items to measure each variable. The demographic component is composed of age, educational level, experience using the mobile payment system and mobile payment vendor which are likely to influence mobile payment adoption. The five-point Likert scale is used for statements of the second category ranging from strongly disagree to strongly agree, where [1= strongly disagree, 2= disagree, 3= neutral, 4= agree, and 5= strongly agree]. The questionnaire was first outlined using the English language as it is the language used for writing this research and the original constructed items adapted from ÖRS (2018). However, Amharic, which is one of the dominant languages spoken in the country, is the national language of Ethiopia where this questionnaire was administered. Hence, the original questionnaire prepared in the English language translated into the Amharic language by a licensed official language translator. Furthermore, the Amharic version was translated back into the English language for equivalency and the two versions were confirmed for meaning consistency.

Procedures of Data Collection

Once the adopted questionnaire is developed as a data-gathering tool, the Amharic version of the questionnaire has been finalized to collect the required data from nominated respondents. Finally, after discussion and confirming the willingness of the service provider companies, first

briefing is given over the questionnaire and then the questionnaire is distributed and collected with their help.

3.7. Data Analysis Method

Data remains a valueless mass of material without proper analysis. Data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial proposition of a study. The purpose of analyzing data is to find answers to questions and link information from a mass of data. The process of data analysis has been started from coding the raw data into a computer by converting from manually filled questionnaire papers. For this purpose, Microsoft (MS) Office products' MS Excel was suitable. MS Excel 2010 was used to correct data types, naming rules and representation values to make the record fit for further analysis. Finally, the complete dataset was saved in CSV file format as it is suitable for SmartPLS (Statistical Package for Social Sciences) software. This well organized and stored data pass through in-depth analysis to find answers to the research problems. Descriptive analysis has been conducted to analyze the demographic data of respondents using SPSS which is a suitable and user-friendly tool for determining basic frequency-based statistical measures. It is one of the most widely used software packages for data analysis in social and behavioural sciences. Structural Equation Modeling (SEM) using Partial Least Squares (PLS) has been used for path coefficient modeling due to its capability of testing the effects of several interaction items. SEM is a statistical technique for testing and estimating causal relationships between variables based on statistical data and qualitative causal assumptions while PLS is a component-based approach for testing structural equation models (Fornell & Larcker, 1981; Henseler, Hubona, & Ray, 2016)According to Henseler (2009), PLS has become a choice of various disciplines that include management of information systems, e-business, organizational and consumer behaviours. PLS was applied to examine the reliability and validity measures along with other variables measures. Hypothesis testing using PLS involves considering the likelihood of type I and type II errors, which relate to whether the data supports accepting or rejecting the hypothesis. Moreover, its capability of handling formative indicators, independency of data normalization and fitting for small sample size are the qualities of PLS to be preferred in testing complex multivariate causal relationships. SmartPLS software has been used to test the model using the PLS-SEM technique. It is selected for its softness and specific design features to ease the analysis of interactions (Venkatesh

et al., 2012). While SmartPLS latest version (v3) is available in the market with enhanced features, it has a free 30 days trial professional version that can accommodate an unlimited number of observations. Hence, SmartPLS Version: v3.2.8 was used for path coefficient modeling as it requires only registration with a valid e-mail address to get its trial key from the SmartPLS support team.

Partial Least Squares (PLS), developed in the 1960s by Herman World, that enables researchers to answer a set of interrelated research questions by modeling the relationships among multiple independent and dependent variables simultaneously (Pirouz, 2006). PLS is widely used in social sciences and information systems research to test the statistical quality and standard of results.

The PLS procedure, as one of the Structural Equation Modeling (SEM) techniques, has been gaining interest and use among researchers in recent years because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes. It allows determining the relationships between independent and dependent latent variables as linear composites, much like multiple regression multivariate techniques (Pirouz, 2006). It also allows the researchers to both specify the relationship among the conceptual factors of interest and the measures underlying each variable. In this study, based on the above benefits PLS is used to analyze the relationship between the selected variables.

The survey data were manually typed into Microsoft Excel 2010 and then exported to SPSS to use the data for demographic analysis. These data are also used for SmartPLS with .csv file format.

3.8. Research Model and hypotheses

Hypotheses are predictions of the outcomes of the study. It is useful at the outset to specify the hypotheses in terms of the assumed relations between variables to clarify the position and pre-understanding of the researcher. Hypotheses can be derived from theory, model, experience or knowledge concerning contextual factors (Goldkuhl, 2016). Bearing in mind, the observations and analysis made in the literature review part, a model is proposed based on the most recurrently used constructs affecting variables. Accordingly, this study used the model given in figure 12 below.

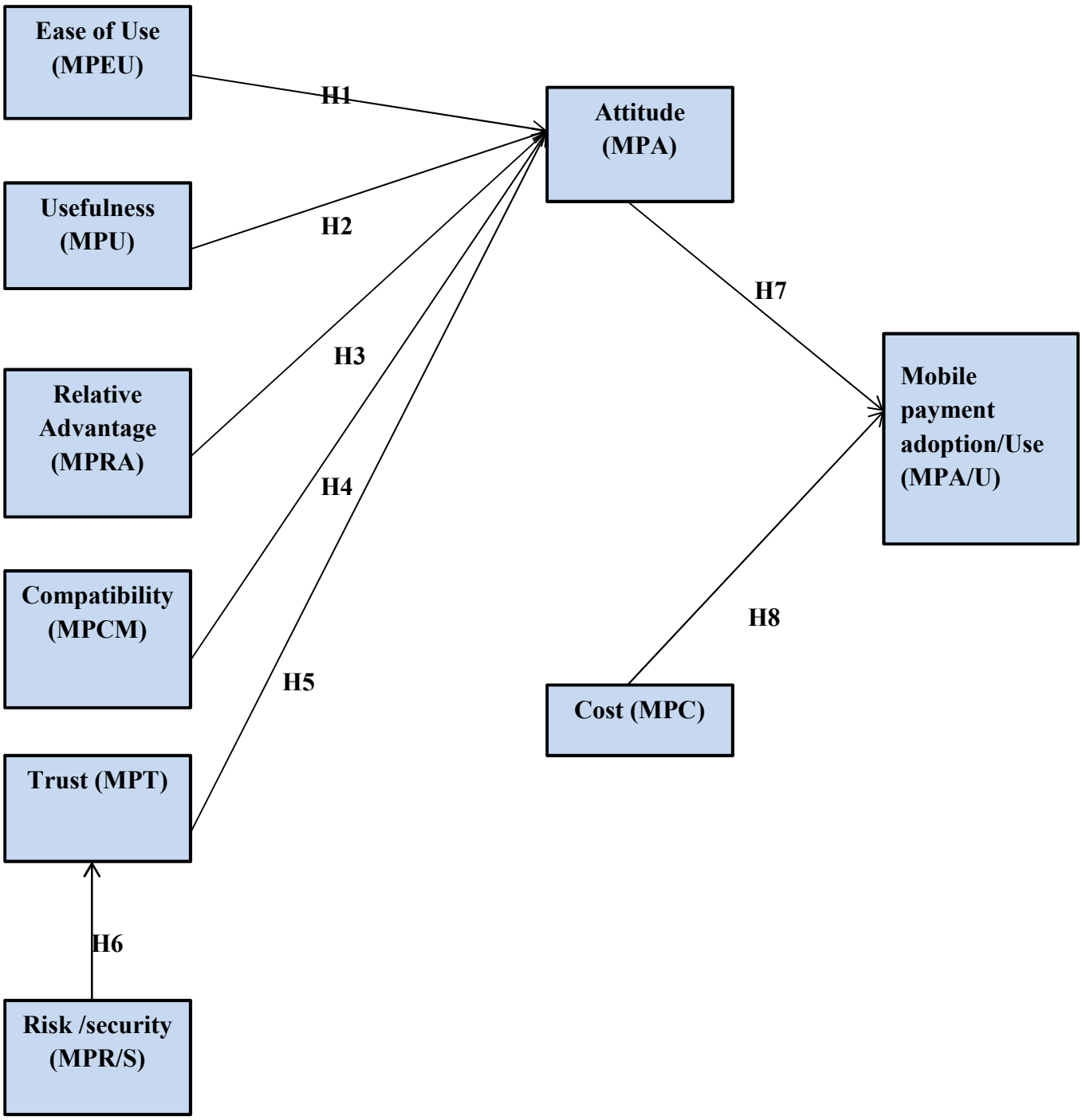

Figure 12: The Proposed Model (Adopted from ÖRS (2018).

According to IFSF (2014), to make mobile payment service acceptable in the market, it should have a lot of good characteristics that can attract customers. The first is that the mobile payment service should be simple and usable with a friendly user interface that has a small learning curve and enable personalization according to the users' need. The second is universality which implies that the system should allow both low-value and high-value payments and cover domestic, regional and global environments. The third is interoperability; the system should be able to

interact with other systems and should be based on open standards and technologies. The fourth is security, privacy, and trust. Security implies that the system should be bulletproof, resistant to inside and outside attacks from hackers and terrorists. Privacy is attained when recorded transactions are not available to the public that is the confidentiality of credit histories and spending patterns of the customer. Trust requires making the customer understand how their information is protected and their credit or debit card information is not misrepresented. The fifth is that the cost of the usability of the system should be lower than the existing system and should compete with other modes of payments in terms of cost and convenience. Sixth, the speed should be acceptable to customers and merchants. And the last is it should provide cross-border payments, i.e. it must be available globally (IFSF, 2014).

Subsequently, considering the concept of technology acceptance models , along with different technology adoption models, this study attempts to explore factors affecting Merchants' mobile payment adoption in Ethiopia. As a result, the factors affecting merchants mobile payment adoption considered in this study are ease of uses, usefulness, relative advantage, compatibility, trust, risk or security, attitude, cost, and complexity. The model is proposed by combining the TAM model used by ÖRS (2018).

Ease of uses

Ease of uses is defined as the degree to which a person believes that using a particular system would be free from a difficulty that is, utilizing a specific technology (like mobile payment) would be free of physical and mental exertion (Davis, 1989). The complexity of innovation was negatively related to their rate of adoption. Some innovations are easily understood by most members of a social system and will be adopted quickly, whereas others may be more complicated and will be adopted more slowly (Nazari, Khosravi, & Babalhavaeji, 2013). The user may accept that a given innovation (such as mobile payment) is helpful, but while using the mobile, the user may find out that the innovation may be difficult to use. For instance, the object on a mobile screen may be difficult to see. Ease of use is the user's impression of the measure of requirement needed to use a technology or the degree to which a user accepts that utilizing a specific innovation will be effortless and smooth (Davis, 1989).

H1: Ease of use has a positive effect on attitude towards the adoption of mobile payment technology.

Usefulness

Usefulness is “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989). Perceived usefulness explains the user's recognition that the interactive mobile payment adoption will enhance their task performance in the purchase of goods and mobile cash. The user has a view of how valuable the innovation is in making payment anywhere at any time with their mobile devices connected with the Internet. Users seamlessly purchase products or services without having to physically hand over cash or swipe a card.

H2: Usefulness of the use of mobile payments has a positive effect on attitude towards the adoption of mobile payment technology.

Relative Advantage

Relative advantage is to express to what extent the new technology or product is perceived as better than the existing product. In relative advantage, there are several sub-dimensions like the degree of economic profitability, low initial cost, a decrease in discomfort, savings in time and effort, and the immediacy of the reward. The relative advantage of an innovation generally, as perceived by members of the social system, is positively related to its rate of adoption (Rogers, 1995). The potential adopters’ can gain an economic and social advantage, if innovation is undoubtedly advantageous (Rogers, 1995). Certainly, the potential adaptors realize that the new products or services are more advantageous and useful than existing similar products or services, it can be predicted that they will accept it. Mobile payments are likely offered relative advantage services for merchants. For example, the use of mobile phones is becoming part of consumers' daily activities, where the device is not only a communication tool but also an electronic wallet so merchants can reach consumers without cash.

H3: The relative advantage of using mobile payment has a positive effect on attitude towards the adoption of mobile payment technology.

Compatibility

Compatibility indicates the degree in which the technology service is perceived as consistent with socio-cultural values and beliefs; with the previous and present ideas; and with client needs of innovation (Rogers, 1995). When an innovation provides alternative products or services little

effort is required to learn procedure or behaviour change, potential adopters are probable to accept it. Using mobile payment systems only require understanding operation procedures and application areas, and it does not change users' behaviour with payment activities.

H4: Compatibility of mobile payment systems has a positive effect on the attitude towards the adoption of mobile payment technology.

Trust

Due to the inherent nature of mobile payments, trust is believed to influence directly or indirectly the intention of adoption and acceptance of mobile payments because mobile services are exposed to various uncertainties and uncontrollable consequences. These include loss and theft of mobile devices resulting in identity theft inconveniences such as frustration and unavailability of mobile payment services caused by network failure, data pilfering attacks, to name just a few examples (Mallat & Kristiina, 2005).

H5: The perceived trust of using mobile payments has a positive effect on the attitude towards the adoption of mobile payment technology.

Risk

Perceived risk in consumer adoption intention of financial technology has three important dimensions: security, privacy and monetary and it can be used for merchants as well. Perceived privacy risk defined the possibility that inline businesses might use personal information inappropriately invading consumer's privacy with mobile payment consumers authorize the retailer to use their personal information and gain access to their bank account (Featherman & Pavlou, 2003), consumers can be concerned about potential risk related to privacy losses due to loss of control over personal information and transaction these leads that consumers evaluation to financial technology to judge its risk high and adoption benefit low (Bezaalem, 2019). Privacy is another major consumers concern in mobile payment adoption because much private information of consumers and the retailer itself, like phone numbers, social security numbers, pin code, consumption locations, shopping records, etc., is required in the mobile payment process. Such information could be exposed or unkindly used if it fell into the wrong hands. Perceived financial risk refers to uses perception about the possible monetary loss caused by the usage of mobile payment (Featherman & Pavlou, 2003). The transfer of money between accounts in

mobile payment may raise great concern about financial information, such as accounts and passwords being stolen and the subsequent risk of losing money.

H6: Perceived risk has a positive effect on trust to use of mobile payment technology.

Attitude

Attitude is defined as an individual's positive or negative evaluation of new technology adoption of acceptance. Attitude toward adoption is the cognitive process that depicts the prospective adopter's affection about adopting new technology (Fishbein., 1979). Attitude toward adoption is hypothesized in different beliefs perceived ease of use, adoptive experience, perceived usefulness, relative advantage, and compatibility. Attitudes are described as the sum of beliefs attributed to a particular behaviour. Thus it could vary depending on the attributions and beliefs while subjective norms are described as mostly situational consisting of user's opinion about the subject's behaviour which could be influenced by a variety of factors such as economy, politics, society and other demographic variables (Fishbein & Ajzen, 1975).

H7: Attitudes towards mobile payment systems has a positive effect on the adoption of mobile payment technology.

Cost

Within the context of mobile payment technologies, the cost could be defined as the amount of money that has to be spent on the usage of mobile payment technologies and/or required tools to acquire related technology (ÖRS, 2018).

H8: Cost of mobile payment systems has a negative effect on the adoption of mobile payment technology.

Hereunder in table 1, the variables and the corresponding item measurements are adopted from TAM for mobile payment systems (ÖRS, 2018). TAM is selected for the reason that most of the papers examined within the scope of this study, uses one or more theories as a theoretical background. The Technology Acceptance Model is employed in most of the studies. It is followed by Diffusion of Innovations and then Unified Theory of Acceptance and Use of Technology. Theory of Reasoned Action and Theory of Planned behaviour are used rarely.

Variables	Item Code	Corresponding Items
Usefulness (MPU)	**MPU1**	Sales would be quicker using mobile payments.
	MPU2	Selling tasks would be easier using mobile payment.
	MPU3	Mobile payment would enhance efficiency in making a sale.
	MPU4	Overall, I would find mobile payment systems useful.
Ease of use (MPEU)	**MPEU1**	Mobile payments would be easy to understand.
	MPEU2	Getting the information needed from mobile payment would be easy.
	MPEU3	Interaction with mobile payment would be clear and understandable.
Risk/ Security	**MPR/S1**	Mobile payment systems are secure.
	MPR/S2	Feel secure to receive sensitive information across the mobile payment.
	MPR/S3	The risk of an unauthorized party intervening in the mobile payment process is low; So that payment systems give me confidence.
Cost (MPC)	**MPC1**	Using mobile payment systems does not create additional costs.
	MPC2	Mobile payment is cost-effective.
	MPC3	At the current price, mobile payment provides a good value.
Compatibility (MPCM)	**MPCM1**	Using mobile payment is completely compatible with my current situation.
	MPCM2	Using mobile payment fits well with the way merchants like to sell.
Attitude (MPA)	**MPA1**	One can use mobile payment services without detailed instructions on its use.
	MPA2	I have the skills/knowledge necessary for selling products via mobile devices.
	MPA3	Confident in selling products via mobile devices.
	MPA4	In general, competent in using mobile payment services.
Trust (MPT)	**MPT1**	The mobile payment service provider is trustworthy.
	MPT2	The mobile payment service is reliable.
	MPT3	Mobile payment systems are safe for me.

	MPT4	Sending sensitive information across the mobile payment is secure.
Relative Advantage (MPRA)	**MPRA1**	Mobile payment enables us to sell at any time and from anywhere.
	MPRA2	Mobile payment supplements cash.
	MPRA3	Using mobile payment increases my productivity.
Items to measure Adoption/Use		Average Cost (**MPCAV**) Average Attitude (**MPAAV**)

Table 1; Variables and the corresponding item measurement

3.9. Validity and Reliability

In order to reduce the possibility of getting the wrong answer, attention needs to be paid to Reliability and validity (Heale & Twycross, 2015). Reliability is defined as the degree to which measurements are free from error and, therefore, yield consistent results. Traditionally, "Cronbach's alpha" is used to measure internal consistency reliability in social science research but it tends to provide a conservative measurement in PLS-SEM. Prior literature has suggested the use of Composite Reliability as a replacement) is concerned with whether the findings are really about what they appear to be about. Validity is defined as the extent to which data collection methods accurately measure what they were intended to measure (Heale & Twycross, 2015; Wong, 2013). Factor loadings, composite reliability, and the average variance extracted (AVE) were used to assess the convergent validities, while the discriminant validity was assessed by examining whether or not the squared roots of AVE exceed the correlations between constructs, and the reliability was evaluated by examining internal consistency reliability (ICR), as suggested by Venkataesh et al. (2003).

3.10. Chapter summary

Generally, this chapter presents a brief description of the research design and techniques used to answer the research questions, research Strategy, approach, data collection methods, and data source, validity and reliability, and data analysis issues and also model concepts. The proposed model is also given.

This study attempts to explore factors affecting Merchants' mobile payment adoption in Ethiopia. As a result, the factors affecting merchants' mobile payment adoption considered in this study are ease of uses, usefulness, relative advantage, compatibility, trust, risk or security, attitude, cost, and complexity. The model is proposed by combining the TAM model used by ÖRS (2018).

Once the research design and techniques used in this study are selected and a model is formulated, we construct the questionnaire for conducting the survey and collect data from respondents. Accordingly, the result of the survey is presented in the next chapter with the necessary analysis and interpretation.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1. Overview

This chapter deliberates the overall process of data analysis including data preparation, processing and analysing results. The statistical analysis presented in the first part is descriptive that quantifies respondents' demographics and the computed results and findings in regards to factors that affect mobile payment adoption by merchants in Ethiopia based on the collected data. Correspondingly, in this chapter results of both structural and measurement models have been presented and discussed.

4.2. Data Preparation

During data preparation, the data that was collected from a cross-sectional survey using structured close-ended questionnaires were manually inserted to a computer using Microsoft Excel 2010. Microsoft Excel was preferred for easily inserting and exporting data to other statistical tools' file formats. Out of the total 376 distributed questionnaires to merchants that are registered to use mobile payment in Addis Ababa and Oromia special zone, surrounding Addis Ababa, six were not returned. During the pre-processing step, incomplete seven questionnaires with missing values more than four items have been rejected. Finally, 363 responses were considered valid for further data processing that makes 96.54% valid response rate. The final complete dataset was then saved in CSV file format so that it can be exported to and analyse using SmartPLS software. In this study, a Partial Least Square (PlS) analysis is used to test the proposed research model and hypotheses. Structural Equation Modelling (SEM) techniques such as LISREL and Partial Least Square (PlS) are second-generation data analysis techniques of Structural Equation Modelling (Bogazi and Fornell, 1982) that can be used to test the extent to which IS research meets recognized standard for high-quality statistical analysis. Partial Least Squares (PLS), developed in the 1960s by Herman World, that enables researchers to answer a set of interrelated research questions by modelling the relationships among multiple independent and dependent constructs simultaneously (Gefen et al., 2000).

PLS is widely used in social sciences and information systems research to test the statistical quality and standard of results. The PLS procedure, as one of the SEM techniques, has been

gaining interest and use among researchers in recent years because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes. It allows the researchers to both specify the relationship among the conceptual factors of interest and the measures underlying each variable. The demographic profile of target respondents (gender and age) is described in frequency and percentage using tables to make the analysis more meaningful, clear and easily interpretable. SPSS is used to analyze demographic data.

4.3. Respondents Demographic Characteristics

The demographic variables used in this study are age, the number of years the respondents used the system, Educational level and strata of respondents (see Table 1). Based on the demographics and other personal background information obtained, the majority (44.6%) of the participants comprise of the age group of 18 to 30. And also most (71.3%) of the participants have 1-3 years of experience using mobile payment.

Variables	**Classification of variables**	**Frequency**	**Percentage**
Age of participants	0-18	2	0.6 %
	18-30	162	44.6%
	31-40	105	28.9%
	41-50	76	20.9%
	51-60	12	3.3%
	More than 60 years old	6	1.7 %
Educational Level	Primary school	9	2.5%
	Secondary school	92	25.3%
	High school	67	18.5%
	Diploma degree	157	43.3%
	First Degree	30	8.3%
	MA/MSc Degree	8	2.2%
Experience Using Mobile Payment	Never	5	1.4%
	1-3 years	259	71.3%
	3-5 years	99	27.3%

	5-10 years	0	0%
	More than 10 years	0	0%
Vendor of the Mobile payment	CBE Birr	201	55.4%
	M-birr	162	44.6%

Table 2: Respondents demographic characteristics

4.4. Structural and measurement model (SEM)

SEM is a second-generation statistical technique best suited for testing and estimating causal relationships based on statistical data and qualitative causal assumptions (Urbach & Ahlemann, 2010). With SEM, researchers can visually examine the relationships that exist among variables of interest to prioritize resources to better serve their customers. The fact that unobservable, hard-to-measure latent variables can be used in SEM makes it ideal for tackling business research problems (Wong, 2013). According to Wong (2013), there are two sub-models in a structural equation model; the inner model specifies the relationships between the independent and dependent latent variables, whereas the outer model specifies the relationships between the latent variables and their observed indicators. In SEM, a variable is either exogenous or endogenous (see figure 13). An exogenous variable has path arrows pointing outwards and none leading to it. Meanwhile, an endogenous variable has at least one path leading to it and represents the effects of other variables.

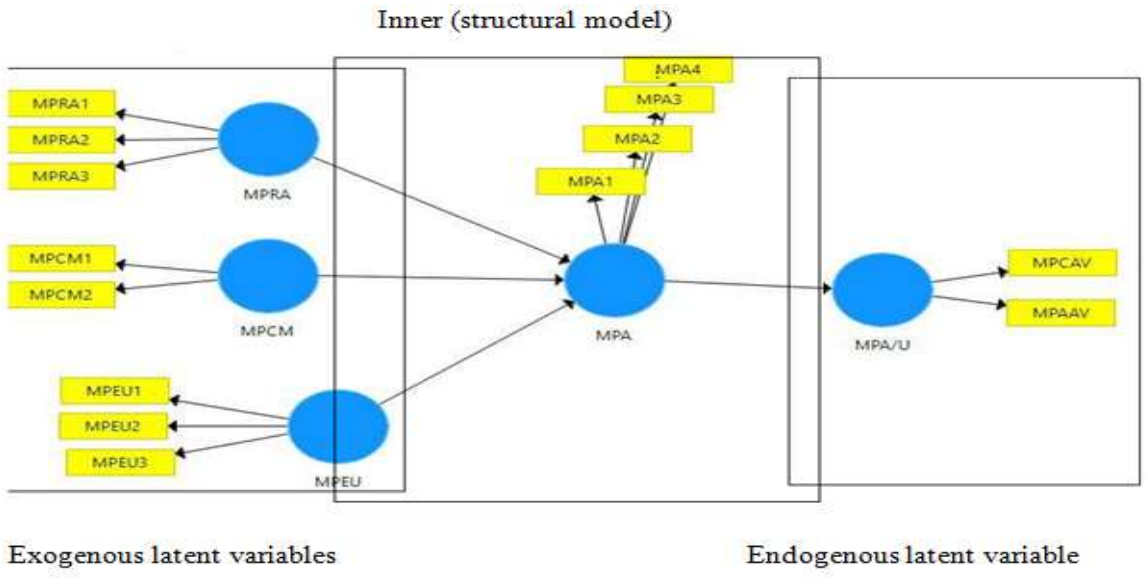

Figure 13: Inner and Outer models of the SEM diagram

Figure 13 illustrates such basic components supported by examples from this research. The rectangular boxes represent Indicators of latent variables. These are directly observable items in the research questionnaire. Each latent variable was represented by 3 or 4 indicators except the 'compatibility' and 'use' (adoption or actual use MPA/U). Blue circles represent latent variables which are MPEU, MPU, MPRA, MPCM, MPT, MPR/S, MPC, MPA and Use in this study (only some part of the variables is presented in the diagram for illustration purpose). In this study, 'MPA' and 'Use' are endogenous variables while MPEU, MPU, MPRA, MPCM, MPT, MPR/S, and MPC are exogenous variables

4.4.1. Measurement models for reflective indicators

Following the guideline developed by Wong (2013) on the test of measurement models, indicator reliability, internal consistency reliability, convergent validity and discriminant validity with the application of standard decision rules are reported for reflective indicators while outer weights, convergent validity, and collinearity of indicators are reported for formative indicators. Internal consistency reliability and discriminant validity were not assessed for formative indicators since it was meaningless for formative indicators where they were not expected to have a high correlation. All the values reported are found from the report of SmartPLS after running the PLS algorithm with the initial setting of the Path weighting scheme, data metric, such as mean, variance and maximum iterations of 0, 1 and 5000, respectively, with 1.0E-5 stop criterion and initial weight of 1.0.

4.4.2. Internal Consistency Reliability (ICR)

Reliability concerns the extent to which a measurement of a phenomenon provides a stable and consistent result (Heale & Twycross, 2015). According to Heale and Twycross (2015), reliability is also concerned with repeatability under constant conditions. Testing for reliability is important as it refers to the consistency across the parts of a measuring instrument. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. In this study, the reliability test used as internal consistency measure is Cronbach's Alpha coefficient with a cutoff value of 0.6 and Composite Reliability with a cutoff value of 0.7 as recommended (Fornell & Larcker, 1981). Cronbach's alpha (α) is commonly used in social and behavioural sciences to measure ICRs that range alpha values from 0 (completely unreliable) to 1

(completely reliable). However, it is blamed to provide a conservative measurement in PLS since it assumes all indicators are equally reliable. In contrast, PLS prioritizes indicators according to their reliability, resulting in a more reliable measure called composite reliability. Hence, ICR is measured using composite reliability in this study.

According to Fornell & Larcker (1981) and Wong (2013), ICR values larger than .7 are desirable to assure strong internal consistency reliability. In the measurement model, composite reliability range from 0.867 to 0.895 and Cronbach's alpha range from 0.701 to 0.843. Therefore, high levels of internal consistency and reliability have been demonstrated among all reflective latent variables. Outer loadings for indicators of reflective variables show individual indicator's reliability. The reflective variables are more than the minimum acceptable value of 0.7. Table 2 shows both composite reliability and Cronbach's α values were larger than 0.7.

Factors	**Cronbach's Alpha**	**Composite Reliability**	**Average Variance Extracted (AVE)**
Adoption/Actual use of Mobile Payment	0.701	0.870	0.770
Attitude	0.843	0.895	0.680
Cost	0.769	0.867	0.684
Compatibility	0.754	0.891	0.803
Ease of use	0.790	0.877	0.704
Relative Advantage	0.775	0.869	0.689
Risk/Security	0.791	0.877	0.705
Trust	0.831	0.888	0.664
Usefulness	0.840	0.895	0.681

Table 3: composite reliability, Cronbach's α values, and AVE

4.4.3. Indicator Reliability

According to Heale and Twyeross (2015), indicator reliability measures to what extent a variable or set of variables is consistent regarding what it intends to measure. It measures how much of the indicators variance is explained by the corresponding latent variable. In the PLS approach, reflective indicators loading should be inspected for determining the appropriateness of the indicator as it is essentially representing the correlation between the indicator and the latent variable (Henseler, Hubona, & Ray, 2016). The reliability of one variable is independent of the other and calculated separately. In general, the larger the lodgings indicate the more reliable than

latent variable. However, the preferred level is above 0.7 which is the level at which about half the variance in the indicator is explained by its factor and is also the level at which explained variance must be greater than error variance (Heale & Twycross, 2015; Wong, 2013).

	MPA	MPAU	MPC	MPCM	MPEU	MPRA	MPRS	MPT	MPU
MPA1	**0.813**								
MPA2	**0.858**								
MPA3	**0.832**								
MPA4	**0.794**								
MPAAV		**0.879**							
MPC1			**0.808**						
MPC2			**0.814**						
MPC3			**0.859**						
MPCAV		**0.876**							
MPCM1				**0.888**					
MPCM2				**0.904**					
MPEU1					**0.847**				
MPEU2					**0.843**				
MPEU3					**0.827**				
MPRA1						**0.835**			
MPRA2						**0.837**			
MPRA3						**0.818**			
MPRS1							**0.836**		
MPRS2							**0.856**		
MPRS3							**0.826**		
MPT1								**0.834**	
MPT2								**0.788**	
MPT3								**0.809**	
MPT4								**0.828**	
MPU1									**0.757**
MPU2									**0.739**
MPU3									**0.897**
MPU4									**0.895**

Table 4: outer loadings

As it is shown in Table 4, the outer loadings for all reflective indicators are much far from the preferred level. Therefore, all the reflective model indicators were considered valid for indicator reliability.

Convergent Validity (AVE)

The two most common construct validity measures are convergent validity and discriminant validity (Wong, 2013). According to Fornell & Larcker (1981), convergent validity involves the degree to which individual items reflecting a variable converge in comparison to items measuring different variables. A commonly applied criterion of convergent validity is the Average Variance Extracted (AVE) which reflects the average commonality for each latent factor in a reflective model. Besides, Wong (2013), as well as Fornell and Larcker (1981) suggested that AVE values should be greater than 0.5 that confirms at least half the variance of indicators is explained by the respective factor. Table 2 shows that all values of AVEs were greater than the threshold value. Each factor surpasses the value of 0.5 showing that model validity is established convergent validity is confirmed (Henseler, Hubona, & Ray, 2016; Wong, 2013).

Discriminant Validity

Discriminant validity is another means of assuring construct validity. While convergent validity involves the degree to which individual items reflecting a construct converge in comparison to items measuring different constructs, discriminant validity tests whether the items do not unintentionally measure something else (Fornell & Larcker, 1981). There are two common approaches to determine discriminant validity in PLS-SEM.

1. The square root of AVE is larger than the correlation between any pair of corresponding latent variables, discriminant validity is confirmed (Fornell & Larcker 1981, as cited in Wong, 2013). Table 5 below demonstrates that the square roots of AVEs (highlighted and bold on the diagonal) are larger than all the correlation values that confirm discriminant validity.

	MPA	MPA/U	MPC	MPCM	MPEU	MPR/S	MPRA	MPT	MPU
MPA	**0.824**								
MPA/U	0.869	**0.877**							
MPC	0.587	0.865	**0.827**						
MPCM	0.501	0.425	0.266	**0.896**					
MPEU	0.498	0.452	0.316	0.370	**0.839**				
MPR/S	0.459	0.391	0.257	0.389	0.659	**0.839**			
MPRA	0.688	0.619	0.470	0.477	0.491	0.489	**0.830**		
MPT	0.615	0.526	0.348	0.519	0.496	0.500	0.624	**0.815**	
MPU	0.525	0.538	0.479	0.317	0.230	0.304	0.418	0.249	**0.826**

Table 5 Construct Discriminant validity Fornell-Larcker Criterion

2. Using cross-loadings. Cross-loadings are obtained by correlating the component scores of each latent variable with all other items. To assure discriminant validity, the loading of each indicator should be higher for its designated variable than or any of the other variables and each of the variables loads highest with its own items. The correlation of the latent variables scores with measurement items needs to show an appropriate pattern of loading, one in which the measurement item load highly on their theoretically assigned factor and not high on other factors. This can be identified by taking the cross-loading output from SmartPLS into the Excel sheet and using the conditional formatting to highlight all cell values greater than 0.6 (considering the lowest indicator reliability equals 0.754). As it is shown in Table 6 below, all highlighted (also on bold for emphasis) cells are those on the diagonal that indicates the loading of each indicator was higher for its designated variable than or any of the other variables and each of the variables loaded highest with its own items which confirm discriminant validity as well achieved.

Indicators	MPA/U	MPA	MPC	MPCM	MPEU	MPR/S	MPRA	MPT	MPU
MPAAV	**0.879**	0.960	0.567	0.486	0.475	0.441	0.639	0.587	0.495
MPCAV	**0.876**	0.563	0.954	0.259	0.319	0.244	0.447	0.335	0.448
MPA1	0.705	**0.813**	0.467	0.402	0.385	0.350	0.557	0.514	0.400
MPA2	0.730	**0.858**	0.501	0.436	0.461	0.436	0.595	0.549	0.416
MPA3	0.715	**0.832**	0.467	0.423	0.435	0.403	0.563	0.476	0.429
MPA4	0.717	**0.794**	0.499	0.391	0.361	0.323	0.553	0.486	0.487
MPC1	0.687	0.450	**0.808**	0.231	0.256	0.228	0.393	0.254	0.380
MPC2	0.691	0.447	**0.814**	0.196	0.255	0.149	0.346	0.241	0.364
MPC3	0.766	0.554	**0.859**	0.232	0.272	0.257	0.424	0.361	0.441
MPCM1	0.356	0.431	0.212	**0.887**	0.322	0.366	0.431	0.452	0.256
MPCM2	0.404	0.466	0.262	**0.904**	0.341	0.331	0.424	0.477	0.310

MPEU1	0.373	0.429	0.229	0.341	**0.843**	0.563	0.437	0.464	0.192
MPEU2	0.398	0.430	0.278	0.305	**0.847**	0.534	0.424	0.427	0.188
MPEU3	0.366	0.393	0.290	0.284	**0.826**	0.562	0.372	0.353	0.200
MPRS1	0.290	0.368	0.159	0.311	0.576	**0.836**	0.374	0.431	0.237
MPRS2	0.378	0.417	0.271	0.328	0.556	**0.856**	0.461	0.450	0.276
MPRS3	0.313	0.368	0.214	0.342	0.525	**0.826**	0.392	0.372	0.252
MPRA1	0.532	0.586	0.404	0.400	0.409	0.449	**0.835**	0.554	0.338
MPRA2	0.519	0.589	0.394	0.430	0.382	0.377	**0.837**	0.523	0.368
MPRA3	0.490	0.536	0.370	0.354	0.434	0.391	**0.818**	0.475	0.334
MPT1	0.437	0.515	0.277	0.415	0.399	0.391	0.497	**0.834**	0.173
MPT2	0.455	0.518	0.317	0.451	0.411	0.363	0.511	**0.788**	0.225
MPT3	0.430	0.496	0.301	0.427	0.401	0.434	0.534	**0.809**	0.222
MPT4	0.395	0.474	0.239	0.400	0.407	0.441	0.493	**0.828**	0.194
MPU1	0.435	0.426	0.380	0.252	0.205	0.182	0.331	0.165	**0.754**
MPU2	0.478	0.454	0.434	0.270	0.188	0.273	0.365	0.223	**0.741**
MPU3	0.425	0.421	0.379	0.258	0.182	0.272	0.337	0.214	**0.897**
MPU4	0.422	0.420	0.376	0.258	0.181	0.271	0.337	0.215	**0.896**

Table 6: Indicator item Cross Loading

Based on the above reliability and validity analysis made on indicators of each variable, this study has reached a satisfactory level regarding reliability and validity. High loading in the diagonal indicates how significant discriminant validity exists.

4.5. Structural model and Hypothesis Test

Path coefficient assessment:

Path coefficients of a structural model can be interpreted as standardized beta (β) coefficients of ordinary least squares regressions to indicate the causal relationship direction and its strength. While the algebraic signs indicate the agreement between the initial theoretical assumption and the actual empirical result, the coefficient magnitude indicates how well the relationship is strong. The strength varied from -1 to 1 in where an absolute value closer to 1 indicates high strength while the value closer to 0 indicates weak relation. Moreover, the significance level of β coefficients is very important to confirm the hypothetical relation. An accepted t-value equal to 1.96 is required to have a significant result at $p < .05$ (Wong, 2013; Fornell & Larcker, 1981; Henseler, Hubona, & Ray, 2016). If $p \leqslant 0.05$ (or absolute value of the t-value is less than 1.96) the hypothesis is accepted indicating the significance of the finding at least with a 95% level of

confidence, otherwise it is not accepted. Both p-value and t-value justify the significance of relations: only relations possessing significant correlation should be taken in to account. This study sets a limit to significance at 5%, thus, only relations exceeding 1.96 t-values (alternatively p-values of below or equal to 0.05) are considered significant. A summary of path coefficients along with the t-value is presented in the table below to show whether the initially assumed relations are confirmed or not. Accordingly, the assumed causal relationships and corresponding findings are discussed in brief below.

Following the methods described in the proposed research model, a structural model for data analysis was created and tested with SmartPLS software. The model indicates the relationships between the variables, i.e. relationships present in the proposed research model. To determine statistical significance a complete bootstrapping was carried out in SmartPLS for collected sample data of 363. The bootstrap used 363 cases and 5000 subsamples. Concerning values for the estimated path coefficients of variables, item loadings of each measurement item, and the coefficient of determination (R2) of the other variable, all of the coefficients, except that of H4, are significant at the 5% significance level providing strong support for the hypothesized relationships. Based on the above parameter the results of the model analysis are presented in Table 7 below.

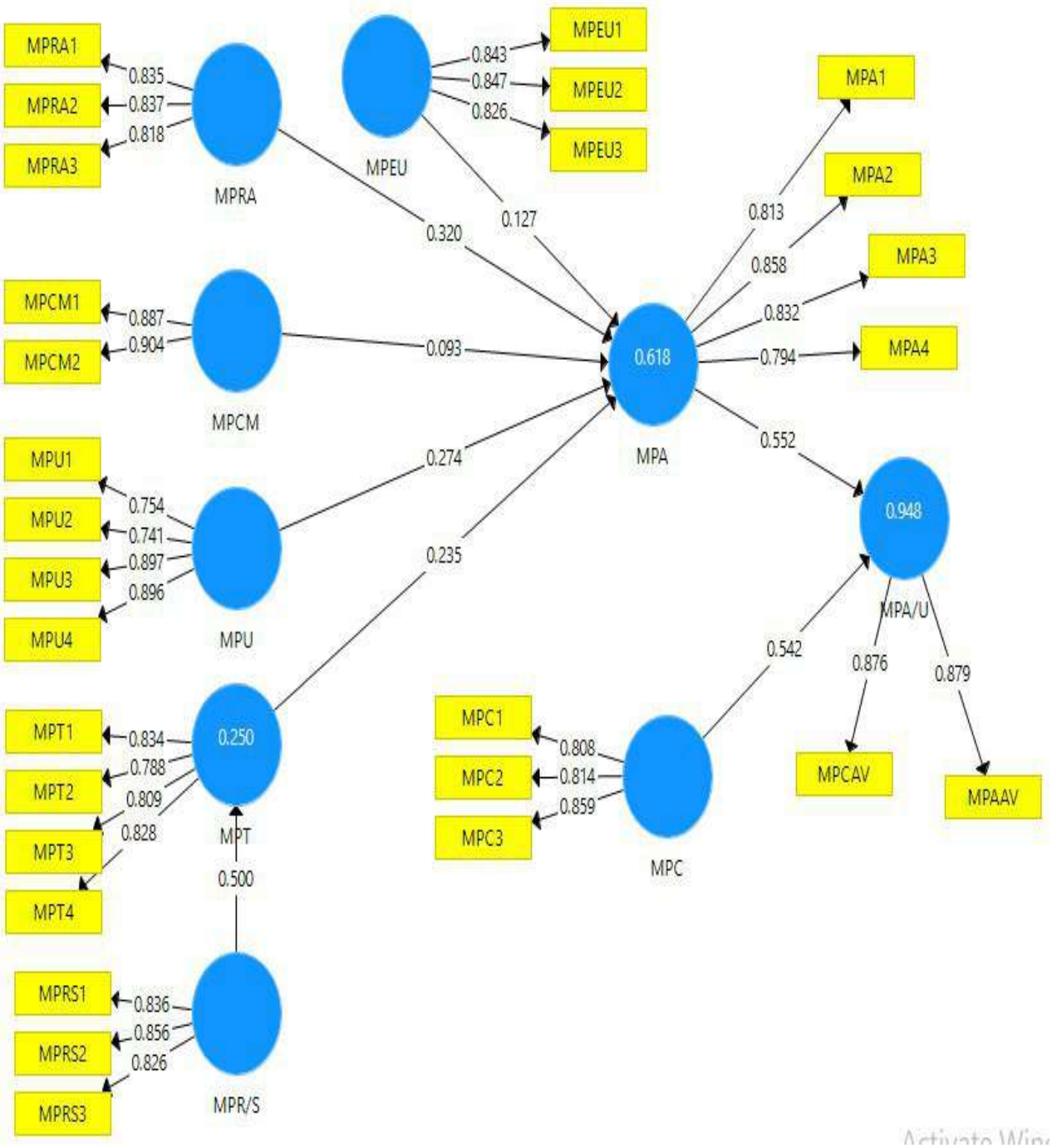

Figure 14: Combined Structural and Measurement Models

Hypothesis	Constructs	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Status
H1	**MPEU -> MPA**	0.127	0.127	0.038	3.383	0.001	**Accepted**
H2	**MPU -> MPA**	0.274	0.272	0.045	6.080	0.000	**Accepted**
H3	**MPRA -> MPA**	0.320	0.320	0.055	5.853	0.000	**Accepted**
H4	**MPCM-> MPA**	0.093	0.096	0.054	1.706	0.089	**Rejected**
H5	**MPT -> MPA**	0.235	0.235	0.045	5.251	0.000	**Accepted**
H6	**MPR/S -> MPT**	0.500	0.505	0.038	13.286	0.000	**Accepted**
H7	**MPA ->MPA/U**	0.552	0.552	0.014	38.085	0.000	**Accepted**
H8	**MPC ->MPA/U**	0.542	0.542	0.012	46.904	0.000	**Accepted**

Table 7: Path coefficients and T-values

As shown in figure 14 and Table 7 above, mobile payment excessively impacted by cost and attitude towards the payment system. For this study, we use average cost value and average attitude to determine merchants' adoption and use of mobile payments. Hence, the attitude of merchants to adopt mobile payments is significantly impacted by usefulness, relative advantage, trust and Ease of use, in their order of influencing strength.

The value of R-square closed to 1 indicating a better model in fitting the data. R-square was used to measure how close the relationship among indigenous variables, while the f-square was used to measure how close the relationship between unobserved exogenous variables and the

endogenous unobserved variables (Pangesti, Sumertajaya, & Sukmawati, 2016). The final model's R square for the 'use' of mobile payment technologies is 94.8% and the adjusted R square value equals 94.8%.

	R Square	R Square Adjusted
MPA	0.618	0.613
MPA/U	0.948	0.948
MPT	0.250	0.248

Table 8: R Square value

4.6. Discussion of Major Findings

Based on the analysis result, this section focuses on each variable relationship and its significance in affecting merchants' adoption or use of mobile payment. Furthermore, the discussion analyzes the statistical findings of the study about the previous empirical evidence. The result for each set of factors is discussed as follows.

In figure 14 above, the structural model presents how much of the variable is explained by the underlying factors of mobile payment adoption. In the inner variables attitude is modeled as a function of MPRA, MPCM, MPEU, MPT, and MPU. These variables explained 61.8 percent of the variance in MPA as the R^2 value or coefficient of determination stood at 0.618. This implies that 39.2 percent of the variance in MPA is explained by other factors not included in the model.

The Relationship between MPA and the Independent and dependent Variables

In this research, attitude (MPA) towards the adoption of Mobile payment is modeled as a function of MPRA, MPCM, MPEU, MPT, and MPU. Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free from a difficulty that is, utilizing a specific technology (like mobile payment) would be free of physical and mental exertion (Davis, 1989). MPEU was hypothesized to have a significant positive effect on merchants' attitude (H1). The empirical evidence of the study indicated that PEU is the least influential factor in affecting customers' attitudes to adopt Mobile payment with a path coefficient of 0.127 and a p-value < 0.05 (or t-value >1.96), thereby supporting the Hypothesis H1. This aligns with the findings of (Pal, Vanijja, & Papasratorn, 2015; ÖRS, 2018). This

suggests that merchants perceive that Mobile payments are easy to learn and use. Therefore, H1 is accepted.

Perceived usefulness is “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989). MPU was hypothesized to have a significant positive effect on merchants’ attitude (H2). The empirical evidence of the study indicated that MPU is the second powerful factor in affecting merchants’ attitude to adopt Mobile payment with a path coefficient of 0.274 and a p-value < 0.05 (or t-value >1.96), thereby supporting the Hypothesis H2. This suggests that customers perceive that mobile payments are useful. Thus, H2 is accepted.

MPRA is included to capture to what extent the new technology or product is perceived as better than the existing products. MPRA was hypothesized to have a significant positive effect on merchants’ attitude (H3). The empirical evidence of the study indicated that MPRA is the most influential factor in affecting merchants’ attitudes to adopt mobile payment with a path coefficient of 0.320 and a p-value < 0.05 (or t-value >1.96), thereby supporting the Hypothesis H3. This suggests that customers acquire relative advantages from the adoption of mobile payments as the latter enables them to purchase without time or place constraint, avoid queues, and improves their performance. Therefore, H3 is accepted.

Compatibility indicates the degree in which the technology service is perceived as consistent with socio-cultural values and beliefs; with a previous and present idea; and with client needs of innovation (Rogers, 1995). MPCM was hypothesized to have a significant positive effect on customers’ attitudes (H4). The empirical evidence of the study does not indicate that MPCM affects merchants’ attitude to adopt mobile payment with a path coefficient of 0.093 and a p-value > 0.05 (or t-value <1.96). Thus, it is failing to support the Hypothesis H4. This suggests that the effect of compatibility on the merchant’s attitude for the adoption of mobile payment is not statistically significant. Therefore, H4 is not accepted.

Due to the inherent nature of mobile payments, trust is believed to influence directly or indirectly the intention of adoption and acceptance of mobile payments because mobile services are exposed to various uncertainties and uncontrollable consequences. MPT indicates the degree to which the technology service is perceived as trusted by users. MPT is a dependent variable that

is affected by MPR/S(risk/security). MPT was hypothesized to have a significant positive effect on merchants' attitude(H5). The empirical evidence of the study indicated that MPT is the third most influential factor in affecting merchants' attitude to adopt mobile payment with a path coefficient of 0.235 and a p-value < 0.05 (or t-value >1.96), thereby supporting the Hypothesis H5. This suggests mobile payments are perceived as trustworthy, reliable and secured by customers. Therefore, H5 is accepted.

Perceived risk in merchants' adoption intention of financial technology has three important dimensions: security, privacy and monetary. Perceived privacy risk defined the possibility that inline businesses might use personal information inappropriately invading consumer's privacy with mobile payment consumers authorize the retailer to use their personal information and gain access to their bank account (Thakur & Srivastava, 2014). MPR/S was hypothesized to have a significant positive effect on merchants' trust (H6). The empirical evidence of the study indicated that MPR/S is the best influential factor in affecting merchants' trust to adopt mobile payment with a path coefficient of 0.500 and a p-value < 0.05 (or t-value >1.96), thereby supporting the Hypothesis H6. This suggests that customers perceive that mobile payments have low risk. Therefore, H6 is accepted.

The Relationship between MPA/U and MPA

In this research, Attitude (MPA) towards the adoption of mobile payment is modeled as a function of MPRA, MPCM, MPEU, MPT, and MPU. MPA was hypothesized to have a significant positive effect on merchants' adoption of mobile payments (H7). The empirical evidence of the study indicated that MPA is the most powerful factor in affecting merchants' adoption of mobile payment with a path coefficient of 0.552 and a p-value > 0.05 (or t-value <1.96), thereby supporting the Hypothesis H8. This suggests that the effect of customers' attitudes to adopt mobile payments is statistically significant. This aligns with the findings of (Bezaalem, 2019). This suggests that merchants attitude has a very high and positive impact on mobile payment adoption. Therefore, H7 is accepted.

The Relationship between MPA/U and MPC

Merchants perceived cost refers to cost which the merchants pay for the deployment of the system. MPC was hypothesized to have a negative effect on mobile payment adoption. The

empirical evidence of the study does indicate that MPC affects mobile payment adoption with a path coefficient of 0.542 and a p-value > 0.05 (or t-value <1.96). This brings into line with the findings of (Bezaalem, 2019; ÖRS, 2018). Therefore, H8 is accepted.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

Based on the discussion of results as per the conceptual research model selected to explore and identify factors affecting merchants' adoption of mobile payments in Ethiopia, with specific emphasis at Addis Ababa, this chapter presents the conclusions drawn from the findings of the study, recommendations forwarded and future works suggested.

5.1. Conclusion

This research was aimed to shed light on mobile payment adoption in the Ethiopian context and explore previously mentioned problems by conducting a comprehensive study of merchants' mobile payment adoption factors among mobile payment providers at Addis Ababa and Oromia special zone, surrounding Addis Ababa. To achieve its main goals an intensive literature review was done and a conceptual research model was employed that consists of eight latent variables adopted from ÖRS, (2018).

To answer the research questions, the study mainly focused on the effect of the following factors or variables on merchants' adoption of mobile payments: perceived ease of use, usefulness, relative advantage, compatibility, trust, perceived risk, attitude, and cost, of Mobile payment service. In this research, the key factors affecting customers' adoption of mobile payments have been examined using the proposed research model. Quantitative survey research was conducted to collect data from merchants of mobile payment users with specific clients of the Commercial Bank of Ethiopia. Out of 376 questionnaires that have been distributed to customers, 363 valid questionnaires were collected and used for data analysis. The proposed model was tested using a partial least square with the help of the SmartPLS software version 3.0 as well as SPSS version 20.

The structural model presents how much of the variable is explained by the underlying factors of mobile payment adoption. In the inner variables, attitude is modeled as a function of MPRA, MPCM, MPEU, MPT, and MPU. These variables explained 61.8 percent of the variance in AT as the R^2 value or coefficient of determination stood at 0.618. This implies that 39.2 percent of the variance in MPA (attitude) is explained by other factors not included in the model. MRA,

MPEU, MPU, and MCT are found to be positively and significantly affecting merchants' attitudes to adopt mobile payment.MPA and MPC as well significantly affecting merchants' attitudes to adopt mobile payment.

This result implies that for mobile payment technology to be adopted by merchants, they should perceive it as a useful and quick way of selling compared with the traditional sales. They should believe that mobile payments are easy to use, understandable and can become skillful at using it. They should also ensure that the cost of mobile payment service is reasonable and affordable. Therefore; it can be concluded that merchants will adopt mobile banking services when the value and benefit of mobile payment are evident.

On the contrary, compatibility (MPCM) is not significantly affecting merchants' attitudes to adopt mobile payment. This result indicates that for mobile payment to be adopted by merchants compatibility doesn't affect existing work practices and the extent to which the payment system "fits" with their current work process.

Overall, the result of this study is indeed helpful to the banking industry, microfinance and other mobile payment system providers in Ethiopia and will be used as the springboard for other researchers for future work on the area.

Deficiency of time and cost for collecting data since the respondents are not available nearby and difficulty of addressing all other regional merchants all over Ethiopia are some of the challenges and weaknesses of this paper.

5.2. Implications of the study

Technology is changing rapidly, so this study is only a milestone in a continuous long journey, not a conclusion. The following implications are recommended to the banking industry, micro-finance, to customers of them and to researchers regarding mobile payment services to help them assess success factors for giving efficient mobile payment services.

5.2.1. Theoretical Implication of the Research

This study employed and tested a research model, with which factors for the merchant to adopt mobile payment are analyzed. The question of which factors are driving the intention of merchants to adopt mobile payment is addressed. This research has contributed to theory in that

considering the shortage of literature that currently exists in general about technology adoption, in particular about mobile payment adoption in Ethiopia, so that it will be used to enrich mobile payment-related literature by exploring different factors which can affect adoption process, and also help as the springboard for other researchers for the future work on the area.

5.2.2. Practical Implication of the Research

The results are of relevance to the commercial bank of Ethiopia, M-birr, and to their customers in general. This study will help them to understand and implement strategy towards providing better customer service of mobile payment to create a suitable environment to speed merchant's adoption process. Results may support decision-makers on which factors should be considered, and to what extent, when increased use intention is desirable. The study made a significant contribution to understanding the nature of the merchants' mindset when making a decision to adopt or not to adopt mobile payment based on the data analysis made with the proposed research model.

5.3. Recommendations

Based on the above findings of the research, the following suggestions are put forward for the commercial bank of Ethiopia and M-birr to improve merchants' attitude to use or adopt mobile payments.

- ✓ The commercial bank of Ethiopia and M-birr could consider taking advantage of value-adding characteristics of mobile payment in promoting perceived usefulness. Besides, they should continue to innovate and invest in mobile payment services which allow merchants to have more alternatives and get more values from mobile payment services.
- ✓ They should emphasize the benefits that merchants' will obtain in the aspects of sales opportunities, improve customer service, ability to track customer data, reducing checkout time and improves Cash Flow. Ultimately, they might try to educate merchants about the benefits of using mobile banking services through promotional mixes such as personal selling, advertisements, sales promotions, and public relations.
- ✓ The study indicated that relative advantage has a very high and positive impact on merchants' attitudes towards the adoption of mobile payments. Therefore, mobile

payment service providers are advised to work on enhancing the awareness of merchants about the relative advantage of the services. This could be achieved by increased advertising initiatives about the services.

- ✓ The study indicated that relative advantage has positive impacts on merchants' attitudes towards the adoption of mobile payments. Therefore, mobile payment service providers are advised to work on enhancing the awareness of merchants about the relative advantage of the services. This could be achieved by increased advertising creativities about the services.
- ✓ The study found that ease of use is another key factor affecting merchants' attitude towards the adoption of mobile payments. Ease of use could be improved by modernizing the mobile payments technology as well the providers must check on system usability design components (Effective, Efficient, Engaging, Error Tolerant, and Easy to Learn) when they are providing the mobile payment system.
- ✓ The study found that perceived usefulness is another key factor affecting merchants' attitude towards the adoption of mobile payments. Usefulness could be enhanced by designing an effective, efficient and enjoyable product additionally expanding the coverage of the service and interfacing the similar with different stakeholders.
- ✓ Based on the findings, perceived trust is a key factor affecting merchants' attitude to adopt mobile payments. Thus, mobile payments service providers must work on enhancing the security, reliability, and privacy of mobile payments services.
- ✓ Lastly, based on the findings, perceived risk is a key factor affecting merchants' trust to adopt mobile payments. Thus, mobile payments service providers must work on a routine inspection of the payment system besides making the mobile payment system free of any transaction errors.

5.4. Suggestion for Future Research

This study was conducted to explore factors that influence the merchants' adoption of mobile payment services. As such, there are still rooms for further investigation into the adoption of mobile payment services.

The following are areas that could be considered for future research

- ✓ From the result obtained on the analysis of the structural model, the research model demonstrated an explanation power (coefficient of determination: R2 value of 94.8% (see the chapter of the data analysis and presentation part of this research). The unexplained 5.2% of the overall research model indicates that some important factors influencing merchants' intention to the adoption of mobile payment may have been ignored in the research. Thus searching for additional new variables may improve the accuracy relating to the expected use of mobile payment in further studies.
- ✓ Future researchers may conduct a qualitative study to construct a conceptual model as well as design a framework for the efficient adoption of mobile payment.
- ✓ This research was conducted in Addis Ababa and surrounding Ormoia zone, Ethiopia. Further studies may also consider selecting respondents from other areas outside of Addis Ababa to expore the problem at the country level.
- ✓ Perceptions of merchants may change over time when merchants have gained more experience. It may be useful to redo and re-evaluate this research and the study after a certain period of time as the results may be affected by the passage of time.
- ✓ The contribution of demographic factors such as knowledge or educational background toward moderating the effect of the mentioned independent variables to the adoption of mobile payment was not given much emphasis in this study; future researchers may investigate the influence of moderating factors.

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APPENDIX

Appendix A: Participant Consent form & questionnaire

Addis Ababa University College of Natural Science

School of Information Science

Voluntary Participation Form

This research is conducted by Firehiwot Abebe Addis Ababa University, Information science master's student. This form is prepared to inform you about this research.

What is the purpose?

In this study, the factors affecting the acceptance of mobile payment systems are investigated. After an investigation of the factors, it is aimed to form a model related to the adoption of merchants mobile payment systems.

How we would like you to help us?

If you agree to join the research, we would like you to fill out the questionnaire which is composed of multiple-choice questions. It is expected to take about 15 minutes.

How are going to use the information that we acquire from you?

Participation is entirely voluntary, and one can stop answering questions at any time without any consequences. We will not ask you to share any information related to your identity or where you work. Your answers will be confidential, and they will only be evaluated by the researchers. The data acquired will be evaluated as a whole and it will be published scientifically.

What you need to know:

There are not any foreseen risks for the respondents of the questionnaire. Participation is entirely voluntary, and one can stop answering questions at any time by directly closing the questionnaire.

About Mobile Payment Systems

In the context of this research, mobile payments can be defined as any type of payment conducted by using a mobile phone. Payments made with NFC or Bluetooth module of a mobile phone, QR code-based payments, transactions by sending SMS, WAP payments (It includes buying goods or services with a mobile phone from websites or applications such as Google Play

Store and Apple Store), or payments conducted by using online wallets (e.g. Google Wallet) are the examples of mobile payments.

Personal Information

1. How old are you?

a. 0-18
b. 18-30
c. 31-40
d. 41-50
e. 51-60
f. More than 60 years old

2. What is your level of education?

a. Primary school
b. Secondary school
c. High school
d. Diploma degree
e. Bachelor's degree
f. Master's degree or more

3. How long have you been using any of the mobile payment systems?

a. I have never used mobile payment systems before.
b. 1-3 years
c. 3-5 years
d. 5-10 years
e. More than 10 years

4. Mobile Payment Provider using:

a) CBEBirr
b) M-birr

About Mobile Payment Technologies

Questions below are given to understand your opinions about mobile payment technologies under various headings. For all questions; answers are scaled from 1 to 5, and the related scale is given below.

1- Strongly disagree

2- Disagree

3- Neutral

4- Agree

5- Strongly agree

Usefulness

1. "My sells would be quicker using mobile payment."

1 – 2 – 3 – 4 – 5

2. "My selling tasks would be more ease using mobile payment."

1 – 2 – 3 – 4 – 5

3. "Mobile payment would enhance my efficiency in making a sells."

1 – 2 – 3 – 4 – 5

4. "Overall, I would find mobile payment systems useful."

1 – 2 – 3 – 4 – 5

Ease of use

5. "Mobile payment would be easy to understand."

1 – 2 – 3 – 4 – 5

6. “Getting the information I want from mobile payment would be easy.”

1 – 2 – 3 – 4 – 5

7. “My interaction with mobile payment would be clear and understandable.”

1 – 2 – 3 – 4 – 5

Risk/Security

8. “I believe mobile payment systems to be secure.”

1 – 2 – 3 – 4 – 5

9. “I would feel secure to receive sensitive information across the mobile payment.”

1 – 2 – 3 – 4 – 5

10. “The risk of an unauthorized party intervening in the mobile payment process is low.so that payment systems give me confidence”

1 – 2 – 3 – 4 – 5

Cost

11. “Using mobile payment systems does not create additional costs”

1 – 2 – 3 – 4 – 5

12. “Mobile payment is cost-effective.”

1 – 2 – 3 – 4 – 5

13. “At the current price, mobile payment provides a good value.”

1 – 2 – 3 – 4 – 5

Compatibility

14. “Using mobile payment is completely compatible with my current situation.”

1 – 2 – 3 – 4 – 5

15. “I think that using mobile payment fits well with the way I like to sell.”

1 – 2 – 3 – 4 – 5

Attitude

16. “I can use mobile payments services without detailed instruction on its use.”

1 – 2 – 3 – 4 – 5

17. “I have the skills/knowledge necessary for selling products via mobile devices.”

1 – 2 – 3 – 4 – 5

18. “I am confident about selling products via mobile devices.”

1 – 2 – 3 – 4 – 5

19. “In general, I am competent in using mobile payments services.”

Trust

20. “The mobile payment service provider is trustworthy.”

1 – 2 – 3 – 4 – 5.

21. “I believe mobile payment service is reliable ”

1 – 2 – 3 – 4 – 5

22. “Mobile payment systems are safe for me .”

1 – 2 – 3 – 4 – 5

23. “ I feel secure sending sensitive information across the mobile payment.”

1 – 2 – 3 – 4 – 5

Relative Advantage

24. “Mobile payment enables me to Sell at any time and from wherever I am”

1 – 2 – 3 – 4 – 5

25. “Mobile payment supplements cash”

1 – 2 – 3 – 4 – 5

26. “Using mobile payment increases my productivity”

1 – 2 – 3 – 4 – 5

Thank you for your unreserved cooperation

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Appendix B: Research Support Letter from School of Information Science

አዲስ አበባ ዩኒቨርሲቲ
የተፈጥሮ ሳይንስ ኮሌጅ
የኢንፎርሜሽን ሳይንስ ት/ቤት

ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date: - January 28, 2019
Ref: - SIS/28/2019/11

To whom it may Concern

Dear Sir/Madam,

Student Firehiwot Abebe (ID.No GSR/0686/08) is a graduae student at the School of Information Science, Addis Ababa University. She is currently conducting a MSc. Thesis research under the title "Merchant acceptance and use of Mobile payment in Ethiopia".

I would like to thank you in advanced for all the assistance that you would provide to the student.

With Regards,

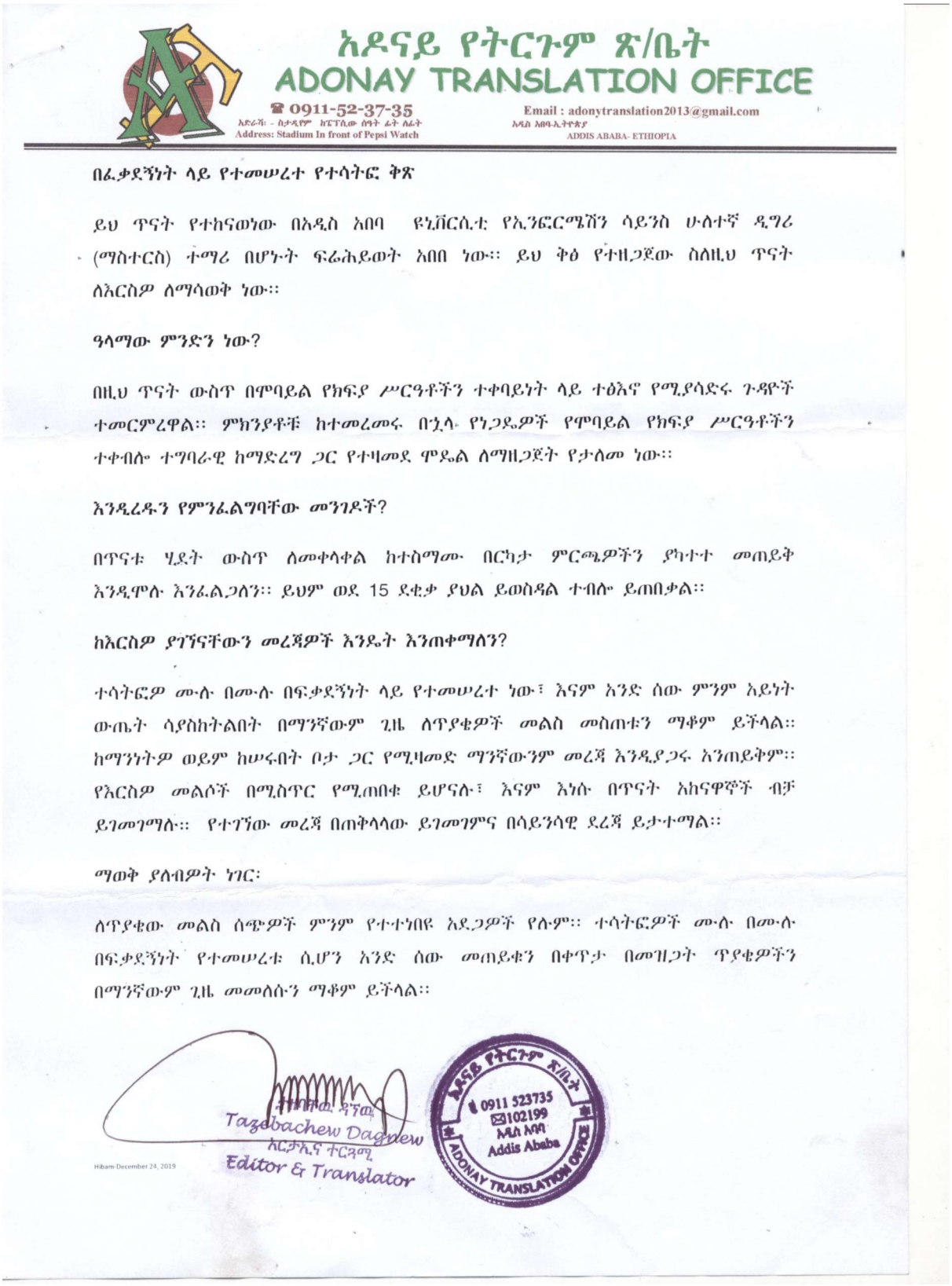
Tibebe Beshah (PhD)
Head, School of Information Science

ADDIS ABABA UNIVERSITY
SCHOOL OF INFORMATION SCIENCE

✉: 1176

☏: +251-(11)-122-91-91

Appendix C: Amharic translation of the Questionnaire



አዶናይ የትርጉም ጽ/ቤት
ADONAY TRANSLATION OFFICE
☎ 0911-52-37-35
አድራሻ: - ስታዲየም ክፐፕሲው ሰዓት ፊት ለፊት
Address: Stadium In front of Pepsi Watch
Email : adonytranslation2013@gmail.com
አዲስ አበባ-ኢትዮጵያ
ADDIS ABABA- ETHIOPIA

በፈቃደኝነት ላይ የተመሠረተ የተሳትፎ ቅጽ

ይህ ጥናት የተከናወነው በአዲስ አበባ ዩኒቨርሲቲ የኢንፎርሜሽን ሳይንስ ሁለተኛ ዲግሪ (ማስተርስ) ተማሪ በሆኑት ፍሬሕይወት አበበ ነው። ይህ ቅፅ የተዘጋጀው ስለዚህ ጥናት ለእርስዎ ለማሳወቅ ነው።

ዓላማው ምንድን ነው?

በዚህ ጥናት ውስጥ በሞባይል የክፍያ ሥርዓቶችን ተቀባይነት ላይ ተፅእኖ የሚያሳድሩ ጉዳዮች ተመርምረዋል። ምክንያቶቹ ከተመረመሩ በኋላ የነጋዴዎች የሞባይል የክፍያ ሥርዓቶችን ተቀብሎ ተግባራዊ ከማድረግ ጋር የተዛመደ ሞዴል ለማዘጋጀት የታለመ ነው።

እንዲረዱን የምንፈልግባቸው መንገዶች?

በጥናቱ ሂደት ውስጥ ለመቀላቀል ከተስማሙ በርካታ ምርጫዎችን ያካተተ መጠይቅ እንዲሞሉ እንፈልጋለን። ይህም ወደ 15 ደቂቃ ያህል ይወስዳል ተብሎ ይጠበቃል።

ከእርስዎ ያገኘናቸውን መረጃዎች እንዴት እንጠቀማለን?

ተሳትፎዎ ሙሉ በሙሉ በፍቃደኝነት ላይ የተመሠረተ ነው፣ እናም አንድ ሰው ምንም አይነት ውጤት ሳያስከትልበት በማንኛውም ጊዜ ለጥያቄዎች መልስ መስጠቱን ማቆም ይችላል። ከማንነትዎ ወይም ከሠሩበት ቦታ ጋር የሚዛመድ ማንኛውንም መረጃ እንዲያጋሩ አንጠይቅም። የእርስዎ መልሶች በሚስጥር የሚጠበቁ ይሆናሉ፣ እናም እነሱ በጥናት አከናዋኞች ብቻ ይገመገማሉ። የተገኘው መረጃ በጠቅላላው ይገመገምና በሳይንሳዊ ደረጃ ይታተማል።

ማወቅ ያለብዎት ነገር:

ለጥያቄው መልስ ሰጭዎች ምንም የተተነበዩ አደጋዎች የሉም። ተሳትፎዎች ሙሉ በሙሉ በፍቃደኝነት የተመሠረቱ ሲሆን አንድ ሰው መጠይቁን በቀጥታ በመዝጋት ጥያቄዎችን በማንኛውም ጊዜ መመለሱን ማቆም ይችላል።

Tazebachew Dagnew
ኦርታኢና ተርጓሚ
Editor & Translator

Hibam-December 24, 2019

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ስለ ሞባይል የክፍያ ስርዓቶች

በዚህ ምርምር ዐውደ-ጽሑፍ በሞባይል ስልክ በመጠቀም የሚደረጉ ክፍያዎች እንደማንኛውም በሞባይል እንደሚፈጸሙ የክፍያ ዓይነቶች ናቸው ተብሎ ሊገለጹ ይችላሉ።

የግል መረጃ

1. እድሜዎ ስንት ነው?
   ሀ. 0-18
   ለ. 18-30
   ሐ. 31-40
   መ. 41-50
   ሠ. 51-60
   ረ. ከ 60 ዓመት በላይ ነው
2. የትምህርት ደረጃዎ ምንድነው?
   ሀ. የመጀመሪያ ደረጃ ትምህርት ቤት
   ለ. ሁለተኛ ደረጃ ትምህርት ቤት
   ሐ. የሁለተኛ ደረጃ ትምህርት ቤት (9-10)
   መ. ዲፕሎማ ዲግሪ
   ሠ. የመጀመሪያ ዲግሪ
   ረ. ማስተርስዲግሪ ወይም ከዚያ በላይ
3. ማንኛውንም የሞባይል የክፍያ ሥርዓት ለምን ያህል ጊዜ ሲጠቀሙ ቆይተዋል?
   ሀ. ከዚህ በፊት የሞባይል የክፍያ ስርዓቶችን በጭራሽ ተጠቅሜ አላውቅም።
   ለ. 1-3 ዓመታት
   ሐ. 3-5 ዓመታት
   መ. 5-10 ዓመታት
   ሠ. ከ 10 ዓመት በላይ

4. የሚጠቀሙት የሞባይል ክፍያ አቅራቢ
   ሀ) CBE-ብር
   ለ) M-ብር
5. ስለሞባይል የክፍያ ቴክኖሎጂዎች
   ከዚህ በታች የቀረቡት ጥያቄዎች የቀረቡት በተለያዩ ርዕሰ ጉዳዮች ላይ ስለሞባይል

Hibam-December 24, 2019
ታዘዘችው ዳኘው
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የክፍያ ቴክኖሎጂዎች ያለዎትን አስተያየት ለመረዳት ነው። ለሁሉም ጥያቄዎች፤ መልሶችከ 1 እስከ 5 በእርከን ቀርበዋል፣ እና ተጓዳኝ እርከን ከዚህ በታች ቀርቧል።

1- ፈጽሞ አልስማማም

2- አልስማማም

3- ገለልተኛ ነኝ

4- እስማማለሁ

5- ፈጽሞ እስማማለሁ

ጠቀሜታው (MPU)

1. "ሽያጮቼ የሞባይል ክፍያን ስጠቀም ይፈጥናሉ።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

2. "የእኔ ሽያጭ ተግባራት የሞባይል ክፍያን በመጠቀም የበለጠ ቀላል ይሆንልኛል።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

3." የሞባይል ክፍያ ሽያጮችን በማከናውንበት ጊዜ ብቃቴን ከፍ ያደርግልኛል።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

4. "በአጠቃላይ፣ የሞባይል የክፍያ ሥርዓቶችን ጠቃሚ ሆነው አግኝቻቸዋለሁ።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

ለአጠቃቀም ቀላል ስለመሆኑ (MPEU)

5. "የሞባይል ክፍያ ለመረዳት ቀላል ነዉ።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

6. "ከሞባይል ክፍያ የምፈልገውን መረጃ ማግኘት ቀላል ነዉ።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

Hibam-December 24, 2019

Tazelachew Dagnew

Editor & Translator

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7. “ከሞባይል ክፍያ ጋር ያለኝ መስተጋብር ግልጽ እና ልረዳው የምችለው ነዉ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

አደጋ / ደህንነት (MPRS)

8. “የሞባይል የክፍያ ሥርዓቶች ደህንነታቸው የተጠበቀ እንዲሆኑ አምናለሁ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

9. “በሞባይል ክፍያ ሚስጥራዊ መረጃዎችን ስቀበል ደህንነቱ እንደተጠበቀ ይሰማኛል።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

10. “ፈቃድ ያልተሰጠው ወገን በሞባይል የክፍያ ሂደት ውስጥ ጣልቃ የመግባት አደጋ አነስተኛ ነው። ስለሆነም የክፍያ ሥርዓቶቹ በራስ የመተማመን ስሜትን ይሰጡኛል”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

ወጭ (MPC)

11. “የሞባይል የክፍያ ሥርዓቶችን መጠቀም ለተጨማሪ ወጪ አይዳርገኝም”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

12. “የሞባይል ክፍያ ወጪ ቆጣቢ ነው”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

13. “አሁን ባለው ዋጋው፣ የሞባይል ክፍያ ጥሩ ዋጋ ይሰጣል።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

ተስማሚነት (MPCM)

Hibam-December 24, 2019

ታዘባቸዉ ዳኘዉ
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14. “የሞባይል ክፍያን መጠቀም ከአሁኑ ካለሁበት ሁኔታ ጋር ሙሉ በሙሉ ተስማሚ ነው።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

15. “የሞባይል ክፍያን መጠቀም መሸጥ ከምፈልግበት መንገድ ጋር በጥሩ ሁኔታ የሚስማማ ይመስለኛል።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

አመለካከት (MPA)

16. “አጠቃቀሙን በተመለከተ ዝርዝር መመሪያ ሳይኖር የሞባይል ክፍያ አገልግሎቶችን መጠቀም እችላለሁ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

17.“በሞባይል መሣሪያዎች በኩል ምርቶችን ለመሸጥ የሚያስችለኝን ክህሎት/እውቀት አግኝቻለሁ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

18.“በሞባይል መሣሪያዎች በኩል ምርቶች እንደሚሸጡ እርግጠኛ ነኝ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

19. “በአጠቃላይ፣ የሞባይል ክፍያ አገልግሎቶችን በመጠቀሙ ረገድ ብቁ ነኝ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

መተማመን/እምነት (MPT)

20. “የሞባይል የክፍያ አገልግሎት አቅራቢ እምነት የሚጣልበት ነው።”

ታዘባቸው ዳኘው
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Hibam December 24, 2019

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102199
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ADONAY TRANSLATION OFFICE

1 ☐ 2 ☐ 3☐ 4☐ 5☐

21.“የሞባይል ክፍያ አገልግሎት አስተማማኝ እንደሆነ አምናለሁ።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

22."የሞባይል የክፍያ ሥርዓቶች ለእኔ ተስማሚ ናቸው።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

23. “በሞባይልክፍያዙሪያሚስጥራዊመረጃንበመላክላይደህንትይሰማኛል።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

አንጻራዊጥቅም (MPRA)

24. "የሞባይል ክፍያ በማንኛውም ጊዜ እና ከየትም ስፍራ ሆኜ እንድሸጥ አስችሎኛል።"

1 ☐ 2 ☐ 3☐ 4☐ 5☐

25.የሞባይል ክፍያ ጥሬ ገንዘብን ይተካል።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

26. “የሞባይል ክፍያ መጠቀም ምርታማነቴን ያሳድግልኛል።”

1 ☐ 2 ☐ 3☐ 4☐ 5☐

ታዘባችው ዳኘው
Tazebachew Dagnew
አርታኢና ተርጓሚ
Editor & Translator

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