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**Building consumer mobile money adoption and trust in conditions where
infrastructures are unreliable**

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria in partial fulfilment of the requirements for the degree of Master of Business Administration.

7 November 2012

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Thokozani Unyolo

7th November 2012

Student

Date

Abstract

Mobile money is gaining momentum in emerging markets as the solution to bank those who were previously unbanked. The number of people in Africa who have mobile phones is 644 million subscribers and has for a long time exceeded those who have bank accounts and access to formal financial services (Cobert, Helms, & Parker, 2012). About 2.5 billion adults, just over half of world's adult population, do not use formal financial services to save or borrow, of this number 2.2 billion of these unserved adults live in Africa, Asia, Latin America, and the Middle East (Chaia et al., 2009). This study sought to explore factors that will determine adoption of mobile money by adapting Venkatesh, Thong and Xu's (2012) Unified Theory of Acceptance and Technology Use (UTAUT 2) research model to assess the drivers of behavioural intention. The model was extended by incorporating two additional constructs; trust and infrastructure reliability, which have been excluded in previous studies that have been done in developed countries. Further to this, the findings of this study will make a significant contribution to Information Systems (IS) research by identifying factors that influence technology adoption in a developing market context.

This main aim of this quantitative research was to empirically discover the deeper motivations that affect the consumer behavioural intention and usage behaviour to use mobile money in Malawi. The value of this paper lies in the use of interviews to unveil new determinants of the Unified Theory of Acceptance and Technology use in the adoption of mobile money in a developing market that influence behavioural intention and usage behaviour. The seven factors examined in this study are performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), price value (PV), infrastructure reliability (IR), and trust (T) moderated by gender and age impact on technology adoption. The study sample consists of 508 respondents with a response rate of 84%.

The findings indicate that performance expectancy, effort expectancy, facilitating conditions, trust, and price value were positively associated with consumer behavioural intention to use mobile money in Malawi. In addition, infrastructure reliability and social influence were found to have an insignificant effect on consumer behavioural intention to use mobile money.

The research adds value on existing studies on technology adoption as it contributes to understanding disruptive technology from a consumer perspective in a developing market which has been excluded in previous research papers. Another value of this paper lies in the use of UTAUT 2 to identify a new construct, trust, as a determinant of mobile money adoption in a consumer perspective which is applicable in Malawi. In addition to this it enables us to contribute to current literature on the emerging mobile money market in Malawi, which is largely under researched.

Keywords

Technology Adoption

Unified Theory of Acceptance and Technology Use (UTAUT)

Mobile Money

Trust

Infrastructure reliability

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List of Abbreviations

IS	Information Systems
MM	Mobile Money
UTAUT	Unified Theory of Acceptance and Technology Use
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Scientists

1 Definition of Problem and Purpose

1.0 Research Title

Building consumer mobile money adoption and trust in conditions where infrastructures are unreliable.

1.1 Introduction

“The spread of mobile phones across the developing world is one of the most remarkable technology milestones of the past decade” (Donner, 2008, p. 318). Many of these new and existing mobile users live in informal, cash based economies without bank accounts and access to formal financial services. Aker and Mbiti (2010) examined the growth of mobile phone technology and its impact on quality of life in Sub-Saharan Africa over the past decade and identified mechanisms through which mobile phones can provide economic benefit to consumers and producers. One of mechanisms identified was m-development, which refers to mobile phone based applications that have the potential to facilitate delivery of financial, education, health and agriculture services Aker and Mbiti (2010). Given the opportunity that mobile money offers to access the unbanked population, there is a need to assess the environment in which the product can foster growth. With this in mind, this study seeks to investigate the factors that influence consumer behaviour intention to adopt new technology, in particular, mobile money.

1.2 Research Problem

Research conducted in 2008 by McKinsey in partnership with the Financial Access Initiative (Chaia, Dalal, Goland, Gonzalez, Mordurch & Schiff, 2009) revealed that 2, 5 billion of the adults in the world do not use formal banks. Of this population that is unserved 326 million (as per Figure 1 below) reside in Sub-Saharan Africa of which Malawi is a part. Mobile money has been touted as revolutionary in developing countries with its capacity to extend financial services to the unbanked (Ghosh, 2012).

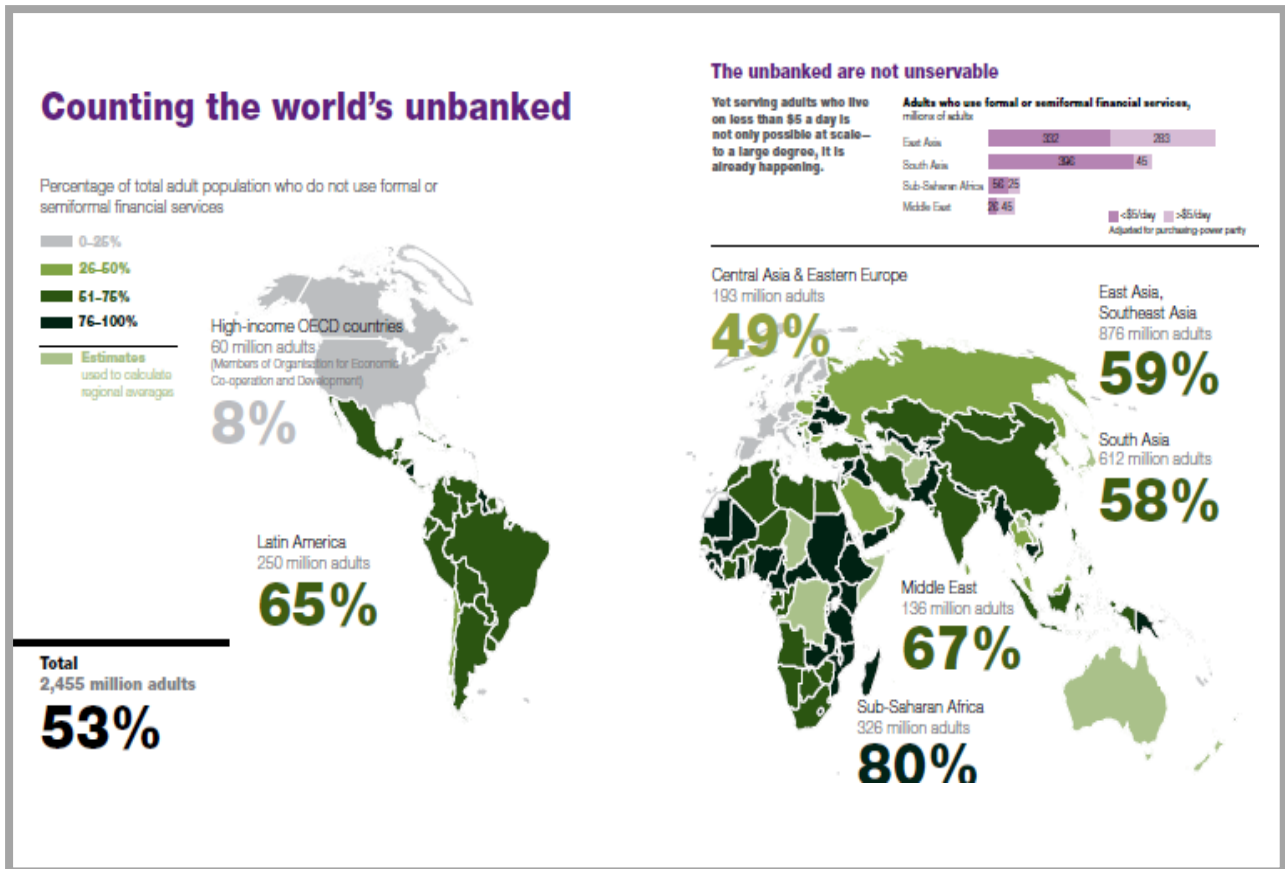


Figure 1: Counting the world's unbanked

Source: *Counting the world's unbanked* by Chaia et al., (2009)

Mobile money has the potential to address the financial inclusion gap through leapfrogging those previously excluded from traditional banks to become banked using the cell phone.

This report, further highlights that this unserved market offers opportunities to innovative institutions that can develop and offer the right and affordable financial services (Chaia et al., 2009). Furthermore, with the right education and support lower income consumers will be able to make a choice and benefit from access to credit, savings, payments and insurance which can help them invest in economic opportunities, manage their money better, and reduce risks (Chaia et al., 2009). However, the challenge is, mobile money adoption has been slower than expected in most developing markets (Chaia et al., 2009). Therefore, it is important to understand the factors that influence consumers and drive behavioural intention and usage behaviour of mobile money in order to facilitate a paradigm shift from cash based to mobile money.

The utility of mobile phones for improving financial inclusion by reaching the unbanked has been ably demonstrated by other emerging economies such as M-pesa in Kenya (CGAP, 2010) and Smart money and G-Cash in Philippines (Wishart, 2006). However, similar success has not been achieved in Malawi (Airtel Malawi, 2012). This paper seeks to explore the key factors that influence consumer behavioural intention and usage behaviour to adopt mobile money in Malawi. Most mobile operators in the world know very little about the unbanked, as the information available is limited. There are some fundamental questions that need to be addressed which are country specific:

- What are the factors that influence consumer adoption of mobile money?
- Does trust in the service or the provider of the service have an impact on behavioural intention and usage behaviour of mobile money?
- Does unreliable infrastructure affect customer's behaviour intention and usage behaviour? Will infrastructural challenges affect the uptake of mobile money in emerging markets is what this paper will unravel.

Traditionally money has always been transacted over the counter on a cash basis with person-to person interaction (Lee, Lee, & Kim, 2007). The new paradigm is money will be transacted via mobile phones using wireless technology (Lee et al., 2007). Compared to traditional banking, mobile money service risk is much higher, the transaction in a wireless environment requires consumer trust and reliable infrastructure due to the complexity of the service, uncertainty and lack of control during the exchange (Lee et al., 2007). Business transactions require trust as a critical element of success, especially when the business is run in an uncertain environment (Lee et al., 2007). Trust is a complex phenomenon Butler (1991), Barber (1983) (as cited in Yeh & Li, 2009, p. 1068). Consumer trust is regarded as a critical factor to the success of technology adoption and new innovations such as mobile money.

A study by Saidi (2010) on challenges of m-commerce implementation, asserts that it is not uncommon to have unreliable signals leading to calls being cut midway through transmission and an SMS taking several hours to be delivered to recipients. The implications of such interruptions may pose a serious challenge to m-commerce in Malawi. Saidi (2010) in his research, focused on an organisational context intending to deploy m-commerce, he concentrates on banks, and mobile network providers. He cites that there are a number of factors that will affect implementation and he categorises them as technical, business and policy problems. Saidi (2010) proposes solutions to these issues, by drawing on literature and experiences in developing and developed countries. However, Saidi's (2010) paper fails to address the factors that drive consumer behaviour intention to adopt new technology from a

consumer's perspective, specifically in an environment where trust and infrastructure reliability is an issue. This paper will look at a consumer perspective with respect to factors that influence an individual's decision such as performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), price value (PV), infrastructure reliability (IR), and trust (T) moderated by gender and age that drive consumer behavioural intention and usage behaviour to adopt the new technology.

1.3 Research Motivation

The motivation for this paper stems from the fact that mobile money is perceived by many as the solution for the unbanked in Africa including Malawi. This is because this service offers them a platform to receive monetary support from their relatives in town. Furthermore, mobile money offers an opportunity for this segment of the economy to become banked as being banked was traditionally perceived as a service for the wealthy in most developing countries. The primary rationale was motivated by the fact that mobile money research is in its formative stages. In addition, most Information Systems research studies on technology adoption have focused on the organizational context. However, given that the opportunity for mobile money service stems from the developing countries where infrastructure reliability is a challenge, it is yet to be understood how consumer adoption of new technology changes in such an environment. Currently, there is inadequate research which specifically addresses the drivers which influence mobile money adoption from a consumer perspective where there is infrastructure unreliability in developing countries. This study will offer insight on how mobile service providers and policy makers can implement and increase usage of mobile money service in developing countries, thus realizing the expected economic growth of banking the unbanked. From the academic side this research will contribute to understanding disruptive technology adoption from a consumer perspective in a developing market context which has been excluded in previous research papers.

To date there have been over 100 mobile money deployments in emerging markets; of which 84 have emerged in the last three years, but only a handful have reached sustainable levels of scale (Cobert et al., 2012). Notable examples are M-pesa in Kenya, G-Cash and Smart money in Philippines, MTN Uganda, Vodacom Tanzania, and FNB in South Africa (Cobert et al., 2012). Even some of these major players have not gained much traction for financial services beyond simple transfers and payments.

Furthermore, Colbert, Helms and Parker (2012) argue that considering the level of investment undertaken by mobile network operators in mobile money deployment on the business side it is important to understand the key enablers and drivers of business growth of this new mobile money phenomenon. Marketers in the telecommunications industry are concerned with growing and sustaining revenue market share and being the most innovative network through launching of new products and services since voice is now a basic commodity offering for all providers and value added services are the key business growth drivers, differentiators and determinants of future success Aker and Mbiti (2010).

To achieve the desired objective of this research, extensive review of literature on technology adoption was conducted. The extended Unified Theory of Acceptance and Use of Technology model (UTAUT2) proposed by Venkatesh et al. (2012) was adopted. Despite UTAUT being widely referred to as ideal model for technology adoption studies in the extant literature, the current model is limited in its use as it was based on simple technology such as internet and ecommerce adoption in a developed country context. In a paper by Riffai, Grant and Edgar (2012), 43 practice based case studies were looked at, and it has been argued that the model fails to fully address radical forms of innovation based technology changes that are happening such as mobile money (Riffai et al., 2012). Furthermore, Riffai et al. (2012) argued that the 43 studies that have been conducted in developed countries where the context is different from the one being addressed here. Hence, this study will give an opportunity to apply this model using radical technology such as mobile money in a developing context (Malawi) and test the model's applicability.

The original UTAUT model assumes that infrastructure is in its advanced stages; therefore it was not necessary to test this factor separately. However, such an assumption cannot hold when the model is used in a developing country context as infrastructure reliability is seen as a huge challenge especially in the adoption of mobile technology (Venkatesh, Ramesh, & Massey, 2003). It has been noted that where infrastructure unreliability is a challenge, the trust element comes into play. Therefore, infrastructure reliability and trust need to be incorporated in the model if it is used in a developing country context. With this in mind, the study extends the applicability of UTAUT 2 in the mobile money consumer context by adding the constructs of infrastructure reliability and trust. In other words, the revised model will contribute to the literature by incorporating the fundamental roles of trust, and infrastructure reliability on behavioural intention and usage behaviour in adoption of mobile money.

Malawi has been chosen as the ideal developing market where this model will be tested because mobile money has recently been launched and is facing adoption challenges. Therefore, we will be able to see the models adaptability in a developing country context, as the previous studies have been predominantly tested in a developed country context. This research will enable mobile telecommunications operators, in terms of understanding existing users, non-users and potential users of mobile money services. The objective is to ascertain, the factors that influence their behavioural intention and usage behaviour of mobile money, thus enabling them to develop relevant marketing strategies. As such, it is imperative that mobile network operators and marketers who are in the process of deploying mobile money or who have launched should take note of the outcomes of this research to enable them to understand the key factors influencing mobile money adoption.

Understanding the drivers of mobile money adoption is not only limited to the commercial view, it is also beneficial on a larger social and economic scale. As stated in the introduction, mobile money offers massive opportunity for economic growth if implemented and adopted successfully. Suffice to say, this research has the potential to offer insights to policy makers on the allocation of resources that will create an enabling environment for mobile money to grow, thus offering access to the unbanked and resulting to economic growth in the long-term.

1.4 Research Scope

The scope of the research is the factors that drive technology adoption in a developing market. The study focuses on mobile money users, non-users and potential users. The study was limited to Airtel Malawi subscribers as this is the only operator that has launched this service on the market. While this study focuses on mobile money only in Malawi, the outcomes of this research are expected to be applicable to other developing markets which exhibit the same market conditions.

This study extends the Unified Theory of Acceptance and Use of Technology (UTAUT2) proposed by Venkatesh et al. (2012) as the research model and incorporates two additional constructs trust and infrastructure reliability as these will contribute in understanding of drivers of adoption of mobile money in conditions where infrastructures are unreliable. The research will cover the following core constructs from the current literature which has mainly been applied in developed markets namely: performance expectancy, effort expectancy, social influence, facilitating conditions and price value moderated by gender and age. Notably, none of the studies in the literature that use UTAUT 2 were relevant or conducted in Malawi. Therefore, an opportunity presents itself to investigate this model and produce empirical evidence from the Malawi environment.

For the purpose of this study it is deemed necessary for the scope of the research to describe the following definitions:

Performance Expectancy refers to degree to which a technology will provide benefits to consumers in performing certain activities (Venkatesh et al., 2012).

Effort Expectancy refers to degree of ease associated with consumer's use of technology (Venkatesh et al., 2012).

Social Influence is the extent to which consumers perceive that important others (e.g. family friends) believe they should use a particular technology (Venkatesh et al., 2012).

Facilitating Conditions refer to consumers perceptions of resources and support to available to perform behaviour (Venkatesh et al., 2012). This refers to resources and support from external and in an organisational context.

Price Value refers to costs associated with the purchase of device and service that consumers have to bear (Venkatesh et al., 2012).

This paper seeks to understand from a theoretical basis how to explain drivers of technology adoption and identify similarities or differences that can be applied in other new innovations.

1.5 Research Objectives

Furthermore, considering the level of investment undertaken by mobile network operators in mobile money deployment, the objective of this study is to promote a better understanding of the impact of infrastructure and trust on technology adoption in Malawi. Various studies (Aker & Mbiti, 2010; Ayo, Ukpere, Oni, Omote, & Akinsiku, 2012; Bigné, Ruiz, & Sanz, 2007; Islam, Khan, Ramayah, & Hossain, 2011; Jenkins, 2008; Ketkar, Shankar, & Banwet, 2012; Luo, Li, Zhang, & Shim, 2010; Min, Ji, & Qu, 2008; Tobbin & Kuwornu, 2011; Venkatesh et al., 2003; Wu & Wang, 2005; Yen, Wu, Cheng, & Huang, 2010) have been conducted in different countries, looking at different factors such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit and these variables are moderated by age, gender, literacy and experience which have an effect on overall behavioural intention and usage behaviour in technology adoption.

Mobile money is gaining momentum in emerging markets as the solution to address the unbanked and bridge financial inclusion gap that will result in socioeconomic development of people in these counties (Cobert et al., 2012). This study seeks to investigate the effects of performance expectancy, effort expectancy social influence, facilitating conditions, price value, infrastructure reliability, and trust and these variables are moderated by age, and gender on adoption of mobile money in Malawi. The following questions will be addressed:

- What is technology adoption?
- What are the variables that influence behavioural intention and usage behavior of mobile money?
- What is the role of infrastructure in technology adoption?
- What is the role of trust in technology adoption?
- What is the impact of infrastructure on trust?
- What is the impact and implications for technology adoption when trust is compromised by infrastructure?

1.6 Structure of the report

Having looked at the problem, research aim and overall objectives, it is imperative to outline a quick preview of the dissertation.

Chapter One: Introduces the research topic, research motivation, research scope and the objectives and aim of the study.

Chapter Two: This is a comprehensive literature review; this chapter defines first technology adoption. It further describes the different technology adoption theoretical frameworks that exist and selects an appropriate model for this research and describes the role of infrastructure on technology adoption. It then reviews infrastructure challenges in mobile money (m-commerce), defines trust and the role of trust in technology adoption, then it goes into a discussion on the impact and implications on trust when infrastructure is compromised it concludes with a definition of mobile money.

Chapter Three: Defines the research hypothesis.

Chapter Four: Describes the research methodology of the study in terms of how the views will be gathered. The research tool to be used will also be presented here.

Chapter Five: The findings, analysis and discussion section, whereby an overall picture will be presented on the responses by customers.

Chapter Six: Discussion on findings of the research done and conclusions.

Chapter Seven: Conclusions will be drawn; recommendations will be presented and suggestions on future studies.

1.7 Summary of Chapter

The chapter has attempted to set the problem at hand into context by looking at the number of people who are currently unbanked in comparison with those that have mobile phones in Africa and the potential that this situation presents to developing countries to achieve the goal of reducing the number of people who are unbanked and increase financial inclusion using new technology in particular mobile money. The chapter has set the scene for the study by arguing that in an environment like Malawi mobile money adoption is also impacted by trust and infrastructure reliability. Finally, the chapter has attempted to succinctly define the objectives of the study which have guided the discussion in the rest of the paper.

2 Theory and Literature Review

2.0 Introduction

The base of this research is technology adoption and the factors that affect it, such as trust and infrastructure reliability. The literature covered in this section will provide the foundation on which this research is built. The key themes to be explored include the concept of technology adoption, technology adoption theoretical frameworks, a modified model for the developing world, the role of infrastructure in technology adoption, the role of trust in technology adoption and the impact and implications on technology adoption when trust is compromised due to infrastructure and concludes with a definition of mobile money in order to understand whether or not a relationship exists. This section of the document presents the literature review, organised along the key themes that seek to identify and explain factors that impact the behavioural intention and usage behaviour of mobile money.

2.1 Technology Adoption

Success, acceptance and uptake of any technology depend on the rate of consumer behavioural intention, usage behaviour and technology adoption. Khasawneh (as cited in Suebsin & Gerd Sri, 2009) defines the meaning of technology adoption as "...the first use or acceptance of a new technology or new product" (p. 2638).

Several adoption process models have been developed in order to identify the process of how technology is adopted. Beal and Bohlen (as cited in Suebsin & Gerd Sri, 2009) divide adoption process into five stages: awareness, interest, evaluation, trial, and adoption. Taylor (2010) refers to technological adoption as an outcome of the process of search and selection which is influenced by social status, information visibility, individual mobility and cognitive beliefs.

Adoption is therefore seen as a sequence of events through which an individual consumer goes through over a period of time which is subjective based on contextual factors. The next section will focus on technology adoption theoretical frameworks.

2.2 Technology Adoption Theoretical Framework

Why and how individuals adopt new technology has spawned a great deal of attention from the business fraternity and scholars of Information Systems (IS) research. To enable new technology adoption, cognitive, emotional and conceptual concerns need to be addressed (Straub, 2009). There are several models that have been used in research, to describe or predict technology acceptance, behavioural intention and usage behaviour, particularly in the information systems arena as this has an impact on business decisions and everyday life of the consumer of new innovation. This paper will focus on the technology acceptance model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology model (UTAUT) (Venkatesh et al., 2003) and the extended unified theory acceptance and use of technology model 2 (Venkatesh et al., 2012) to understand technology adoption and validate it in the context of mobile money.

Davis' research (1989) was one of the first studies on how an individual's perceptions of technology innovation affect eventual use of that technology. This model has been influenced by both social cognitive theory and decision-making theories. TAM identified two perceived characteristics about an innovation's perceived usefulness and perceived ease of use as the most important factors in explaining individual users' adoption intentions and actual usage (Davis, 1989). The first, perceived ease of use is the "degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Davis linked perceived ease of use to self-efficacy because he believed ease of use was a similar outcome judgement.

Bandura (as cited in Luo et al., 2010) defined self-efficacy as a person's perception of how easy or difficult it would be to carry out behaviour. Thus, the idea proposed by Davis that, perceived ease of use can be directly mapped on to the concept of self-efficacy is unsound. First, perceived ease of use is a judgment about the qualities of a technology, but self-efficacy is a judgment about the abilities of an individual. The second characteristic, perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Perceived usefulness has been found to be a consistent influence of future individual use of a technology (Adams, Nelson, & Todd, 1992; Agarwal & Prasad, 1998; Lippert & Forman, 2005). These two beliefs create a favourable disposition or intention towards using new technology. Its main advantage over others is that the two related beliefs can be generalised across different settings. TAM has been extensively validated as a model which can be modified using other theories or constructs (Luo et al., 2010; Venkatesh & Davis, 2000; Wu & Wang, 2005; Yen et al., 2010). Many of the studies done argue that TAM is the most robust and influential model for explaining technology adoption.

Studying technology adoption, Venkatesh et al. (2003) upon the review and synthesis of eight theories/models of technology use, created the Unified Theory of Acceptance and Use of Technology model (UTAUT), which is now considered to be one of the most important models for research into technology adoption. In this model, they suggested that individual's reactions to using technology directly affect behavioural intention to use technology and that in turn affects actual use (Venkatesh et al., 2003). The theory holds that four key constructs (performance expectancy, effort expectancy, social influence and facilitating conditions) are direct determinants of behavioural intention and usage behaviour (Venkatesh et al., 2003). Gender, age, experience, and voluntariness of use are posited to mediate the impact of the four key constructs on behaviour intention and usage behaviour (Venkatesh et al., 2003).

In UTAUT, performance expectancy is the same as TAM's perceived usefulness and effort expectancy is the same as perceived ease of use. According to UTAUT, performance expectancy, effort expectancy and social influence are theorised to influence behavioural intention to use a technology, while hedonic motivation and facilitating conditions determine technology use (Venkatesh et al., 2012). A study done by Lu, Yao, and Yu (2005), in which they examined factors that are strong contributors to consumer technology adoption, while they agreed that perceived ease of use and perceived usefulness are strong variables in consumer willingness to adopt mobile technology, suggested that variables such as social influence and personal innovativeness must also be taken into consideration. UTAUT addresses this suggestion by including the social influence construct. Carlsson, Hyvonen, Puhakainen and Walden (2006) examined the factors that contribute to adoption rates of mobile devices and services; this showed that performance expectancy, effort expectancy, and attitude towards using were found to be directly related to behavioural intention.

Despite its frequent use, TAM has been widely criticised. This is because, many assumptions are made in order for the model to hold and it has widely been tested in a developed country context. As such, only two variables are applied in the model namely; perceived use and perceived ease of use. Thus this approach is seen to be simplistic and limited in its applicability in a different context such as a developing country. It is therefore, suggested that adding more variables would be ideal and increases the applicability of the model in a developing country context. As argued in (Benbasat & Barki, 2005), understanding two factors does not guarantee success, even if an innovation is relevant to society, contextual factors can lead to non-adoption. This is the gap that this paper intends to explore. This study seeks to investigate the variables that drive consumer behavioural intention to adopt mobile money by using a more robust model with more variables.

When tested in a different context, such as in a study by Chong, Chan, and Ooi (2012) in China and Malaysia, the technology acceptance model (TAM) and diffusion innovation (DOI) theory were integrated with additional variables such as trust, cost, social influence, variety of services, and control variables such as age, educational level, and gender of consumers to investigate factors that predict consumer intention to adopt. However, the drawback of this study is that the impact of trust on m-commerce was studied in general and not on a specific product. Furthermore, the impact of infrastructure reliability on consumer intention to adopt new technology was not taken into account in (Chong et al., 2012) or previous studies on TAM. Therefore, there is a gap in TAM literature on the impact of infrastructure and trust on a specific product on consumer intention to adopt new technology or mobile commerce. In this study, two new variables namely; infrastructure reliability and trust of a specific product (mobile money) will be added to the model in the context of a developing country (Malawi), hence providing knowledge, insight and contribute to the gap that has not been addressed in previous models and studies.

In Chong et al. (2012), the TAM model used two variables (perceived usefulness and perceived ease of use) to assess the factors that impact consumer's behavioural intention to adopt new technology in an organisational context. However, this approach is not suitable when assessing the impact in a consumer context. This is because in a consumer context, there are perception differences that might exist from person to person in any given population, which are modelled by beliefs, user experience and environment. It has also been argued that predicting behavioural intention and usage behaviour by using only two variables omits many factors that may play a role in an individual's decision to adopt a new technology (Venkatesh & Davis, 2000). Venkatesh and Davis (2000) suggested that, including more variables to the model would improve determining the drivers of an individual's decision to adopt new technology. In the study, social and organisational variables such as image, job relevance, and output quality and result demonstrability were added to the model as they have an impact on consumer behavioural intention to adopt new technology.

Conversely, Lin and Wang (2006) explored factors that contributed to customer satisfaction and post purchase intention in mobile commerce and they discovered that perceived value and service quality impact customer satisfaction. Service quality is directly impacted by infrastructure reliability, thus this supports the argument that infrastructure reliability needs to be included as a construct in the model to assess its impact on behavioral intention and usage behaviour.

In consumer technology use, context price and hedonic motivation, which is defined as the fun or pleasure derived from using a technology, have been shown to play an important role in determining technology acceptance and use (Venkatesh et al., 2012). In IS research, hedonic

motivation is conceptualized as perceived enjoyment and has been found to influence technology acceptance and use directly; hence, it has been added as a predictor of consumers' behavioural intention to use (Venkatesh et al., 2012). The UTAUT 2 research model presented by Venkatesh et al., (2012), in Figure 2 below, purports that behavioural intention and usage behaviour is influenced by the following variables: - performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit and these variables are moderated by age, gender and experience which have an effect on overall behavioural intention and usage behaviour. Nonetheless, there is a common thread among present literature, which demonstrates that behavioural sciences and individual psychology play an important role in mobile technology adoption. This has led to a need to further understand and explain specific factors that drive behavioural intention and usage behaviour of mobile money.

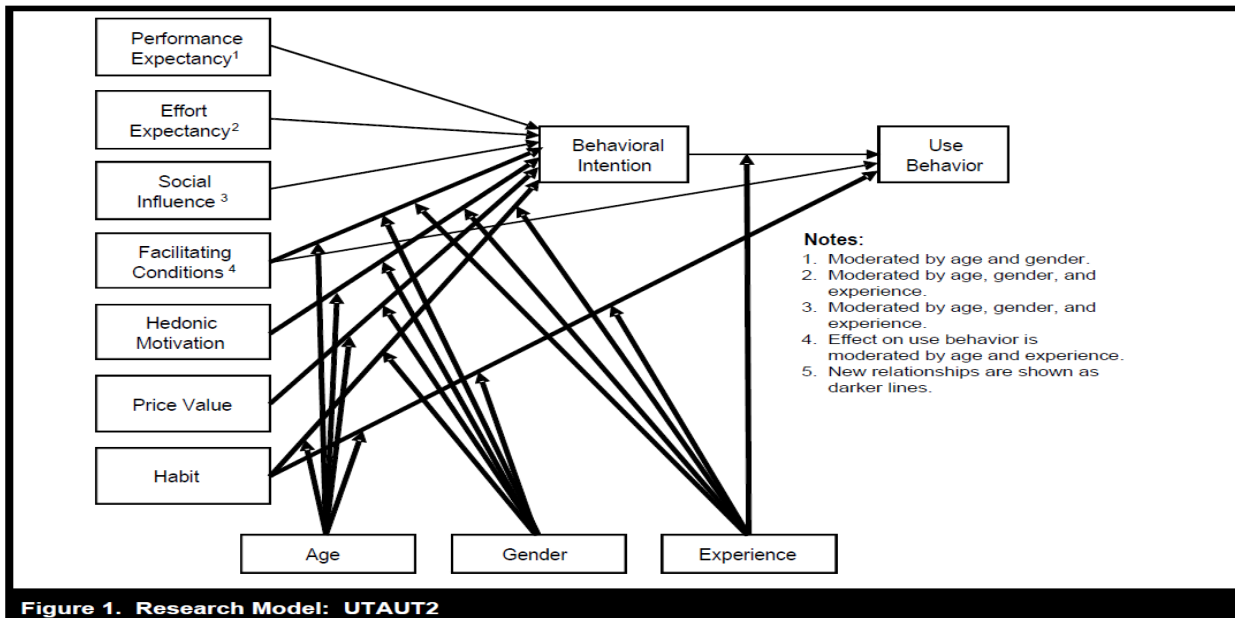


Figure 2: Research Model UTAUT 2

Source: Venkatesh, Thong and Xu (2012, p. 160)

2.3. A Modified Model for the Developing World

In order to enhance the prediction of behavioural intention and use behaviour of mobile money in Malawi, this study selects the approach that extends the original UTAUT 2 by adding two additional constructs to be tested and validated: infrastructure reliability and trust. Furthermore, given that little research has been done in a developing market. Given the importance of the market and its potential for mobile operators, banks and governments goal of financial inclusion of the previously unbanked an insufficient understanding of the context can lead to strategic

failure hence the need for a modified model for the developing world. The newly extended modified model for the developing UTAUT 2 in this study is shown in Figure 3.

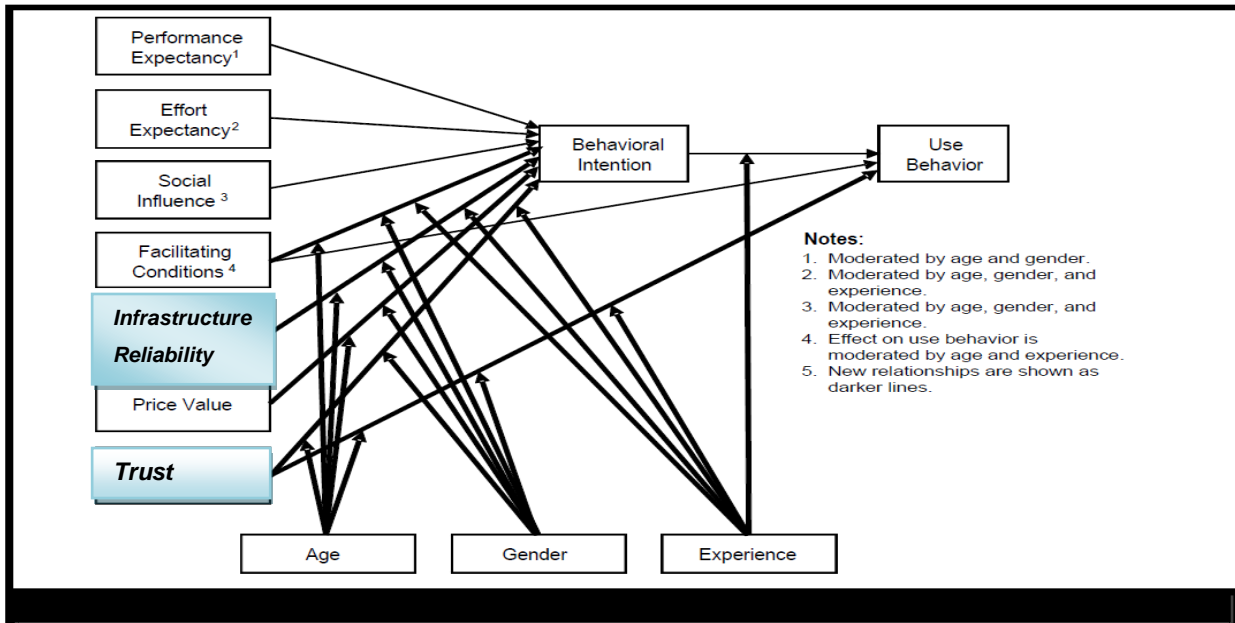


Figure 3: A Modified Model for the Developing World

Consistent with the literature, this study posits that performance expectancy, effort expectancy, social influence, facilitating conditions, infrastructure reliability, price value, and trust moderated by age, gender, and experience are critical factors that impact the adoption of mobile money. Infrastructure reliability and trust are included in the research model as these have a direct effect on the behavioural intention and use behaviour of mobile money as trust in the mobile operator, the service and competence in delivery of mobile money is contextualised. Thus, it is anticipated that the additional variables stated above are more likely to negatively influence adoption of mobile money. In terms of trust, the UTAUT model has also been revised by previous scholars in an attempt to study mobile commerce acceptance, where additional determinants such as trust, privacy, convenience and cost were shown to affect behavioural intention (Min et al., 2008). Although trust was added by Min et al. (2008), their results are limited to mobile commerce in general and the developed world context. The reason is that the constructs presented above in both TAM and UTAUT 2 assumes an ideal situation that is prevalent and applicable in the developed world. Yet for a developing country the dynamics and applicability of this model may be different. Moreover the problems confronted by mobile telecommunications in developing countries are unique in nature and thus deserve further exploration.

There are numerous studies that were conducted in a developing country context to ascertain the factors that drive consumer behavioural intention to adopt technology. For instance, Mbogo (2010) explored the factors that contribute to success with use of mobile payments within micro-businesses in Kenya, he concluded that convenience of the money transfer technology plus its accessibility, cost, support and security factors are related to behavioural intention to use and actual usage of the mobile payment services. Hence, there appears to be support for an integrated model of predictors that have been used in an organisational and consumer context to provide insights and highlight whether the suggested predictors by previous researchers are significant predictors for mobile money adoption.

The real barrier in developing markets remains infrastructure reliability and trust which, is the focus of this paper. To support this argument, a study done by Tobbin and Kuwornu (2011) in Ghana investigated factors that affect the intention to use mobile money transfer technology, using key constructs from the technology acceptance model (TAM) and diffusion of innovation (DOI) theory. The findings resulted in the questions below being posed by respondents during the interviews:

- How can we rely on network providers to transfer our money when their network is always down?
- What happens to our money when the network is down for a day or two? And who is ultimately responsible, the merchant or the network provider?

These questions provide valuable insight that infrastructure reliability has the potential to distort the result of the model and confirms that it is indeed a concern for consumers in the mobile money context, given the nature of the service. Therefore, it must be incorporated in to the model, this study provides an opportunity to empirically test and determine to what extent infrastructure reliability affects consumer behavioral intention and usage behaviour.

A study by Saidi (2010) cited inadequate telecommunications infrastructure as a problem, in particular unreliable network signals that lead to calls being cut midway through transmission and an SMS taking several hours to be delivered to recipients. Such interruptions may pose a serious challenge to m-commerce in Malawi due to delays in the transmission of data (Saidi, 2010). It must be noted that success of mobile money is not dependent only from an organizational context but is dependent on two perspectives that are interrelated; organizational and consumer perspective. Saidi (2010) addressed infrastructure as a problem in terms of data transmission from an organization general m-commerce implementation point of view. This, however, does not cover the impact of infrastructure reliability on consumer decision to adopt mobile money as a component of m-commerce. A criticism of this paper is it does not use any

specific model nor does it cover the consumer perspective. This is the contribution that this paper will make is to cover the knowledge gap.

2.4 The Role of Infrastructure in Technology Adoption

When it comes to very sensitive services in m-commerce, such as mobile money, a service which depends on network and telecommunications, infrastructure could be even more susceptible to reliability and trust issues. Infrastructure is the main foundation on which any new innovation is built, thus the desired adoption level and trust cannot be achieved if infrastructure is challenged thus it plays an important role in technology adoption as it is the key enabler for business growth (Islam et al., 2011).

In developing countries, however, it is of significant importance and requires special attention and focus as there are country specific challenges that need to be analysed, understood and addressed. Saidi (2010) showed that SMS can sometimes take up to eight hours to be received. This poses a serious challenge especially if a connection is terminated during an authentication transaction. The implications for more sensitive transmissions, especially those involving money, could be large. A study by Ewusi-Mensah (2012) reiterated the fact that telecommunications network technology is an infrastructure resource that is absolutely essential for countries to integrate into the global information economy. Hence, the role of infrastructure in technology adoption is critical for success for any country's social and economic development.

Nevertheless, since the TAM and UTAUT 2 have generally been tested in contexts where infrastructure is less of an issue, the less developed nature of Malawi highlights that this condition is not universal. Indeed, infrastructure neglect or overloading in developed countries could result in its inclusion in the adoption model elsewhere.

The role of infrastructure in technology adoption is mainly two-fold, it's the wireless network which is to transport information from mobile end user through the network to the servers in order to be able to perform a transaction or experience the service (Siau, Sheng, & Nah, 2003). The second role is infrastructure is the main support for mobile applications that are designed to facilitate technology adoption (Siau et al., 2003). Parallel to this, is the view that user satisfaction is determined by system quality, infrastructure quality and reliable service quality (Min et al., 2008). According to their research, Siau, Sheng, and Nah (2003) pointed out that mobile communication technology is designed to transport data and information in coded digital form between various computers that support storage, retrieval, updates and processing for mobile end-users. Customer experience depends on reliable infrastructure and the experience

when using any innovation affects the perceived usefulness, perceived ease of use as well as behavioural intention thus one can conclude that seamless experience without challenges will increase rate of adoption of new technology. It is of importance, therefore, that this variable be included and tested.

2.5 Infrastructure Challenges in Mobile Money (M-commerce)

M-commerce is being embraced in many countries but its growth remains slow in most African countries (Min et al., 2008). Technological problems abound when mobile money is investigated, as the service relies on network and telecommunication infrastructure. Previous studies reiterated this finding and found that the factors which affect mobile money adoption were infrastructure problems, application problems and network problems (Islam et al., 2011; Tarasewich, Nickerson, & Warkentin, 2002). Furthermore, Saidi's (2010) Malawian study also found that technical, business and policy problems can also affect implementation of m-commerce.

M-commerce is new and not fully developed in Malawi (Said 2010), which brings infrastructural challenges that will impact consumer adoption and trust, even though there are opportunities and possible applications that could result in social and economic transformation of rural and urban people.

Key challenges on limited literature that exists on these issues in developing countries will be discussed to better comprehend the factors that drive or inhibit technology adoption and the reasons for it. The study will focus on three of these challenges, namely, telecommunications infrastructure, data transmission over wireless networks and mobile handset limitations, which are believed to have an impact on behavioural intention, usage behaviour and adoption.

Telecommunication infrastructure

Telecommunications infrastructure is the core for the mobile money platform. Malawi does not have adequate telecommunication infrastructure to successfully launch m-commerce in the country (Saidi, 2010). Some parts of the country have neither mobile network coverage nor supporting infrastructure (Saidi, 2010). According to Ketkar et al. (2012), the reach and reliability of telecom service in remote areas, which need an alternative channel for delivery of banking services, would be a barrier for mobile banking in India. In his study, Ewusi-Mensah (2012) revealed that data cannot be communicated over a geographically dispersed area without a working telecommunications link to the region.

Consequently it is not surprising that Dholakia and Rask (2004) who observed that adoption and usage of m-commerce services have been highly variable between countries, confirmed that "the adoption of mobile technology does not follow any single universal logic or pattern" (p. 7). Furthermore "the differences in adoption and usage between countries may be attributed to differences in the mobile telecommunications infrastructure "(Dholakia & Rask, 2004, p. 7) and as a result of this, behavioral intention; usage behavior and adoption will be impacted if it is exacerbated by infrastructure unreliability.

Data transmission over wireless networks

Such interruptions may pose a serious challenge to m-commerce in Malawi due to delays in the transmission of data (Saidi, 2010). A study by Sharma and Kansal (2012) revealed that wireless networks are inherently more prone to disconnection. Disconnections in communication can interrupt or delay the execution processes of transactions. More seriously, on-going transactions could be aborted due to a disconnection (Sharma & Kansal, 2012). These findings are of particular importance, because of the nature of mobile money service which involves cash and the service relies on data transmission over wireless networks. The other reason is that mobile money users want to be assured that whenever they need to transact, nothing will disrupt the process.

Mobile handset limitations

The prevalence of unsuitable mobile handsets to access mobile money services is one perception of most customers (Kim et al., 2009). The small size of the devices (screens and keypads) might inhibit the progress of the mobile banking service (Laukkanen & Lauronen, 2005; Laukkanen, 2007). Cruz, Neto, Muñoz-Gallego and Laukkanen (2010) studied resistance among Internet banking customers. Kim, Shin and Lee (2009) in their study clearly explained that mobile devices with small sized screens, limited screen resolution and uncooperative key pads may make it difficult for the customer to use mobile banking. Results show that those respondents with "basic" cell phones (GSM or GPRS) have a significantly higher level of resistance when compared to more "advanced" mobile devices (Cruz et al., 2010). The higher the perception of the device's inadequacy, the higher the opposition to the adoption of the service will be (Cruz et al., 2010).

Interactive m-commerce applications deploy Java for user-friendly Graphical User Interface (GUI). With the majority of mobile telephone subscribers in Malawi using mobile phones that are not Java-enabled, the range of m-commerce applications that may be implemented in Malawi may be limited (Saidi, 2010). A study by Sharma and Kansal (2012) in India established that a

large percentage of low-ARPU subscribers mostly use entry-level handsets and are not quite adept at browser type applications.

Language is another issue. Ketkar et al. (2012) conducted a study on structural modelling and mapping of m-banking influencers in India, they observed that non availability of SMS/IVR options in a language of users' choice could become a direct barrier for consumer adoption of mobile banking services. The language issue presented here is a handset limitation issue that could impact success of mobile money in any market.

Ketkar et al. (2012) further cited that the lack of steady and substantial source of income and the lack of need for banking/payment services would be a major reason for financial exclusion.

Table 1: Summary of Infrastructure Challenges

SN	Brief Description of Challenge	References
1	Inadequate infrastructure, reach and coverage reliability of Telecom networks	Dholakia et al. (2004), Saidi (2010), Ketkar (2012)
2	Data transmission over wireless networks	Saidi (2010), Sharma and Kansal (2012)
3	Mobile handset limitation	Laukkanen and Lauronen (2005), Laukkanen (2007a), Cruz et al. (2009), Kim et al. (2009), Cruz et al. (2010), Saidi(2010), Sharma and Kansal (2012), Ketkar et al. (2012)

2.6 Trust

Mobile money transactions involve a great deal of perceived risk (Zhou, 2012). It is essential that mobile service providers build user trust in order to address the perceived risk that prevails. Therefore, building mobile user trust is a critical component in the success for mobile money adoption. Lin and Wang (2006) revealed that trust has significant effects on mobile user satisfaction and loyalty. At present, there is abundant research on online trust compared to mobile user trust which is relatively new in the IS research domain (Zhou, 2012). Given this current state, it is important to introduce the trust concept into mobile money research.

Trust has been a recurring business issue in interpersonal and business relationships (G. Kim et al., 2009). With the surge of e-commerce, more studies are being conducted on the conceptual structure and formation mechanisms of trust (Ba & Pavlou, 2006; Bhattacharjee, 2002; Brown, Dennis, & Venkatesh, 2010; Gefen, Karahanna, & Straub, 2003; G. Kim et al., 2009; M. J. Kim, Chung, & Lee, 2011; Paul & McDaniel, 2004; Pavlou & Gefen, 2004; Piccoli & Ives, 2003; Shin, 2010).

According to a study by Siau et al. (2003), trust can be classified into two categories: trust of technology and trust of mobile banking providers. Siau et al. (2003) defined trust as a state involving confident, positive expectation about another's motives with respect to oneself in situations entailing risk. This definition highlights three characteristics of trust as follows:

- First a trust relationship involves two parties: the trustor and the trustee, reliant on each other for mutual benefit (Siau & Shen, 2003). This argument is confirmed by Lee, Lee and Kim (2007) in their study which supports that there are three trust dimensions: trust in bank, trust in mobile network provider and trust in wireless infrastructure.
- Secondly, trust involves uncertainty and risk. No perfect guarantee ensures the trustee will live up to the trustor's expectation (Siau & Shen, 2003).
- Third, the trustor has faith in the trustee's honesty and benevolence, and believes the trustee will not betray his/her risk assuming behaviour. Gaining consumer trust involves consideration of four components: competence trust, benevolence trust, integrity and predictability (Siau & Shen, 2003).

In a conceptual framework built by McKnight, Cummings, and Chervany (1998) in studies using empirical evidence, they defined trust through four distinctive components:

- Competence, one's belief that the other party has the ability or power to do what needs to be done.
- Benevolence, one's belief that the other party cares about and is motivated to act in one's interest.
- Integrity, one's belief that the other party makes good-faith agreements, tells the truth, acts ethically and fulfils promises.
- Predictability, one's belief that the other party's actions are consistent over time and can be forecasted in a given situation.

In a study by Kim et al. (2009) which analysed the effect of initial trust in mobile banking user adoption, trust was defined as a psychological expectation that a trusted party will not behave opportunistically, this consistent with the earlier definition in particular the component of integrity which states that trust is one's belief that the other party makes good faith agreements, tells the truth, acts ethically and fulfils promises. In the context of mobile money the customer expects that the mobile service provider will not exploit them but act in good faith.

In Kim, Chung and Lee (2011), trust was defined as a feeling of security and willingness to depend on someone or something, this concurs with the previous component of integrity. Trust is the extent of consumer belief in systems, processes and procedures of the service provider and its channel (Ketkar et al., 2012). The customer for mobile money expects the systems to perform properly and that their money is secure.

For the purposes of this study, the definition of trust that will be adapt is the one that looks at trust of technology and trust of mobile banking providers (Siau & Shen, 2003), together with trust, as the extent of consumer belief in systems, processes and procedures of the service provider and its channel (Ketkar et al., 2012). The rationale for using the two definitions is because mobile money service involves trust in the technology (the mobile money service platform and vendors who provide the platform), the mobile service provider, and other players (such as retail agents, banks, start-up agents,) working together to deliver the service to the end consumer seamlessly.

2.7 The Role of Trust in Technology Adoption

Trust has an important role in adoption of new technology. New technologies are expected to provoke important changes both in customer behaviour and in the channel structure of banking distribution system (Dimitriadis & Kyrezis, 2008). Trust appears as a key variable that reduces perceived risk (Aldás-Manzano, Lassala-Navarré, Ruiz-Mafé, & Sanz-Blas, 2009) but lack of it can become a serious block for acceptance of any service (Ketkar et al., 2012, p. 73). Due to its significant role, trust has received considerable attention in information systems research, especially in the e-commerce context (Zhou, 2012). Mobile transactions involve a great deal of risk, and thus it is critical to build mobile user trust (Zhou, 2012). Lin and Wang (2006) revealed that trust has significant effects on mobile user satisfaction and loyalty. Li and Yeh (2010) argued that design aesthetics affect mobile trust through ease of use, usefulness and customisation.

According to Siau and Shen (2003), trust can be defined as a state involving confident positive expectation about another's motive with respect to oneself in situations entailing risk. Trust is a very important factor in technology adoption due to the high risk and poor experiences associated with new innovations (Siau & Shen, 2003). In terms of this view, when infrastructure malfunctions, providers are expected to guarantee the safety of their customer's money. It is therefore, imperative for service providers to understand the role that they play in building user trust, in order to improve the customer's experience and thus gain a competitive edge.

Trust has long been identified as an essential element of social exchange relationships (Tams, 2012). Mobile money is a recent form of social exchange in which money is transferred from one person to another using a mobile device without any face to face contact, as it was traditionally done in the past, when sending and receiving money. For instance, when technology fails the customer needs to notify their provider through a customer care services call centre and the provider is responsible for reimbursing customers without any personal interaction with them as the money is held in a virtual account in the system reference.

Benevolence refers to one's belief that the other party cares about and is motivated to act in one's interest (McKnight et al., 1998). For instance, the expectation from the customer, as per the example stated in the preceding paragraph, is that the mobile network provider would reimburse the customer their money in the least time possible when an incident is reported. In this case, when a service provider introduces a new technology, it should not be done with the business interests at heart, but also with the user in mind as what is launched today is not just about today; it is also about its use in future (Dimitriadis & Kyrezis, 2008).

The role of trust in this instance is to create confidence in the consumer; that the provider cares in order to ensure that this does not affect future behavioural intention and adoption of new technology. Integrity refers to one's belief that the other party makes good-faith agreements, tells the truth, acts ethically and fulfils promises (McKnight et al., 1998). Integrity also looks at adherence to a set of acceptable standards and also facilitates in reducing uncertainty. In a study done by Chandra, Srivastava and Theng (2010), it showed that there are behavioural risks in mobile payments when using mobile service providers as they have an opportunity to exploit the customer as they hold all the customer's information and money on their wireless network. Hence, this looks at the extent to which the value proposition, product communicated and integrity of the mobile service provider satisfy the needs of the customer as well as privacy and security controls.

Predictability refers to one's belief that the other party's actions are consistent over time and can be forecasted in a given situation (Dimitriadis & Kyrezis, 2008). In order to support this Chandra et al. (2010) stated that, reputation is a valuable asset that can be leveraged on in unrelated situations. Mobile service providers hold confidential customer information via the SIM and this has been the case for a long time, how they have acted with this information can be used to predict future actions (Chandra et al., 2010). Consumer's perception of the mobile service provider in terms of the safety of their money will determine and drive behavioural intention and use behaviour to adopt mobile money. This again is very important for mobile money adoption. If a consumer believes that a service provider is consistent and has been on their network for a long time, this acts as a reminder; and increases familiarity as customers tend to trust familiar brand names which in turn facilitates technology adoption.

Based on previous literature, mobile technology characteristics affecting consumer trust have been mainly identified as perceived environmental risk and perceived structural assurance (Zhou, 2012). Perceived environmental risk (PER) is the risk associated with the underlying technological infrastructure, which in the current study is the wireless network. Perceived structural assurance mechanisms are specifically: seals of approval, vendor-specific guarantees, and transaction protections, which may have their unique effects on trusting intentions (Sha, 2009). For the purposes of mobile money the structural assurance mechanism of concern are vendor specific guarantees and transaction protections. Mobile money is an emerging service which requires consumer trust in order to drive behavioural intention and usage behaviour and is gaining attention from researchers. A study by Luo, Li, Zhang and Shim (2010) integrated trust theory and the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine mobile banking user behaviour. Their results show that trust has an effect on perceived risk and performance expectancy. Although trust is incorporated into this study, it focuses on mobile banking. Another finding the paper fails to address is infrastructure reliability, which plays a role in building trust and loyalty of a consumer. Thus it is necessary to take this unique factor into consideration when examining mobile money user adoption, which is what this research attempts to capture.

Different segments of people in any given society perceive mobile payment advantages differently (Kim et al., 2011). Consumer's behavioural intention to adopt any new innovation is affected by the perceived risk of using a category especially to familiarity which is impacted by benevolence, integrity and predictability. In this instance, the typical unbanked customer is an individual who has had no formal experience, with any formal financial service, has low financial literacy levels, no access to any form of savings and will have very little established trust for the category or the system, therefore experiences of poor cellular reception and service may result in trust being affected and damage potential adoption greatly.

2.8 The Impact and Implications for technology adoption when trust is compromised due to infrastructure

Mobile money is an emerging service that not only facilitates life, but also creates great opportunities for consumers, mobile operators and banks (Liu et al., 2009). In technology adoption, trust in the technology is a critical foundation to gain and retain customers and this does not happen in isolation as there are several factors at play during any transaction experience.

Thus there are several impacts and implications for technology adoption when trust is compromised due to infrastructure. A study by Featonby (2006) on barriers and motivators of m-commerce adoption by cellular subscribers in South Africa found that slow and/or unreliable connectivity is widely reflected as a significant deterrent in the adoption of mobile commerce. A service which is slow or unreliable is unlikely to be considered a viable commercial channel, this finding is of particular importance given the fact that slow or unreliable connectivity is caused by infrastructural challenges and this also impacts on trust in new technology which affects behavioural intention as well as adoption.

A study by Tobbin (2012) which was conducted on mobile adoption of mobile banking by the unbanked showed that when it comes to the issue of trust, there are three areas that have been identified: first, the trust of the unbanked in the technology being offered; then the trust of the Mobile Network Operator; and finally, the trust of the agents. This finding supports the earlier insight on benevolence trust which states that one's belief that the other party cares about and is motivated to act in one's interest (McKnight et al., 1998). Thus, the expectation is that the technology is sound, the mobile network operator and the mobile money agents will act in the best interest of the consumer. The trust of the technology could be based on their trust of the mobile banking interface on their handset and their trust of the network that carries the transactions; this trust is built through past experiences (Maurer, 2008). The findings of Tobbin (2012) highlight the fact that persistent network fluctuation and delayed SMS deliveries, cited as challenges, have to be addressed in a developing market context earlier as they can affect the behavioural intention, usage behaviour and adoption of mobile money.

2.9 Mobile Money

Jenkins (2008) simply defined mobile money as money that can be accessed and used via a mobile phone. Mobile money has evolved through many similar definitions from systems that involve a set of applications that facilitate a variety of financial transactions via mobile phone, including transmitting airtime, paying bills, and transferring money between individuals (Aker & Mbiti, 2010), to the emerging use of mobile telephones to transfer remittances (Vlcek, 2011).

Mobile money transfer (MMT) service is an aspect of a broader concept emerging in the electronic payment and banking industry referred to as Mobile Money ((Tobbin & Kuwornu, 2011). A more conclusive definition has been a suite of financial services, between partners, that are offered through mobile phones and other handheld mobile devices. These services include person-to-person transfer of funds, such as domestic and international remittances, person-to-business payments for the purchase of a range of goods and services, and mobile banking, through which customers can access their bank accounts, pay bills, or deposit and withdraw funds (Ayo et al., 2012, p. 2195).

Mobile money transfer falls between two technologies namely; mobile payment and mobile banking, thus, research on adoption of mobile money can be seen as part of previous research in mobile banking and mobile payment (Tobbin & Kuwornu, 2011). It can be argued that determinants of adoption in mobile banking and mobile payments environment should be applicable to mobile money (Tobbin & Kuwornu, 2011). Nonetheless there is a common thread amongst different authors on the definition. Mobile money is a subset of m-commerce thus for this reason the researcher adopts mobile money as per Ayo et al.'s (2012) definition and in this paper mobile money and m-commerce will be used interchangeably.

A precondition for the success of mobile money is establishing trust through minimization of consumer perceived risk. Ismail and Masinge (2011) conducted a study in South Africa on innovation for the poor. In their study, they found trust to be significantly and negatively correlated to perceived risk. In addition to this, they concluded that trust therefore plays a role in risk mitigation and in enhancing customer loyalty (Ismail & Masinge, 2011). Therefore when people are unfamiliar with a category and perceived risk is high like it is in the case of mobile money, managers need to focus on how to use the service in order building loyalty. This was supported by Im, Kim and Han (2008), who advocate that when deploying a technology where it is perceived by users to be high risk, managers need to emphasize the **“ease of use”**.

2.10 Summary of Chapter

Based on the literature review, technology adoption is important, at organisational, individual and country levels, to build a competitive advantage. The review reveals that studies conducted in the technology adoption field; on mobile money or m-commerce present an ideal situation that is applicable in the developed world and mobile money is still in formation stages in terms of research. Those that have covered developing countries mainly examine adoption based on the TAM models perceived usefulness and ease of use, original UTAUT and but have most of them have not applied the extended UTAUT 2 research model.

Literature on determinants of technology adoption highlights common variables that influence behavioural intention and usage behaviour. Exploring these factors will be useful for telecommunication and in formulating marketing strategies (Chong et al., 2012). The main points emanating from the literature are as follows:

- Mobile money is being advocated as the next big evolution in mobile history and the new growth frontier for mobile operators. It is the primary driver in banking the unbanked and leapfrogging of financial services in emerging markets. However, the challenges faced in developing countries in the context of mobile technology adoption have not been addressed adequately in order to extensively take advantage of mobile money opportunity. Such challenges are infrastructure reliability and lack of trust. Therefore, research into the drivers that influence the adoption of mobile technology such as mobile money in the context of a developing country is fundamental to the success of this product. Thus research in this field is critical.
- Researchers in the field of mobile phone technology argue that the success and failure of mobile money is dependent on three trust dimensions: trust in bank, trust in mobile network provider and trust in wireless infrastructure. However, previous research has failed to incorporate the trust factor in their model. For instance, the two most popular models in technology adoption literature, UTAUT or TAM, have not incorporated trust as a construct to be measured and validated. Given the importance of trust as a factor in driving mobile money adoption, it is imperative to conduct a study where trust is included as one of the factors.

- Past research based their models in a developed country and is yet to be tested in a developing country context. However, there are fundamental differences that exist between the two economies which are highly likely to distort the research results if one used the current model available in the literature. Hence, there is a need to adopt the model in a developing country context, in particular, Malawi.
- In reviewing the literature above, it is clear that the UTAUT research model has not been measured or validated in a similar consumer context of mobile money in an emerging economy with infrastructural challenges like the ones stated above of signals disconnecting during transmission or delayed SMS deliveries. Thus, these findings have been critical to the formation of the research questions that will be explored in this paper.
- The researcher needs to include infrastructure reliability, and trust as constructs, as there is a proven link that behaviour intention and usage behaviour are impacted by these.

3. Research Hypotheses

3.0 Introduction

The extensive literature review above on technology adoption presented by Davis and Venkatesh (2000) postulate that behavioural intention and usage in the consumer context are driven by several variables. Thus based on this view the research hypotheses have been developed. In the first part the author undertakes to test the UTAUT 2 research model presented by Venkatesh in order to ascertain its applicability in this context. In the second part, the author aims to understand the impact of infrastructure reliability and trust on behavioural intention and usage behaviour in a developing country, as these are critical to the success of mobile money adoption.

The hypotheses have been developed mainly from the UTAUT 2 proposed by Venkatesh et al (2012); taking into consideration the unique challenges prevailing in Malawi with an aim to attempt to measure the impact of performance expectancy, effort expectancy, social influences, facilitating conditions, price value, infrastructure and trust on behavioural intention, usage behaviour and adoption of mobile money.

3.1. Research Hypothesis

To accomplish the objectives of this research the following Hypotheses will be tested:

H1: Performance expectancy has an impact on behavioural intention which affects usage behaviour.

H2: Effort expectancy has an impact on behavioural intention which affects usage behaviour.

H3: Social Influence has an impact on behavioural intention which affects usage behaviour.

H4: Facilitating conditions have an impact on behavioural intention which affects usage behaviour.

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H5: Price value has an impact on behavioural intention which affects usage behaviour.

H6: Infrastructure reliability has an impact on behavioural intention which affects usage behaviour.

H7: Trust has an impact on behavioural intention which affects usage behaviour.

H8: Age as an impact on behavioural intention which affects usage behaviour.

H9: Gender has an impact on behavioural intention which affects usage behaviour.

H10: Experience has an impact on behavioural intention which affects usage behaviour.

Figure 4 below depicts the hypotheses for this study. It includes key determinants from the original Unified Theory of Acceptance model (UTAUT) and the revised model UTAUT 2. It is supported by two additional constructs infrastructure reliability and trust as these were identified as antecedents of technology adoption as well as moderating factors which are gender, and age.

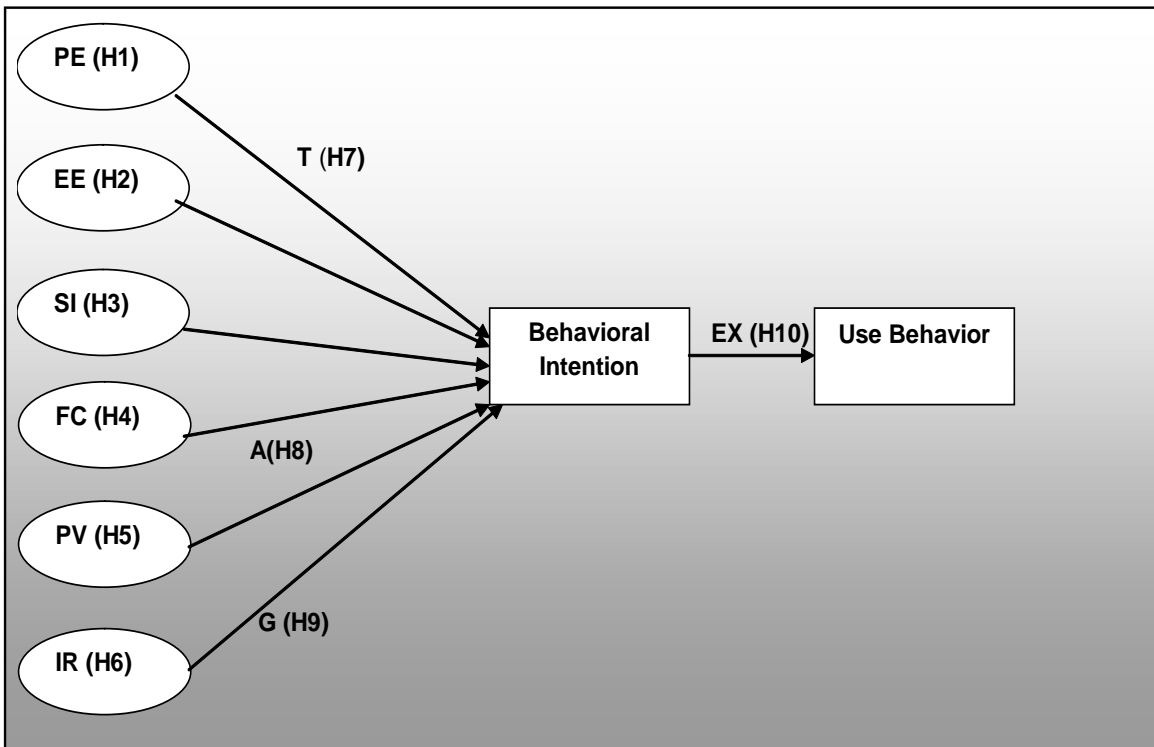


Figure 4: Research Model Hypotheses

Performance Expectancy refers to the degree to which a technology will provide benefits to consumers in performing certain activities (Venkatesh et al., 2012). In the broader context of mobile money this can be referred to as, how it will assist customers in managing their money.

Effort Expectancy refers to the degree of ease associated with consumer's use of technology (Venkatesh et al., 2012). In the context of mobile money, how easy is it for one to use the service.

Social Influence is the extent to which consumers perceive that important others (for example family friends and peers) believe they should use a particular technology (Venkatesh et al., 2012). In the mobile money environment this refers to the degree to which ones social circle will impact the decision to use the service.

Facilitating Conditions refer to consumer's perceptions of resources and support available to perform behaviour (Venkatesh et al., 2012). This refers to resources and support in an organisational context thus it does not cover the infrastructural challenges experience and perceptions from a consumer perspective.

Price Value refers to costs associated with the purchase of the device and service that consumers have to bear (Venkatesh et al., 2012). This includes the cost of a new device if one is needed to use the service and the transaction cost.

Infrastructure Reliability refers to the physical system or application required for operation of mobile money (network stability, agent and merchant reliability, and sms functionality). Given that the original UTAUT was developed in a developed market context, the infrastructure reliability that consumers can experience when using technology was not considered as a relevant variable. It was not seen as a challenge as it is in developing countries.

Trust: Like any business transaction, mobile money which is a high risk service as it involves money requires an element of trust to be established between the consumer, provider and agents to become a viable business entity and to grow. For the purposes of this study, trust is defined as a state involving confident, positive expectation about another's motives with respect to oneself in situations entailing risk. The original UTAUT and the modified model UTAUT2 did not incorporate trust but in a consumer context trust has a direct impact on behavioural intention and usage behaviour.

4 Proposed Research Methodology and Design

4.1 Introduction

This chapter describes in detail the research methodology adopted in this study. Lehaney and Vinten (1994) described methodology as “the way in which techniques are selected to address a particular problem” (p. 5). This is how the research work was conducted, in order to attain the aims and objectives of the study.

The procedure was premeditated after a careful analysis of the problem structure. The research methodology covered the research stance, research design, population, data collection and analysis and possible limitations.

A surmountable reference will be on the “research onion” from Saunders and Lewis (2011) as they clearly provide a systematic approach to be adopted for any research whether natural science or on business. The figure below is a spatial diagram of the research methodology:

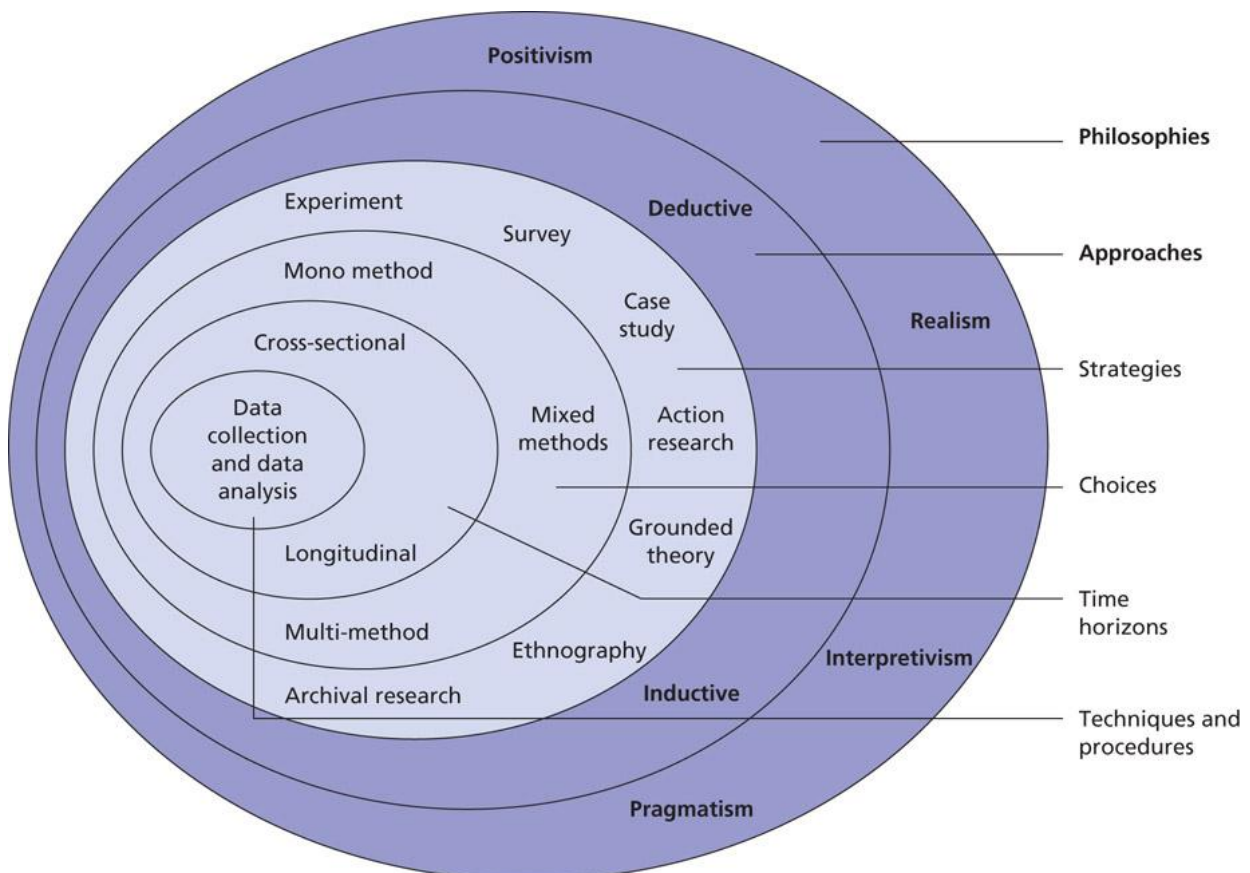


Figure 5: The Research Onion

Source: Mark Saunders, Philip Lewis and Adrian Thornhill (2008)

The research onion was examined in detail to provide direction for each stage of the research process. This subsequently provided justification to the choices and options in relation to research philosophy, research approaches, research strategies, and time horizon and data collection methods.

4.2 Research Stance

According to Saunders and Lewis (2011), “the research philosophy you adopt contains important assumptions about the way in which you view the world around you” (p. 104). According to these authors, there are four main strands of research philosophy namely positivism, realism, interpretivism and pragmatism.

According to this view, the research philosophy relevant for this research is positivism because the main concern was to study observable and measurable variables in certain controllable conditions and to describe the reactions of these variables to treatments applied by the researcher. The emphasis was on predicting the outcomes of the research in order that these variables may be controlled in the future. (Saunders & Lewis, 2011, p. 105).

4.3 Research Approach

According to Saunders, Lewis, and Thornhill (2003) “every research will involve a use of theory, and it may not be apparent during the research design but it’s more explicit during presentation and findings” (p. 85). Being cognizant of the theory, leads to a clear picture of the research design to be adopted on the project that is to use a deductive approach or an inductive Table 2. Easterby-Smith, Thorpe and Lowe (2002) put forward three reasons why adopting a particular research approach was important. They clarified that it enables a researcher to take a more informed decision about research design, think about those approaches that will work for him/her or not and enable a researcher to adapt the research design to cater for constraints.

Table 2: Differences between deductive and inductive approaches

Deduction	Induction
Scientific principles; moving from theory to data.	Gaining an understanding of the meanings humans attach to the events
The need to explain causal relationship between variables	A close understanding of the research context
The collection of quantitative data and Researcher independence of what is being researched	The collection of qualitative data
The application of controls to ensure validity of data and a highly structured approach	A more flexible structure to permit changes of research emphasis as the research progresses
The operationalisation of concepts	A realisation that the researcher is part of the research process
	Less concern with the need to generalise

Based on the fact that the main objective of the study is to identify the variables that influence behavioural intention and usage behaviour of mobile money using the UTAUT 2 research model a deductive approach will be used (Saunders et al., 2003).

4.4 Research Design

The research design proposed for this study is a quantitative approach – in particular descriptive method using survey via a telephone. Saunders et al. stated that “quantitative is predominantly used as a synonym for any data collection technique (such as questionnaires) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data” (Lewis, Saunders, & Thornhill, 2009, p. 151). Quantitative research was used to provide a descriptive categorical measurement and investigate the impact of trust and unreliable infrastructure on the behavioural intention and adoption of mobile money.

Using a descriptive approach in this paper was deemed appropriate as descriptive study is designed to produce an accurate representation of persons, events or situations (Saunders & Lewis, 2011, p. 111). Also there has been extensive prior research on the topic and there is no need for further insights. Using descriptive research enabled the researcher to gain insights into factors that influence and are relevant to consumers in Malawi to increase adoption of mobile

money which is very valuable. The reason why a survey method was decided upon is because it is quick, inexpensive and accurate.

The focus was on non-users and users of mobile money. The rationale behind the two groups was to determine the factors that drive behavioural intention and usage and also what the reasons were behind non-adoption of consumers. In this paper, the impact of the following independent variables performance expectancy, effort expectancy, social influence, facilitating conditions, price value, infrastructure, and trust on behavioural intention and usage behaviour (the dependent variables) of mobile money were investigated.

4.5 Population

According to Saunders and Lewis (2011), “a population is a complete set of group members” (p. 132). For the purposes of this study, the population is individuals who are customers of a mobile phone operator in Malawi. There are currently 4, 5 million subscribers on the Malawi mobile market. The rationale behind using the two categories was to understand the factors that hinder those not registering on mobile money and to establish the determinants that lead to behavioural intention and adoption of the current users.

4.6 Unit of Analysis

According to Zikmund (2003), “a sample unit is a single element or a group of elements subject to selection in the sample” (p. 375). The unit of analysis proposed for this study a mobile phone user male or female in Malawi.

4.7 Sampling

Sampling is important, as given budget and time constraints it is often impractical to survey the whole population (Saunders et al., 2003, p. 151). In this study, the sample comprised of people who use and those who do not use mobile money in Malawi, in order to gain insights and draw conclusions.

Sampling technique

Due to the nature of the problem, probability sampling was employed - in particular stratified random sampling. The sample was broken down by age in six strata in the following brackets (16-26, 27-34, 35-44, 45-54, 55-64, 65+); the reason for this stratification was to cover the population especially groups which are not dominant

Initially a sample of 400 users and non-users over the age of 16 was decided as the base for this research. However a sample of 508 was settled on as more numbers had to be added due to numbers not available, switched off or an unanswered during the time of the call and this is discussed further in Chapter 5. Stratified random sampling is used because it is administratively convenient to stratify a sample (Saunders & Lewis, 2011). The age limit 16 years and over was chosen because in Malawi the legal age of owning a mobile phone is 16 years so it was only ethical and legal to interview those who were within this age group

The two strata are as follows: users and non-users. As mentioned above, a user will be defined as a customer who owns a cell phone and who is subscribed to the mobile money service and made a transaction in the past 90 days. A non-user will be categorised as a subscriber who owns a phone and has been on the network for the past 90 days who has not registered for mobile money but uses other services such as voice, Internet or SMS.

Stratified Sampling

Table 3: Stratified Sampling for Subscribers

Stratified Sampling for Mobile Subscribers					
Total sample size		508			
Strata based on age			Sample Description		Sample size
Stratum 1	16 to	26	16-26 will be students and will use the service mainly to receive money from their parents or sponsors and buy airtime		147
Stratum 2	27 to	34	27-34 will be professionals who will use the service mainly to send money to their parents, relatives or children, payment of utility bills, buying airtime and receive		179
Stratum 3	35 to	44	38-48 will be working class as well as parents who will use the service to send money and also receive from their children who are in towns and use it to buy airtime and upkeep		106
Stratum 4	45 to	54	49-59 will be parents who will use the service to receive money from their children in town, buy airtime and upkeep		46
Stratum 5	55 to	64	60-70 will be pensioners who will use the service to receive money from their children or their pension		22
Stratum 6	65+		70-80 will be pensioners who will use the service to receive money from their children or their pension		7

Table 3 above represents the description of the type of respondents in each strata and the number of respondents used in the study.

a. Sample Size

For a population of 500 000 or more, a sample of 306 is required to obtain a 95% confidence level and a range of error of 5% (Zikmund, 2003, p. 428). To achieve the objectives of this study, a minimum of 400 telephone interviews were conducted.

Sample Size Calculation Formula

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

Where n = sample size; N is the population size, and e is the level of precision.

Assuming a 95% confidence level and ±5% precision (maximum variability) i.e. (e = .05):

$$\begin{aligned}
 N &= 4,500,000 \\
 e &= .05 \\
 (e)^2 &= .05 \cdot .05 \\
 (e)^2 &= 0.0025 \\
 1+N(e)^2 &= 1+4500000 \cdot 0.0025 \\
 1+N(e)^2 &= 11250.00 \\
 n = \frac{N}{1+N(e)^2} &= \frac{4500000}{11250.00} \\
 n &= 399.99
 \end{aligned}$$

n = 400

Table 4: Confidence Interval

Confidence Interval	
Total sample size	400
Degrees of freedom (n-1)	399
α	0.05
Confidence Level	95%
Confidence Interval	± 5.62
Range of the true population proportion	50.38% to 61.62%
To get accurate results required sample	225

b. Research Instrument and Measurement

1. Design

The Consumer Acceptance and Use of Information Technology Instrument as developed by Venkatesh et al., (2012) was used and two extra constructs were added. The items in the survey were measured on a five-point Likert scale, measuring from “strongly disagree” to “strongly agree”. Existing literature (Carlsson et al., 2006; Crabbe, Standing, Standing, & Karjaluoto, 2009; Islam et al., 2011; Min et al., 2008; Park, Yang, & Lehto, 2007; Venkatesh et al., 2003; Wang, Lin, & Luarn, 2006; Zhou, 2012) revealed a number of factors that impact behavioural intention and usage behaviour. Being consistent with literature and existing instruments the study measured nine factors (internal consistency reliabilities in brackets),

namely Performance Expectancy (0.88), Effort Expectancy (0.91), Social Influence (0.82), Facilitating Conditions (0.75), Infrastructure (0.75), Price Value (0.85), Trust (0.82), and Behavioural Intention (0.75) that are perceived as critical factors that impact behavioural intention and adoption of technology. The aforementioned variables were used as these are the most critical and determinants of the success in behavioural intention and usage behaviour in IT systems as well as consumers context with regards to new innovations.

2. Reliability and validity

Reliability is “the extent to which data collection methods and analysis procedures will produce consistent results” (Saunders & Lewis, 2011, p. 128). Validity is concerned with whether their findings are really about what they appear about (Saunders & Lewis, 2011, p. 127) (Saunders et al., 2003). The Cronbach’s Alpha and factor analysis were used to determine reliability. These two were used as, in most of the studies done under technology adoption, this is the commonly used for reliability and validity. A Cronbach’s Alpha of 0.60 or higher, Nunnally (as cited in Islam et al., 2011) was used as this is recommended as an acceptable value for internal consistency of the measures.

A study published in 2012 done in Oman on adoption of online banking using UTAUT achieved the results in Table 5 below on Cronbach’s Alpha reliability measurement.

Table 5: Summary of Cronbach's Alpha and Reliability Results

Measurements	Items	Cronbach's Alpha	Reliability Results
Performance Expectancy (PE)	4	0.873	Good
Effort Expectancy (EE)	4	0.838	Good
Social Influence (SI)	4	0.818	Good
Trust (TR)	4	0.888	Good
Awareness (AW)	4	0.88	Good
Output Quality (OQ)	4	0.906	Good
Perceived Playfulness (PP)	4	0.824	Good
Web- design (WD)	4	0.884	Good

Note. Adapted from “Exploring the promise of on-line banking, its adoption by customers and the challenges of banking in Oman” by Riffai et al., (2012)

Thus based on the guide stated above the Cronbach’s alpha value of 0.60 and above selected for this paper is within range.

3. Pilot-testing

Before commencing the main study, a pilot test was carried out with staff members from different levels and departments within the researcher's organisation to enable the researcher to test the questionnaire and sort out any problems that might arise before the actual research was undertaken. The pre-test was done twice; first as per initial questionnaire then secondly the revised questionnaire as per the feedback given to another group of people different from the first set.

4.8 Data Collection

There are several methods that one can use for data collection such as case study interviews, questionnaire, observation or documentary analysis. In order to address the research questions that this paper seeks to answer both primary and secondary data collection methods were used.

Primary Data

Primary Data is "data that is collected specifically for the research being undertaken" (Saunders & Lewis, 2011, p. 84). The interviewer used a questionnaire as a primary data collection method to conduct a structured interview. According to Saunders and Lewis (2011), questionnaires are a good method for collecting data about the same things from large numbers of respondents.

Secondary Data

Secondary data is "data used for research projects that were originally collected for some other purpose" (Saunders & Lewis, 2011, p. 85). Multiple-source secondary data type was collected including internal company reports, industry reports, World Bank reports, previous dissertations and journals. The study dwells on both types of data, in order to collect substantial evidence.

4.9 Data Analysis

The descriptive data collected from the telephone interviews was coded according to the different variables and recorded in Excel format, which was then analysed using diagrams and statistical analysis software, in particular, SPSS and AMOS version 21 structural equation modelling.

4.9.1 Structural Equation Modelling

This is utilised in the attainment of a best fitting model between all considered work constructs. Hair, Black, Babin, Anderson, and Tatham (2006) described Structural Equation Modelling (SEM) as a technique that allows separate relationships for each of the dependent variables. It is characterised by a basic component known either as the structural or the path model, which relates independent to dependent variables. Hair et al. (2006) further added that in such situations, theory and prior experience enable the researcher to distinguish which independent variables predict each dependent variable. SEM was used to determine relationships that had been confirmed by theory to influence behavioural intention and usage behaviour in technology adoption.

In SEM, the independent variables measured were classified as observed endogenous variables and these are Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), Price Value (PV), and Trust (T). These core constructs expected to influence behavioural intention to use mobile money and usage behaviour to use mobile money. The dependent variables measured were classified as unobserved exogenous variables (also referred to as latent variables) and these are behavioural intention and usage behaviour.

Hair et al. (2006) recommended a few data considerations on account of missing values and sample size when working with SEM. These appear below:

- Regarding missing values, pair wise deletion of missing cases (all- available approach) is a good alternative for handling missing data (rather than calculating the missing data artificially) when the amount of missing data is less than 10% and the sample size is about 250 or more. There is a caveat however; when the missing data becomes very high (15% or more), SEM may not be appropriate.
- In dealing with sample sizes, SEM models containing five or fewer constructs each with more than three items (in the study these original underlying items ranged in number from 15 to 20), and with higher communalities (0.6 or higher), can be adequately estimated with samples as small as 100 – 150.

In SEM approach, the theoretical model being tested is either confirmed or disconfirmed, based on a chi-square statistical test of significance and or meeting acceptable model fit criteria (Schumacker & Lomax, 2010). Hair et al. (2006) provided a guideline for establishing whether a fit is acceptable or unacceptable, they argued that multiple fit indices need to be reported. The fit indices are reported in order to inform the researcher how closely the data fits the model.

However, a researcher need not report all available indices because of the redundancy among them. Furthermore, it is added that to assess a fit, the following types of indices need to be represented:

- **One absolute fit index** – for this the researcher selected the Chi- Square Measurement (χ^2/df);
- **One incremental fit index** – the Comparative Fit Index (CFI) was selected;
- **One goodness-of-fit index** – here the researcher selected the Goodness- of-fit Index (GFI); and
- **One badness-of-fit index** – the Root Mean Square Error of Approximation (RMSEA) was chosen.

The fit indices that were applied in this study are discussed in greater detail below:

4.9.2 Chi-Square

The (χ^2) value is “a measure of the difference between what the actual relationships in the sample are and what would be expected if the model were assumed correct” (Dion, 2008 p 367). For every estimation criterion the ratio should be close to 1 for correct models. It is suggested a ratio of approximately five or less ‘as beginning to be reasonable.’ However, χ^2 to degrees of freedom (df) ratios in the range of 5 to 1 are indicative of an acceptable fit between the hypothetical model and the sample data (Arbuckle, 2005) (Nourisis, 2005). Naudé and Rothman (2004) indicated that a value smaller than 5 indicates an acceptable fit. A model that represents sample data well would yield close to 1 and most researchers would reject a model that was much over five.

4.9.3 Goodness of Fit Index (GFI)

The Goodness-of-fit Index indicates the relative amount of variance and co-variance in the sample predicted by estimates of the population. Its value usually varies between 0 and 1 with values higher than 0.90 indicating good model fit with the data (Naudé & Rothman, 2004). Hair et al. (2006) agreed that GFI values of greater than 0.90 are considered good.

4.9.4 The Root mean square error of approximation (RMSEA)

The Root Mean Square Error of Approximation provides an indication of the overall amount of error in the hypothesised model-data fit, relative to the number of estimated parameters (complexity) in the model. Naudé and Rothman (2004) recommended that acceptable levels of the RMSEA should be 0.05 or less and should not exceed 0.08. Dion (2008) supported the

suggestion and recommends acceptable level should be 0.05... Furthermore it is argued that a model with a RMSEA of above 0.1 should not be employed (Arbuckle, 2005). Hair et al. (2006) indicated that because it is a model of error term the lower RMSEA values indicate a better fit, contrast to other indices where higher values produce a better fit and that values below 0.1 are acceptable for most models.

4.9.5 Comparative Fit Index (CFI)

The Comparative Fit Index is an incremental fit index that is formed so that values range between 0 and 1, with the higher values indicating a better fit. Because the CFI has many desirable properties including its relative, but not complete, insensitivity to model complexity, it is among the most widely used indices. CFI values less than 0.90 are not usually associated with a model that fits well (Hair et al., 2006). Naudé and Rothman (2004) concurred that critical values for good model fit have been recommended for the CFI to be acceptable above the 0.90 level. For the purposes of this study CFI of 0.90 and above will be used as the acceptable level because any value below this implies that the model does not fit well. Table 6 below provides model fit criteria that will be acceptable for this study:

Table 6: Model Fit Criteria and Acceptable Fit Interpretation Summary

Model Fit Criterion	Acceptable Level	Interpretation
Chi-square	Tabled χ^2 value	χ^2 to degrees of freedom (df) ratios in the range of 5 to 1 are indicative of an acceptable fit between the hypothetical model and the sample data
Goodness-of-Fit Index (GFI)	0 (no fit) to 1 (perfect fit)	Value close to .90 or .95 reflect a good fit
Root-mean-square error of approximation (RMSEA)	.05 to .08	Value of 0.5 to .08 indicate a close fit
Comparative Fit Index (CFI)	0 (no fit) to 1 (perfect fit)	Value close to .90 or .95 reflect a good fit

Source: Schumaker et al., 2010

Garson (2012) highlighted that the structural equation modelling process enters around two steps: validating the measurement model and fitting the structural model.

The measurement model is that part of a SEM model which deals with the latent variables and their indicators. The structural model is that part of a SEM model which shows direct and indirect effects connecting the latent variables. The full model is one with both a measurement model and a structural model. It is possible to analyse a measurement model without having a structural model, but not the reverse.

4.10 Research Limitations

The data used for this research was cross-sectional data, due to the fact that mobile money had just been launched in Malawi, thus the results obtained could only be inferred rather than proven.

The study focused on Malawi, which is a small economy where the concept of mobile money is still very new.

Non-response of respondents may have occurred due to phones being either unanswered or switched off.

4.11 Summary of Chapter

This chapter outlined the research design of the study being undertaken. The philosophy of positivism, using observable and measurable variables in specific conditions and quantitative method, and finally the survey data collection method through telephone interviews using a 5 point Likert scale, were strongly backed by literature as the ideal route to be taken in gathering data for the study against the stated objectives. This route and the research instruments described in the chapter form the backbone of the study, holding and supporting all the other parts of the study. The instruments not only prevented bias, confusion and haphazard data collection and analysis but also ensured that all information collected and analysed was complete, valid and reliable. Finally, the statistical procedures for analysis which is structural equation modelling are discussed, highlighting the chosen path to achieve the research objectives. The next chapter will discuss the research findings of the study.

5 Chapter 5: Results

5.0 Introduction

The previous chapter dwelled much on the research design and methodology, this chapter presents the findings collected from the questionnaires administered to a sample of 508 mobile subscribers. The purpose of this research was to explore and identify relevant factors that influence behavioural intention and usage behaviour in mobile money technology adoption. Since the launch of mobile money in Malawi, the service has not yet experienced the successes expected like Kenya. Therefore this study was conducted in Malawi, to look at these factors from a Malawian context. In this Chapter, the results of the various procedures indicated in the statistical process flow chart below are documented and the most significant factors Figure 6 depicts the process to be followed. The results will be discussed in-depth in Chapter 6.

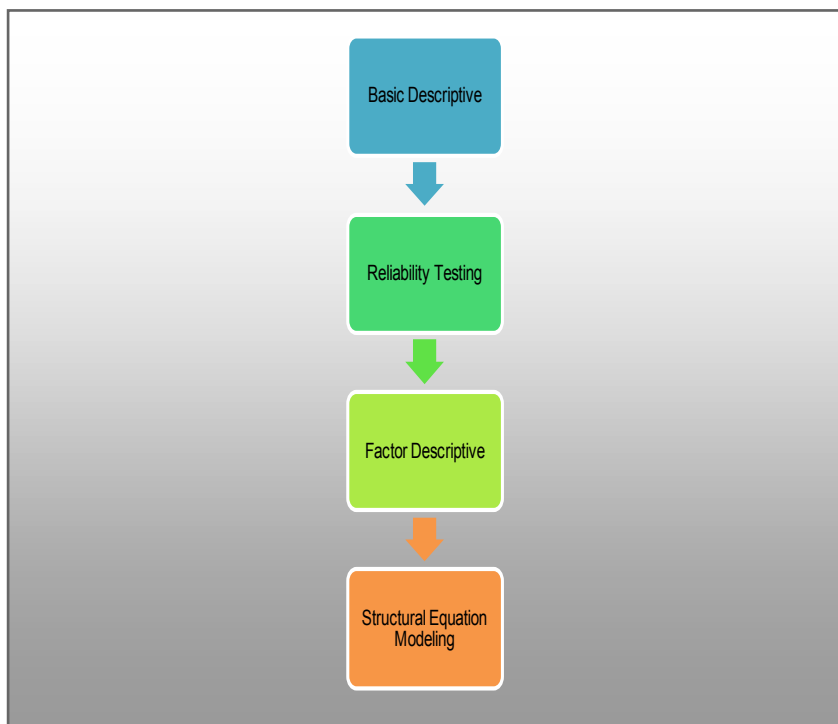


Figure 6: Statistical Process Flow Chart

5.1 Methodology

A telephone survey questionnaire was developed for data collection. Appendix 2 provides a sample of the questionnaire employed. The data collected was analysed using SPSS and AMOS version 21 was used to test the research model fit using Structural Equation Modelling and the data collection instrument used was a multiple item five point Likert scale approach (where 1 = Strongly disagree, 2 = disagree, 3= Neutral, 4 =Agree , 5 = Strongly agree).

Before the questionnaire was finalised and deployed, as outlined in Chapter 4, a pilot study was conducted using Airtel staff from different departments and some selected customers. A sample of 50 respondents was calculated and the questionnaire was tested with them. The major aim of the pilot study was to make sure that the survey instruments to be employed in the final study were able to capture the required information and that the data collected is plausible and the desired results are produced. All the instruments to be used in the final study were tested and vetted. At the end it was found that the survey instruments were reliable and they were recommended for the final study. But during the pilot phase, the following were observed:

- The questionnaire was not too long.
- When one respondent does not have an answer to the question on the Likert scale they were not sure as what to fill in since there was no option for “I don’t know or other”. To address the issue, on “I don’t know” responses, it was instructed that these responses should be recorded on the neutral option.
- As per the limitations outlined in Chapter 4, when calls were made some respondents’ numbers would go unanswered and some were unreachable. Thus, to address this issue in the final study it was agreed to make prior arrangements with the respondents on a suitable time to make the call. Therefore in order to reduce the non-response rate, it was seen necessary to increase the number of subscribers in order to get a reasonable response rate which would depict plausible results.

5.2 Response Rate

A total number of 508 respondents were used for this analysis (the data collected from 60 people had missing information and 32 people despite several attempts went unanswered hence we used 508 instead of 600). The telephone interviews were administered to Airtel Malawi mobile subscribers as this is the only mobile operator who has launched mobile money

service at the moment. The response rate was 84% [$508/600 = 84\%$] these were thoroughly completed and validated and used for the purpose of this analysis. The minimum required sample for a population of 500 000 or more, is 306 to obtain a 95% confidence level and a range of error of 5% .Thus 508 respondents are within the minimum required threshold in terms of sample size.

5.3 Main Study

For the main study the survey questionnaire consisted of four sections. The sections collected the following information:

- **Section A:** captured the general information about the respondent.
- **Section B:** gathered information on demographics which included gender, age, academic, professional education attainment and occupation.
- **Section C:** was aimed at collecting information on individual's cell phone user profile and the types of services they were currently using from the product portfolio available.
- **Section D:** focussed solely on mobile money to determine whether the consumer uses mobile money and which services they intended to use and what factors were likely to influence their adoption decision. The section was further divided into various constructs adapted from UTAUT 2 research model with a total of 31 items ranging between 3 to 5 items per construct.

5.4 Data Analysis

Data analysis was done using the Statistical Package for Social Scientists (SPSS) software and AMOS version 21 for analysis. The data collection from the questionnaire was entered into Excel and the data sheets were imported into SPSS.

During the analysis, a two-step approach was followed. The first step was that the measurement model was tested for reliability and validity of the survey instrument. Secondly Structural Equation Modelling was employed. Structural Equation Modelling was used in order to reveal the relationships underlying the set of variables used in the study and to test the applicability of the model in a different context. The results were then transferred back into Excel for graphical presentations.

5.5 Descriptive Statistics

Descriptive statistics simply describe what the data are showing. They provide the researcher with a 'bird's eye' view of how the data looks. Section B of the questionnaire covered the descriptive data that was collected and findings are presented in the Section 5.7 below. The descriptive statistics discussed below were used in the analysis of the findings presented in this section.

- The **Mean** is calculated by summing the values of a variable for all observations and then dividing by the number of observations (Nourisis, 2005). This describes the central tendency of the data.
- The **Standard Deviation** is calculated as the square root of the variance (Nourisis, 2005). This describes the dispersion of the data. Since Standard Deviation is a direct form of variance, it will be used in place of the latter when reporting.
- The **Median** is considered another measure of central tendency. It is the middle value when observations are ordered from the smallest to the largest (Nourisis, 2005).
- **Skewness** is a measure of symmetry of a distribution; in most instances the comparison is made to a normal distribution (Hair et al., 2006). Schepers (2004) emphasised that those variables with skewness higher than 2 should be avoided.
- **Kurtosis** is a measure of the peakedness or flatness of a distribution when compared with the normal distribution (Hair et al., 2006). Leptokurtosis is normally associated with low reliabilities and should be avoided at all costs. Indices as high as 7 are rather extreme and signify very low reliabilities (Schepers, 2004).

Major Findings

5.6 Demographic Characteristics

The demographic characteristics that were used were gender, age, academic and professional education attainment and occupation.

5.6.1 Gender

Figure 7 below represents the results of the gender representation in the study. The sample was dominated by male respondents (74.4%) and 25.6% female of the 508 people who participated in this survey.

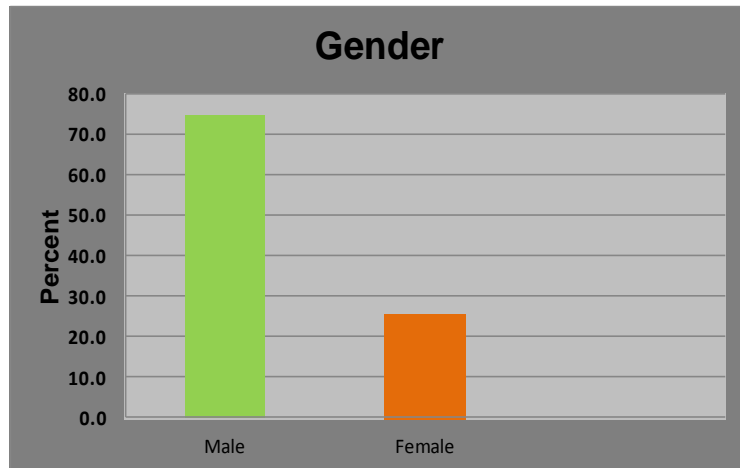


Figure 7: Gender representation in the survey

One of the possible reasons why the male respondents were more than the female respondents could be because there were more males represented in the population selected for the study. Another reason could be because the primary bread winners are males, which is why the number of males who had handsets and formed part of this sample were high.

5.6.2 Age

Table 7 shows the different age groups from the study. The largest number of respondents were in the 27-34 years age bracket (35.2%) followed by 16-26 years bracket (28.9%) and 35-44 years age bracket (20.9%), which is mainly students, professional working class and other non-working class respondents. The age matched the initial quota set for the research.

Table 7: Age of Subscribers

Age	Frequency	Percent
16 - 26 years	147	28.9%
27 - 34 years	179	35.2%
35 - 44 years	106	20.9%
45 - 54 years	46	9.1%
55 - 64 years	22	4.3%
65 years +	7	1.4%
Total	507	99.8%
Missing	1	0.2%
	508	100.0

5.6.3 Academic and Professional Education Attainment

From the results of the study, 35% of the respondents have attained secondary school education, 29% diploma and certification holders, 18% degree holders, 10% primary school educational attainment, 4% high school attainment, 3% post-graduate degree and 1% professional qualification. Furthermore, the insights provided that at least 90% of the respondents have secondary level attainment and above which illustrates that the literacy level cannot be a barrier to the adoption/usage of the mobile money services amongst the groups observed. Therefore the research used the highest level of education attainment for the respondents in the analysis. As per Figure 8 below, one can highlight that most of the respondents had a decent educational qualification.

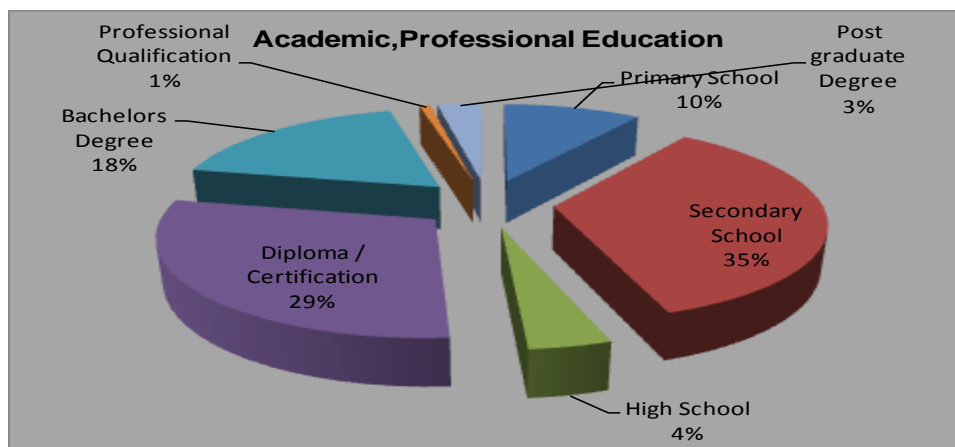


Figure 8: Respondents Academic and Professional Education

5.6.4 Occupation

The bulk of the respondents are self-employed and employed at clerical level representing 59% of the total sample below in Figure 9 is a spatial view of the occupation levels of the subscribers interviewed in this study:

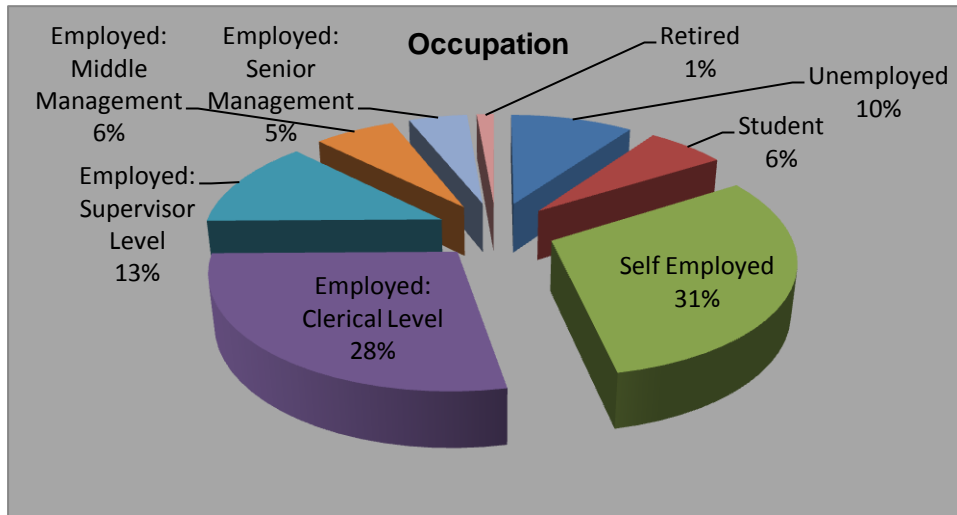


Figure 9: Occupation

5.6.5 Cell Phone User Profile

Table 8 highlights that of the 508 respondents 97.2% were on prepaid and 2.8% post-paid. Over 90% of the respondents indicated that they own a phone and 7.3% share a phone. This result is as expected as the prepaid is the biggest customer base in this market because of the affordability.

Table 8: Cell phone User Profile Frequency

Type of Service		
	Frequency	Percent
Post-paid	14	2.8%
Prepaid	494	97.2%
Total	508	100.0

5.6.6 Type of Service Used

The data received from the 508 respondents in terms of usage of the various services available on the mobile phone was analysed and Table 9, of 90.4 % use local voice, 65.7% SMS and this is closely followed by 49.2% Internet. An interesting finding is that Internet is growing and is very close to SMS in terms of usage.

Table 9: Type of Service Used

Service	Yes	N	No	N	Total
Local Voice	90.4%	459	9.6%	49	508
International Voice	36.4%	185	63.6%	323	508
Internet	49.2%	250	50.8%	258	508
Blackberry	10.6%	54	89.4%	454	508
Airtel Money	50.8%	258	49.2%	250	508
SMS	65.7%	334	34.3%	174	508
Airtel Hello Tunes (Caller Ring back tones)	30.9%	157	69.1%	351	508
Airtel Nyimbo (Music on Demand)	4.5%	23	95.5%	485	508

Key N =Number of Respondents

5.6.7 Mobile Money Service Usage

The data received from the 508 respondents in terms of usage of the mobile money services that are available were analysed and Table 10, of 46.1% use mobile money for purchasing airtime, 26.2% use mobile money for receiving cash, which this is closely followed by 24.6% receiving cash and the lowest usage being on bank transfers at 3%.. An interesting finding is purchasing airtime is the highest but is not the core offering of mobile money.

Table 10: Mobile Money Service Usage

Mobile Money Services Usage					
Mobile Money Services	Yes	N	No	N	Total
Sending cash	24.6%	125	75.4%	383	508
Receiving cash	26.2%	133	73.8%	375	508
Purchases at retailer	8.9%	45	91.1%	463	508
Bill payments (utilities)	4.7%	24	95.3%	484	508
Airtime purchases	46.1%	234	53.9%	274	508
Bank transfer	3.0%	15	97.0%	493	508
Do not use mobile money	18.5%	94	81.5%	414	508

Key N = Number of Respondents

A total number of 508 respondents were used in this analysis. From the demographics of the sample the following can be concluded. The sample is made up of 74.4% male and 25.6% female with 64.1% below the age 35 which indicates that majority of the sample fall under the youth profile which in Malawi falls in the range of 16- 35 years of age. With regards to education, the majority had attained at least secondary school education (90% of the respondents). In terms of occupation self-employed and clerical represented the majority at 59% (31% and 28% respectively). Malawi is a predominantly prepaid market and this was confirmed by 97.2% of the sample using prepaid service. With regards to the type of services used on the handset is voice calls are at 90.4% and value added services, namely SMS, Internet and Airtel Money the most used service is purchasing of airtime.

5.7 Construct Reliability and Validity Analysis

Cronbach's Alpha was used to test the reliability of each of the multiple-item constructs that formed the survey instrument in this study. As discussed, reliability is considered to be an assessment of the degree of consistency between multiple measurements of a variable it is the most popularly used measure of internal consistency. As a rule of thumb, a reliability coefficient of .70 or higher is considered "acceptable" (Nunnally Jum & Bernstein Ira, 1978) although it may decrease to 0.60 in exploratory research (Hair et al., 2006). Below we will present the reliability analysis result of each variable:

5.7.1 Performance Expectancy Reliability

Table 11 below presents the performance expectancy reliability analysis results:

Table 11: Performance Expectancy Reliability

Cronbach's Alpha	N of Items
.863	5

Performance expectancy achieved a reliability result of .863; this is above the recommended 0.70 and the .60 chosen for this research. Therefore the reliability was acceptable and all the questions were used.

5.7.2 Effort Expectancy Reliability

Table 12 below presents the effort expectancy reliability analysis results:

Table 12: Effort Expectancy Reliability

Cronbach's Alpha	N of Items
.410	3

Effort expectancy achieved a reliability result of .410; this is below the recommended 0.70 and the .60 chosen for this research. Below is Table 13 representing the item statistic of each question used:

Effort Expectancy Reliability Item Statistics

Table 13: Effort Expectancy Reliability Item Statistics

	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
EE 14: Learning to use mobile money would be easy	0.189	.422
[I] EE 15: It would take me lots of time to learn how to use mobile money	0.315	0.179
[I] EE 16: Using mobile money services would lead to loss of convenience as I would have to follow up when errors occur	0.235	.334

Having reviewed the detailed item statistics of effort expectancy, and having tried to invert question EE15 and EE16, nothing we could do would have improved the results, therefore a decision was made to use a single item question EE14. Netemeyer and Bearden (2003) recommended the use of single items in cases such as these.

5.7.3 Social Influence Reliability

Table 14 below presents the Social Influence reliability analysis results:

Table 14: Social Influence Reliability

Cronbach's Alpha	N of Items
.565	3

Social Influence achieved a reliability result of .565; this is below the recommended 0.70 and the .60 chosen for this research. Therefore the reliability was not acceptable. Below is Table 15 which provides detailed social influence reliability item statistics

Table 15: Social Influence Reliability Item Statistics

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SI 17: I use m-money because of my peers and friends	0.350	.503
SI 18: m-money is important because my family use it	0.356	0.496
SI 19: I use m-money to conform to what everyone is doing	0.423	0.393

Having reviewed the detailed item statistics of social influence, nothing we could do would have improved the results; therefore a decision was made to use a single item question SI17. EE14. Netemeyer and Bearden (2003) recommended the use of single items in cases such as these.

5.7.4 Facilitating Conditions Reliability

Table 16 below presents the facilitating conditions reliability analysis results:

Table 16: Facilitating Conditions Reliability Table

Cronbach's Alpha	N of Items
.826	4

Facilitating Conditions achieved a reliability result of .826; this is above the recommended 0.70 and the .60 chosen for this research. Therefore the reliability was acceptable and all the questions were used. In the context of mobile money facilitating conditions refer to aspects like easy access to the agent network, confidence in the knowledge of how mobile money works, presence of the network coverage, reliable customer support and availability of float with merchants and the agent network responsible for the service. The fact that facilitating conditions turned out to be one of the most important variables signifies the need for mobile service providers need to ensure support and assurance are provided. Furthermore, one needs to remember that these consumers have low financial literacy; they are unbanked and have irregular and low income. In this case, they trust that the mobile money service provide will keep their money safe, manage it and they can access it whenever they need it. Thus, users want to be assured that nothing will come in their way during a transaction to frustrate the process.

5.7.5 Price Value Reliability

Table 17 below presents the Price value reliability analysis results:

Table 17: Price Value Reliability

Cronbach's Alpha	N of Items
.834	3

Price value achieved a reliability result of .834; this is above the recommended 0.70 and the .60 chosen for this research. Therefore the reliability was acceptable and all the questions were used.

5.7.6 Infrastructure Reliability

Table 18 below presents the Infrastructure reliability analysis results:

Table 18: Infrastructure Reliability

Cronbach's Alpha	N of Items
.558	4

Infrastructure reliability achieved a reliability result of .558; this is below the recommended 0.70 and the .60 chosen for this research. Therefore the reliability was not acceptable. Further analysis was done to look at each item statistics in Table 19 below:

Table 19: Infrastructure Reliability Item Statistics

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I 28: Network stability is good (No dropped calls)	0.440	0.417
I 29 :SMS reach their destination on time	0.434	0.416
I 30: Is there a mobile money outlet in your area	0.250	0.565
I 31 :Network coverage exists in everywhere	0.280	0.546

Having reviewed the outcome of the infrastructure reliability results a decision was made to drop the question as it was deemed not significant for the research. This measurement is no longer going to be used further on in this research.

5.7.7 Trust Reliability

Table 20 below presents the Trust reliability analysis results:

Table 20: Trust Reliability

Cronbach's Alpha	N of Items
.822	5

Trust achieved a reliability result of .822; this is above the recommended 0.70 and the .60 chosen for this research. Therefore the reliability was acceptable and all the questions were used.

5.7.8 Experience Reliability

Table 21 below presents the experience reliability analysis results:

Table 21: Experience Reliability Analysis

Cronbach's Alpha	N of Items
.631	4

Experience achieved a reliability result of .631; this is below the recommended 0.70 but above the .60 chosen for this research. Therefore the reliability was acceptable and all the four questions were used instead of five as the one question was redundant and did not add value to the research.

The reliability of each construct based on Cronbach's Alpha summary is presented in Table 22 below:

Table 22: Cronbach's Alpha and Reliability Results Summary

Measurement	Items	Cronbach Alpha's	Reliability Results	Outcome
Performance Expectancy	5	0.863	Good	Accepted
Effor Expectancy	3	0.410	Weak	Rejected
Social Influence	3	0.565	Weak	Rejected
Facilitating Conditions	4	0.826	Good	Accepted
Price Value	3	0.739	Good	Accepted
Infrastructure reliability	4	0.558	Weak	Rejected
Trust	5	0.822	Good	Accepted
Experience	4	0.631	Average	Accepted

As shown in Table 22, the Cronbach's Alpha (reliability) ranges from 0.410 to 0.863. Performance expectancy, facilitating conditions, price value, trust and experience were above the chosen guide for this study of acceptable reliability of 0.6. As a result, the data were found to be appropriate for further analysis. However, effort expectancy, social Influence and infrastructure reliability were all below 0.6. This meant that five of the eight variables met the reliability test requirement of 0.70 and the rest did not meet this; however a decision made was to cap the reliability coefficient at 0.6 in order to see the impact of those variables on the research model selected.

5.8 Analysis of factors

Questions within the questionnaire were grouped together to focus on each variable of the research model that have an influence on behavioural intention or usage behaviour for this analysis. In SEM the variables are referred to as exogenous variables.

5.8.1 Performance Expectancy

Five questions of the questionnaire relate to performance expectancy. From the 508 responses, the frequencies below were determined: See results in Table 23 below:

Table 23: Frequency Analysis of Performance Expectancy

Performance Expectancy	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
PE 9: m-money makes it easier for me to do	2 (.4%)	4 (.8%)	176 (34.6%)	232 (45.7%)	94 (18.5%)	508	3.81	0.75
PE 10: m-money allows me to manage my money	0 (0.0%)	8 (1.6%)	204 (40.2%)	231 (45.5%)	65 (12.8%)	508	3.69	0.71
PE 11: m-money allows me to save my money	2 (.4%)	18 (3.5%)	211 (41.5%)	221 (43.5%)	56 (11%)	508	3.61	0.74
PE 12: m-money is a convenient and secure for	2 (.4%)	6 (1.2%)	188 (37.0%)	239 (47.0%)	73 (14.4%)	508	3.74	0.73
PE 13: m-money will allow me in improving my	4 (0.8%)	30 (5.9%)	202 (39.8%)	222 (43.7%)	50 (9.8%)	508	3.56	0.78

The frequency analysis for performance expectancy indicated that overall the respondents were (Mean =3.68, SD =.768). The results also indicate that the majority of the people are leaning towards "agree" and "strongly agree", which means everybody is generally positive about mobile money in a favourable way. The most positive area being *"mobile money makes it easier for me to do my transaction followed by mobile money is convenient and secure"*. This gives insight that mobile money can grow and be successful in this country. Performance Expectancy

achieved a Cronbach's Alpha result of 0.863 therefore this construct is acceptable for use because of it is above the 0.70 rule of thumb and selected guide for this study of 0.60 as an acceptable result. Thus, the data gathered for performance expectancy from a frequency point of view has the validity for testing this hypothesis.

5.8.2 Effort Expectancy

From the questionnaire, three of the questions were dedicated to effort expectancy, the frequency results of the survey are indicated in the Table 24 below:

Table 24: Frequency Analysis of Effort Expectancy

Effort Expectancy	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
EE 14: Learning to use mobile money would be easy	13(2.6%)	99 (19.5%)	68(13.4%)	270 (53.1%)	58 (11.4%)	508	3.56	0.78
EE 15: It would take me lots of time to learn how to use mobile money	11(2.2%)	161 (31.7%)	114 (22.4%)	198 (39.0%)	24 (4.7%)	508	3.51	1.01
EE 16: Using mobile money services would lead to loss of convenience as I would have to follow up when errors occur	10 (2.0%)	135 (26.6%)	94 (18.5%)	247 (48.6%)	22 (4.3%)	508	3.12	0.98

The frequency analysis for effort expectancy indicated that there were less responses in the "strongly disagree" option of the responses and more in the "disagree" and "agree" options. During the analysis it was discovered the other 2 questions were weak namely "EE 15" and "EE16", E15 stated that *"it would take time lots of time to learn to use mobile money"* thus a single item question was used for testing the hypothesis. The actual questions themselves did not achieve the expected response.

5.8.3 Social Influence

Three of the questions from the questionnaire were dedicated to social influence, the survey results are indicated in Table 25 below:

Table 25: Frequency Analysis Social Influence

Social Influence	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
SI 17: I use m-money because of my peers and friends	57 (11.2%)	201 (39.6%)	165 (32.5%)	65 (12.8%)	20 (3.9%)	508	3.27	0.97
SI 18: m-money is important because my	30 (5.9%)	142 (28.0%)	162 (31.9%)	142 (28.0%)	32 (6.3%)	508	2.59	0.98
SI 19: I use m-money to conform to what everyone	30 (5.9%)	180 (35.4%)	184 (36.2%)	93 (18.3%)	21(4.1%)	508	3.01	1.02

From the responses on social influence as a variable, the survey indicates that it has minimal impact (Mean = 2.80, SD =.984). Based on these findings the researcher made a decision to reduce this to a single item SI (17) only which states, “I used m-money because of my peers and family”. It must be noted that the majority of the respondents were leaning towards neutral and disagree options. Therefore, the majority of the respondents disagreed with this variable as having no impact on their decision to use mobile money. This suggests that the decision to use mobile money is based primarily on an individual’s preference and need. On review of the results from Cronbach’s Alpha, Social Influence achieved a Cronbach’s Alpha result of 0.565 therefore this construct is not acceptable for use because of its below the 0.70 rule of thumb and selected guide for this study of 0.60. Thus, the data gathered for social influence from a frequency point of view does not provide validity for testing of this hypothesis. The data reflected that two of the three questions were weak thus only S1 17 was used for rest of the analysis.

5.8.4 Facilitating Conditions

From the questionnaire, four questions were dedicated to facilitating conditions; the survey responses provide the following frequencies indicated Table 26 below:

Table 26: Frequency Analysis of Facilitating Conditions

Facilitating Conditions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
FC 20 :m-money makes it easier for me to do transactions	0 (.0%)	2 (.4%)	181 (35.6%)	244 (48.0%)	81 (15.9%)	508	2.79	0.95
FC 21: m-money allows me to manage my finances	0 (0.0%)	10 (2.0%)	147 (28.9%)	327 (64.4%)	24 (4.7%)	508	3.80	0.70
FC 22: m-money allows me to save my money	0 (.0%)	13(2.6%)	153 (30.1%)	306 (60.2%)	36 (7.1%)	508	3.72	0.58
FC 23: m-money allows me to make purchases of goods and services easily	2 (.4%)	8 (1.6%)	169 (33.3%)	311 (61.2%)	18 (3.5%)	508	3.72	0.63

Of the 508 respondents surveyed, there is a clear indication that there is a positive perception on facilitating conditions (Mean =3.51, SD =0.71). By analysing the frequencies it should be

noted that there is between 28.9% to 35.6% responding to “neutral” option in the questionnaire. On the other hand overall “agree “and “strongly agree “weighted positively with the highest on the agree column being “*m-money allows me to manage my finances*” at 64.4% and on the “strongly agree” option the most favourable being m-money makes it easier for me to do transactions at 15.9%. Facilitating Conditions achieved a Cronbach’s Alpha result of 0.826 therefore this construct is acceptable for use because of its above the 0.70 rule of thumb and selected guide for this study of 0.60 as an acceptable result. Thus, the data gathered for facilitating conditions from a frequency point of view has the validity for testing this hypothesis the researcher concluded that facilitating conditions are relevant input in the research questions

5.8.5 Price Value

From the questionnaire, four of the questions were dedicated to price value. The survey responses provided the frequencies indicated in Table 27 below:

Table 27: Frequency Analysis of Price Value

Price Value	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
PV 24 : m-money transaction fee is	8 (1.6%)	34 (6.7%)	160 (31.5%)	256 (50.4%)	50 (9.8%)	508	3.66	0.59
PV 25 : m-money overall service is affordable	2 (0.4%)	10 (2.0%)	158 (31.1%)	276 (54.3%)	62 (12.2%)	508	3.60	0.82
PV 26 :The price charged for the service gives me	0(.0%)	16 (3.1%)	190 (37.4%)	264 (52.0%)	38 (7.5%)	508	3.76	0.70
PV 27: The price for the device to use the service is affordable	2(.4%)	2 (.4%)	51(10.0%)	348 (68.5%)	105 (20.7%)	508	3.64	0.67

Over 80% of the respondents surveyed indicated that price value of the service is key (Mean=3.77, SD=.694). From the responses, it is clear that responses in the options “agree” and “strongly agree”; are very strong, of particular interest is “*the price for the device to use and the service is affordable*” at 68.5% and strongly agree at 20.7%. Further insight provided was that price of the service was the most important and the question on the device required to use the service is affordable had little meaning to the respondents based on the fact that mobile money works on any handset. Price Value achieved a Cronbach’s Alpha result of 0.739 therefore this construct is acceptable for use because it is above the 0.70 rule of thumb and selected guide for this study of 0.60 as an acceptable result. Thus, the data gathered for Price Value from a frequency point of view has the validity for testing this hypothesis. The data does not reflect any anomaly therefore it is valid to use for the hypothesis testing.

5.8.6 Infrastructure Reliability

From the questionnaire, four questions were dedicated to infrastructure reliability. The survey results are indicated in the Table 28 below:

Table 28: Frequency Analysis Infrastructure Reliability

Infrastructure Reliability	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
I 28: Network stability is good (No dropped calls)	9 (1.8%)	26 (5.1%)	60 (11.8%)	316 (62.2%)	97 (19.1%)	508	4.09	0.59
I 29 :SMS reach their destination on time	8 (1.6%)	40 (7.9%)	56 (11.0%)	313 (61.6%)	91 (17.9%)	508	3.92	0.82
I 30: Is there a mobile money outlet in your area	36 (7.1%)	21 (4.1%)	114 (22.4%)	291 (57.3%)	46 (9.1%)	508	3.86	0.85
I 31 :Network coverage exists in everywhere	34 (6.7%)	45 (8.9%)	64 (12.6%)	308 (60.6%)	57 (11.2%)	508	3.57	0.97

Of the 508 respondents interviewed the results show a (Mean = 3.86, SD =0.81). The majority of responses were leaning towards the “agree “and “strongly agree” options with the highest being on “*Network stability is good (No dropped calls)*” for both options. The data highlights that, the majority of the respondents indicated infrastructure reliability as positive with 80% indicating good network stability and 87% responding that “*SMS reach their destinations on time*” being confirmed as the most positive. Infrastructure Reliability achieved a Cronbach’s Alpha result of 0.558 therefore this construct is not acceptable for use because it’s below the 0.70 rule of thumb and selected guide for this study of 0.60 as an acceptable result. Thus, the data gathered for Infrastructure reliability from a Cronbach’s Alpha reliability results point of view does not have the validity for testing this hypothesis. This question was therefore dropped for SEM as it was perceived not to be a reliable measure and had no impact on the analysis.

5.8.7 Trust

From the questionnaire, five of the questions were dedicated to trust. Trust was seen as one of the important influencers as this service involves money. The survey responses provided the frequencies in Table 29 below:

Table 29: Frequency Analysis Trust

Trust	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
T32 : I trust mobile money service	53 (10.4%)	61 (12.0%)	46(9.1%)	283 (55.7%)	65 (12.8%)	508	3.61	1.02
T33: I trust the operator who is providing the mobile money service	6 (1.2%)	36 (7.1%)	55 (10.8%)	310 (61.0%)	101(19.9%)	508	3.48	1.17
T34 :I trust that my money is secure using mobile	50 (9.8%)	68 (13.4%)	55 (10.8%)	266 (52.4%)	69 (13.6%)	508	3.91	0.83
T35 : I trust mobile money transactions	46(9.1%)	48 (9.4%)	67 (13.2%)	272 (53.5%)	75 (14.8%)	508	3.46	1.18
T36: I believe wireless infrastructure can be	8(1.6%)	30 (5.9%)	58 (11.4%)	327 (64.4%)	85 (16.7%)	508	3.56	1.13

It should be noted that the option “agree” and “strongly agree” were very strong with “*I believe wireless infrastructure*” at 64.4% and “*I trust the operator who is providing the mobile money service*” at 61% as the highest points on the “agree” option and high scores again on the same questions on the “strongly agree” option. From the results, the respondents interviewed viewed trust as an important component for mobile money (Mean =3.66, SD=1.024). The most positive finding being that they believe wireless infrastructure can be trusted followed by trust in the mobile operator who is providing the mobile money service. More than 80% of the respondents were leaning to positive on the trust variable. Trust achieved a Cronbach’s Alpha result of 0.822 therefore this construct is acceptable for use because of its above the 0.70 rule of thumb and selected guide for this study of 0.60 as an acceptable result. Thus, the data gathered for trust from a frequency point of view has the validity for testing this hypothesis. The data does not reflect any anomaly therefore is valid to use for the hypothesis testing.

5.8.8 Experience

From the questionnaire initially five questions were dedicated to experience, but during the analysis the last question EX41 was dropped as this was a weak question. The survey results are indicated in the frequency analysis Table 30 below:

Table 30: Frequency Analysis of Experience

Experience	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	Std. Deviation
EX 37: I have used my mobile phone for at least a	29 (5.7%)	53 (10.4%)	29(5.7%)	277 (54.5%)	120 (23.6%)	508	3.89	0.81
EX 38 : I am able to use the functionality of my mobile	5 (1.0%)	5 (1.0%)	18 (3.5%)	364 (71.7%)	116 (22.8%)	508	3.80	1.09
EX 39: I use my mobile phone frequently	4 (.8%)	0 (0.0%)	21 (4.1%)	346 (68.1%)	137 (27.0%)	508	4.14	0.61
EX 40 : I am very skilled at using my mobile phone	7 (1.4%)	12(2.4%)	21(4.1%)	341 (67.1%)	127 (25.0%)	508	4.20	0.58

Of the 508 respondents, indicated an experience of (Mean = 4.01, SD =0.77). It should be noted that the option “agree” and “strongly agree” were very strong with I am able to use the functionality of my mobile being the highest at 71.7% on the “agree” option and I use my mobile phone frequently being the highest on “strongly agree”. More than 80% of the respondents were leaning towards the trust variable. Experience achieved a Cronbach’s Alpha result of 0.631 therefore this construct is acceptable for use because of the selected guide for this study of 0.60 as an acceptable result. Thus, the data gathered for Experience from a frequency point of view has the validity for testing this hypothesis. The data did not reflect any significant anomaly this was suitable for hypothesis testing.

5.9 Factor Descriptive

The factors depicted in the Table 31 below indicate the seven items that will be included in Structural Equation Modelling. Below are the mean, median, mode, standard deviation, skewness and kurtosis for each item. The full detailed questionnaire is in Appendix 2.

Table 31: Factor Descriptive Results Summary

	Statistics								
	N		Mean	Median	Mode	Std. Deviation	Skewness	Kurtosis	
	Valid	Missing							
Performance Expectancy	508	0	3.6831	3.8000	3.00 ^a	.59660	.292	-.564	
EE 14: Learning to use mobile money would be	508	0	3.51	4.00	4	1.012	-.646	-.461	
SI 17: I use m-money because of my peers and	508	0	2.59	2.00	2	.980	.437	-.148	
Facilitating Conditions	508	0	3.7229	4.0000	4.00	.50844	-.365	-1.008	
Price Value	508	0	3.6667	4.0000	4.00	.63294	.033	-.215	
Trust	508	0	3.6610	4.0000	4.00	.79226	-.527	-.317	
Experience	508	0	4.0669	4.0000	4.00	.53312	-.755	4.074	

From the above frequency table it can be seen that four of the questions have a negative skewness indicating that the questions were favorably answered i.e. a positive inclination towards mobile money. This is further supported by the fact that the majority of the questions experience higher than average mean values. Since the Likert scale is divided into five categories, the middle category (“3”) indicates a neutral response to the question. The majority of the items in this case scored higher than “3”, suggesting an overall positive inclination to mobile money except for social influence which had a mean of 2.59. This is again further strengthened by the calculated median values. Both skewness and kurtosis values were found to be within acceptable ranges.

5.9 Hypothesis Testing

5.9.1 SEM analysis and Interpretation

The SEM technique is utilised to attain a best fitting model between all considered work constructs. In this analysis, SEM was utilised to determine firstly, which hypothesised models held statistically and secondly, which model was the best fitting. Analysis of the model began with calculation of the relevant indices as presented in the preceding chapter. The indices that will be represented here are:

- **One absolute fit index** – for this the researcher selected the Chi- Square Measurement (χ^2/df);
- **One incremental fit index** – the Comparative Fit Index (CFI) was selected;
- **One goodness-of-fit index** – here the researcher selected the Goodness- of-fit Index (GFI); and
- **One badness-of-fit index** – the Root Mean Square Error of Approximation (RMSEA) was chosen.

This section presents and discusses SEM results as per the recommended two phase approach; firstly the preliminary measurement model, followed by the improved measurement model, and finally the structural model with the results of testing the hypothesis of each of the key the constructs (i) performance expectancy, (ii) effort expectancy, (iii) social influence (iv) facilitating conditions (v) price value, and (vi) trust.

The key described below is used:

- **Error Terms (e1-e7)**: These are used as the prediction of the dependent variable will not be perfect, and hence the model requires the inclusion of an error term. The error terms represent not only random fluctuations in the predicted variable due to measurement error, but also a composite of other variables on which the predicted variable may depend, that was not measured in the study. This error term is essential because the path diagram is supposed to show all variables that affect the predicted variable (Garson, 2012).
- **Rectangles**: These are used to represent the observed variables i.e. all actual asked items from each questionnaire (Garson, 2012). In this paper this is PE, EE, SI, FC, and PV & T.

- **Ellipse:** This is used to represent the unobserved variables i.e. all created work constructs (Garson, 2012). In this paper this is behavioural intention and usage behaviour of mobile money.
- **Single-Headed Arrow:** – This is used to represent a path from one variable to the other (Garson, 2012). i.e. a typical linear dependency.
- **Double-Headed Arrow:** – This is used to represent the covariance between two variables. The rule is to assume a correlation or covariance of zero whenever arrows do not connect variables (Garson, 2012).

In this analysis there was no evidence of any missing data during the analysis.

5.9.2 The Preliminary SEM Model:

Figure 10 presents the path analysis of the model that was hypothesised in Chapter 3 for this research which was developed in the SPSS Version 21 using SEM in Amos. The theoretical framework which this model is based comprises of three types of variables namely:

- (1) Eight core constructs (independent variables) are Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Price Value (PV), Infrastructure Reliability (IR), Trust (TR) and Experience (EX)
- (2) Two dependent variables are Behavioural intention (latent variable not observed) to use mobile money and Usage behaviour to use mobile money.
- (3) Two moderating variables are Gender (G), Age (AG),) these moderators are expected to influence on the impact of core constructs.

Figure 10 represents the original preliminary structural model Due to space limitation the following abbreviations will be used in the figure below:

Table 32: Abbreviations

PE	Performance Expectancy
EE	Effort Expectancy
SI	Social Influence
FC	Facilitating Conditions
PV	Price Value

T	Trust
BI	Behavioural Intention
UB	Usage Behaviour

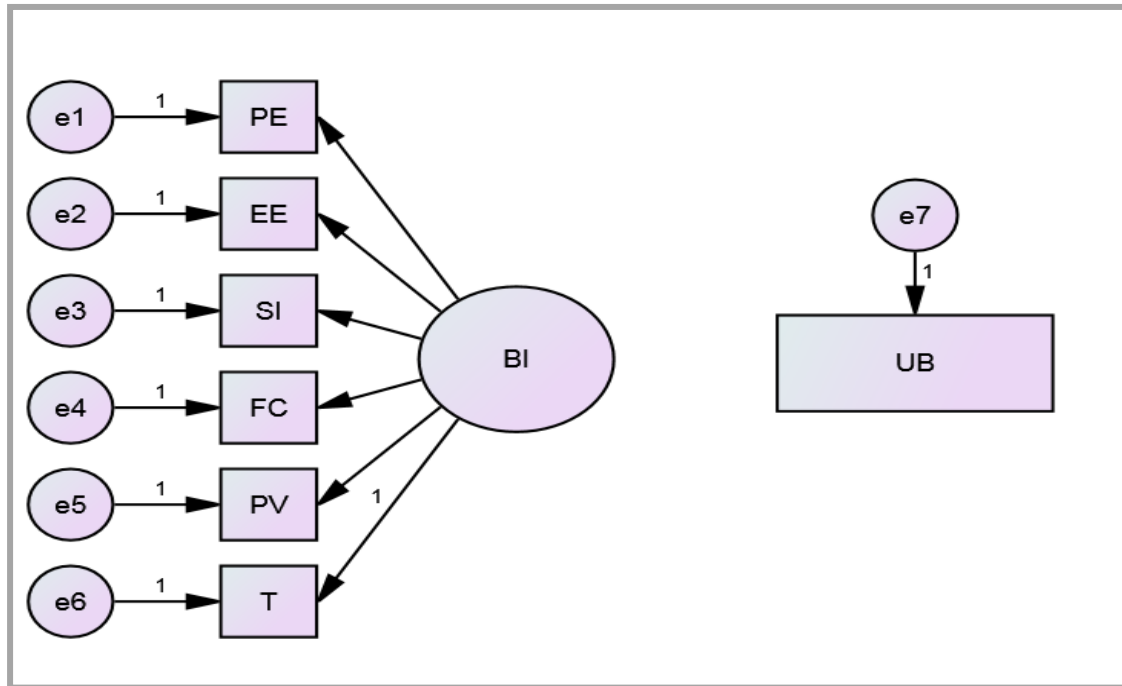


Figure 10: Preliminary SEM Model Path Analysis to determine Model fit

5.9.3 The Preliminary Model

Having successfully completed step one of SEM which is the preliminary measurement model, validity and reliability of the structural model was evaluated using the SEM goodness of fit indicators that were selected for this paper to determine the model fit to the data namely:

- The Chi-Square Measurement (χ^2/df);
- The Comparative Fit Index (CFI);
- The Goodness-of-fit Index (GFI); and
- The Root Mean Square Error of Approximation (RMSEA).

The results of the fit indices that were applied in this study will now be presented and discussed in greater detail below:

The following indices abbreviations will be used in the tables below.

- X2 = Chi-Square Measurement (**X2/DF**)
- GFI = Goodness-of-fit Index
- RMSEA = Root mean square error of approximation
- CFI = Comparative Fit Index;

The Preliminary Measurement Model indicates the following Characteristics:

Table 33: Preliminary Model Chi-square Results

Number of parameters	X2	Degrees of freedom (DF)	Probability	X2/DF
11	61.169	9	.000	6.832
21	0	0		
6	1261	15	.000	0

The Chi-square is one of the models of fit criterion it measures the difference between what the actual relationships in the sample are and what would be expected if the model were assumed correct. In this model the CMIN/DF the result indicates 6.832; however χ^2 to degrees of freedom (df) ratios in the range of 5 to 1 are indicative of an acceptable fit. Therefore according to the chi-square analysis the preliminary measurement model is rejected as it is above the acceptable recommended fit.

Further analysis of the goodness of fit model is the use of Naude and Rothman's (2004) guide that states that its value usually varies between 0 and 1 with values higher than .90 indicating good model fit with the data Table 34 below presents Goodness of FIT results achieved from the SEM analysis:

Table 34: Goodness-of-fit-Index for Preliminary Model

Model	RMR	GFI	AGFI	PGFI
Default model	0.021	0.948	0.925	0.415
Saturated model	0	1		
Independence model	0.185	0.48	0.272	0.343

In Table 34 of results presented above GFI value is 0.948. From the additional fit indices it can be concluded that the model is good fit to the data.

To further determine whether the model fits, further model indices were reviewed and the results of RMSEA are presented in Table 35 below:

RMSEA Results for Preliminary Model

Table 35: RMSEA Preliminary Model

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.107	0.075	0.125	0.001
Independence model	0.405	0.386	0.424	0

The root mean square error of approximation falls outside the preferable range of 0.08. For the purpose of this research; the approach followed the guide by Schumaker et al. (2010) that stated that the range between 0.05 and 0.08 is a good fit. The RMSEA from SEM analysis indicates 0.107 that falls outside of the stated parameters.

Another incremental fit index selected for this paper was CFI the results are presented in the Table 36 below:

Table 36: Comparative Fit Index for Preliminary Model

Model	NFI	RFI	IFI	TLI	CFI
Default model	0.957	0.929	0.964	0.94	0.933
Saturated model	1		1		1
Independence model	0	0	0	0	0

CFI is preferred to have a good fit at values ranging from 0 to 1 with values greater than 0.90 being a guide of model fit. In the table presented above CFI value is 0.933. From the additional fit indices it can be concluded that the model is good fit to the data.

In addition to the above captured results, Amos also produces tabular model parameters of standard error tests and statistical significance as presented in the Table 37 below:

Table 37: Regression Weights of Preliminary Measurement Model

		Latent Variable	Estimate	S.E.	C.R.	P	Standardized Estimate
Trust	<---	BehaviourIntention	1				.844
Price Value	<---	BehaviourIntention	0.721	0.033	21.555	.000	.798
Facilitating Conditions	<---	BehaviourIntention	0.539	0.028	19.384	.000	.742
Social Influence	<---	BehaviourIntention	-0.259	0.065	-3.993	.000	-.185
Effort Expectancy	<---	BehaviourIntention	0.69	0.063	10.998	.000	.478
Performance Expectancy	<---	BehaviourIntention	0.687	0.031	21.886	.000	.806

Preliminary Measurement model was based on the literature after only using variables selected after the reliability analysis). The Critical ratio is the estimate divided by the standard error. According to Dion (2008), values greater than 2 tend to indicate an estimate that is statistically significantly different from zero at the .05 level. Thus based on the results indicated above all the values are statistically significant except for Social Influence which has a CR value of -3.993. Here is where we remove Social Influence because of the spurious coefficient (its negative). The most significant factors being trust, followed by price value and performance expectancy.

5.9.4 The Improved Measurement Model

Based on the outcome of the results above an iteration was done on the measurement model where the variable Social Influence was removed as it was negative and not theoretically sound Figure 11 below represents the improved model:

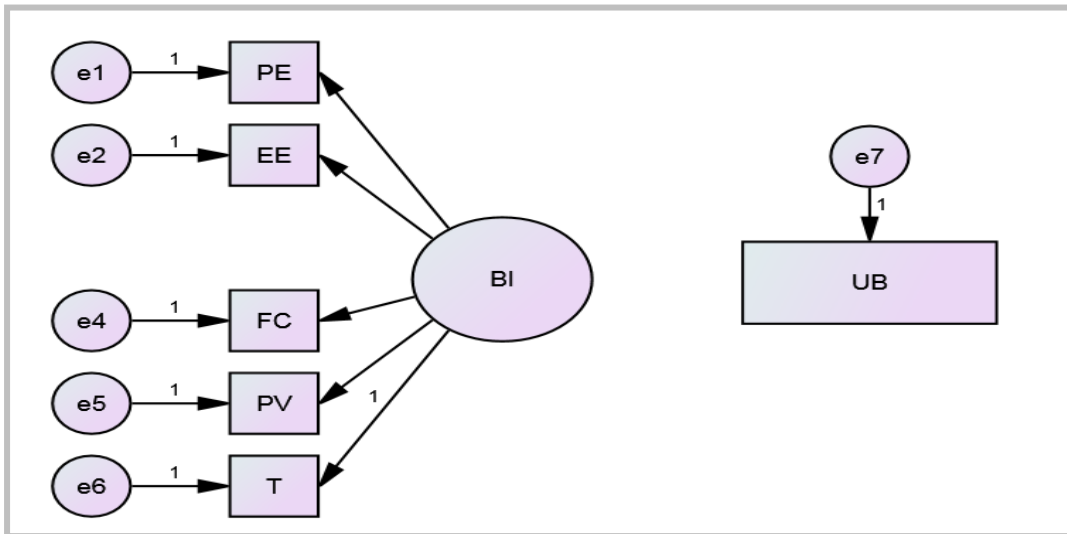


Figure 11: Improved Measurement Model

The Improved Measurement Model indicates the following Characteristics:

Table 38: Improved Model Chi-square Results

Model	Number of parameters	X2	Degrees of freedom (DF)	Probability	X2/DF
Default model	11	61.169	9	.000	6.117
Saturated Model	21	0	0		
Independence Model	6	1261	15	.000	84.107

The Chi-square is one of the models of fit criterion it measures the difference between what the actual relationships in the sample are and what would be expected if the model were assumed correct. In this model the CMIN/DF the result indicates 6.117; however χ^2 to degrees of freedom (df) ratios in the range of 5 to 1 are indicative of an acceptable fit. Therefore according to the chi-square analysis the model is rejected as it above the acceptable recommended fit.

Further analysis of the goodness of fit model is the use of Naude and Rothman (2004) guide that states that its value usually varies between 0 and 1 with values higher than .90 indicating good model fit with the data Table 39 below presents Goodness of FIT results achieved from the SEM analysis:

Table 39: Goodness-of-fit Index for Improved Model

Model	RMR	GFI	AGFI	PGFI
Default model	0.031	0.964	0.923	0.459
Saturated model	0	1		
Independence model	0.185	0.48	0.272	0.343

In Table 39 of results presented above GFI value is 0.964. From the additional fit indices it can be concluded that the model is good fit to the data.

To further determine whether the model fits, further model indices were reviewed and the results of RMSEA are presented in the Table 40 below:

Table 40: RMSEA Results for Improved Model

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.100	0.077	0.125	0
Independence model	0.405	0.386	0.424	0

The Root mean square error of approximation falls outside the preferable range of 0.08. For the purpose of this research; the approach followed was that the range between 0.05 and 0.08 is a good fit. The RMSEA from SEM analysis indicates 0.107 that falls outside of the stated parameters.

Another incremental fit index selected for this paper was CFI the results are presented in the Table 41 below:

Table 41: Comparative Fit Index for Improved Model

Model	NFI	RFI	IFI	TLI	CFI
Default model	0.952	0.927	0.959	0.938	0.959
Saturated model	1		1		1
Independence model	0	0	0	0	0

CFI is preferred to have a good fit at values ranging from 0 to 1 with values greater than 0.90 being a guide of model fit. In the Table 41, presented above CFI value is 0.959. From the additional fit indices it can be concluded that the model is good fit to the data.

Table 42: Regression Weights of Improved Measurement Model

Variable		Latent Variable	Estimate	S.E.	C.R.	P
Trust	<---	BehaviourIntention	1			
PriceValue	<---	BehaviourIntention	0.726	0.034	21.502	.000
FacilitatingConditions	<---	BehaviourIntention	0.544	0.028	19.418	.000
EffortExpectancy	<---	BehaviourIntention	0.698	0.063	11.056	.000
PerformanceExpectancy	<---	BehaviourIntention	0.689	0.032	21.692	.000

Based on the above results presented in Table 42, the improved measurement model regression weights are all significant and the fit indices work out perfectly

5.9.5 Structural Model Improvements

Based on the outcome of the preliminary model in the statistics presented above it was observed that the model did not fit perfectly thus some decisions were made. Therefore the researcher had to do a number of iterations in order to improve the model fit to the data.

Below are chronology of the iterations performed and the results of these iterations:

- Infrastructure reliability was dropped during the reliability analysis stage as this factor was deemed weak and had no significant on behavioural intention and usage behaviour of mobile money.
- Social influence was dropped during the structural equation modelling preliminary measurement stage as this factor was found to be weak. This was established based on the result from the regression weights, which showed a negative estimate which was spurious and the outcome did not make theoretical sense for the model.

Table 43 below presents a summary of the SEM iterations done to improve the Model

Table 43: Summary of the SEM Iterations done to improve the Model

Goodness of fit Index	Ideal Model	Original Measurement Model	Iteration 1 (SI Removed)	Structural Model
Chi-square	3.000	6.832	6.117	5.978
Goodness of fit Index (GFI)	0.900	0.948	0.964	0.968
Root Mean Square Error of Approximation (RMSEA)	0.100	0.107	0.100	0.099
Comparative Fit Index (CFI)	0.900	0.933	0.959	0.964

The main action during this stage was dropping of social influence.

5.9.6 The Final SEM Model for Behavioural Intention and Usage Behaviour of MM

The researcher examined the paths coefficients of this model and deleted paths to the model that were considered statistically insignificant. Due to the weakness and negative relationship that was discovered during the analysis two constructs were dropped namely Social Influence and Infrastructure Reliability and having the re-run and going through a number of iterations the final model is presented in Figure 12 below:

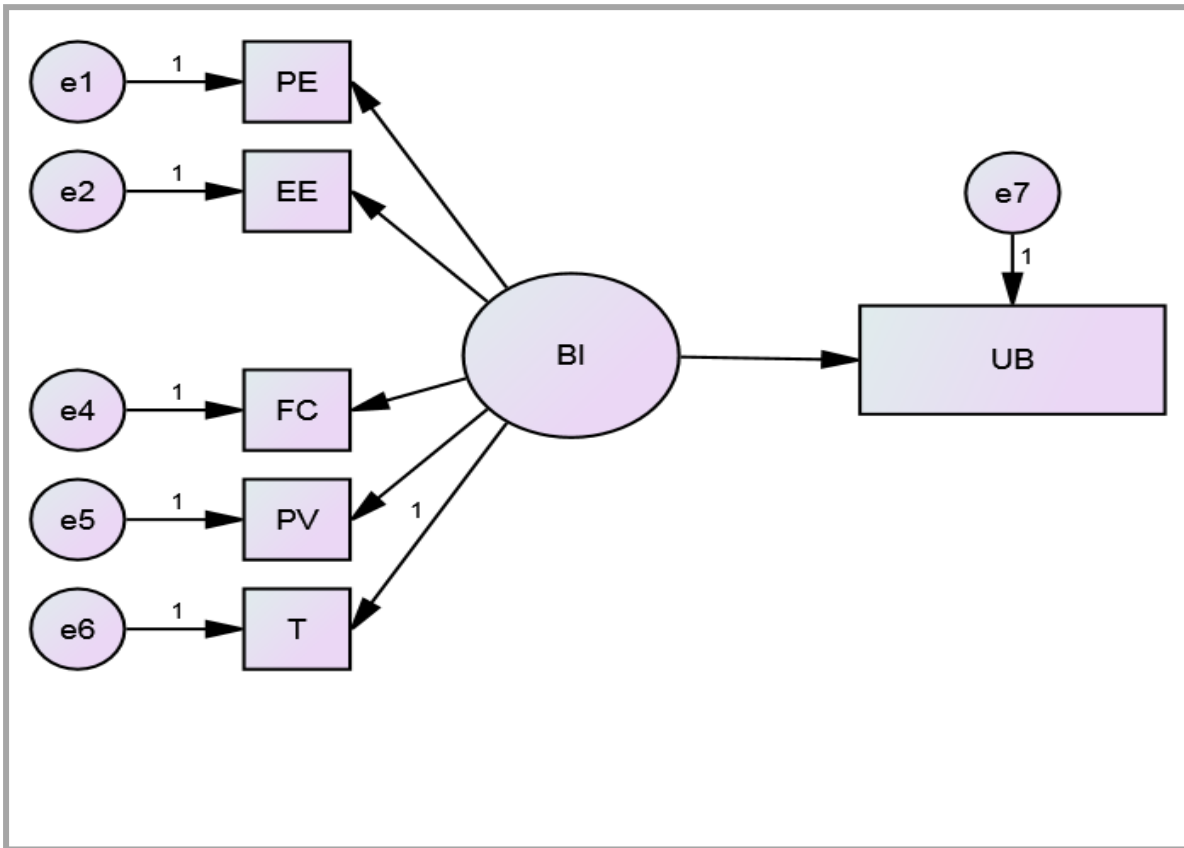


Figure 12: The Final Model of Behavioural Intention and Usage Behaviour of MM

This revised model presented above is as a result of removal of social influence and infrastructure reliability as these did not add value to model. From outcome above it is clear that there is a relationship between Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), Price Value (PV) and Trust (T) with behavioural intention to use mobile money is strong, but from behavioural intention to usage behavioural the relationship is weak.

The Final Model indicates the following Characteristics:

The results below show the fit indices for the final structural model that were achieved during this study:

Table 44: Final Model Chi-square Results

Model	Number of parameters	X2	Degrees of freedom	Probability	X2/DF
Default model	12	53.802	9	0	5.978
Saturated Model	21	0	0		
Independence Model	6	1261.601	15	0	84.107

The Chi-square is one of the models of fit criterion that measures the difference between what the actual relationships in the sample are and what would be expected if the model were assumed correct. In this model the CMIN/DF the result indicates 5.978; however χ^2 to degrees of freedom (df) ratios in the range of 5 to 1 are indicative of an acceptable fit. Therefore according to the chi-square analysis the model is a moderate fit.

Further analysis of the goodness of fit model is the use of Naude and Rothman's (2004) guide that states that its value usually varies between 0 and 1 with values higher than .90 indicating good model fit with the data Table 45 below presents Goodness-of-Fit results achieved from the SEM analysis:

Table 45: Goodness-of-Fit Index for Final Model

Model	RMR	GFI	AGFI	PGFI
Default model	0.021	0.968	0.925	0.415
Saturated model	0	1		
Independence model	0.185	0.48	0.272	0.343

In Table 45 the results presented above GFI value is 0.968. From the additional fit indices it can be concluded that the model is reasonable fit to the data.

To further determine whether the model fits, further model indices were reviewed and the results of RMSEA are presented in the Table 46 below:

Table 46: RMSEA Results for Final Model

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.099	0.075	0.125	0.001
Independence model	0.405	0.386	0.424	0

The Root mean square error of approximation falls slightly outside the preferable range of 0.08. For the purpose of this research; the approach followed was that the range between 0.05 and 0.08 is a good fit. The RMSEA from SEM analysis indicates 0.09 that falls slightly outside of the stated parameters.

Another incremental fit index selected for this paper was CFI the results are presented in Table 47 below:

Table 47: Comparative Fit Index for Final Model

Model	NFI	RFI	IFI	TLI	CFI
Default model	0.957	0.929	0.964	0.94	0.964
Saturated model	1		1		1
Independence model	0	0	0	0	0

CFI is preferred to have a good fit at values ranging from 0 to 1 with values greater than 0.90 being a guide of model fit. In the table presented above CFI value is 0.964. From the additional fit indices it can be concluded that the model is good fit to the data.

Table 48: Regression Weights Final Structural Model

Variable		Latent Variable	Estimate	S.E.	C.R.	P	Standardized Estimates
Trust	<---	BehaviourIntention	1				0.882
PriceValue	<---	BehaviourIntention	0.771	0.037	20.823	.000	0.8
FacilitatingConditions	<---	BehaviourIntention	0.534	0.033	16.208	.000	0.744
EffortExpectancy	<---	BehaviourIntention	0.838	0.079	10.548	.000	0.484
PerformanceExpectancy	<---	BehaviourIntention	0.736	0.039	18.981	.000	0.803
Experience	<---	BehaviourIntention	0.118	0.047	2.521	0.006	0.127

The Critical ratio is the estimate divided by the standard error. According to Dion (2008), values greater than 2 tend to indicate an estimate that is statistically significantly different from zero at the .05 level. Thus based on the results indicated above all the values are statistically significant

The first hypothesis presented above stated that “*Trust has an impact on behavioural intention which affects usage behaviour*”. In this case, trust is associated positively with behaviour intention as it has the highest standardized regression; by inference it is as significant as the others **and a β of 1** which implies that when behavioural intention goes up by 1 trust will go up by 1, therefore, we concluded that Hypothesis 1 was supported. The second hypothesis presented in the table above stated that “*Price value has an impact on behavioural intention which affects usage behaviour*”. Therefore, price value is also related positively to behaviour intention at a significance level of **$p = .000$ and a β of .771** which implies that when behavioural intention goes up by 1 price value will go up by 0.771; therefore, Hypothesis 2 is supported.

Hypothesis 3 investigated stated that “*Facilitating conditions have an impact on behavioural intention which affects usage behaviour*”. Facilitating conditions, as had been suggested was indeed associated with behaviour intention at a significance level of **$p = .000$. and a β of .534**

which implies that when behavioural intention goes up by 1 facilitating condition will go up by 0.534. The fourth hypothesis presented here stated that “*Social Influence has an impact on behavioural intention and usage behaviour*”. The impact of social influence on behaviour intention resulted in a negative estimate was spurious; the outcome did not make theoretical sense for the model as it was negative. Based on this reason social influence was dropped no further analysis was done in the structural model on this variable. Therefore the hypothesis is not supported.

The fifth hypothesis presented here stated that “*Effort expectancy has an impact on behavioural intention and usage behaviour*”. Similarly, hypothesis 5 results showed that effort expectancy has a significant level of **p= .000 and a β of .838** which implies that when behavioural intention goes up by 1 effort expectancy will go up by 0.838, therefore hypothesis 5 was supported. The sixth hypothesis presented here stated that “*Performance expectancy has an impact on behaviour intention and usage behaviour.*” Hypothesis 6 assessed the effect of Performance Expectancy on behaviour intention and the result was it is positively associated with behaviour intention at significance level of **p=.000 and a β of .736** which implies that when behavioural intention goes up by 1 performance expectancy will go up by 0.736, therefore Hypothesis 6 is supported.

In conclusion having reviewed and analyzed the regression weights and fit indices achieved the model is a good fit to the data.

5.9.1 Demographic Structural Model Age and Gender

In order to assess whether the moderators of the model which are age and gender have an impact on the relationship between the variables and behavioural intention a multi-group analysis was carried out to test for the moderation.

Multi-group moderation is a special form of moderation in which a dataset is split along values of a categorical variable (such as gender), and then a given model is tested with each set of data. In the case of gender, the model is tested for males and females separately. The use of multi-group moderation is to determine if relationships hypothesized in a model will differ based on the value of the moderator. We tested using critical ratios. The critical ratio represents skewness (or kurtosis) divided by the standard error of skewness (or kurtosis). It is interpreted as one would interpret a z-score. Effectively we looked at the main relationships at hand:

Price Value	<---	Behaviour Intention
Facilitating Conditions	<---	Behaviour Intention
Effort Expectancy	<---	Behaviour Intention
Performance Expectancy	<---	Behaviour Intention
Usage Behaviour	<---	Behaviour Intention

Furthermore, the variables were tested to see if the critical ratios for the differences in parameters (i.e. between males and female) exceed our 1.96 value (considered significant at the 5% level). The outcome (for gender) was as follows:

Table 49: Outcome of Gender

Parameter			Critical Ratio	Outcome
Price Value	<---	Behaviour Intention	0.028	Not Significant
Facilitating Conditions	<---	Behaviour Intention	1.273	Not Significant
Effort Expectancy	<---	Behaviour Intention	0.241	Not Significant
Performance Expectancy	<---	Behaviour Intention	0.838	Not Significant
Experience	<---	Behaviour Intention	-0.318	Not Significant

Based on the above findings on Table 46, gender does not moderate any of the relationships in the above table (so gender does not have an impact on the model over all them).

Furthermore to interrogate the model moderators that have an impact, we also did a pair wise comparison of age by breaking it into two groups 16-34 and 35+ the results are depicted in Table 47 below:

Table 50: SEM Pair-wise Comparison Age

Parameter			Critical Ratio	Outcome
Price Value	<---	Behaviour Intention	-1,489	Not Significant
Facilitating Conditions	<---	Behaviour Intention	0.916	Not Significant
Effort Expectancy	<---	Behaviour Intention	-3.290	Significant
Performance Expectancy	<---	Behaviour Intention	-1.927	Not Significant
Experience	<---	Behaviour Intention	-0.942	Not Significant

Examining the results above in Table 47, of the pair-wise comparison by age the observations indicate that age does not moderate price value, facilitating conditions, performance expectancy and experience. However, age moderates the relationship between effort expectancy and behaviour intention. For younger people effort expectancy has twice the significance at **z value = -3.290**.

However, on the whole there is no overall major difference in moderation of the relationships for age and gender but a potential difference lies in the younger age group with regards to effort expectancy which can be explored

5.9.2 Summary

This chapter presented the findings based on the analysis outlined in the methodology section in Chapter 4. The statistical process commences with firstly a review of basic descriptives. Secondly, a reliability and validity analysis is done using Cronbach's Alpha it was established that not all variable achieved the desired reliability of this study of 0.60. Finally Structural Equation Modelling using four fit indices namely Chi-square, Goodness of Fit (GFI), Root mean square error of approximation (RMSEA) and Comparative Fit Index (CFI), was employed starting with the measurement model, structural model and then moderated by age and gender one based on the methodology outlined in Chapter 4. Table 48 below presents a summary of the results analysis using regression weights outcomes.

Table 51: Summary of Results Analysis

No	Hypothesis	Hypothesis Status	Outcome
H1	Performance expectancy has an impact on behavioural intention which affects usage behaviour.	Supported	P- value = .000 $\beta = .736$
H2	Effort expectancy has an impact on behavioural intention which affects usage behaviour.	Supported	P –value = .000 $\beta = .838$
H3	Social Influence has an impact on behavioural intention which affects usage behaviour.	Not Supported	Dropped as it was statistically weak during measurement model stage
H4	Facilitating conditions have an impact on behavioural intention which affects usage behaviour.	Significant	P –value = .000 $\beta = .534$
H5	Price value has an impact on behavioural intention which affects usage behaviour.	Supported	P –value = .000 $\beta = .771$

H6	Infrastructure reliability has an impact on behavioural intention which affects usage behaviour.	Not Supported	Dropped as it was statistically weak during reliability stage
H7	Trust has an impact on behavioural intention which affects usage behaviour.	Supported	P –value=.000 $\beta = 1$
H8	Experience has an impact on behavioural intention which affects usage behaviour.	Supported	P –value =.0006 $\beta = .118$

In the next chapter, Chapter 6, the results will be discussed and interpreted.

6 Discussion of Results

6.0 Introduction

The objective of this research was to explore factors that influence technology adoption focussing on mobile money in Malawi. In the previous chapter, the results of all various procedures were documented. The results of the basic descriptive, reliability analysis, factor descriptive and structural equation modelling were presented.

This chapter carries out the analysis of data collected using the methodology discussed in the Chapter 4. It also uses the theory covered in the literature review discussed under Chapter 2 and the results presented in Chapter 5 as a guide in the discussion and interpretation of the findings of the empirical study. Some of the findings from the study support the previous literature and some contradict it. This chapter will discuss the individual hypotheses to better understand the effects on mobile money adoption and make recommendations to aide developing markets in increasing up take of mobile money and also achieving the goal of banking the previously unbanked.

6.1 Discussion of Hypothesis

6.1.1 Hypothesis One: Performance expectancy

Hypothesis one stated that performance expectancy has an impact on behavioural intention which affects usage behaviour. Venkatesh et al., (2012) defined performance expectancy as degree to which a technology will provide benefits to consumers in performing certain activities. In the broader context of mobile money this can be referred to as how it will assist customers in managing their money. From the analysis, there is an indication of a model fit that found that performance expectancy had a significant and positive impact on behavioural intention to use mobile money, but the relationship to usage behaviour of mobile money is weak.

This observation is inline and is consistent with the argument and the findings of prior study by Davis (1989) where performance expectancy is said to be same as TAMS perceived usefulness which is defined as "degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Perceived usefulness has been found to be a consistent influence of future individual use of a technology (Adams, Nelson, & Todd, 1992; Agarwal

Prasad, 1998a; Lippert & Forman, 2005; Venkatesh et al., 2003). Chen (2008) defined perceived ease of use as the degree to which the consumer believes that the MM transfer will enhance his transaction. In his study the argument presented was when these belief increases, the consumer's intention to use the MM transfer services will also increase, but this study does not capture the age component. Thus one can conclude that TAMS has good predictability for the mobile money environment.

The results in Chapter 5 from the survey presented in Table 23 indicate that the majority of the people are leaning towards "agree" and "strongly agree", which means everybody is generally positive about mobile money in a favourable way. The most positive area being mobile money makes it easier for me to do my transaction followed by mobile money is convenient and secure. This observation highlights that adoption of mobile money can be achieved if consumers understand the benefits derived from using the service and if the sample is primarily young and tech friendly this can also facilitate in influencing individual use of mobile money in future if it meets the stated expectations.

The results in Table 48, indicate that when Performance Expectancy was assessed on its effect on behaviour intention it showed that it is positively associated with behaviour intention at significance level of $p = .000$ and a β of $.736$ which implies that when behavioural intention goes up by 1 facilitating condition will go up by 0.736. Increases in performance expectancy were positively correlated with increases in behavioural intention to use mobile money.

This analysis supports and reinforces previous literature that stated that performance expectancy has a significant impact on behavioural intention of technology adoption. However gender or age does not moderate the relationship between performance expectancy on behavioural intention to use mobile money. In conclusion, based on the findings of this paper, the results support the hypothesis.

6.1.2 Hypothesis Two: Effort expectancy

Hypothesis two stated that effort expectancy has an impact on behavioural intention which affects usage behaviour. Venkatesh et al. (2012) defined effort expectancy as the degree of ease associated with a consumer's use of technology. In the context of mobile money how easy is it for one to start to use the service. Considering the paradigm shift required to use a mobile money service as it is a shift from a cash based system to a virtual based with little human interaction, it was expected that the effort required by an individual to start to use the service would have a significant impact on the adoption of mobile money service. This result is

consistent with the findings of prior studies (Lichtenstein & Williamson, 2006; Venkatesh & Davis, 2000; Venkatesh et al., 2003).

The results from the survey in Table 24 for effort expectancy indicated that there were less responses in the “strongly disagree” option of the responses and more in the “disagree” and “agree” options. The results in Table 48 show that effort expectancy is positively associated with behaviour intention at significance level $p=.000$ and a β of $.118$ which implies that when behavioural intention goes up by 1 effort expectancy will go up by 0.118. Increases in effort expectancy were positively correlated with increases in behavioural intention to use mobile money. This finding implies that effort expectancy hypothesis is supported.

As expected the analysis supports previous literature that stated that effort expectancy has a significant impact on behavioural intention and usage behaviour in a consumer context of technology adoption based on the findings. When analysed using SEM it was observed that there is a positive relationship between performance expectancy and behavioural intention exists but a weaker one with usage behaviour. In addition, when the relationship between effort expectancy and behaviour intention is moderated with age the findings in Table 50 in Chapter 5. For younger people effort expectancy had twice the significance at z value $=-3.290$. This could be as a result of young people tending to know what they want and can't be influenced easily. However, on the whole there is no overall major difference in moderation of the relationships for gender but a potential difference lies in the younger age group with regards to effort expectancy which can be explored.

6.1.3 Hypothesis Three: Social Influence

Hypothesis three stated that social Influence has an impact on behavioural intention which affects usage behaviour. Venkatesh et al. (2012) defined social influence as the extent to which consumers perceive that important others (example family, friends, and peers) believe they should use a particular technology. In the mobile money environment this refers to the degree to which ones social circle will impact the decision to use the service.

Initially it was anticipated that one's social circle of influence would have a significant effect on consumers behavioural intention and usage behaviour to use mobile money as per visual representation of Figure 2 in Chapter 2 of the original research model UTAUT 2 adopted from Venkatesh et al. (2012) that was used in this study which included this variable as an influence of technology adoption from the consumer perspective The overall findings in Table 25 from the survey showed that majority of the respondents were leaning towards “neutral” and “disagree options”. Therefore, the majority of the respondents disagreed with this variable and this

illustrates that social influence has no impact on their decision to use mobile money. This observation could be as a result of the nature of the product as money is private. When social influence reliability and validation tests were done using Cronbach's, the result achieved as per Chapter 5, Table 20=2 .565 which showed that this was not a reliable measure even when other questions were dropped. An outcome of this is that Malawi would require a tailored measure as sociability is different between collectivist and individualist societies and Malawi is an individualistic society in behaviour.

It can be noted that during the SEM preliminary model measurement analysis phase, social influence is one of the variables that was dropped out from the final model as it had a negative estimate of **-0.259** on review of the regression weights which suggests that this variable is spurious and it did not make theoretical sense to continue using this variable. Based on that finding, it was removed from any further analysis as it was perceived not to be significant for this research. This outcome does not support previous literature that stated that social influence has a significant impact on behavioural intention and usage behaviour in a consumer context of technology adoption. Against this backdrop the third hypothesis is rejected. Social Influence is a subjective factor with no substantial contribution to behaviour intention.

The validation tests of Venkatesh et al. (2003) suggested that social influence was not significant in a voluntary context. The use of mobile money is voluntary and is not a shared good. This suggests that the decision to use mobile money is based primarily on an individual's preference and need not on social circle influence. The correlation between Social Influence was very low and not significant. This observation is consistent with observations by some researchers (Bankole et al., 2011). In addition to this, money also has a lot of personal attachment, therefore people tend to make decisions based on need, convenience and efficiency rather than what the relevant others think. From these findings one can conclude that one's social circle can influence easier decision like shopping for a product that you just buy and use but for a service like mobile money it takes more than one's social influence to drive behavioural intention. In addition to this, having tested the model, the suggestion is that this model does not therefore entirely apply to money.

6.1.3 Hypothesis Four: Facilitating conditions

Hypothesis four stated that facilitating conditions have an impact on behavioural intention which affects usage behaviour. Venkatesh et al. (2012) defined facilitating conditions as consumer's perceptions of resources and support available to perform behaviour. There are two types of resources that support the use of system external and organisational resources. In the context of mobile money it would refer to aspects like easy access, availability of the agent

network, knowledge of how mobile money works, network coverage, reliable customer care and support services and availability of float in the agent networks. These are crucial to Malawi and the pinnacle of which success will be achieved.

The users of mobile money want to be assured that whenever they need to transact, nothing will come in their way to frustrate the usage process. During the analysis it was observed that facilitating conditions were ranked as one of most important influencers of behavioural intention of mobile money. Furthermore, this validates the whole thrust of the study. This is consistent with the findings by Min et al. (2008) on the importance of the role of facilitating conditions in influencing behavioural intention in m-commerce.

From Chapter 5, the results in Table 26 on facilitating conditions show that overall “agree “and “strongly agree “weighted positively with the highest on the agree column, being “m-money allows me to manage my finances” at 64.4% and on the “strongly agree” option, the most favourable being “m-money makes it easier for me to do transactions” at 15.9%. From the results in Table 48, it was observed that facilitating conditions is positively associated with behaviour intention at significance level $p=.000$ and a β of $.534$ which implies that when behavioural intention goes up by 1 facilitating condition will go up by 0.534. Increases in facilitating conditions were positively correlated with increases in behavioural intention to use mobile money. The results support the hypothesis and are consistent with prior studies. However gender or age does not moderate the relationship between facilitating conditions on behavioural intention to use mobile money. This implies that regardless of gender or age consumers care a lot about supporting services around their money therefore support and assurance needs to be provided by the mobile service providers to all consumers at all time.

6.1.4 Hypothesis Five: Price Value

Hypothesis five stated that price value has an impact on behavioural intention which affects usage behaviour. Venkatesh et al. (Venkatesh et al., 2012) defined price value as costs associated with the purchase of device and service that consumers have to bear. This includes the cost of a new device if one is needed to use the service and the transaction cost. This factor was considered to be one of the important drivers of behavioural intention of mobile money and this was confirmed by the measurement scale achieved a Cronbach’s Alpha of 0.739, indicating a reliable scale.

This concurs with the argument presented by Tobbin and Kuwornu (2011), where they termed price value as transaction cost which captured the following elements: cost incurred for one in registration for the mobile money service, transaction price, or a cost for a new device if one is needed. In his study he confirmed that transactional cost can influence the consumer behavioural intention to use mobile money transfer services.

From the responses in the results presented in Chapter 5, in Table 27 it is clear that responses in the options “agree” and “strongly agree” are very strong of particular interest is the price for the device to use the service is affordable at 68.5% and strongly agrees at 20.7%. Price value was the fourth most important variable that influences consumer behavioural intention to use mobile money. The main area of interest in price is the transaction cost has provided a perceived value for the fee that they are being charged. The cost of the device required to use this service was not a prohibitive factor as the service works on any device. This finding again validates the model.

The results presented in Chapter 5, in Table 48 as expected show that price value is positively associated with behaviour intention at significance level **$p=.000$ and a β of .771** which implies that when behavioural intention goes up by 1 price value will go up by 0.771. This implies that increases in price value were positively correlated with increases in behavioural intention to use mobile money. This validates the model in the current context.

As expected this variable was found to be a significant variable in the influencing consumer behavioural intention of mobile money. From the SEM analysis on model fit to data, it was observed that pricing has a strong relationship with behavioural intention but a weaker relationship exists with usage behaviour. This finding could be as a result of Malawi being a price sensitive market thus if the price is high consumers will not be keen to use the service In conclusion, against the findings presented here the result of this study support the hypothesis. . However gender or age does not moderate the relationship between price value on behavioural intention to use mobile money. This could be as a result of price value of service impacts everyone regardless of gender or age and usage will depend on the perceived benefits or savings that will be derived.

6.1.6 Hypothesis Six: Infrastructure Reliability

Hypothesis six stated that infrastructure reliability has an impact on behavioural intention which affects usage behaviour. This was an additional construct that was core to the current study and the focus was on the infrastructure reliability during use refers to the physical system or application required for operation of mobile money (network stability, and SMS functionality).

To the researcher's surprise, infrastructure reliability had no substantial contribution in predicting behaviour intention of technology adoption and the correlation was very low and not significant for this study. Infrastructure reliability did not even appear when the regression weights analysis was done as this was dropped at reliability and validity measurement stage as the result achieved in Table 22, of .558 which was too low. This could be the case as infrastructure is covered by Hypothesis 4 facilitating conditions.

Overall from the findings of this study infrastructure reliability does not have anything to do with model. Having reviewed the data results presented in Chapter 5, the hypothesis was rejected as it does not support the model.

6.1.7 Hypothesis Seven: Trust

Hypothesis seven stated that trust has an impact on behavioural intention which affects usage behaviour. For the purposes of this study, the two categories of trust that were considered were: trust of technology and trust of mobile banking providers (Siau & Shen, 2003), together with trust, as the extent of consumer belief in systems, processes and procedures of the service provider and its channel (Ketkar et al., 2012). Consumer trust is one of the most important factors from both a marketing and technology adoption perspective as this encourages word of mouth and also usage. Previous studies had introduced the concept of "perceived risk". In fact, perceived risk is closely related to trust.

Trust is one of additional constructs that was added to the revised proposed model in Chapter two and the researcher anticipated that this would be one of the determinants of success of behavioural intention behaviour and usage behaviour in mobile money context. This concurs with a previous study by Riffai et al. (2012) in Oman conducted using UTAUT which had included trust but looking at its impact in influencing behavioural intention of online banking (BIOB) and usage behavioural of on-line banking.

From the results presented in Chapter 5, Table 29 indicates It should be noted that the option “agree” and “strongly agree” were very strong with “I believe in wireless infrastructure” at 64.4% and “I trust the operator who is providing the mobile money service” at 61%. Furthermore, more than 80% of the respondents were leaning to positive on the trust variable. From the results in Table 48, it was observed that trust is positively associated with behaviour intention, with a significance level of **p=.000 and β of 1** which implies that when behavioural intention goes up by 1 trust will go up by 1. Increases in Trust were positively correlated with increases in behavioural intention to use mobile money. This result implies that increase in trust will increase is associated with behavioural intention to use mobile money. The researcher therefore concluded that this hypothesis supported the results as noted already in Chapter 5. The result did not come as a surprise as money and trust go hand in hand. This is an impressive result and this further validates the model and underlines its applicability in the emerging market context.

Further analysis was done using SEM to test the model fit to the data, from the findings it indicated that there is a strong relationship between trust and behavioural intention to use mobile money but there is a weaker relationship to usage behaviour of mobile money. However gender or age does not moderate the relationship between Trust on behavioural intention to use mobile money. This is due to the fact that trust is earned based on experience that one encounters when using a service and that is regardless of gender or age. One’s experience can either build trust or create distrust in the service and this will have an impact on uptake and growth.

6.1.8 Lack of money and Low Income Levels

Another interesting insight established from respondents during the interviews which was not part of the research was lack of money and low income levels as a reason of being unbanked. This brings to light that the introduction of mobile might not necessarily lead to banking the unbanked and low levels of consumer income may affect consumer behavioural intention and usage behaviour of mobile money. This finding is not surprising given the poverty levels in the market in which the study was done and this could also be an inhibitor in other developing countries with similar conditions. This insight is consistent with studies done by Ketkar (2012) in India, which cited lack of steady and substantial source of income and lack of need for banking /payment services as a major reason for financial exclusion.

6.2 Summary

The purpose of this chapter was to discuss the findings collected in Chapter 5 in relation to the modified UTAUT 2 model for the developing world, while referring to the literature covered in Chapter 2 to give insight and confirm whether there are any similarities or differences that were observed from the context in which the study was conducted. Overall the model only achieved a good fit it was still able to provide insights that will contribute to IS research as well business.

It was found that the most significant variables to drive adoption of mobile money through behavioral intention were Performance Expectancy, Effort Expectancy, Facilitating Conditions, Trust and Price Value these have been presented in order of importance. One can draw a conclusion that an increase in any one of the four stated variables will result in a direct increase and impact on behavioural intention of mobile money. Further analysis conducted in SEM revealed that there is a strong relationship between the variables and behavioural intention but a weaker relationship exists with usage behaviour thus one cannot conclude that these variables also drive usage behaviour at this stage. Broad support for the UTAUT 2 research model has been tested and found, however the core construct that was incorporated for this context infrastructure reliability did not hold as it was covered with hypothesis 4 facilitating conditions. In addition to this, age and gender do not have a significant impact in terms of moderating the relationship with the different variables, except for effort expectancy which needs to be explored more by age strata.

On discussion of the other variables proposed in the model, the results of the survey highlighted that, Social Influence, and Infrastructure Reliability do not have any significant impact on behavioural intention and usage behaviour of mobile money in this environment. In this vein, it may be concluded that the research objectives have been achieved and the variables that can influence behavioural intention of mobile money in a developing or emerging market context have been established. The final modified model for developing world is presented below in figure 13. The model presents a consolidation of previous literature and findings from this study in particular trust has been incorporated into the variables that influence adoption of mobile money. Furthermore it was also concluded that age moderates the relationship between effort expectancy and behaviour intention only in this environment.

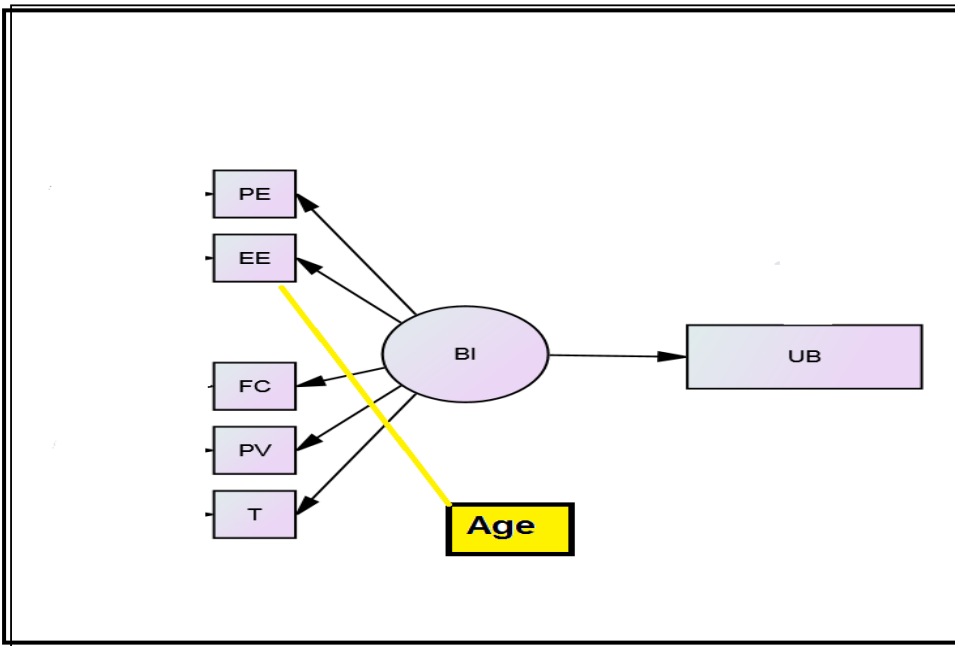


Figure 13: The Final Modified Model for the Developing World

Table 52: Key Final Modified Model

PE	Performance Expectancy
EE	Effort Expectancy
FC	Facilitating Conditions
PV	Price Value
T	Trust
Age	Age
BI	Behavioural Intention
UB	Usage Behaviour

7 Conclusion

7.0 Introduction

This study sought to extend the existing body of knowledge of technology adoption from a consumer perspective using the modified UTAUT2 model for a developing world and bringing in two additional constructs trust and infrastructure reliability to the existing literature in order to identify the factors that influence behavioural intention and usage behaviour in technology adoption of the mobile money service in Malawi. The research was primarily motivated by the fact that mobile money research is in its formative stages and most Information Systems research studies on technology adoption have focused on the organizational context and there are still gaps that need to be understood in the consumer context especially in developing countries. On the academic side the aim was to contribute to understanding disruptive technology adoption from a consumer perspective in a developing market context which has been excluded in previous research papers.

Since the launch of mobile money service on the Malawi market it has not experienced expected success like it has in Kenya. Seven variables were tested moderated with gender and age to identify the predictors and influencers of behavioural intention and usage behaviour of mobile money.

From the seven variables, Performance Expectancy, Facilitating Conditions, Price Value and Trust were the most significant determinants of behavioural intention of mobile money adoption. The research findings summary for mobile money adoption, recommendations for mobile network operators, marketers and policy makers, as well as suggestions for direction of future research are documented below:

7.1 Findings Summary

With the developments happening in the mobile industry and voice becoming a commodity offering for all mobile network operators the uptake of mobile money is more critical for retention as well as a differentiator. The objectives of the research stated in chapter one and all the questions set that formed the study were met. The findings revealed that four main drivers from the modified model for a developing world had an impact on behavioural intention of mobile money namely performance expectancy, facilitating conditions, trust, and price value. Further to this it was observed that effort expectancy, social influence, and infrastructure reliability did not have a significant impact on behavioural intention. When structural equation modelling was

used to determine model fit to data, after some iteration the result was that it was a good fit. The model, therefore, holds well in terms of behaviour for mobile money in emerging markets. The lack of finding in terms of infrastructure could be due to two possible reasons – firstly, measurement was an issue and, even though a single item was used, the solution was not optimal. Secondly, facilitating conditions can be seen to encompass infrastructural issues

The findings suggest that if mobile money customers perceive mobile money system as user friendly and that it provides clear benefits for them in using the service, they have clear information, it's understandable and customer services support their intention to use mobile money will be positive and any increase in any of the variable stated will increase the adoption. It is further reported that if the mobile money customer trusts the wireless network infrastructure and the mobile service provider and the transaction price gives them value for money they may adopt the system. It was also noted that customers will not intend to use mobile money because of influence of families, peers or friends thus mobile money as money is a private issue. Therefore, providers need to come up with campaigns that create the confidence of the customer and win them over to try the service and experience it.

Whilst the implications for mobile network providers are significant, we also provide theory for knowledge of technology adoption from the consumer perspective from disruptive technologies. Having reviewed various conceptual frameworks from previous studies we have proposed an approach that allows for an understanding from the developing market perspective and a different social setting to the organisational context and the developed perspective where most IS research has been conducted in order to understand drivers of technology adoption and acceptance. So in order to grow the mobile money uptake and achieve success and transform the industry a customer centric and context specific radical end-to-end approach needs to be adopted.

Managerial Implications

- Mobile network operators' networks department and mobile money managers need to consider facilitating conditions as a priority area in their business model and an enabler of growth and success. This speaks volumes about the need for support and assurance of the performance of this service as for the majority of the consumers who are unbanked have low income or irregular income from relatives in urban cities and they trust that the mobile money provider will keep their money safe and whenever they need it they should be able to access it.

- There other important insights that can be drawn from mobile money is this is the equivalent of a virtual bank and it will offer those who have never been banked and low income consumers an opportunity to experience being banked. Therefore mobile money service managers and providers need to ensure they mitigate against consumers experiencing distrust when using the service as this is money at stake.

7.2 Recommendations

7.2.1 Mobile Network Operators

The results from this study have significant implications that need to be taken into account by mobile network operators given the level of investment involved in the deployment of mobile money service that operators have to take. A good understanding of the factors driving mobile money adoption is critical so as to make sure that prioritisation of resources is done appropriately.

Facilitating conditions turned out to be the second most significant construct determining behavioural intention of adoption of mobile money. Mobile network operators must therefore ensure the mobile money ecosystem is well managed and information of where to get support is readily accessible to customers.

Users of mobile money are concerned with the supporting services around their money such as:

- They want reliable network access anywhere, anytime that they need to get their money. Thus mobile operators need to have sufficient network coverage to be able to deliver the service.
- They need to be well educated and have confidence in how to use the mobile money service. Mobile operators need to spend a lot of time and effort educating and engaging with customers to disseminate and impart knowledge on how to register, use and where to access the service.
- Agent quality is one of the critical components of the mobile money ecosystem in terms building faith and trust in the mobile money system. Customers want the mobile money

agent to have enough float when they go there to cash in or out. This implies that the mobile network operators need to consider starting with a small number of agents, do proper due diligence and register credit worthy agents in their deployment of the service. It is essential that mobile network operators develop an understanding and work hand in hand with agents to develop a profit story for their business in order to understand the day to day operations and challenges they face and work with them to develop solutions.

- Mobile network operators need to be prepared to invest considerably in acquisition incentives for merchants and agent.
- They want customer service support that is reliable and they can get help whenever they need it as this is money that we are dealing with. Mobile network operators need to train and make sure their customer care agents, all customer touch points that are owned by the mobile operator as well as franchised outlets as well as the airtime distributors and retail selling outlets are conversant and able to give first level support to customer queries on mobile money.

7.2.2 Marketers

For marketers the main concern is increasing mobile money uptake, strengthening the product and improving the adoption numbers. Trust turned out to be one of the important influencers of mobile money adoption and the role of the marketing managers is to build trust of the service through the following means:

- Based upon the results obtained from the respondents a key insight that can be drawn from the findings is that from a marketers perspective the pricing of the mobile money service can be a driver or inhibitor of uptake and growth thus when pricing the registration and transaction cost careful consideration has to be taken in terms of the value or savings that customer gets compared to if he had to go physically to get a similar service.
- Find creative way to create a sense of urgency in the customers mind for them to want to learn about mobile money.
- Customer education on product features and awareness through aggressive marketing campaigns and activations.

- Most mobile deployments that are happening including the one launched in Malawi have taken the M-pesa approach and driving heavily the person-to-person transfer of money for sending and receiving money without taking time to be customer centric or context specific. A more robust approach recommended to marketers is to identify the market specific customers main need through a customer needs assessment that maps out current customer behaviour, customer pain points with traditional banks and expectations from mobile provider of mobile money, identify important segments and design and develop a killer compelling product offering to take to market through a 360 degrees integrated marketing communication approach comprising of above the line (TV, Radio, Billboards, Print, Posters, Wall Painting), below the line (SMS broadcasts, experiential campaigns, face to face interactions and online media (Facebook, Twitter). The researcher believes that this can help the product gain the momentum that it deserves as it will be need based.

7.2.3 Policy Makers

Even though the impact of minimum requirements to register mobile money as a driver of was not part of this study the researcher felt that this was an important condition to highlight, in the Malawi context. One important insight that was cited by several respondents was the requirements for customers to register for the mobile money service in Malawi are similar to those that traditional banks use which is quite prohibitive and laborious.

Mobile money is expected to improve the socio-economic welfare of those who were previously unbanked. The first recommendation is for government through the central bank to conduct its own study on the impact of minimum requirements stipulated as a provision to open a mobile money account on banking the unbanked in Malawi.

Considering the goal of financial inclusion and also the fact that most of the expected mobile money users are low income and predominantly rural based who will use the service to receive monetary support from their relatives in cities. The second recommendation to government through the central bank is to relax the requirements for one to register for the mobile money service and consider usage of mobile number as ID by encouraging mobile operators to do KYC so that the numbers registered can be substantial.

7.3 Limitations of the research

As is the case in most empirical research, this study has several limitations:

- The exposure to mobile money is still at its infant stages in Malawi and the researcher had to explain to what it is to respondents.
- Mobile money is a new phenomenon in Malawi and the conclusions drawn from this study are based on cross-sectional data, thus the posited relationships can only be inferred rather than proven.
- Thus study focussed only on Airtel Malawi's current subscriber base as this is the only operator that has launched the service.

7.4 Directions for future research

The research focussed on consumer intention to adopt mobile money. Without specific focus on a particular segment, future research can explore the predictors and influences of behavioural intention and usage behaviour of mobile money for the low income customers (Bottom of the Pyramid), as this is a service that is believed to serve the previously unbanked.

There is a belief that mobile money can help governments achieve the goal of financial inclusion and build a saving culture in an economy. Future research can look at post adoption usage behaviour with a focus on the impact of mobile money on banking the unbanked, cultivating savings habits and social economic benefits.

Another factor that was established from the findings which was not part of the research was lack of money and low income levels as a reason for being unbanked. This brings to light that the introduction of mobile money might not necessarily lead to banking the unbanked and low levels of consumer income may affect consumer behavioural intention and usage behaviour of mobile money. Therefore further studies can look at the impact of the economic factor and low income levels on intention to adopt mobile money.

Finally, since this was not covered in this study, future studies can look at the impact of minimum requirements to register for mobile money and their impact on adoption of the service.

This can be built on technology adoption literature and also incorporated into the two common models Davis's (1989) Technology Acceptance Model (TAM) and Venkatesh et al. (2012) extended Unified Theory of Acceptance and Technology Use model (UTAUT 2).

Earning mobile money trust is necessary in order to increase uptake and influence behaviour intention and usage behaviour of this service within an emerging market context. It is therefore important to include the concept of trust into the model for future research. In conclusion, having considered the findings from the data, the researcher proposes that the variable, Trust, must be added to future IS research models as variable for disruptive technologies in a consumer context.

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9 Appendices

9.0 Appendix 1: Informed Consent Letter



Date:

Dear Participant,

MBA – Master of Business Administration – Participant Briefing and Consent Letter

I am conducting a research on Building consumer mobile money adoption and trust in conditions where infrastructure are unreliable in Malawi .The key objectives of the study are to;

- Understand Mobile Money
- Identify the factors that impact behavioural intention and usage of mobile money
- Develop campaigns that will enable marketers and mobile operators increase penetration and business growth

To that end you will be asked several questions based on a 5 point likert scale. This will help us better understand challenges faced when transacting on Mobile Money in Malawi and the information you will be asked will be used to help provide insights, our interview should take no more than 30 minutes of your time.

Your participation is voluntary and can be withdrawn at anytime without penalty. The data you provide will only be used for the dissertation, and will not be disclosed to any third party, except as part of the dissertation findings, or as part of the supervisory or assessment processes of the University of Pretoria Gordon Institute of Business Science (GIBS). If you have any concerns, please contact me or my supervisor. Our details are provided below.

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:

Signature of participant: _____ *Date:* _____

Signature of researcher: _____ *Date:* _____

9.1 Appendix 2: Mobile Money Questionnaire

Mobile Money Questionnaire

Section A: General	
Name of Respondent	
Mobile Number	
Physical Address	
Town	

Section B: Demographics

1. Please indicate your gender:

Male [1]

Female [2]

2. Please tick appropriate age:

16 – 30 years	1
31 – 62 years	2
63 – 80 years	3
More than 80 years	4

3. What level of academic and professional education/training have you attained?

Please tick accordingly;

Primary School (e.g. Standard 8)	1
Secondary School (e.g. MSCE/ O levels)	2
High School (e.g. A Levels)	3
Diploma / Certification	4
Bachelors Degree (e.g. BSc, BCom, BA)	5
Professional Qualification (e.g. Chartered Accountant, Pilot)	6
Post graduate Degree (e.g. MBA, MSc ,	7

MA etc)	
Other (Please specify here) _____	8

4. What is your occupation?

Please tick accordingly;

Unemployed	1
Student	2
Self Employed	3
Employed : Clerical Level	4
Employed : Supervisor Level	5
Employed : Middle Management	6
Employed : Senior Management	7
Retired	8
Other (Please specify here) _____	9

Section C: Cell Phone User Profile

5. Please indicate cell phone use status

- Own a phone
- Share a phone
- No phone

6. Please indicate by ticking appropriate box type of service you have

- Post-paid
- Prepaid

7. Please indicate by ticking appropriate box type of services you use (tick all which apply)

- Local Voice
- International Voice
- Internet
- Blackberry
- Airtel Money

- SMS
- Airtel Hello Tunes (Caller Ring back tones)
- Airtel Nyimbo (Music on Demand)

Section D: Mobile Money

8. Are you currently using any of the following services on mobile money

- Sending cash
- Receiving cash
- Purchases at retailer
- Bill payments (utilities)
- Airtime purchases
- Bank transfer
- Do not use mobile money

Performance expectancy refers to degree to which a technology will provide benefits to consumers in performing certain activities. For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
9	m-money makes it easier for me to do transactions	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
10	m-money allows me to manage my money better	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
11	m-money allows me to save my money	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
12	m-money is a convenient and secure for my money	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

13	m-money will allow me in improving my financial tasks	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
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Effort expectancy refers to degree of ease associated with consumer's use of technology. . For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
13	Learning to use mobile money would be easy	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
14	It would take me lots of time to learn how to use mobile money	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
15	Using mobile money services would lead to loss of convenience as I would have to follow up when errors occur	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Social influence is the extent to which consumers perceive that important others (e.g. family friends) believe they should use a particular technology. . For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
16	I use m-money because of my	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

	peers and friends					
17	m-money is important because my family use it	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
18	I use m-money to conform to what everyone is doing	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Facilitating conditions refer to consumers perceptions of resources and support to available to perform behaviour. . For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
19	m-money makes it easier for me to do transactions	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
20	m-money allows me to manage my finances better	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
21	m-money allows me to save my money	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
22	m-money allows me to make purchases of goods and services easily	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Price value refers to costs associated with the purchase of device and service that consumers have to bear. For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
23	m-money transaction fee is affordable	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
24	m-money overall service is affordable	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
25	The price charged for the service gives me value	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
26	The price for the device to use the service is affordable	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Infrastructure reliability refers to the physical system or application required for operation of mobile money (network stability, network outages, mobile money agent availability in area, sms functionality). For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
27	Network stability is good (No dropped calls)	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
28	SMS reach their destination on time	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
29	Is there a mobile money outlet in your area	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
30	Network coverage exists	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

	in everywhere					
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Trust is a state involving confident, positive expectations about another's motives with respect to oneself in situations entailing risk. For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
31	I trust mobile money service	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
32	I trust the operator who is providing the mobile money service	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
33	I trust that my money is secure using mobile money	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
34	I trust mobile money transactions	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
35	I believe wireless infrastructure can be trusted.	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Experience refers to previous experience using mobile phone technology and applications. For this use a 5 point scale where 1 = strongly disagree and 3 neutral whereas 5 = strongly agree.

		Strongly disagree [1]	Disagree [2]	Neutral [3]	Agree [4]	Strongly Agree [5]
36	I have used my mobile phone for at least a year	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
37	I am able to use	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

	the functionality of my mobile phone	disagree				Agree
38	I use my mobile phone frequently	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
39	I am very skilled at using my mobile phone	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
40	I know less about using mobile phones than most users	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

Thank you for completing this questionnaire.

9.2 Appendix 3: Reliability Analysis

Reliability Analysis		
Performance Expectancy		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.863	5	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PE 9: m-money makes it easier for me to do transactions	0.704	.828
PE 10: m-money allows me to manage my money better	0.771	0.812
PE 11: m-money allows me to save my money	0.671	0.837
PE 12: m-money is a convenient and secure for my money	0.700	.830
PE 13: m-money will allow me in improving my financial tasks	0.576	0.862
Effort Expectancy		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.410	3	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EE 14: Learning to use mobile money would be easy	0.189	.422
[I] EE 15: It would take me lots of time to learn how to use mobile money	0.315	0.179
[I] EE 16: Using mobile money services would lead to loss of convenience as I would have to follow up wh	0.235	.334
Social Influence		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.565	3	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SI 17: I use m-money because of my peers and friends	0.350	.503
SI 18: m-money is important because my family use it	0.356	0.496
SI 19: I use m-money to conform to what everyone is doing	0.423	0.393
Facilitating Conditions		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.826	4	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FC 20 :m-money makes it easier for me to do transactions	0.614	.803

Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FC 20 :m-money makes it easier for me to do transactions	0.614	.803
FC 21: m-money allows me to manage my finances better	0.750	0.739
FC 22: m-money allows me to save my money	0.644	0.783
FC 23: m-money allows me to make purchases of goods and services easily	0.614	0.797
Price Value		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.739	4	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PV 24 : m-money transaction fee is affordable	0.630	.619
PV 25 : m-money overall service is affordable	0.687	0.585
PV 26 :The price charged for the service gives me value	0.671	0.601
PV 27: The price for the device to use the service is affordable	0.187	0.834
Reliability Statistics		
Cronbach's Alpha	N of Items	
.834	3	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PV 24 : m-money transaction fee is affordable	0.704	.771
PV 25 : m-money overall service is affordable	0.720	0.747
PV 26 :The price charged for the service gives me value	0.677	0.790
Infrastructure Reliability		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.558	4	
Item-Total Statistics		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I 28: Network stability is good (No dropped calls)	0.440	0.417
I 29 :SMS reach their destination on time	0.434	0.416
I 30: Is there a mobile money outlet in your area	0.250	0.565
I 31 :Network coverage exists in everywhere	0.280	0.546
Trust		
Reliability Statistics		
Cronbach's Alpha	N of Items	
.822	5	

