UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

MODERATING FACTORS IN ADOPTION OF MOBILE FINANCIAL SERVICES IN KENYA

by Andrew Kimotho Wamatu

A dissertation submitted in fulfillment for the Degree of Masters of Science in Information Systems in the School of Computing and informatics in the University of Nairobi
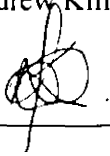
December 2012

Declaration/Approval Page

Declaration

I hereby confirm that that the material contained in this project is my original work and does not contain significant portions of unreferenced or unacknowledged material. I also confirm that this work has not been presented for a degree in any other university.

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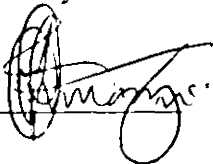
Signature: _____   Date: __25/02/2013__

Approval

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

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Abstract

Rapid growth of mobile financial services in Kenya is transforming how consumers access financial services.

This research uses a technology acceptance model known as the Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate the moderating factors that influence the Kenyan consumer to adopt a particular mobile financial service provider and how they act in response to the newly adopted and diffused mobile technology. A quantitative research design was employed to study Kenyan consumers' adoption and use of mobile money.

Data for this study was collected from 311 respondents in different areas on Nairobi by means of a hardcopy survey complemented by face-to-face interviews. Data and analysis was done using Structural Equation Modeling (SEM) and AMOS.

The results showed that in adopting mobile financial services, consumers were mostly influenced by the perception of the mobile money service on those in their social circle. Perceived trust in the mobile financial service was also a strong influence toward mobile money adoption. With respect to the moderating factors considered in this study i.e. age, gender, education and duration of use; none appeared to have any significant influence between the various predictors of intention to use mobile financial services.

The study validated the UTAUT model in the context of mobile money. Knowledge gained from this study may be of use to providers of mobile money services or those intending to introduce similar services into the Kenyan market.

Acknowledgement

I am sincerely grateful to The Almighty God without whom nothing is possible together with the people who participated in this research and thus contributed to make this dissertation a success. Of special mention is Tonny Omwansa for his well-organized supervision, my employer for the opportunity and support and my family for their constant encouragement. I wish them all God's abundant blessings.

Andrew Kimotho Wamatu

9th December 2012

1.   LIST OF FIGURES

2. LIST OF TABLES

TABLE OF CONTENTS

Appendix A: M-PESA Questionnaire

Appendix B: Airtel Money Questionnaire

Appendix C: Orange Money Questionnaire

CHAPTER 1

Introduction

1.1 Background

Kenya is among many countries in Africa that have experienced dramatic increase in mobile phone access. Indeed, the mobile penetration rate in Kenya is among the highest in Africa (World Bank, 2010).

By mid 2010, there were 21 million active mobile phone numbers, equivalent to one per adult, as compared to less than 1 in 1000 Kenyan adults in 1999 (World Bank, 2010).

One of the consequences of this growth is mobile money financial services or Mobile Money. Mobile Money can be defined as money that can be accessed and used via mobile phone (Jenkins, 2008) and comprises of services such as transfer of money from person to person, paying of bills, and purchasing of goods and services including airtime.

Mobile Money has transformed how consumers access financial services, especially in the developing world where large sectors of society have often gone without any formal banking services whatsoever.

There is no better example as yet of the impact and success mobile money has had than *M-PESA*, a mobile money service launched in 2007 by Safaricom Ltd – a mobile operator in Kenya, and has been described as *"by far the most successful example of mobile money banking in Africa"* (Economist, 2009).

By August 2010, *M-PESA* had enlisted 12.6 million customers and nearly 20,000 agents countrywide (World Bank, 2010). It is remarkable that has happened even among a poor and unbanked population with no technology precedent.

There are a few other mobile money services that have been launched in Kenya. These include Airtel's *Airtel Money*, initiated in January 2010; *yuCash* started in December 2009, by Essar; and, *Orange Money (Iko Pesa)*, which was launched in November 2010 by Telkom Kenya. M-PESA has by far the largest market share, with more than 90 percent of mobile money subscriptions (World Bank, 2010).

It was estimated that by end of the year 2010, 15 million Kenyans (3/4 of the adult population) would have used mobile money, transferring an estimated US$ 7 billion annually (20 percent of GDP) by phone (World Bank, 2010).

The clearest and most direct benefits of mobile money are the greater convenience, far greater speed, and generally lower cost of transferring funds (Plyler, 2010).

1.2 Problem Statement

From the mobile financial service products that have been launched by their respective mobile network operators (MNOs) in Kenya, it is clear that other products have not witnessed the kind of adoption and diffusion that M-PESA has.

This is interesting given that these mobile money products that offer similar and in some cases enhanced services as compared to those offered by M-PESA.

It is thus useful to investigate the factors that influence the Kenyan consumer to adopt a particular mobile financial service provider and how they act in response to the newly adopted and diffused mobile technology.

In order to investigate the Kenyan consumers' technology acceptance process of mobile financial services, this research uses a technology acceptance model known as the Unified Theory of Acceptance and Use of Technology (UTAUT).

The research aims to establish whether the moderating factors proposed in UTUAT are relevant in mobile Money adoption in Kenya as well as investigate additional factors not included in the original UTAUT model that may have an influence on adoption.

By carrying out this study, this research seeks to inform the mobile money sector of factors that may affect the adoption of mobile financial services. Such information is definitely be useful in strategy and positioning of the current mobile financial service products.

The study can also be insightful to companies wishing to introduce a mobile money product or service to the market in the near future.

1.3 Objectives

The objectives of this research are thus:

a) To apply UTAUT to study mobile money adoption in Kenya and establish its relevance and suitability.

b) To extend UTAUT by taking into account potentially useful moderating variables that were not included in the original model

c) To empirically test the fitness of existing and additional moderating factors in the modified model of the adoption of Mobile Money in Kenya.

CHAPTER 2

Literature Review

In order to understand what might influence the adoption of Mobile Money, literature on theoretical models and relevant studies is reviewed in the following section. The key factors affecting Mobile Money adoption together with the moderating factors are discussed first and then a proposed conceptual model is outlined.

2.1 Technology Adoption Models

Various theoretical models for technology acceptance and adoption have been developed in order to provide understanding of the usage and adoption of Information technology. Among the most influential ones is the theory of reasoned action (TRA) developed by Fishbein and Ajzen (1975). TRA proposes that a person's behavioral intention depends on the person's attitude about the behavior and subjective norms (the influence other people have on a person's attitudes and behavior). According to this theory, if a person intends to do a behavior then it is likely that the person will do it. TRA is the basis for the theory of planned behavior (TPB) proposed by Ajzen (1991). TPB attempts to improve TRA by adding another construct – behavioral control, which is "the individual's perception of the ease or difficulty with which the behavior can be performed"(Ajzen, 1991).

The technology acceptance model (TAM) is another adaptation of TRA that was proposed by Davis (1989). It is based on the premise that system adoption and use is fundamentally determined by perceived usefulness and perceived ease of use. Perceived usefulness is also seen as being directly impacted by perceived ease of use (Davis, 1989).

Another prominent theory that concerning technology adoption is the innovation diffusion theory (IDT) by Rogers (1995) that seeks to explain how, why, and at what rate new ideas and technology spread through cultures.

After reviewing and empirically testing the above among other technology acceptance models, Venkatesh et al., (2003) proposed a unified model known as the Unified Theory of Acceptance and Use of Technology (UTAUT) that integrates technology acceptance determinants across several adoption models.

According to the UTAUT, the intention to use an information technology (IT) is directly determined by three constructs: performance expectancy, effort expectancy and social influence. Consequently, intention together with facilitating conditions, exert influence on actual behavior toward IT adoption (Venkatesh et al., 2003).

Performance expectancy measures how much people perceive an information system, such as a mobile technology, as being useful in achieving their goals in terms of job performance. Effort expectancy explains how much people feel comfortable and find it easy to adopt and use a system, whereas social influence, is the influence of others people's opinions about a certain system adoption. Facilitating conditions on the other hand is "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003).

In addition UTAUT incorporated four moderators were included in the original UTAUT model. These include: age, gender, experience, and voluntariness of use. These moderate the impact of the four constructs on usage intention and behavior.

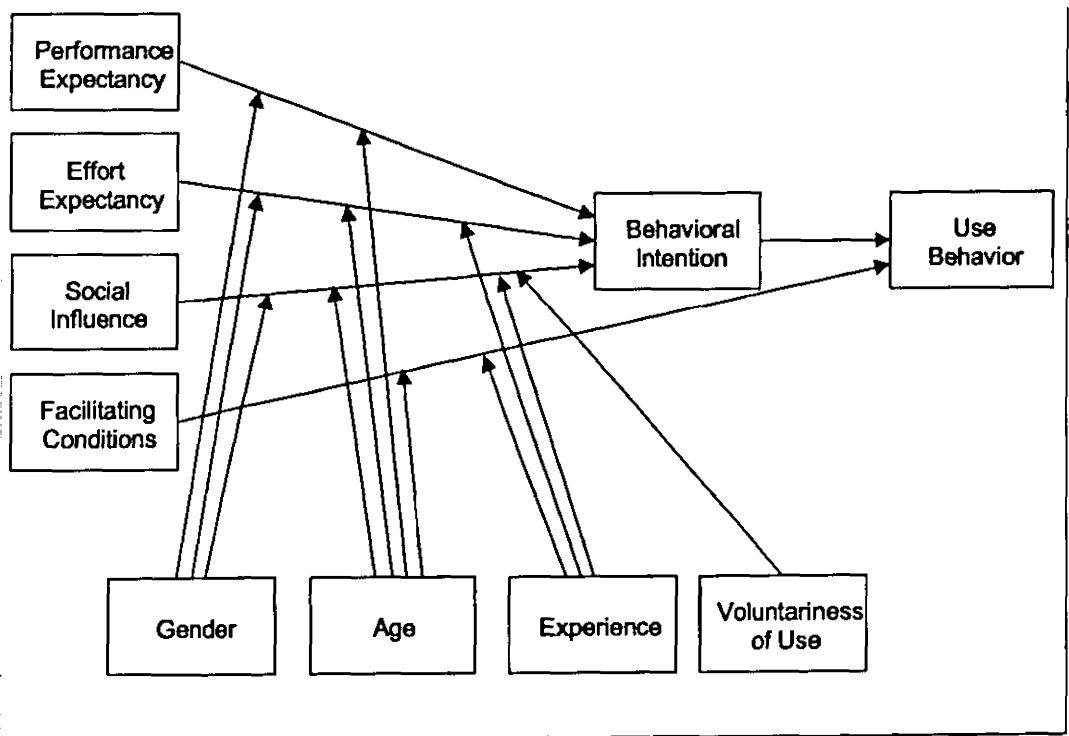The original UTAUT model is represented in Fig 1.1

Fig 1.1: Diagram of the original UTAUT Model. Source: Venkatesh et al., (2003)

Studies show that the above theories have been used to study value added mobile services and the most applied, tested and refined models are TAM and UTAUT, IDT and TPB in that order (Tobbin, 2010).

This research bases its rationale for using UTAUT on findings from empirical tests on explanatory power, which is the ability of a theory to effectively explain the subject matter it pertains to.

Results from tests done by Venkatesh et al., (2003) on explanatory power in eight user acceptance models including TAM and revealed that UTAUT accounted for 70 percent of the variance (adjusted R^2) in usage intention an improvement over any of the original models where the maximum was around 40 per cent. This suggested that UTAUT had a higher explanatory power than any of the original models.

UTAUT has also been considered to be the most prominent and unified model in the stream of information technology adoption research with high robustness of the instruments regarding the key constructs (Li and Kishore, 2006).

Despite the wide application and robustness attributed to UTAUT, the suitability of UTAUT for explaining the adoption of technologies like Mobile Money in Kenya can be questioned on the basis that most of the previous studies were conducted on were on an organizational setting and were done in countries mainly the United States and European nations whose economic and cultural contexts are very different to the current research environment. The legitimacy of applying standardized research methodologies and results from western nations to understand other environments is also questionable (Zhang and Prybutok, 2005).

Hence one of the objectives of this research is to attempt to establish the suitability of this model in explaining the adoption of mobile money.

2.2 Moderating Factors

Moderating factors are the qualitative or quantitative variables, which affect the direction and/or strength of the relation between an independent and dependent or criterion variable.

Investigating moderating factors is useful because as stated by Sun and Zhang (2006), "prior studies imply great potential regarding the additional of moderating factors to enhance explanatory power".

The results of tests done by Venkatesh et al., (2003) on eight models and revealed that the explanatory power (same as predictive validity) of six of the eight models increased significantly after the inclusion of moderating variables thereby confirming the significant influence of moderating factors in existing models of user technology acceptance (Sun and Zhang 2006).

This has also been confirmed by Chin et al. (2003) who empirically examined and confirmed the significant influence of moderating factors in existing models of user technology acceptance.

Though Venkatesh et al., (2003) only included age, gender, experience and voluntariness as the moderating factors in their study, they acknowledged that empirical evidence suggested a larger number of moderators than these. This view is also shared by Sun and Zhang (2006) who have argued for the case for additional factors to capture the complexity of the different contexts.

With regard to age as a moderating factor, several studies point toward age influencing the use of technology with younger people being showing higher use levels than older users (Gefen and Straub, 1997; Venkatesh and Morris, 2000).

With respect to gender, studies have found that men and women adopt and use technology differently (Gefen and Straub, 1997; Venkatesh and Morris, 2000). Men appear to be more influenced by perceived usefulness while women appear to gravitate toward the influence of the technology's ease of use (Venkatesh and Morris, 2000).

However, another study on the gender differences in IT acceptance and usage reveals that the expected gap between genders are diminishing as the technologies are more widely diffused (Zhou et al., 2007).

Studies on the influence of education as a moderating factor in technology adoption reveal that an individual's education level influences technology adoption and usage by affecting his or her capability to use technology. (Piccoli et al., 2001)

This view is also supported by Chabossou et al., (2009), who in their study on mobile adoption and usage in Africa, observed that income and education significantly enhances mobile adoption, though gender and age are observed not to have much influence.

Considering that UTAUT was developed to explain organizational adoption of information technologies, there is need to include mobile and contextual factors (Mallat et al., 2008) in order to reflect the unique influences of moderating factors that may influence adoption of mobile money.

Therefore, this research proposes to contextualize the UTAUT model for Mobile Money adoption in Kenya by making some modifications to the UTAUT model.

One moderating variable – voluntariness of use is dropped in this study on the basis that use of mobile money is optional and voluntary and that the context is not an organizational one as in UTAUT.

Among the additional and useful factors that this research considers relevant to mobile money adoption are perceived trust and perceived risk.

Trust is an important aspect in a e-commerce environment (Siau and Shen, 2003) and this applies to mobile money environment as well.

In the mobile money context, the presence of trustworthy local agents who are well integrated into the consumers' communities is important. Moreover, how a consumer perceives the network and service as being reliable and available affects his or her perceived trust in the service (Siau and Shen 2003).

Previous studies have found perceived trust as a significant determinant influencing consumers' behavior intention towards conduct electronic commerce transactions (Keen, 1997; Gefen et al., 2003; Mallat, 2007).

For the purpose of this study, trust is defined as "a measure of consumer's level of assurance that the service will be provided with minimum possible hindrance" (Tobbin, 2010).

Since the need for trust arises purely from a risky situation (Mayer et al., 1995), perceived risk cannot be ignored in light of trust (Pennanen et al., 2006) and are thus considered as related to each other.

Perceived risk is defined as the consumer's belief about the potential uncertain negative outcomes from the mobile money transaction (Bauer et al., 2005).
The consumers desire to minimize risk has been shown to be greater than their willingness to maximize utility and hence their subjective risk perception strongly influences their behavior (Bauer et al., 2005). Chen (2008) also confirms that that reducing uncertainty has a positive influence on consumers' intention to adopt electronic transactional systems.

The relationship between trust and risk is complex (Gefen et al., 2003) and there is no agreement in research on how the relationship between trust and risk can be represented in models (Johnson et al., 2002). This research takes the view that the degree to which trust influences behavior depends on the level of risk (Mayer et al., 1995) and therefore perceived risk would moderate the influence of trust on an individual's intention to adopt mobile money.

The proposed modified contextualized model is discussed in the following section.

2.3   Other Mobile Money Studies

Mallat (2007) conducted a qualitative study based on diffusion of innovations theory Rogers (1995) with the aim of exploring factors that affect consumer adoption of mobile payments. Their results identified trust and relative advantage (closely related to perceived usefulness) as among the factors enhancing mobile money adoption. Among the barriers identified were perceived security risks, high costs and as well as complex solutions. Their findings indicated that increased trust in the mobile money environment led to reduced perceived risks.

However the study was in a European setting and was based on a small number of subjects and hence could not be generalized to the population.

Another study that sought to establish the key determinants of use Mobile Money transfer is one by Tobbin (2010). The study developed and empirically tested a theoretical model based on a combination of TAM and IDT.

In that study they noted that studies on mobile money is still young and scarce and suggest that there is need for further research to understand factors influencing users adoption of Mobile money.

Other studies include that by include that of Ngugi et al., (2010) who studied the factors that led to the rapid adoption of M-PESA, the leading mobile money service provider in Kenya. Among the factors identified were the unmet need for financial services by consumers who were largely unbanked.

Although there are many studies on e-commerce adoption, there are few studies in Mobile Money adoption and hence this study would provide more insight into this area.

CHAPTER 3

Conceptual Framework

As mentioned in the previous section, there is need to modify the original model to include additional factors that may influence or affect the adoption of mobile money.

Based on our studies on past literature review the conceptual model below (Figure 1.2) is proposed and its rationale is discussed.
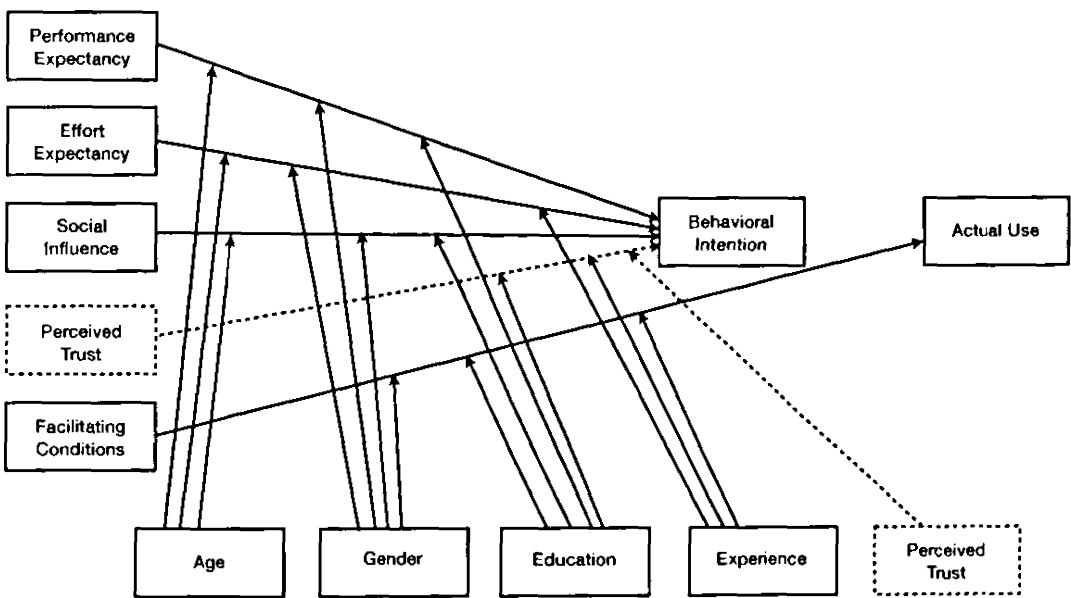

Fig 1.2: Diagram of the Conceptual Framework

3.1 Performance Expectancy

Performance expectancy measures how much people perceive an information system, such as a mobile technology, as being useful in achieving their goals in terms of job performance (Venkatesh et al., 2003).

Performance expectancy together with perceived usefulness has been considered the most powerful tool for explaining the intention to use the system regardless of the types of environments (Park et al., 2007).

Hence the hypothesis that:

H1: Performance expectancy positively influences attitude toward using mobile

money. This relationship may be moderated by age, gender, and education.

3.2 Effort Expectancy

Effort expectancy is the level of ease associated with the use of the particular information system. And is closely related perceived ease of use in TAM. In the mobile money context a complex technology that is difficult to use is unlikely to be widely adopted and therefore this study proposes that:

H2: Effort expectancy positively influences attitude toward using mobile technology. This relationship may be moderated by age, gender, education, and past experiences with mobile money technology.

3.3 Social Influence

The social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system. Venkatesh and Davis (2000) suggest that social influence is a strong predictor of behavioral intention to use particular technology and it is thus rational to include social influence into the research model.

H3: Social influence positively influences attitude toward using mobile technology. This relationship may be moderated by age, gender, education, and past experiences with mobile money technology.

3.4 Perceived Trust

Perceived trust is defined as the degree to which a consumer believes that assurance that the mobile money services will be provided with the minimum possible barriers impediments, (Tobbin, 2010) and will involve as little risk as possible. In a mobile money context, this could involve loss of money, technology failures and loss of privacy. Low level of education could cause a consumer to distrust particular technology. Hence the hypothesis that:

H4: Perceived trust positively influences attitude toward using mobile money. This relationship may be moderated by education and perceived risk.

3.5 Facilitating Conditions

Facilitating conditions refers to the degree people believe that technical infrastructure and resources exist to help them use a system when they need to. In the context of mobile money adoption this would include mobile network reliability and coverage, easy availability of local agents etc.

14

Facilitating conditions were found to have a direct influence on usage beyond that explained by behavioral intentions. (Venkatesh et al., 2003) Hence the hypothesis that:

H4a: Facilitating conditions have no influence on behavioral intention toward mobile money adoption.

H4b: Facilitating conditions have a positive influence toward mobile money adoption.

Finally as proposed in UTAUT,

H5: Behavior Intention positively influences adoption on mobile technology

CHAPTER 4

Research Design and Methodology

The research used a quantitative survey method to collect data on mobile money adoption and use among Kenyan consumers.

The chosen method of survey research was face-to-face interviews and this was complemented by a qualitative data collection in order to provide deeper insights of the respondents' perspectives.

The survey instrument was developed using a multiple-item, five-point Likert-scale technique ranging from 'strongly disagree' to 'strongly agree'.

Once the instrument was drafted, iterative interviews were conducted to refine the instrument to gauge its completeness and effectives with the necessary changes being made.

A pilot test was conducted to evaluate the specific questions, format, question prior to use in the main survey to establish effectiveness of the instrument and revisions were done accordingly.

The final questionnaire consisted of thirty-one (31) questions measuring the seven latent variables as shown the conceptual model as well as demographic data. Samples of the questionnaire are shown in Appendix A.

Data was collected between November 2011 and December 2011 using the questionnaire from 311 respondents deemed to represent a sample of the average mobile money consumer in Kenya. The sample frame was drawn from areas in Nairobi that can be categorized as poor according to data from the Kenya National Bureau of Statistics (KNBS). The choice of these areas was because they are usually well populated with many small businesses that use of Mobile Money services and also represent a wide spectrum of Mobile Money users in terms of age, gender, and educational levels.

In 2008, KNBS classified the income levels as 1-Upper Class, 2-Upper Middle Class, 3-Middle Class, 4-Lower Middle Class and 5-Lower Class. With the Lower Middle Class and Lower Class being considered poor.

Six areas of Level 4 and 5 classifications were randomly selected from each of Nairobi's eight divisions as a study area.

In light of different penetration of the three Mobile Money products, it was reasonable to seek responses proportionate to the penetration of each product.

The estimated market share of *M-PESA* is at 85%, followed by *Airtel Money* and *Orange Money (Iko Pesa)*.

Therefore, data was collected from respondents according to a ratio of 84% to 10% to 6% representing M-PESA, Airtel Money and Orange Money respectively.

CHAPTER 5

Analysis and Results

The aim of the data analysis is to statistically evaluate the conceptual model and investigate the significance of the moderating variables – age, gender, education, experience and perceived risk on the relationship between the various variables.

Data analysis was performed using SPSS 20.0.0 for Windows while Structured Equation Modeling (SEM) was done through using Analysis of Moment Structures (AMOS) 20.0.0 (Build 817).

Structured Equation Modeling (SEM) is statistical modeling technique that combines confirmatory factor analysis (CFA) and structural model into a simultaneous test. (Hoe, 2008). SEM is chosen because of its suitability to the research due to its confirmatory approach as compared to other multivariate techniques that take an exploratory approach. SEM also has strengths in modeling multivariate relations and in estimating indirect effects like moderation.

5.1   Respondent Characteristics

Raw Data was entered and coded into SPSS format and the resultant data screened for incorrectly entered data and for out-of-range values. The data was also screened for missing values, which were found to be negligible and could be ignored.

Preliminary data analysis revealed that out of the 310 respondents, 184 (59.4%) were male and 126 (40.6%) were female indicating that that both gender were well represented in the study. The age of the respondents was found to be between 13 to 64 years, showing that different age groups were represented in the study.

The analysis further revealed that majority of the respondents (34.8%) had completed secondary education with 24.2% of the respondents having completed primary school education with the rest having undertaken some form of tertiary education.

From the analysis of how long the respondents had been using the particular mobile money service, the study found that 124 (40%) respondents indicated that they had used it for three to four years, 79 (25.5%) had used it for one to two years and 60 (19.4%) of the respondents indicated that they had used it for two to three years. Only

10 (3.2%) of the respondents indicated that they had been using it for less than six months.

Table 1.1 summarizes the item descriptions and descriptive statistics of the measured items from the survey.

The results showed that with regards to performance expectancy, majority of the respondents agreed that using the Mobile Money service was beneficial in meeting their needs, as shown by Mean M= 4.29, 4.19 and 4.51 of the performance expectancy indicators. This is supported by low standard deviations 0.700, 0.843, and .606 respectively, an indication that the respondent opinion didn't vary greatly.

Majority of the respondents also agreed that the mobile money service was easy to use as shown be the results in Table 1.1. The results also suggested that majority of the respondents agreed that the mobile money service that those in their social circle used greatly determined their choice of which mobile money service they chose to use.

The results also showed that majority of the respondents agreed that the technical infrastructure and resources were available for them to use the mobile money service whenever they needed to. A similar trend was seen with regards to Perceived Trust and Behavioral Intention.

With regards to perceived risk, however, the majority of the respondents appeared to disagree that using the Mobile Money service was risky and unreliable, as shown by Mean M= 2.27, 2.02 and 3.05 of the perceived risk indicators.

Table 1.1: Mean scores and standard deviation of variables (N — 310)

Variables	Minimum	Maximum	Mean	Std. Deviation
Performance Expectancy (PE)				
The Mobile Money service is very useful in managing my finances	1	5	4.29	.700
I don't need to go to bank frequently because I use the Mobile Money service	1	5	4.19	.843
I save time by using the Mobile Money service	1	5	4.51	.606
Effort Expectancy (EE)				
The Mobile Money service was easy to learn	1	5	4.27	.714
The Mobile Money service is easy to use	1	5	4.38	.631
The registration process for the Mobile Money service was simple and easy	1	5	4.17	.806
Social Influence (SI)				
My parents, siblings and friends think that I should use the Mobile Money service	2	5	4.17	.777
My friends use the Mobile Money service	1	5	4.22	.757
Using the Mobile Money service makes me feel better than those who do not use it	2	5	4.15	.799
Facilitating Conditions (FC)				
I know how to use the Mobile Money service very well	1	5	4.39	.820
I get help from the Mobile Money provider about the Mobile Money service when I need it	1	5	4.00	.947
Agents are available for me to use the Mobile Money service	1	5	4.40	.752
Perceived Trust (PT)				
If I made a mistake or lost my phone, the Mobile Money service safeguards my money and information	1	5	4.20	.783
My financial information is safe when I use the Mobile Money service	1	5	4.18	.657
People working and managing the Mobile Money service can be trusted	1	5	3.69	.960
Perceived Risk (PR)				
Transacting in the Mobile Money service is risky, the information I send can be accessed by other people	1	5	2.27	1.004
The cash I put in the Mobile Money service could possibly get lost	1	5	2.02	.892
The Mobile Money service technology can fail	1	5	3.05	1.188
Behavioural Intention (BI)				
I intend to continue using the Mobile Money service in the future	1	5	4.35	.734
I recommend people to use the Mobile Money service	2	5	4.36	.701

5.2 Evaluation of measurement model

In order to examine the relationship between the constructs, indicator variables and their relationships, Confirmatory Factor Analysis (CFA) was used to create a measurement model. CFA is a statistical technique that is used to verify the factor structure of a set of observed variables. It allows the researcher to confirm the hypothesis that a relationship between observed variables and their underlying latent constructs exists.

CFA provides quantitative measures of the reliability and validity of the constructs and also gives suggestions as to how well the model was a fit to the data.
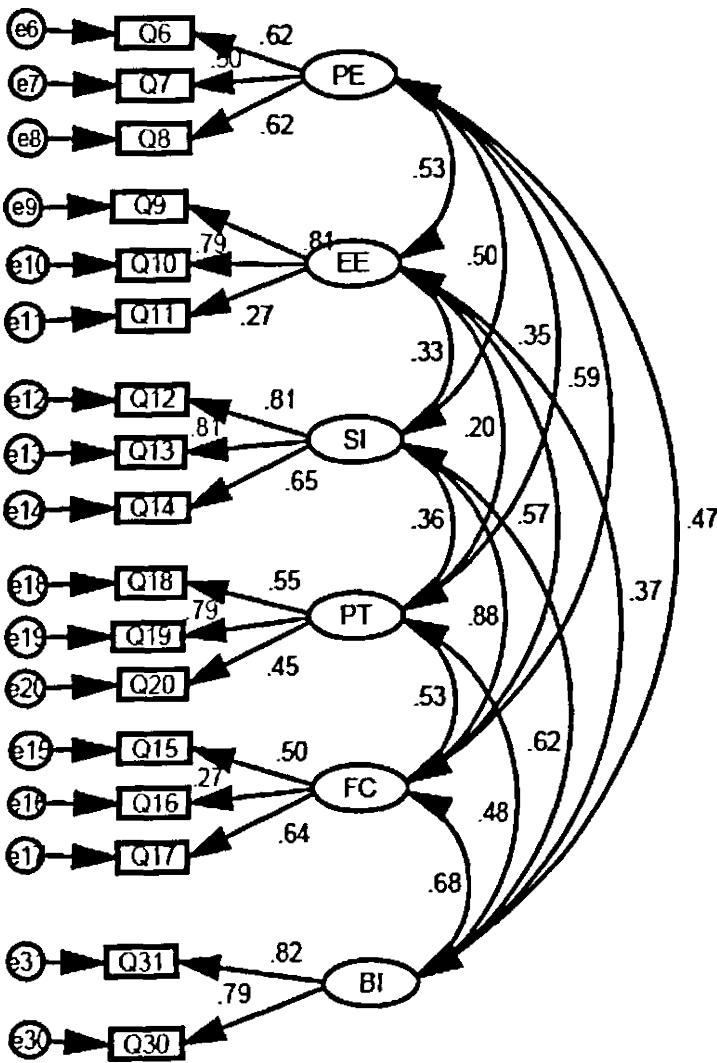
Fig. 1.3: CFA measurement model showing standardized estimates

Several of the commonly used fit indicators were used to judge the model fit for the measurement model as recommended by Hair et al (2006). These include:

Chi-Square (CMIN)

The chi-square test is a goodness-of-fit measure, which evaluates the expected and observed values to determine how well a theoretical model fits the data.

The results showed that the chi-square value (x^2) value was 244.636 with 104 degrees of freedom (df). The probability statistic was significant (p-value = 0.00), suggesting that the model was not a good fit to the data. However, since the (x^2) statistic is sensitive to sample size for observations greater than 200 (Hoe, 2008), a low ratio of (x^2)/df is also indicative of good model fit (Joreskorg & Sorbom, 1993). Therefore the (x^2)/df value of 2.352 that was obtained would suggest that the model is a good fit to the data.

Comparative Fit Index (CFI)

The comparative fit index is a recommended index of overall fitness (Gerbing and Anderson, 1993). It represents the improvement of fit of the specified model over a baseline model in which all the variables are constrained to be uncorrelated. The comparative fit index values close to 1 indicate a very good fit while values close greater than 0.90 indicate and acceptable fit (Bentler, 1992). The result was 0.9 also suggesting that the model was a reasonable fit to the data.

Normed fit index (NFI)

The normed fit index measures the proportion by which a model is improved in terms of fit compared to the base model (Hair et al., 2010). Values of 0.90 or greater indicate an adequate model fit (Bentler, 1992). The result was .843, suggesting inadequate fit and indicating that this model can be improved (Bentler & Bonett, 1980).

Root Mean Square Error of Approximation (RMSEA)

RMSEA represents the degree to which lack of fit is due to misspecification of the model tested versus being due to sampling error. According to Browne and Cudeck (1993), an RMSEA value of 0.05 would indicate a close fit and a value of between 0.06 and 0.08 would indicate a reasonable error of approximation.

The RMSEA value was 0.066 indicating that the model fit was not satisfactory.

Table 1.3 summarizes the results of model fit and the conclusion is that the result was mixed showing that the model needed to be further improved in order to obtain better fit to the data.

Table 1.2 Analysis of Model fit for measurement model

Fit Indices	Result	Benchmark
CMIN (x^2)	244.636	-
Degrees of Freedom (DF)	104	-
Probability value (p)	0.000	≥ 0.005
CMIN (x^2) /DF ratio	2.352	< 3
CFI	0.9	> 0.9
NFI	0.843	> 0.9
RMSEA	0.066	< 0.1

Reliability and Validity

In order to examine the reliability and validity of constructs standardized estimates (standardized regression weights in AMOS) that link the individual indicators to a particular construct were examined. Factor loadings of 0.7 and above indicate good convergent validity and those above 0.5 being acceptable. 14 out of 20 factors had factor loadings of 0.5 or above indicating good convergent validity. Cronbach's alpha (which measures the internal consistency of a scale) was also derived for each construct using SPSS. The results are summarized in the table below. According to George and Mallery (2003) Cronbach's alpha values of above 0.7 are acceptable while those less than 0.5 are poor.

Table 1.3: Analysis of reliability estimates

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items	Comment
Performance Expectancy	.590	.603	3	3
Effort Expectancy	.635	.629	3	3
Social Influence	.799	.800	3	3
Facilitating Conditions	.452	.463	3	3
Perceived Trust	.565	.596	3	3
Perceived Risk	.408	.424	3	3
Behavioral Intention	.781	.781	2	3

According to George and Mallery (2003) Cronbach's alpha values of above 0.7 are acceptable while those less than 0.5 are poor.

5.3 Evaluation of structural model

Following CFA, the structural model was examined in AMOS in order to determine whether significant relationships exist between the constructs according to the proposed hypothesis. The standardized regression weights and the Squared Multiple Correlation (R^2) values were derived using AMOS. The standardized regression weights are useful in comparing the intensity of effects of the different latent variables on the dependent variable within the identical group of respondents while the Squared Multiple Correlation (R^2) values represent the proportion of variance in the dependent variable that is explained by the collective set of predictors.

Fig 1.4 shows the structural model and Table 1.3 summarizes the results of the standard estimates.
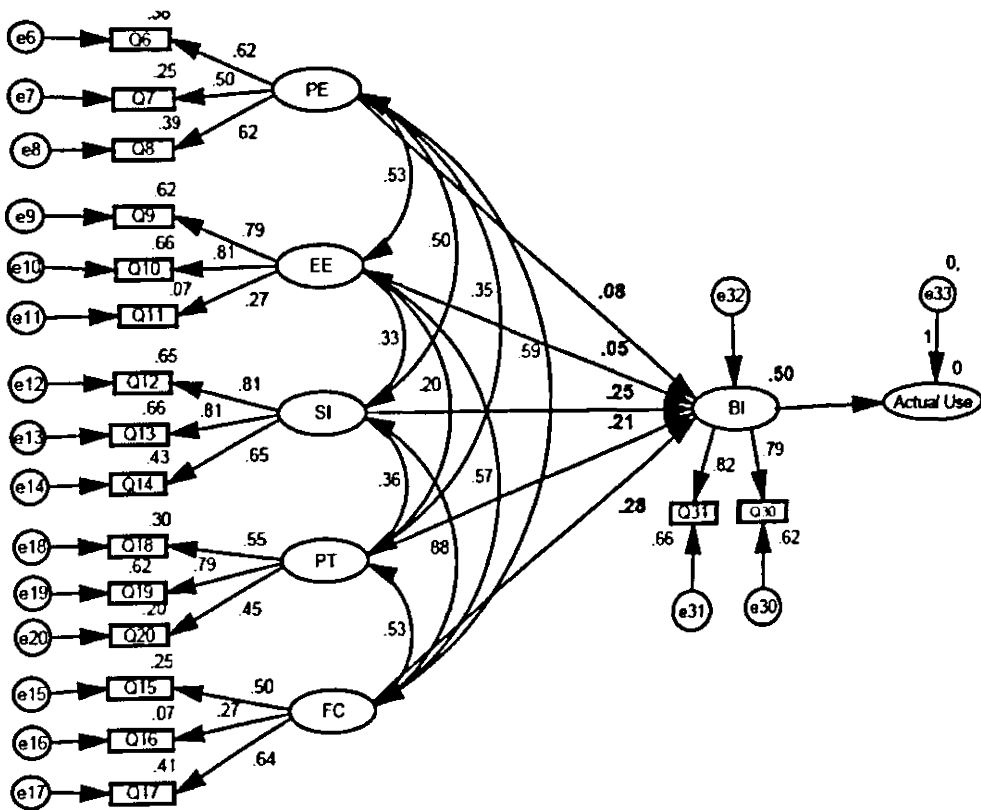
Fig 1.4: Structural model showing the standardized estimates

Table 1.4: SEM Estimates

Relation	Estimate	Standardized Estimates	Std Error	Critical Ratio	p	Hypothesis results
Performance Expectancy -> Behavioral Intention	0.111	0.084	0.140	0.795	0.427	H1 - Confirmed
Effort Expectancy -> Behavioral Intention	0.048	0.047	0.213	0.224	0.822	H2 - Confirmed
Social Influence -> Behavioral Intention	0.223	0.246	0.431	0.518	0.604	H3 - Confirmed
Perceived Trust -> Behavioral Intention	0.278	0.210	0.216	1.284	0.199	H4 - Confirmed
Facilitating conditions -> Behavioral Intention	0.385	0.277	0.913	0.422	0.673	H4b confirmed

The results confirmed the hypotheses that all the constructs had a positive influence on Behavioral Intention with Facilitating Conditions having the most influence (28%) on Behavioral Intention followed by Social Influence (25%) and Perceived Trust (21%). Performance Expectancy and Effort expectancy were found to have the least effect on Behavioral Intention.

The analysis of the Squared multiple correlations revealed that the predictors of Behavioral Intention accounted for 50% of its variance.

5.4 Analysis of moderation effects

Multi-group structural equation within AMOS was used to assess the moderating variable effects on the structural model. The main purpose of a multi-group analysis is to find out the extent to which groups differ.

To test the hypothesis of the moderating effect of age, gender, experience and education on the relationships between the various constructs and behavioral intention to use mobile money services, multi-group analysis was used. Using AMOS 20, the above variables were recoded into several groups and standardized estimates calculated for each group.

To help investigate the differences between the groups, a tool developed by Gaskin (2011) that compares the differences using the critical ratio method was used. A pairwise comparison matrix of every possible parameter in the model compared against the constituent groups was obtained with AMOS. Using the tool, the z-score for the difference among the estimates in the comparison was obtained.

Table 1.5 summarizes the results of the analysis of the moderating effect of gender on the various relationships. A z-score exceeding ± 1.96 at the critical value of z for $p < 0.05$ would indicate that significant differences existed between the genders. The

results showed no significant differences suggesting that there was no moderating effect of gender in the various relationships.

Table 1.5: Analysis of the moderating effect of gender

Relation	Male		Female		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	0.043	0.761	-0.722	0.594	-0.561
Effort Expectancy -> Behavioral Intention	0.289	0.088	0.258	0.740	-0.038
Social Influence -> Behavioral Intention	0.158	0.717	0.514	0.372	0.494
Perceived Trust -> Behavioral Intention	0.248	0.070	0.871	0.353	0.658
Facilitating conditions -> Behavioral Intention	0.336	0.650	-0.107	0.961	-0.193

In order to analyze the moderating effect of age, the data obtained for age was recoded into three groups using SPPSS. The young group consisted of people of age bracket 13-25 years, the second group had people of ages 25-44 and the last group consisted of people of age bracket 45 years and over. Table 1.6 summarizes the results obtained. The results did not find any significant difference between the groups suggesting that age was not a moderating factor between the relationships.

To study the moderating effect of education on the relationships, the data obtained for education level was recoded into three groups using SPPSS. The first group consisted of people who had primary education as their highest education level while the second group had had secondary education as their highest education level. The last group consisted of people who had completed some form of tertiary education. Table 1.7 summarizes the results obtained. The results did not find any significant difference between the three groups suggesting that education was not a moderating factor between the relationships.

In a similar way, the moderating effect of experience was investigated. Several groups were created according to the duration that respondents had used mobile money. The results were obtained and summarized in Table 1.8. As observed previously no significant differences were observed between the groups indicating that experience was not a moderating factor in the different relationships.

Table 1.6: Analysis of the moderating effect of Age

Relation	Young group (13-24 years)		Middle-aged group (25-44 years)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	-0.556	0.603	0.119	0.891	0.491
Effort Expectancy -> Behavioral Intention	0.632	0.103	-0.238	0.818	-0.788
Social Influence -> Behavioral Intention	-0.339	0.574	-0.198	0.889	0.091
Perceived Trust -> Behavioral Intention	-0.156	0.387	0.026	0.983	0.144
Facilitating conditions -> Behavioral Intention	1.172	0.218	1.817	0.687	0.140

Relation	Young group (13-24 years)		Older group (45 years and above)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	-0.556	0.603	0.521	0.946	0.139
Effort Expectancy -> Behavioral Intention	0.632	0.103	1.454	0.952	0.034
Social Influence -> Behavioral Intention	-0.339	0.574	0.778	0.957	0.078
Perceived Trust -> Behavioral Intention	-0.156	0.387	-0.224	0.981	-0.007
Facilitating conditions -> Behavioral Intention	1.172	0.218	-1.238	0.951	-0.119

Relation	Middle-aged group (25-44 years)		Older group (45 years and above)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	0.119	0.891	0.521	0.946	0.052
Effort Expectancy -> Behavioral Intention	-0.238	0.818	1.454	0.952	0.070
Social Influence -> Behavioral Intention	-0.198	0.889	0.778	0.957	0.068
Perceived Trust -> Behavioral Intention	0.026	0.983	-0.224	0.981	-0.027
Facilitating conditions -> Behavioral Intention	1.817	0.687	-1.238	0.951	-0.147

Table 1.7: Analysis of the moderating effect of Education

	Primary Education level group		Secondary Education level group		
Relation	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	0.178	0.621	-2.153	0.743	-0.355
Effort Expectancy -> Behavioral Intention	0.144	0.717	2.766	0.710	0.352
Social Influence -> Behavioral Intention	0.244	0.315	3.312	0.740	0.307
Perceived Trust -> Behavioral Intention	0.612	0.361	2.548	0.725	0.267
Facilitating conditions -> Behavioral Intention	-0.069	0.782	-5.251	0.751	-0.313

	Primary Education level group		Tertiary Education level group		
Relation	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	0.178	0.621	0.286	0.320	0.234
Effort Expectancy -> Behavioral Intention	0.144	0.717	0.025	0.819	-0.289
Social Influence -> Behavioral Intention	0.244	0.315	0.146	0.572	-0.278
Perceived Trust -> Behavioral Intention	0.612	0.361	0.235	0.056	-0.554
Facilitating conditions -> Behavioral Intention	-0.069	0.782	0.661	0.244	1.177

	Secondary Education level group		Tertiary Education level group		
Relation	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	-2.153	0.743	0.286	0.320	0.372
Effort Expectancy -> Behavioral Intention	2.766	0.710	0.025	0.819	-0.369
Social Influence -> Behavioral Intention	3.312	0.740	0.146	0.572	-0.317
Perceived Trust -> Behavioral Intention	2.548	0.725	0.235	0.056	-0.320
Facilitating conditions -> Behavioral Intention	-5.251	0.751	0.661	0.244	0.357

Table 1.8: Analysis of the moderating effect of Experience

Relation	Group 1 (Usage of less than One year)		Group 2 (Usage of 1-2 years)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	8.295	0.939	-0.031	0.921	-0.077
Effort Expectancy -> Behavioral Intention	-4.626	0.943	0.340	0.375	0.077
Social Influence -> Behavioral Intention	-6.350	0.940	0.723	0.029	0.083
Perceived Trust -> Behavioral Intention	0.503	0.783	0.478	0.151	-0.013
Facilitating conditions -> Behavioral Intention	9.056	0.937	-0.617	0.506	-0.084

Relation	Group 1 (Usage of less than One year)		Group 3 (Usage of 2-3 years)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	8.295	0.939	0.772	0.070	-0.070
Effort Expectancy -> Behavioral Intention	-4.626	0.943	-0.190	0.202	0.069
Social Influence -> Behavioral Intention	-6.350	0.940	0.339	0.041	0.079
Perceived Trust -> Behavioral Intention	0.503	0.783	0.641	0.251	0.072
Facilitating conditions -> Behavioral Intention	9.056	0.937	-0.057	0.939	-0.080

Relation	Group 1 (Usage of less than One year)		Group 4 (Usage of 3-4 years)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	8.295	0.939	0.445	0.056	-0.073
Effort Expectancy -> Behavioral Intention	-4.626	0.943	0.068	0.657	0.073
Social Influence -> Behavioral Intention	-6.350	0.940	-0.128	0.754	0.073
Perceived Trust -> Behavioral Intention	0.503	0.783	-0.197	0.152	-0.382
Facilitating conditions -> Behavioral Intention	9.056	0.937	0.065	0.673	-0.079

Relation	Group 2 (Usage of 1-2 years)		Group 3 (Usage of 2-3 years)		
	Estimate	p	Estimate	p	z-score
Performance Expectancy -> Behavioral Intention	-0.031	0.921	0.445	0.056	1.225
Effort Expectancy -> Behavioral Intention	0.340	0.375	0.068	0.657	-0.660
Social Influence -> Behavioral Intention	0.723	0.029	-0.128	0.754	-1.615
Perceived Trust -> Behavioral Intention	0.478	0.151	-0.197	0.152	-1.874*
Facilitating conditions -> Behavioral Intention	-0.617	0.506	0.065	0.673	0.725

CHAPTER 6

Conclusion and Implications

This study sought to examine the factors that influence mobile money adoption in Kenya while focusing on the significance of moderating factors in the adoption of Mobile Money in Kenya by applying a contextual model based on the Unified Theory of the application and Use of Technology (UTAUT).

The results confirmed that as expected performance expectancy, effort expectancy, social influence and perceived trust were all positive influences on consumers' intention to use mobile money.

Among these influencing factors, facilitating conditions followed by social influence and perceived trust had the strongest influence on behavioral intention with performance expectancy and effort expectancy exhibiting little influence on the intention to use mobile money.

From the results of the study, the presence mobile money agents in widespread and convenient locations appear to have the strongest influence for consumers to use a particular mobile money service. Consumers would be hesitant to use a mobile money service if there are no mobile money agents in their vicinity or in the vicinity of people they would want to transact with. It is thus crucial for mobile money providers to strategically position their products to have the widest reach possible.

Social networks also appear to notably influence how the Kenyan market adopts mobile money products. Positive reviews of a mobile money product in one's social circle would appear to be a significant influence for those positioning their mobile money products.

The strong influence of perceived trust suggests that mobile money products ought to be safe and reliable with as little or no risk of financial loss or transaction delays. The mobile network connection availability also needs to be high with no congestion or downtime. In addition, the presence of agents who are well integrated in the consumer communities is helpful for the consumers to be to trust the service.

With respect to the moderating factors that were the focus of the study, age, gender, education and experience did not appear to have any significant influence between the

various predictors of intention to use mobile financial services. One possible explanation could be that the rapid growth of mobile telephony, and consequently mobile money products has contributed to the lack of influence of these moderating factors. This could be true given that the dominant mobile money product had no precedent and that it proved useful very quickly.

Future research could undertake a similar study in another mobile money environment.

While there are other predictive and moderating factors that can influence the adoption of mobile money, these results of this study provide us with a better understanding of the adoption of mobile money in a Kenyan context.

References

Ajzen, I. (1991). The theory of planned behavior, *Organizational Behavior and Human Decision Processes*, Vol. 50, p. 179-211.

Bauer, H. H., Barnes, S. J., Reichardt, T., & Neumann, M. M. (2005). Driving Consumer Acceptance Of Mobile Marketing A Theoretical Framework And Empirical Study. *Journal of Electronic Commerce Research*, 181 - 192.

Chabossou, A., Stork, C., Stork, M., & Zahonogo, Z. (2009, April 17–19). Mobile telephony access and usage in Africa. 3rd Annual Conference on Information and Communication Technologies and Development: 2009 Proceedings. Education City, Doha, Qatar: Carnegie Mellon University in Qatar, Doha, Qatar.

Chen, L.-d. (2008). A model of consumer acceptance of mobile payment. [Article]. *International Journal of Mobile Communications*, 6(1), 32-52. doi: 10.1504/ijmc.2008.015997

Chin, W.W., Marcolin, B.L., Newsted, P.R., (2003). A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research* 14 (2).

Davis, F. D (1989). Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology. *MIS Quarterly* 13 (3), 319-339.

Economist. (2009). The Power of Mobile Money, *The Economist*, September, 26th.

Fishbein, M., & Ajzen, I. (1975). Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research, Reading, MA: Addison-Wesley, 1975.

Fornell, C. & Larcker, D. F. (1981) Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, *Journal of Marketing Research* 19, 39-50

Gaskin, J. (2011). Multigroup Moderation in AMOS Made Easy. Available at:
http://statwiki.kolobkreations.com/wiki/Main_Page. (accessed October 2012)

Gefen, D., Rao, V. S., & Tractinsky, N. (2003). *The Conceptualization of Trust, Risk and Their Relationship in Electronic Commerce: The Need for Clarifications.* Paper presented at the Proceedings of the 36th Hawaii International Conference on System Sciences, Hawaii, USA.

Gefen, D., & Straub, D. (1997). Gender Differences in the Perception and Use of E-Mail: An Extension to the Technology Acceptance Model. *MIS Quarterly, 21* (4), 389-400.

George, D., & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4thed.). Boston: Allyn & Bacon.

Hoe, S. L. (2008). Quantitative Methods Inquires Issues And Procedures In Adopting Structural. *Business, 3*(1), 76-83. Retrieved from http://www.jaqm.ro/issues/volume-3,issue-1/pdfs/jaqm_vol3_issue1.pdf#page=81 (accessed October 2012)

Jenkins, B. (2008). Developing mobile money ecosystems. Washington, DC: International Finance Corporation and Harvard Kennedy School.

Johnston, A.C., Warkentin, M. (2002). The online consumer trust construct: A web merchant practitioner perspective. *Proceedings of the Seventh Annual Conference*, Southern Association for Information Systems: 221-226.

Jöreskog, K. G., & Sörbom, D. (1993). LISREL 8: User's guide. Chicago: Scientific Software.

Keen, P. G. W. (1997). Are you ready for the "trust" economy. *ComputerWorld, 31*(16), 80.

Li, J.P. and R. Kishore, R. (2006) How Robust is the UTAUT Instrument? A multigroup Invariance Analysis in the Context of Acceptance and Use of Online Community Weblog Systems. Proceedings of the 2006 ACM SIGMIS CPR Conference on Computer Personnel Research: Forty-four years of

research: achievements, challenges & the future. Claremont, California, USA, ACM Press.

Mallat, N. (2007). Exploring Consumer adoption of Mobile Payments- A Qualitative Study. *The Journal of Strategic Information Systems*, 16 (4), 413-432.

Mallat, N. et al,. (2008) An Empirical Investigation of Mobile Ticketing Service Adoption in Public Transportation. *Personal and Ubiquitous Computing*, Vol. 12, No 1, pp. 57 - 65.

Marsh H W, Hocevar D. (1985) The Application of Confirmatory Factor Analysis to the study of Self-concept: First and Higher Order Structures and their Invariance Across Age Groups, *Psychological Bulletin*, Vol. 97, pp 562-582

Ngugi, B., Pelowski, M. and Ogembo, J.G. (2010) M-PESA: A Case Study of the Critical Early Adopters' Role in the Rapid Adoption of Mobile Money Banking in Kenya. *The Electronic Journal on Information Systems in Developing Countries*. 43, 3, 1-16.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995) An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.

Pennanen, K., Kaapu, T., & Paakki, M.K. (2006). Trust, risk, privacy, and security in ecommerce. Proceedings of the ICEB + eBRF Conference, Tampere, Finland

Piccoli, G., Ahmed, R. & Ives, B. (2001). Web based virtual learning environments: a research framework and a preliminary assessment of effectiveness in basic IT skills training. *MIS Quarterly*, 25, 401–426.

Park, J., Yang, S., & Lehto, X. (2007). Adoption of mobile technologies for Chinese consumers.*Journal of Electronic Commerce Research*, 8(3), 196-206.

Plyler, Megan G., Sherri Haas, and Geetha Nagarajan (2010). *Community-level economic effects of M-PESA in Kenya: Initial findings*. College Park, MD: The IRIS Center at the University of Maryland, College Park, www.fsassessment.umd.edu (accessed October 2012)

Pousttchi, K. & Wiedeman, D.G., (2007). What Influences Consumers' Intention to Use Mobile Payments? *LA Global Mobility Round table*, p.1-16. Available at: http://www.marshall.usc.edu/assets/025/7534.pdf. (accessed October 2012)

Rogers, E M (1995). Diffusion of Innovations. New York: Free Press.

Siau, K. and Shen, Z. (2003). Building Consumer Trust in Mobile Commerce, *Communications of the ACM*, 46(4), pp. 91-93

Sun H., and Zhang, P. (2006). The role of moderating factors in user technology acceptance. *International Journal of Human-Computer Studies* 64, 2 (February 2006), 53-78.

Tobbin, P. E. (2010). *Modeling Adoption of Mobile Money Transfer: A Consumer Behaviour Analysis*. Paper presented at The 2nd International Conference on Mobile Communication Technology for Development, Kampala, Uganda

Venkatesh, V. and Davis, F. D., (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, Vol 45, No 2, pp. 186–204.

Venkatesh, V. et al,. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, Vol. 27, No3, pp. 425–478.

World Bank. (2010). *Kenya Economic Update: Kenya at the tipping Point?*, Edition No. 3, December 2010

World Bank. (2004). *Gender and development in the Middle East and North Africa: women in the public sphere*. Washington, DC: Author.

Zhang X., and Prybutok, Victor R,. (2005). How the mobile communication markets differ in China, the U.S., and Europe. *Communications of the ACM* 48, 3 (March 2005), 111-114.

Zhou, L., L. Dai, and D. Zhang (2007). Online Shopping Acceptance Model – A Critical Survey of Consumer Factors in Online Shopping. *Journal of Electronic Commerce Research*, 8(1), 41-62.

Appendices

Section A   FILTER QUESTION

1a)	Which of these ranges best describes your household income per month in terms of salary or wages in KShs? ☐ Less than 10,000 ☐ Between 10,000 and 20,000 ☐ Between 20,000 and 30,000 ☐ Between 30,000 and 40,000 ☐ Over 40,000	
1b)	Which of these ranges best describes your household income per month in terms of self employment and property income or business or income from agricultural produce and farming in KShs? ☐ Less than 10,000 ☐ Between 10,000 and 20,000 ☐ Between 20,000 and 30,000 ☐ Between 30,000 and 40,000 ☐ Over 40,000	

Section B   DEMOGRAPHICS

2	Gender	Male ☐	Female ☐

3	Age in Years	

4	How long have you used M-PESA? ☐ Less than SIX months ☐ Between SIX months and ONE year ☐ Between TWO years and THREE years ☐ Between THREE years and FOUR years	
5	Which is the last class attended? ☐ Primary School ☐ Secondary School ☐ Certificate College ☐ Diploma College ☐ University College	

Section C   DETERMINANTS

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	PERFORMANCE EXPECTANCY					
6	M-PESA is very useful in managing my finances. *(M-PESA inanisaidia kuhifadhi na kupanga fedha zangu)*	☐	☐	☐	☐	☐
7	I don't need to go to bank frequently because I use M-PESA *(Sihitaji kutembelea banki mara kwa mara kwa sababu niko na M-PESA)*	☐	☐	☐	☐	☐
8	I save time by using M-PESA *(M-PESA hunisaidia kuokoa mda)*	☐	☐	☐	☐	☐
	EFFORT EXPECTANCY					
9	M-PESA was easy to learn *(M-PESA ilikuwa rahisi kujifunza)*	☐	☐	☐	☐	☐
10	M-PESA is easy to use *(M-PESA ni rahisi kutumia)*	☐	☐	☐	☐	☐
11	The registration process for M-PESA was simple and easy *(Mpangilio wa kusajiliwa kwa M-PESA ulikuwa rahisi na wa kueleweka)*	☐	☐	☐	☐	☐
	SOCIAL INFLUENCE					
12	My parents, siblings and friends think that I should use M-PESA. *(Wazazi, ndigu zangu and marafiki wanaona ni vyema nitumie M-PESA)*	☐	☐	☐	☐	☐
13	My friends use M-PESA. *(Marafiki wangu hutumia M-PESA)*	☐	☐	☐	☐	☐
14	Using M-PESA makes me feel better than those who do not use it. *(Nikitumia M-PESA najihisi vyema kuliko wasiotumia)*	☐	☐	☐	☐	☐
	FACILITATING CONDITIONS					
15	My parents, siblings and friends think that I should use M-PESA. *(Wazazi, ndigu zangu and marafiki wanaona ni vyema nitumie M-PESA)*	☐	☐	☐	☐	☐
16	My friends use M-PESA. *(Marafiki wangu wanatumia M-PESA)*	☐	☐	☐	☐	☐
17	Using M-PESA makes me feel better than those who do not use it. *(Nikitumia M-PESA najihisi vyema kuliko wasiotumia)*	☐	☐	☐	☐	☐

	PERCEIVED TRUST					
18	If I made a mistake or lost my phone, the M-PESA safeguards my money and information. *(Nikifanya makosa wakati ninatumia M-PESA, kila kitu kitahifadhiwa)*	☐	☐	☐	☐	☐
19	My financial information is safe when I use M-PESA *(Hakuna mtu anaweza kuona habari ya fedha zangu ninapotumia M-PESA)*	☐	☐	☐	☐	☐
20	People working and managing M-PESA can be trusted *(Watu wanaosimamia M-PESA wanaaminika)*	☐	☐	☐	☐	☐

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	TRANSACTION COST					
21	The transaction costs for M-PESA are too high *(Gharama ya kutumia M-PESA iko juu sana)*	☐	☐	☐	☐	☐
22	Some times I don't send money because sending M-PESA is expensive. *Kuna wakati ambapo huwezi kutumia M-PESA kwasababu gharama ni juu sana)*	☐	☐	☐	☐	☐
23	M-PESA is cheaper than Western Union and Banks. *(M-PESA ina gharama ya chini kuliko Western Union ama Benki)*	☐	☐	☐	☐	☐
	TRIAL-ABILITY					
24	I encourage new users to try M-PESA with little money, before starting to use it. *(Ninawashauri watu wajaribu M-PESA na pesa kidogo, kabla waanze kuitumia kabisa)*	☐	☐	☐	☐	☐
25	I tried out the M-PESA service I use before adopting it fully *(nilijaribu M-PESA nione iwapo inafanya kazi vizuri kabla sijaitumia)*	☐	☐	☐	☐	☐
26	If I try other services like Orange Money or Airtel Money etc for free, I could end up using them. *(Nikijaribu Orange Money ama Airtel Money, bila malipo kwanza, huenda nikaanza kuzitumia)*	☐	☐	☐	☐	☐

Section C MODERATORS

	PERCEIVED RISK					
27	Transacting in M-PESA is risky, the information I send can be accessed by other people. *(Kuna hatari nikitumia M-PESA, ujumbe ninaotuma unaweza kujulikana)*	☐	☐	☐	☐	☐
28	The cash I put in M-PESA could possibly get lost. *(Pesa nilizoweka kwa M-PESA zaweza kupotea)*	☐	☐	☐	☐	☐
29	The M-PESA technology can fail, e.g. the network collapse *(Teknolojia ya M-PESA inaweza kuharibiba wakati wowote)*	☐	☐	☐	☐	☐

Section D ENDOGENOUS VARIABLES

	BEHAVIORAL INTENTION					
30	I intend to continue using M-PESA in the future *(nitaenelea kutumia M-PESA siku za usoni)*	☐	☐	☐	☐	☐
31	I recommend people to use M-PESA *(ninawahimiza watu kutumia M-PESA)*	☐	☐	☐	☐	☐

Section A FILTER QUESTION

1a)	Which of these ranges best describes your household income per month in terms of salary or wages in KShs? ☐ Less than 10,000 ☐ Between 10,000 and 20,000 ☐ Between 20,000 and 30,000 ☐ Between 30,000 and 40,000 ☐ Over 40,000	
1b)	Which of these ranges best describes your household income per month in terms of self employment and property income or business or income from agricultural produce and farming in KShs? ☐ Less than 10,000 ☐ Between 10,000 and 20,000 ☐ Between 20,000 and 30,000 ☐ Between 30,000 and 40,000 ☐ Over 40,000	

Section B DEMOGRAPHICS

2	Gender	Male ☐	Female ☐

3	Age in Years	

4	How long have you used AIRTEL MONEY? ☐ Less than SIX months ☐ Between SIX months and ONE year ☐ Between TWO years and THREE years ☐ Between THREE years and FOUR years	
5	Which is the last class attended? ☐ Primary School ☐ Secondary School ☐ Certificate College ☐ Diploma College ☐ University College	

Section C   DETERMINANTS

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	PERFORMANCE EXPECTANCY					
6	AIRTEL MONEY is very useful in managing my finances. *(AIRTEL MONEY inanisaidia kuhifadhi na kupanga fedha zangu)*	☐	☐	☐	☐	☐
7	I don't need to go to bank frequently because I use AIRTEL MONEY *(Sihitaji kutembelea banki mara kwa mara kwa sababu niko na AIRTEL MONEY)*	☐	☐	☐	☐	☐
8	I save time by using AIRTEL MONEY *(AIRTEL MONEY hunisaidia kuokoa mda)*	☐	☐	☐	☐	☐
	EFFORT EXPECTANCY					
9	AIRTEL MONEY was easy to learn *(AIRTEL MONEY ilikuwa rahisi kujifunza)*	☐	☐	☐	☐	☐
10	AIRTEL MONEY is easy to use *(AIRTEL MONEY ni rahisi kutumia)*	☐	☐	☐	☐	☐
11	The registration process for AIRTEL MONEY was simple and easy *(Mpangilio wa kusajiliwa kwa AIRTEL MONEY ulikuwa rahisi na wa kueleweka)*	☐	☐	☐	☐	☐
	SOCIAL INFLUENCE					
12	My parents, siblings and friends think that I should use AIRTEL MONEY. *(Wazazi, ndigu zangu and marafiki wanaona ni vyema nitumie AIRTEL MONEY)*	☐	☐	☐	☐	☐
13	My friends use AIRTEL MONEY. *(Marafiki wangu hutumia AIRTEL MONEY)*	☐	☐	☐	☐	☐
14	Using AIRTEL MONEY makes me feel better than those who do not use it. *(Nikitumia AIRTEL MONEY najihisi vyema kuliko wasiotumia)*	☐	☐	☐	☐	☐
	FACILITATING CONDITIONS					
15	My parents, siblings and friends think that I should use AIRTEL MONEY. *(Wazazi, ndigu zangu and marafiki wanaona ni vyema nitumie AIRTEL MONEY)*	☐	☐	☐	☐	☐
16	My friends use AIRTEL MONEY. *(Marafiki wangu wanatumia AIRTEL MONEY)*	☐	☐	☐	☐	☐
17	Using AIRTEL MONEY makes me feel better than those who do not use it. *(Nikitumia AIRTEL MONEY najihisi vyema kuliko wasiotumia)*	☐	☐	☐	☐	☐

	PERCEIVED TRUST					
18	If I made a mistake or lost my phone, AIRTEL MONEY safeguards my money and information. *(Nikifanya makosa wakati ninatumia AIRTEL MONEY, kila kitu kitahifadhiwa)*	☐	☐	☐	☐	☐
19	My financial information is safe when I use AIRTEL MONEY *(Hakuna mtu anaweza kuona habari ya fedha zangu ninapotumia AIRTEL MONEY)*	☐	☐	☐	☐	☐
20	People working and managing AIRTEL MONEY can be trusted *(Watu wanaosimamia AIRTEL MONEY wanaaminika)*	☐	☐	☐	☐	☐

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	TRANSACTION COST					
21	The transaction costs for AIRTEL MONEY are too high *(Gharama ya kutumia AIRTEL MONEY iko juu sana)*	☐	☐	☐	☐	☐
22	Some times I don't send money because sending AIRTEL MONEY is expensive. *Kuna wakati ambapo huwezi kutumia AIRTEL MONEY kwasababu gharama ni juu sana)*	☐	☐	☐	☐	☐
23	AIRTEL MONEY is cheaper than Western Union and Banks. *(AIRTEL MONEY ina gharama ya chini kuliko Western Union ama Benki)*	☐	☐	☐	☐	☐
	TRIAL-ABILITY					
24	I encourage new users to try AIRTEL MONEY with little money, before starting to use it. *(Ninawashauri watu wajaribu AIRTEL MONEY na pesa kidogo, kabla waanze kuitumia kabisa)*	☐	☐	☐	☐	☐
25	I tried out the AIRTEL MONEY service I use before adopting it fully *(nilijaribu AIRTEL MONEY nione iwapo inafanya kazi vizuri kabla sijaitumia)*	☐	☐	☐	☐	☐
26	If I try other services like Orange Money or Safaricom etc for free, I could end up using them. *(Nikijaribu Orange Money ama Safaricom, bila malipo kwanza, huenda nikaanza kuzitumia)*	☐	☐	☐	☐	☐

Section C   **MODERATORS**

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	PERCEIVED RISK					
27	Transacting in AIRTEL MONEY is risky, the information I send can be accessed by other people. *(Kuna hatari nikitumia AIRTEL MONEY, ujumbe ninaotuma unaweza kujulikana)*	☐	☐	☐	☐	☐
28	The cash I put in AIRTEL MONEY could possibly get lost. *(Pesa nilizoweka kwa AIRTEL MONEY zaweza kupotea)*	☐	☐	☐	☐	☐
29	The AIRTEL MONEY technology can fail, e.g. the network collapse *(Teknologia ya AIRTEL MONEY inaweza kuharibiba wakati wowote)*	☐	☐	☐	☐	☐

Section D   **ENDOGENOUS VARIABLES**

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
30	**BEHAVIORAL INTENTION** I intend to continue using AIRTEL MONEY in the future *(nitaenelea kutumia AIRTEL MONEY siku za usoni)*	☐	☐	☐	☐	☐
31	I recommend people to use AIRTEL MONEY *(ninawahimiza watu kutumia AIRTEL MONEY)*	☐	☐	☐	☐	☐

Section A FILTER QUESTION

1a)	Which of these ranges best describes your household income per month in terms of salary or wages in KShs? ☐ Less than 10,000 ☐ Between 10,000 and 20,000 ☐ Between 20,000 and 30,000 ☐ Between 30,000 and 40,000 ☐ Over 40,000	
1b)	Which of these ranges best describes your household income per month in terms of self employment and property income or business or income from agricultural produce and farming in KShs? ☐ Less than 10,000 ☐ Between 10,000 and 20,000 ☐ Between 20,000 and 30,000 ☐ Between 30,000 and 40,000 ☐ Over 40,000	

Section B DEMOGRAPHICS

2	Gender	Male ☐	Female ☐

3	Age in Years	

4	How long have you used ORANGE MONEY? ☐ Less than SIX months ☐ Between SIX months and ONE year ☐ Between TWO years and THREE years ☐ Between THREE years and FOUR years	
5	Which is the last class attended? ☐ Primary School ☐ Secondary School ☐ Certificate College ☐ Diploma College ☐ University College	

Section C DETERMINANTS

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	PERFORMANCE EXPECTANCY					
6	ORANGE MONEY is very useful in managing my finances. (ORANGE MONEY inanisaidia kuhifadhi na kupanga fedha zangu)	☐	☐	☐	☐	☐
7	I don't need to go to bank frequently because I use ORANGE MONEY (Sihitaji kutembelea banki mara kwa mara kwa sababu niko na ORANGE MONEY)	☐	☐	☐	☐	☐
8	I save time by using ORANGE MONEY (ORANGE MONEY hunisaidia kuokoa mda)	☐	☐	☐	☐	☐
	EFFORT EXPECTANCY					
9	ORANGE MONEY was easy to learn (ORANGE MONEY ilikuwa rahisi kujifunza)	☐	☐	☐	☐	☐
10	ORANGE MONEY is easy to use (ORANGE MONEY ni rahisi kutumia)	☐	☐	☐	☐	☐
11	The registration process for ORANGE MONEY was simple and easy (Mpangilio wa kusajiliwa kwa ORANGE MONEY ulikuwa rahisi na wa kueleweka)	☐	☐	☐	☐	☐
	SOCIAL INFLUENCE					
12	My parents, siblings and friends think that I should use ORANGE MONEY. (Wazazi, ndigu zangu and marafiki wanaona ni vyema nitumie ORANGE MONEY)	☐	☐	☐	☐	☐
13	My friends use ORANGE MONEY. (Marafiki wangu hutumia ORANGE MONEY)	☐	☐	☐	☐	☐
14	Using ORANGE MONEY makes me feel better than those who do not use it. (Nikitumia ORANGE MONEY najihisi vyema kuliko wasiotumia)	☐	☐	☐	☐	☐
	FACILITATING CONDITIONS					
15	My parents, siblings and friends think that I should use ORANGE MONEY. (Wazazi, ndigu zangu and marafiki wanaona ni vyema nitumie ORANGE MONEY)	☐	☐	☐	☐	☐
16	My friends use ORANGE MONEY. (Marafiki wangu wanatumia ORANGE MONEY)	☐	☐	☐	☐	☐
17	Using ORANGE MONEY makes me feel better than those who do not use it. (Nikitumia ORANGE MONEY najihisi vyema kuliko wasiotumia)	☐	☐	☐	☐	☐

	PERCEIVED TRUST					
18	If I made a mistake or lost my phone, ORANGE MONEY safeguards my money and information. (Nikifanya makosa wakati ninatumia ORANGE MONEY, kila kitu kitahifadhiwa)	☐	☐	☐	☐	☐
19	My financial information is safe when I use ORANGE MONEY (Hakuna mtu anaweza kuona habari ya fedha zangu ninapotumia ORANGE MONEY)	☐	☐	☐	☐	☐
20	People working and managing ORANGE MONEY can be trusted (Watu wanaosimamia ORANGE MONEY wanaaminika)	☐	☐	☐	☐	☐

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	TRANSACTION COST					
21	The transaction costs for ORANGE MONEY are too high					
	(Gharama ya kutumia ORANGE MONEY iko juu sana)	☐	☐	☐	☐	☐
22	Some times I don't send money because sending ORANGE MONEY is expensive.					
	Kuna wakati ambapo huwezi kutumia ORANGE MONEY kwasababu gharama ni juu sana)	☐	☐	☐	☐	☐
23	ORANGE MONEY is cheaper than Western Union and Banks.					
	(ORANGE MONEY ina gharama ya chini kuliko Western Union ama Benki)	☐	☐	☐	☐	☐
	TRIAL-ABILITY					
24	I encourage new users to try ORANGE MONEY with little money, before starting to use it.					
	(Ninawashauri watu wajaribu ORANGE MONEY na pesa kidogo, kabla waanze kuitumia kabisa)	☐	☐	☐	☐	☐
25	I tried out the ORANGE MONEY service I use before adopting it fully					
	(nilijaribu ORANGE MONEY nione iwapo inafanya kazi vizuri kabla sijaitumia)	☐	☐	☐	☐	☐
26	If I try other services like M-PESA or Airtel Money etc for free, I could end up using them.					
	(NikijaribuM-PESA ama Airtel Money, bila malipo kwanza, huenda nikaanza kuzitumia)	☐	☐	☐	☐	☐

Section C MODERATORS

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	PERCEIVED RISK					
27	Transacting in ORANGE MONEY is risky, the information I send can be accessed by other people.					
	(Kuna hatari nikitumia ORANGE MONEY, ujumbe ninaotuma unaweza kujulikana)	☐	☐	☐	☐	☐
28	The cash I put in ORANGE MONEY could possibly get lost.					
	(Pesa nilizoweka kwa ORANGE MONEY zaweza kupotea)	☐	☐	☐	☐	☐
29	The ORANGE MONEY technology can fail, e.g. the network collapse					
	(Teknologia ya ORANGE MONEY inaweza kuharibiba wakati wowote)	☐	☐	☐	☐	☐

Section D ENDOGENOUS VARIABLES

		Strongly Disagree	Disagree	Neutal	Agree	Strongly Agree
	BEHAVIORAL INTENTION					
30	I intend to continue using ORANGE MONEY in the future					
	(nitaenelea kutumia ORANGE MONEY siku za usoni)	☐	☐	☐	☐	☐
31	I recommend people to use ORANGE MONEY					
	(ninawahimiza watu kutumia ORANGE MONEY)	☐	☐	☐	☐	☐