



## CONSUMERS' BEHAVIOURAL INTENTION TO ADOPT MOBILE BANKING IN RURAL SUB-SAHARAN AFRICA USING AN EXTENSION OF TECHNOLOGY ACCEPTANCE MODEL: LESSONS FROM ZIMBABWE

Joe Muzurura<sup>1+</sup>  
Farai Chigora<sup>2</sup>

<sup>1</sup>Faculty of Postgraduate Studies, Catholic University of Zimbabwe, Zimbabwe.

Email: [jmuzurura@cu.z.ac.zw](mailto:jmuzurura@cu.z.ac.zw)

<sup>2</sup>Dean Post Graduate Studies, Catholic University of Zimbabwe, Zimbabwe.

Email: [fchigora@cu.z.ac.zw](mailto:fchigora@cu.z.ac.zw)



(+ Corresponding author)

### ABSTRACT

#### Article History

Received: 6 August 2019

Revised: 13 September 2019

Accepted: 22 October 2019

Published: 9 December 2019

#### Keywords

Rural areas

Sub-Saharan Africa

Zimbabwe

Mobile banking

TAM.

#### JEL Classification:

A1; B41; F23.

The zeitgeist of mobile banking epoch in Sub-Saharan Africa has marked a fundamental transition from the use of physical currency, debit/credit cards and cheques towards a mobile banking e-commerce. In these countries mobile banking provides consumers with added-on advantages such as user-friendliness, cost effective, fast transaction speeds and increased customer satisfaction. Despite the popularity of mobile banking, consumers in most rural areas have largely remained excluded from such beneficial financial innovation. In addition, the extent to which mobile banking services are being adopted by rural consumers has not increased as expected, yet, economic growth and development of Sub-Saharan Africa could fundamentally be contingent on how these potential consumers adopt and use mobile banking innovations. The main objective of the study was to examine the adoption of mobile banking in Sub-Saharan African rural areas drawing lessons from Zimbabwe. Quantitative data was collected using a questionnaire from a random sample of 100 respondents. The findings show that the likelihood of adopting mobile banking in rural Sub-Saharan Africa regions are influenced by perceived usefulness, compatibility perceived ease of use and demographic factors. The likelihood of deferring the adoption of mobile banking are due to complexity, relative advantages, perceived usefulness, social influence and perceived risk. The study recommends policies that reduce perceived risk and complexity, increase trust, confidentiality and awareness knowledge among rural user.

**Contribution/Originality:** The study contributes to the existing literature by employing both technology acceptance model and multinomial regression technique to examine factors that affect the probability of adopting mobile banking in rural areas of developing economies.

### 1. INTRODUCTION

Since time immemorial, payment systems have always been part and parcel of the human race evolution. The gradual development in payment methods started with barter transactions, then cash, followed by cheques, and later metamorphosed to electronic payment systems. In recent years innovations in financial intermediation have gained accelerated traction in developing countries abetted by the speedy diffusion of communication technology and other ancillary telecommunication infrastructure. Consequently, traditional payment systems in many Sub-Saharan African (SSA) countries have since gravitated towards the adoption of mobile phones for making payments and receiving funds. Traditionally the payment systems have primarily been expedited by banks and financial institutions. Nevertheless, in recent years mobile banking has expanded from being the sole preserve of financial

institutions and but also to include a cocktail of other important stakeholders such as supermarkets, telecommunication and insurance firms. Mobile banking allows consumers to use mobile phones and other devices to perform various transactions that range from; accessing credit from banks, making mobile money transfers, doing online payments at points of sale, storing monetary value, checking balance enquiries, accessing insurance services, and receiving transaction alerts through short message services. This development has seen many consumers in SSA countries gaining twenty-four hour access to cash and also having ready, seamless, effortless, speedy and secure access to electronic payments from their homes, fields, villages and offices at lower transaction costs. Most consumers no longer leave their homes without their mobile phones or other devices. Just like car keys and leather wallets, the mobile phone has managed to achieve a permanent share of the pocket and the hand bag. The huge storage capacity of information, the ease of use, flexibility, convenience, reliability, faster interoperability and transmission capabilities of the mobile phone, makes it a useful device for containing everything people normally carry in their wallets, such as cash and business cards. Unlike traditional banks mobile banking provides more features and functionalities that enable consumer to easily access their demand deposits and savings using instant messaging from any location and at any time of the day. In SSA mobile banking has become a disruptive and innovative force that is changing the traditional transactional, speculative and precautionary demand for cash and hence, transforming rural communities.

In contrast, in many developed economies such as in USA and much of Europe, the growth of mobile banking has been hindered by the already trusted alternatives such as internet banking, credit cards and use of point of sale cards. The paper avers that in these countries, traditional modes of payments such as cheques, automated teller cards, and point of sale networks still remain attractive to many consumers owing to high level of technological advancements, deepened financial sector development, and faster telecommunication network speeds. For these reasons, the use of mobile banking in developed countries assumes an additive value, that is, it is perceived as an additional method of managing money without demanding cash transactions. The traditional banking system in developed countries is visible and highly developed. This suggests that mobile banking has been relegated to being just another convenient way of accessing an existing account.

Unlike in developed economies, in the SSA region mobile banking has both additive and transformational value to rural consumers. This is because in many SSA rural areas, the use of mobile banking is less about convenience but more about usefulness, efficacy and accessibility. In rural areas, using mobile bank reduces travelling time and brokerage costs. In many urban areas of SSA countries, the adoption of mobile banking services by consumers has been marked by a significant transition from the use of physical currency, ATMs, debit/credit cards and cheques to a mobile-based person to person, person to business, business to person as well as business to business payment environment. However, despite the immense popularity of mobile banking services in SSA urban areas, most consumers in rural areas have not embraced it. Several studies have examined factors influencing consumers' the acceptance of mobile banking in urban areas of developing economies (for example, (Hanafizadeh *et al.*, 2014; Aijaz and Karjaluto, 2015; Dapp *et al.*, 2015; Harris *et al.*, 2016; Koksai, 2016; Alalwan *et al.*, 2017)). Even with such a plethora of researches little has been done to understand the supremacy and adoptability of mobile bank technologies on the magnitude of unbanked rural consumers who constitutes seventy percent of the SSA population. At macro-level general insights and practical experience may reveal that the uptake of mobile banking in the SSA rural areas could be mired due to various factors such as remote geographic locations, low disposable incomes, poor public infrastructure, shallow financial sector development, lower economic growth, socio-political instability and financial illiteracy of many rural consumers. In other regions of developing countries the acceptance of mobile banking has enabled a growing number of people living in rural areas to access financial services for the first time, showing that the same might be achieve across the SSA region. Far reaching network coverage has removed geographic barriers by enabling the most remote and inaccessible areas to receive financial services at minimal transaction costs. Less people in SSA countries have bank accounts compared to people with mobile

phones. This indicates the need for financial institutions to tap into this potential market segment, through the adoption of mobile banking services. This paper therefore argues that since many people in SSA have mobile phones than bank accounts, there are enormous opportunities for mobile banking to fill in the financial intermediation gap between the financial services coverage and the desired infrastructure. In this view there is a strong prospective for the unbanked rural consumers in SSA who possess a mobile phone to be converted to the banked through the use of mobile phone. This means that mobile banking might be used to empower rural people and eradicate poverty and hence, to contribute meaningfully to economic growth and development of SSA countries.

The uptake of mobile banking in SSA can ascend rapidly if more rural consumers become aware of the transformational value of adopting mobile banking services. Many people in rural areas of SSA countries still make many long trips to banks that are usually located in provincial towns in order to access banking services. Numerous trips to banks by rural people with low disposable incomes involves high opportunity costs in terms of inconveniences, loss of agricultural productivity, wastage of time and other brokerage costs. In fact many rural consumers travel long distances to banks only to withdraw or deposit few dollars. Therefore, the adoption of mobile banking services could play a pivotal role in SSA by bridging the financial intermediation divide experienced by rural people, whilst at the same time providing safe, secure, convenient and cheap financial services. Adoption of mobile banking also offers many tangible benefits to banks in terms of increased market coverage, enhanced service quality and increased profitability. Using e-commerce other stakeholders could also accrue cost efficiencies by leveraging on interoperable functionalities of mobile banking.

Besides being used as a substitute for actual cash, cheques, debit and credit cards, the adoption of mobile banking can also potentially catalyse economic growth and development. In rural areas with limited presence of financial institutions people keep savings under the pillow and other unsafe places. However, the adoption of mobile banking by rural consumers besides ensuring security of investment can in addition provides new opportunities in the commerce world by facilitating person to business payments and funds receipts. Most people in rural areas keep savings in the form of animals and crop harvest which are prone to disease epidemics or can be drought stricken leading to heavy monetary losses. Hence, mobile banking can be used as a conduit for accumulating long-term savings and to strengthen livelihood resilience against the caprices of adversative climatic changes. Despite the existence of good absorptive capacity factors, the adoption of mobile banking in SSA rural areas still faces significant challenges that have not been extensively explored in literature. Faced with the rapidly increasing pace of mobile banking technological progress and other adjuvant financial innovations that are occurring globally, a reduced willingness or capacity to embrace innovation such as mobile banking by rural people in SSA, is likely to leave the SSA region lagging significantly behind other African countries in terms of poverty reduction, employment generation and economic development. Unlike most countries in SSA region, Zimbabwe has good absorptive capacity factors that can facilitate the adoption of mobile banking such as a well-developed financial sector, high literacy rate of 95% and a mobile phone penetration rate of 97%. The country is saddled with a huge number of unbanked rural consumers that constitute at least 65% of the entire population. Since 2007, the country has been shackled in severe financial and cash crises due to high demand for cash transactions. Therefore, the adoption of mobile banking by the majority of its rural citizens might mean a reduction in the demand for transactional, precautionary and speculative balances held against unexpected consumption expenditures that are often occasioned by recurrent droughts. Mobile banking acceptance could also enable rural consumers to more easily and at a lower costs accommodate unexpected expenditure needs such as hospital fees by switching out of mobile balance into cash. Zimbabwe is a typical SSA country with more unbanked people who have also more mobile phones. This suggest that the country can be used as perfect nominee for drawing some lessons on factors that are likely to hinder or facilitate the intention to adopt mobile banking in SSA rural areas.

The study is significant for a number of reasons. First, mobile banking has the potential for offering both transformational and additive value that can empower rural consumers in SSA countries. Second, for financial institutions mobile banking can be used to revamp traditional banking value chains and to create shareholder value, whilst at the same time enhancing channel transformation in service delivery for the benefit of disadvantaged rural consumers. Ultimately, increased financial disintermediation from traditional banking channels towards interactive mobile banking has the potential to create long-term transformational and additive value for rural consumers. Banks will be able to develop proprietary services and products that are tailored to attract neglected rural market segments, thus expediting financial inclusion and capital deepening. In addition, mobile banking has a wider outreach coverage than the conventional bank network and thus could be used for increasing bank penetration in areas that are inaccessible and remote. The study seeks to respond to the following question; what are some of the factors that are likely to hinder or facilitate the adoption of mobile banking SSA region? Section one gives the introduction and background. Section two covers Literature Review whilst section three presents the methodology. Section four covers findings and section five is on recommendations and conclusions.

## 2. LITERATURE REVIEW

This study defines mobile banking as an innovative method for accessing banking services and products through a communication network channel hence, enabling the customer to interact with a bank via a mobile device at any time from any location. This suggest that the bank controls the customer relationship by providing mobile banking services that augment existing delivery channels whilst on the other hand, a mobile operator provides the channel for the transactions conducted by the financial institution. Alternatively mobile banking can be defined the use of mobile devices especially, the mobile phone to carry out bank transactions that include; account management, checking account balances, viewing account activities, bill payments and funds transfer. It can also be considered as a set of applications that enable people to use their mobile devices to remotely access their bank accounts via short messaging services using telecommunication networks. Theories such as the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and Unified Theory of Acceptance and Use of Technology (UTAUT) have been used to make predictions on the intention to adopt or use new technologies (see (Davis, 1989; Ajzen, 1991; Venkatesh *et al.*, 2012)). Some of the factors examined in mobile banking literature include perceived usefulness (Kazemi *et al.*, 2013; Koksal, 2016) perceived self-efficacy (Martins *et al.*, 2014) social influence (Poong *et al.*, 2017) relative advantages (Laukkanen, 2016) perceived compatibility (Venkatesh *et al.*, 2012) perceived risk and trust (Hosseing M *et al.*, 2015; Harris *et al.*, 2016) perceived complexity and perceived trialability (Bashir and Madhavaia, 2015) awareness-knowledge and perceived ease of use (Alalwan *et al.*, 2016) as well as intermediating factors such as age, gender and education (Gulamhuseinwala *et al.*, 2015; Koksal, 2016; Tan *et al.*, 2016; Poong *et al.*, 2017). Some studies have also integrated models such as UTAUT and TAM to examine external factors that affect the adoption and usage of mobile banking such as performance expectancy (Hew *et al.*, 2015; Hsu and Lin, 2016; Alalwan *et al.*, 2017) social influences and facilitating conditions (Oh and Yoon, 2014; Hsu and Lin, 2016) trust and innovativeness (Bashir and Madhavaia, 2015; Chauhan, 2015) espoused cultural values (Tan *et al.*, 2016) technological readiness (Venkatesh *et al.*, 2012) ethnicity, religion, language, employment, income and marital status (Sellitto, 2015) perceived threats and risk (Martins *et al.*, 2014) job fit, attitude, anxiety and economic development (Arenas *et al.*, 2015) user groups, social groups, trust of internet and trust of intermediaries (Hsu and Lin, 2016; Salimon *et al.*, 2017) and duration, frequency and intensity (Venkatesh *et al.*, 2012). Rogers (1961) diffusion of innovation model (DOI) have also been widely used to investigate an individual's decision to adopt or reject the innovation. Table 1 summaries some of the major factors or variables that influence the intention to adopt mobile banking based technology. The factors include perceived usefulness, attitude, subjective norms, relative advantages, performance expectancy among others.

Table-1. Summary of main theories on the intention to adopt mobile technology.

Main theory or model	Main dependent constructs	main independent constructs	Genesis of the theory	Originating source of study	Developed by
Theory of reasoned Action (TRA)	Behavioural intention, actual behaviour	Attitude toward behaviour, subjective norm		Social psychology	Ajzen (1991)
Technology Acceptance model (TAM)	Behavioural intention to use, Actual system usage	Perceived usefulness, perceived ease of use	Adopted from TRA	Information Systems	Davis (1989)
Theory of Planned Behaviour	Behavioural intention, Behaviour	Attitude to behaviour, subjective norm, perceived behavioural control	Derived from TRA	Sociology Psychology	Ajzen (1991)
Diffusion of Innovation	Behavioural intention, Actual behaviour	relative advantage, compatibility, complexity, observability and trialability		Information Systems	Rogers (1961)
Unified theory of acceptance and Use of technology (UTAUT)	Behavioural intention, Behaviour	Performance expectancy, effort expectancy, social influence, facilitating conditions	Adopted from TRA, TAM, TPB, Motivational Model (MM), SCT, MPCU	Information Systems	Venkatesh <i>et al.</i> (2003)
Task Technology Fit (TTF)	Performance	Task characteristics, technology characteristics, task technology fit, Utilisation		Information systems	Goodhue and Thompson (1995)

### 3. METHODOLOGY

#### 3.1. Conceptual Framework

Various studies have examined the behavioural intention to adopt mobile banking in developing countries using the original TAM. This paper departs from this approach and develops a holistic polychotomous regression model that integrates the TAM with other theories such as the DOI, TRA, PBM, UTAUT and Mallat factors. The aggregate model was conceptualized as shown [Figure 1](#).

Researchers studying consumer behaviour often wish to draw inferences about factors underlying the different choices that individuals make such as the adoption of mobile banking services. However, unlike in many empirical studies that use ordinary least regression models (OLS) this paper argue that consumer behavioural intentions to adopt mobile banking services are not linear decisions. Instead, the paper posits that a consumer's intention to adopt mobile banking is a discreet choice that can follow either binary or polychotomous distribution functions. Consequently, we argue that behavioural intention to adopt mobile banking maybe better investigated using Tobit, Logit, Probit or multinomial regression models.

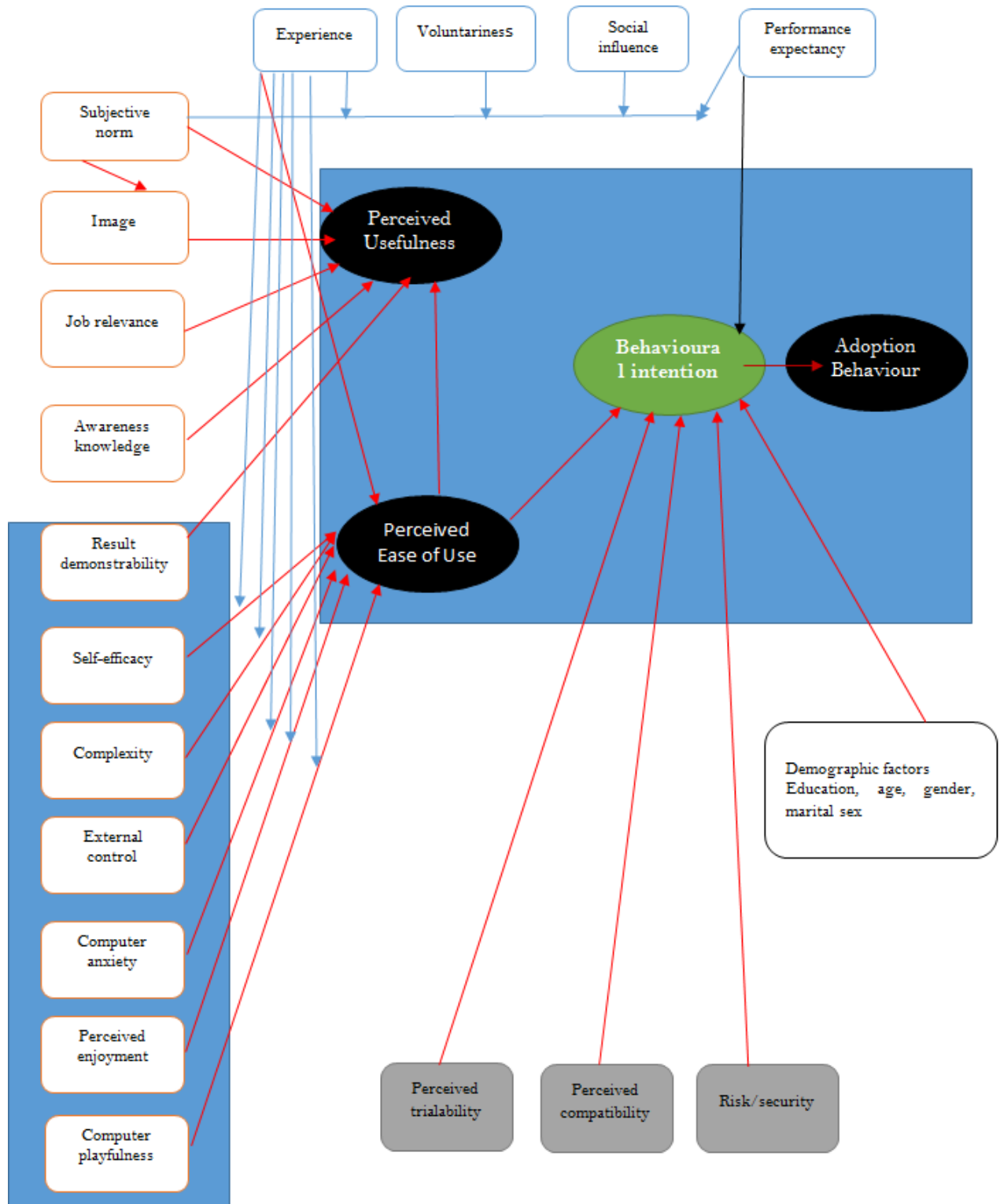


Figure-1. Technology acceptance model (TAM 3).

These models permit analyses of binary or multiple choice decisions that individuals' make in the adoption process. For instance, in line with the predictions of the TAM model, an individual behavioural intention to adopt mobile banking might involve choices such as; (1) adopt mobile banking at introductory phase (early adopters) (AMB), 2 not adopt mobile banking at all (NAMB), and (3) defer the adoption process to a later period when sure of its perceived usefulness and ease of use (laggards) (DAMB). When compared to other logistic models, the MNL model has an added advantage in that, it is possible to investigate a wider range of research questions in one study than permitted by other models. The model has more easily interpretable diagnostic statistic tests and is also more

robust to violations of assumptions of equal variance-covariance matrices across independent variables (Muzurura, 2019).

However, the critical challenge of using the MNL model is that the sign of the estimated model coefficients do not determine the direction of the relationship between an independent variable and the probability of choosing a specific alternative. The paper removed this challenge by using relative risk ratios (RRR). Individuals that chose the decision ADMB, NAMB and DAMP were denoted by dependent variables 1, 2 and 3 respectively. Thus, the model had three unordered dependent outcomes that were not hierarchical. This suggest that the individual's decisions either to adopt, or (ADMB) not to adopt (NADM) or to defer adoption (DAMBB) was not necessarily better or worse than the other. However, another major problem of using MNL in the study is the fundamental assumption of independent of irrelevant alternatives. The IIA assumption says that the ratio of the choice probabilities of any two alternatives is unaffected by the systematic utilities of any other available alternatives. The IIA means that the odds for any pair of an individual decision outcomes such as "ADMB" or "DAMB" are determined without reference of any other alternative such as "NAMB" that may be available to a consumer. If the assumption of IIA is violated, it follows that the MNL model is invalid for the purposes of the study. We therefore carried out some diagnostic tests for IIA using the Hausmann and McFadden (HM), Wald and the Small and Hsiao (SH) tests. Because prima facie, the decision to DAMB and NAMB appears to be the same decision outcome we had to carry out the likelihood test to rest this assertion.

### 3.2. The MNL Model Specification

From the probability formula;

$$P_{ij} = \Pr(Y_i = x_i) = \frac{\exp(x_i \beta_j)}{\sum_{j=0}^2 \exp(x_i \beta_j)} \quad (1)$$

$P_{ry_i}$  and  $P_{rx_i}$  are the probability of the behavioural intention to adopt mobile banking. We expand Equation 1 into three equations representing the three dependents outcomes; ADMB, NAMB and DAMB in the respective order, as shown below.

$$P_{ijt}, 1 = P(Y_{ijt}=1) = \exp [Z'_{ijt} \gamma_1] / [\exp [Z'_{ijt} \gamma_2] + [Z'_{ijt} \gamma_3] + [Z'_{ijt} \gamma_4]] \quad (2)$$

$$P_{ijt}, 2 = P(Y_{ijt}=2) = [\exp [Z'_{ijt} \gamma_1] / (\exp [Z'_{ijt} \gamma_2] + [Z'_{ijt} \gamma_3] + [Z'_{ijt} \gamma_4]] \quad (3)$$

$$P_{ijt}, 3 = P(Y_{ijt}=3) = [\exp [Z'_{ijt} \gamma_1] / (\exp [Z'_{ijt} \gamma_2] + [Z'_{ijt} \gamma_3] + [Z'_{ijt} \gamma_4]] \quad (4)$$

Equation 2 represents the probability that the *i*th consumer will choose alternative *j* (*j* = 1, (ADMB), Equation 3 shows that there is probability that a consumer will select NAMB outcome. Equation 4 is the consumer's behavioural intention to probably select the outcome DAMB.  $Z_i$  are a consumer's-specific regressors such as; age, gender, perceived ease of use, perceived usefulness, social influence, self-efficacy, level of education, compatibility, trialability and among others, that are thought to explain the consumer's decision to adopt mobile banking. The elasticities  $\gamma_1$ ,  $\gamma_2$ ,  $\gamma_3$  and  $\gamma_4$  are the coefficient vectors which are all assumed to have positive signs. Based on the number of consumers who selected "not to adopt decision", the NADM decision was chosen as the baseline category from which a consumer's decision not to adopt mobile banking was compared against other decisions such as ADM and DAMB. In order to guarantee identification of the equations,  $\gamma_j$  is set to zero for the referent or baseline category. Setting  $\gamma_j = 0$ , and computing the predicted probabilities yields the Equation 5 below;

$$P_{ij} = \Pr(Y_i = j | x_i) = \frac{\exp(x_i \gamma_j)}{\exp(x_i \gamma_0) + \sum_{j=1}^2 \exp(x_i \gamma_j)} \quad (5)$$

$$= \frac{\exp(x_i \gamma_j)}{\sum_{j=2}^2 \exp(x_i \gamma_j)} \tag{6}$$

The baseline or referent category that is Equation 6 can be further reduced to Equation 7 and Equation 8

$$Pr_{ij} = \text{Prob}(y_i = j | x_i) = \frac{\exp(x_i \gamma_j)}{\exp(x_i \gamma_1) + \sum_{j=2}^2 \exp(x_i \gamma_j)} \tag{7}$$

Equation 7 explains the decision to defer acceptance of mobile banking given all variables in the equation are held constant.

$$Pr_{ij} = \text{Prob}(y_i = j | x_i) = \frac{1}{1 + \sum_{j=1}^2 \exp(x_i \gamma_j)} \tag{8}$$

Equation 8 indicates the decision to adopt mobile banking relative to not to adopt given that all other variables are held constant.

The referent group can be expanded into Equation 7 and Equation 8 as follows;

$$Pr_{ijt, 1} = \text{Pr}(Y_{ijt}=2) = [\exp [X'_{ijt} \gamma_1] / 1 + \exp [X'_{ijt} \gamma_2] + \exp [X'_{ijt} \gamma_3]] \tag{9}$$

$$Pr_{ijt, 3} = \text{Pr}(Y_{ijt}=3) = (\exp [X'_{ijt} \beta \gamma_1] / 1 + \exp [X'_{ijt} \beta \gamma_2] + \exp [X'_{ijt} \gamma_3]) \tag{10}$$

$$Pr_{ijt, 2} = \text{Pr}(Y_{ijt}=1) = [1 / 1 + \exp [X'_{ijt} \gamma_2] + \exp [X'_{ijt} \gamma_3]] \tag{11}$$

The coefficients of the ADMB and DAMB were interpreted with the respect to the base category (NAMB) as follows;

$$\text{Pr}(Y_{ijt}=2) / \text{Pr}[Y_{ijt}=1] = \exp(X'_{ijt} \gamma_2) \tag{12}$$

This equation shows the relative risk of ADMB outcome relative to DAMB outcome. This equation represents the relative risk of NAMB relative to DAMB.

$$\text{Pr}(Y_{ijt}=3) / \text{Pr}[Y_{ijt}=1] = \exp(X'_{ijt} \gamma_3) \tag{13}$$

The RRR indicates how the relative risk of the alternative compared to the benchmark option changes with a unit increase in the explanatory variable. The RRR of the intention to adopt mobile banking was specified as following equation;

$$\text{RRR} = [\text{Pr}\{Y_{ijt}=h | x_{ijt}+1\} / \text{Pr}\{Y_{ijt}=3 | x_{ijt}+1\}] / [\text{Pr}\{Y_{ijt}=h | x_{ijt}\} / \text{Pr}\{Y_{ijt}=3 | x_{ijt}\}] \quad I, j=1 \dots N; I \neq j; t=1 \dots T \tag{14}$$

Equation 14 indicates that an increase of the explanatory variable increases or decreases the likelihood of the consumer adopting mobile banking, compared to the benchmark or baseline category that is, the behavioural intention not to adopt mobile banking. The final empirical model was therefore specified as follows;

$$X^*_{ijtm} = \rho_1 + \rho_j + \phi_{tm} + X'_{ij} \beta + \varepsilon_{ij} \quad I, j=1 \dots Y; I \neq j; t_m=1 \dots T \tag{15}$$

Where;

$Y^*_{ijt}$  is consumer behavioural intention of individual  $i$  to individual  $j$  in time  $t_m$  and is a variable with three possible outcomes.  $X^*_{ijtm}$  is a vector of  $N$  explanatory variables such as firm perceived ease of use (PEU), perceived usefulness (PE), perceived self-efficacy (PSE), social Influence (SI), facilitating conditions (FC), perceived complexity (PC), compatibility (COM), trailability (TRIAL), perceived Risk (PR), Awareness Knowledge (AK), Behavioural Intentions (BI), gender (G), marital status (M) and education (EDU).

### 3.3. Expanded Model

$$pr(1,2,3) = \partial_0 + \partial_1 PE + \partial_2 PEU + \partial_3 SI + \partial_4 FC + \partial_5 RA + \partial_6 PC + \partial_7 COM + \partial_8 TRI + \partial_9 PR + \partial_{10} AK + \partial_{11} BI + \partial_{12} G + \partial_{13} AGE + \partial_{14} EDU + \partial_{15} PSE + \varepsilon_{15}$$



### 3.4. Dependent Variables ( $X^*$ )

- |      |   |
|------|---|
| ADMB | 1. Intention to adopt mobile banking.           |
| NAMB | 2. No intention to adopt mobile banking.        |
| DAMB | 3. Defer the intention to adopt mobile banking. |

All were denoted 1, or otherwise 0.

### 3.5. Independent Variables

Perceived Usefulness- is the extent to which a consumer believes that adopting and using mobile banking would improve the management of payments and receipts of funds. Perceived usefulness has been reported to enhance people's every day routines in many rural settings (Martins *et al.*, 2014; Alalwan *et al.*, 2016). For rural consumers, perceived usefulness can be described in terms of accessibility, portability, flexibility in having a choice of the account to debit where several accounts are on one mobile phone, speed of use when they have run out of time to visit a bank, the ability to make purchases when they want to at any time. For these reasons, the following hypothesis is suggested.

**H<sub>1</sub>**. Perceived usefulness has a positive effect on the probability of adopting mobile banking in rural areas.

Perceived Ease of Use- Perceived ease of use was also found to have a direct effect on the intention to adopt mobile banking in rural areas of Taiwan, Tanzania, Malaysia and Zimbabwe (see (Arunagiri *et al.*, 2014; Dismas and Mutalemwa, 2014; Mbengo *et al.*, 2015)). Given the remoteness of rural areas and absence of financial institutions, mobile banking should be not only be easy to use, but also afford rural consumers convenience and speed access to menu hence, allowing them to timely access to payment and receipts through ubiquitous purchase possibilities. In this regard the following hypothesis is proposed. **H<sub>2</sub>**. The higher the degree of perceived ease of use the higher the probability of the behavioural intention to adopt mobile banking services in rural area.

Perceived Self-Efficacy- refers to the confidence that consumers have in using mobile banking in order to perform banking or other transactions. This variable has been in empirical literature to assess the behavioural intention to adopt mobile banking in other developing countries (see (Venkatesh *et al.*, 2012; Ramdhony and Munien, 2013; Hanafizadeh *et al.*, 2014)). In most developing countries rural people tend to have a collectivistic culture and therefore, the higher the extent of perceived self-efficacy among them, the more probable that mobile banking can be adopted faster. **H<sub>3</sub>**. The higher the perceived self-efficacy the higher the probability of behavioural intention to adopt mobile banking services in rural areas.

Social Influence-can be defined as social norms, subjective norms or normative pressures resulting from other members of the society that will influence or approve the probability of adopting a particular innovation or technology. Social interaction through various platforms is particularly significant because it directs the manner people behave and conform with other people they consider relevant to themselves. A number of studies have demonstrated that consumer behaviour towards the intention to adopt is to a large extent a result of social influence (Harris *et al.*, 2016; Hsu and Lin, 2016; Krishanan *et al.*, 2016). The prevalence of cheap and interactive social applications in many rural areas suggest that consumers are likely to influence each other through social interactions to adopt mobile banking in rural areas. Thus our hypothesis; **H<sub>4</sub>** Social influence positively influences the probability of adopting mobile banking services in rural areas.

Facilitating Conditions- refers to the degree to which a person believes the existence of organisational, human capital and technical infrastructure such as telecommunication networks that support the use an innovation such as mobile banking. However, new technology also brings some form of fear or anxiety to the new users forcing them to be more cautious on deciding to adopt newer innovation. Facilitating conditions are reported to facilitate the adoption of mobile banking in some developing countries (Harris *et al.*, 2016). Hence hypothesis, **H<sub>5</sub>**: the more the facilitating conditions (absorptive capacity), the higher the behavioural intention to probably adopt mobile banking services in rural areas. Relative Advantage-refers to the degree to which using mobile banking to perform similar

tasks as traditional banking is regarded as being better and beneficial than the former. The more rural consumers view mobile banking as better than using traditional banking, the more the likelihood of adopting and accepting it in their daily routines. Hence, **H<sub>6</sub>**: Relative advantage has a positive effect on the behavioural intention to probably adopt mobile banking services in rural areas.

Perceived Complexity- is used to refer to the degree to which mobile banking as new innovation is viewed by individuals as relatively difficult to understand and to use. [Gia-Shie and Tai \(2016\)](#) say that consumers are unlikely to adopt mobile banking system when it is complex or difficult to use. Most rural consumers who have been unbanked since their birth and also illiterate are likely to find mobile banking usage difficult than using traditional banking. Thus, the hypothesis- **H<sub>7</sub>**: Perceived complexity has a negative effect on the behavioural intention to probably adopt mobile banking services in rural area. Perceived Compatibility- is the degree to which mobile banking is compatible or consistent with an individual's values, lifestyle, needs and past experiences. Many studies have shown that perceived compatibility has a positive effect on the intention to adopt mobile banking in both rural and urban areas (see ([Chitungo and Munongo, 2013](#); [Koksal, 2016](#); [Masocha and Dzomonda, 2018](#))). In the regard, we adopt hypothesis **H<sub>8</sub>**: The higher the degree of perceived compatibility, the higher the behavioural intention to probably adopt mobile banking services in rural areas.

Trialability refers to the extent to which an individual perceives that he or she can try a new mobile banking technology or system before actually using it. [Alalwan et al. \(2016\)](#) for Jordan and [Shaikh et al. \(2015a\)](#) for Finland report the importance of trialability on the intention to adopt mobile banking in both rural and urban areas. Consumers in rural areas are likely to accept mobile banking services if they are given an opportunity to try the service before actual use. Trialability enables consumers to gauge the ease of use and future usefulness of mobile banking. Hence, **H<sub>9</sub>**: The greater the perceived trialability, the higher the behavioural intention to probably adopt mobile banking services in rural areas. Perceived Risk- measures the probability that a future event or transaction arising out of the use of mobile banking could result in disastrous or undesirable outcomes to consumers that may lead outflows of economic benefits. More significant, we argue that mobile banking services have intangible benefits and rural users are like to value self-efficacy well after the consumption have been done. Resultantly, consumers tend to be anxious about security of their savings, theft of identity transactions ([Arunagiri et al., 2014](#); [Laukkanen, 2016](#)). Users of mobile banking in rural are likely not to adopt mobile banking until fears of risk, safety and security of transactions are addressed. Therefore, **H<sub>10</sub>**-perceived risk has a negative influence on the behavioural intention to probably adopt mobile banking services in rural areas. Awareness-Knowledge- can be defined as the degree to which a consumer is aware that a new technology such as mobile banking exists and that it has short and long-term benefits to her. In order for mobile banking to be adopted in rural areas it means more users should not only be aware of it but are able to accrue benefits from its use. **H<sub>11</sub>**: Awareness-knowledge has a positive effect on the probability of adopting mobile banking in rural areas. Behavioural Intention- apart from the above variables, the effect of behavioural intention on adoption has also been incorporated as a dependent variable (see [Park et al. \(2014\)](#)). Behavioural intention is used in this study to measure the probability that a person could be involved in a given behaviour. Social norms and culture are likely to influence human behavioural intention to adopt mobile banking. **H<sub>12</sub>**: Behavioural intention has a positive effect on the usage of mobile banking services. Demographic factors-different results have been shown the positive effect of demographic factors such as age, per capita income, gender, marital status and education on the intention to adopt mobile banking in developing countries ([Park et al., 2014](#); [Arenas et al., 2015](#); [Hosseing M et al., 2015](#); [Sellitto, 2015](#); [Tan et al., 2016](#); [Poong et al., 2017](#)). A number of hypotheses are proposed. **H<sub>15a</sub>**: Gender affects the probability of the intention to adopt mobile banking services in rural areas. **H<sub>15b</sub>**: Age affects the probability of the behavioural intention to adopt mobile banking services in rural areas. **H<sub>15c</sub>**: Education differences affect the probability of adopting mobile banking services in rural areas. **H<sub>15d</sub>**: There are significant differences in the behavioural intention to probably adopt mobile banking.

#### 4. FINDINGS

##### 4.1. Independence of Irrelevant Alternative (IIA) Test

The Hausmann and Small-Hsiao diagnostic test for IIA are shown in Table 2. The ADMB decision has a coefficient of -19.933 and NADM (-614.80) whilst DAMB has a coefficient of -316.321. The research therefore rejects the hypotheses that the three outcomes, ADMB, NAMB AND DAMB did not affect the variables considered important for the behavioural intention to adopt mobile banking by the consumer in rural areas. The p-value for the decision to ADMM is statistically significant at 95% level whilst the decision to DAMB and NAMB are statistically significant at 1% level of confidence. Hence, using either the p-value or coefficients of the independent variables, the assumption of IIA could also not be rejected.

Table-2. Hausmann and small-Hsiao test for IIA.

mlog test, hausman smhsiao base						
*** Hausman tests of IIA assumption (N=100)						
Ho: Odds (Outcome- J) vs Outcome-k) are independent of other alternatives						
Omitted	Chi 2	df	P>chi1	Evidence		
ADMB	-1.67	8	-----	-----		
DAMB	-7.71	8	-----	-----		
NAMB	0.00	8	1.000	for H <sub>o</sub>		
Note: if chi2<0, the estimated does not meet asymptotic assumptions of the test						
H <sub>o</sub> Odds(outcome-J) vs Outcome-K) are independent of other alternatives						
Omitted	lnl(full)	lnL (omit)	chi2	df	P>chi1	Evidence
ADMB	-19.933	-6.062	15.742	8	0.037	against Ho
NADM	-714.8	-0.00012	29.606	8	0.000	against Ho
DAMB	-316.321	-0.0004	32.642	8	0.000	against Ho

##### 4.2. Combining Dependent Categories-the Wald Test

In order to test whether the independent variables differentiated pairs of outcome categories such as ADMB and NAMB and DAMB, the researchers undertook a Wald test as shown in Table 2. Using the p-value, the results are statistically significant at 95% level of confidence. These findings show that ADMB, NAMB and DAMB are separate consumer decisions and therefore cannot be combined as one or two decisions. The findings indicate ,that a consumer can either decide to adopt or to defer adoption or not to adopt mobile banking and such decisions can be analysed and interpreted as separate choice decisions that depend on the peculiar circumstances of a particular consumer.

Table-3. The wald test.

.mlogtest, combine				
***Wald test for combining alternatives (N=100)				
Ho: All coefficients except intercepts associated with a given pair of alternatives are 0 (i.e alternatives can be combined)				
Alternative that was tested		chi-squared	df	P>chi-squared
ADMB	DAMB	12.809	13	0.029
ADMB	NADM	11.582	13	0.035
DAMB	NADM	15.900	13	0.046

##### 4.3. Multicollinearity Test

The test for multicollinearity of all independent variables is shown in the Table 4. As shown in the table, all independent/predictor variables did not move together in systematic ways that could influence the robustness of the MNL model. Therefore, owing to the absence of multicollinearity among variables, the findings study concludes that individual effects of all independent variables on dependent variables, NAMB, DAMB and ADMB can be isolated.

Table-4. Multicollinearity tests.

Factor	PE	PEU	SI	FC	RA	PC	COM	TRI	PR	AK	BI	G	AGE	EDU	PSE
PE	1.00														
PEU	-0.09	1.00													
SI	-0.02	0.04	1.00												
FC	0.40	-0.14	-0.05	1.00											
RA	-0.04	0.06	-0.06	-0.01	1.00										
PC	-0.05	0.08	-0.03	0.016	-0.09	1.00									
COM	0.07	0.01	0.07	-0.02	0.06	0.07	1.00								
TRI	-0.06	-0.02	-0.08	-0.01	-0.09	-0.02	-0.06	1.00							
PR	0.05	-0.01	-0.11	0.02	0.02	0.05	-0.03	-0.22	1.00						
AK	-0.05	0.05	0.01	0.09	0.09	0.08	0.02	0.03	-0.21	1.00					
BI	0.10	0.01	-0.02	0.11	0.11	0.04	0.02	-0.02	0.05	-0.04	1.00				
G	-0.02	-0.05	-0.05	0.04	0.04	-0.05	-0.06	0.06	0.08	0.01	-0.08	1.00			
AGE	0.03	-0.02	-0.05	0.14	0.23	0.02	0.01	-0.04	0.07	0.01	-0.12	0.01	1.00		
EDU	-0.05	0.12	0.14	0.01	0.02	0.01	0.05	-0.10	0.21	0.01	0.15	0.23	-0.12	1.00	
PSE	0.01	0.01	0.10	0.14	0.01	0.12	-0.10	-1.15	0.02	0.35	0.10	-0.14	0.06	0.10	1.00

#### 4.4. Model Fitness Test

Table 5 shows findings from likelihood-ratio variable fitness test for variables that were used in the MNL regression model. As shown in Table 5 perceived self-efficacy, relative advantage gender, and borrowing costs were found to be insignificant and therefore were dropped from further analysis. All other variables were found to be statistically significant at various level of significance suggesting that they influence the decision to probably adopt or not adopt or to defer the adoption of mobile banking in rural areas.

Table-5. Model fitness test.

.mlogtest, lr

\*\*\*likelihood-Ratio test for independent variables (N=100).

Ho: All coefficients associate with given variable(s) are 0.

Predictor	Chi-squared	df	P>Chi-squared
Perceived usefulness	7.54	2	0.02
Perceived ease of use	9.67	2	0.01
Social influence	18.84	2	0.00
Facilitating conditions	12.97	2	0.00
Relative advantage	0.06	2	0.97
Perceived complexity	8.125	2	0.02
Compatibility	10.125	2	0.01
Trialability	12.45	2	0.00
Perceived risk	11.23	2	0.00
Awareness knowledge	8.79	2	0.00
Behavioural intention	5.69	2	0.01
Gender	0.07	2	0.78
Age	5.74	2	0.03
Education	6.58	2	0.01
Perceived self-efficacy	0.02	2	0.89

## 5. DISCUSSIONS

The discussions on the findings were based on the relative risk ratios shown in Table 5. A positive sign on a coefficient on a MLN regression model does not necessarily mean that an increase in the independent variable corresponds to an increase in the probability of choosing an outcome. Researchers routinely and wrongly assume that the sign and significance of MLN model coefficients can be used to evaluate their hypotheses (Muzurura, 2019). Muzurura also argued that the sign and size of the coefficients indicate neither the direction nor the size of the marginal effect on the probability that an alternative is chosen. Hence, if researchers want to draw valid conclusions about the direction and magnitude of the relation between a predictor and dependent variables using MNL regression models they must use relative risk ratios rather the conventional MNL regression output. Thus using

RRR, the coefficient of a predictor variable with regard to a specific category indicates how that predictor is related to the probability of observing a particular category relative to the base category, (in this case the decision not to adopt mobile banking). Table 6 shows relative risk ratios that will be used for discussions of the findings in the next section.

Table-6. Relative risk ratios (RRR).

ADMB decision	RRR	Std. error	z	P> z	95%CI	Interval
Perceived usefulness	0.322	0.009	2.65	0.00	1.45	6.45
Perceived efficacy	0.651	0.167	1.15	0.75	1.86	3.78
Perceived ease of use	0.222	0.280	2.69	0.03	14.75	22.46
Complexity	0.000	0.053	-1.04	0.05	4.11	8.45
Social influence	0.056	0.004	2.85	0.01	0.45	1.65
Facilitating conditions	0.456	0.437	-1.91	0.05	4.66	9.85
Relative advantage	0.780	0.010	0.88	0.89	3.85	6.14
Compatibility	0.025	-0.0567	2.05	0.00	1.46	3.55
Trialability	0.235	0.442	-2.78	0.02	0.25	7.19
Perceived risk	0.00	0.385	4.65	0.00	3.45	8.65
Awareness knowledge	0.256	0.315	1.99	0.05	5.12	10.25
Age	0.084	0.293	2.85	0.03	8.56	12.25
gender	0.056	0.135	1.01	0.95	0.44	1.56
Marital status	0.00	0.999	3.45	0.00	13.45	24.70
Education	0.556	0.151	2.85	0.05	2.89	3.78
NADM referent						
DAMB decision						
Perceived usefulness	0.045	0.002	3.65	0.01	22.45	33.31
Perceived efficacy	0.45	0.004	0.65	0.78	3.85	8.25
Perceived ease of Use	0.121	0.119	0.45	0.87	0.456	7.89
Complexity	1.053	0.451	1.99	0.08	9.85	16.55
Social influence	0.03	0.003	-3.45	0.02	11.85	25.64
Facilitating conditions	0.333	0.138	-1.58	0.65	14.65	19.89
Relative advantage	0.513	0.020	2.14	0.01	0.44	7.78
Compatibility	0.891	-0.156	2.05	0.03	0.48	1.56
Trialability	0.012	0.326	3.55	0.00	0.56	1.89
Perceived risk	1.325	0.318	4.65	0.00	6.66	7.68
Awareness knowledge	1.35	0.030	-1.06	0.05	0.05	2.12
Gender	0.223	0.093	0.78	0.99	39.87	45.35
Age	1.011	0.105	3.15	0.00	5.46	8.17
Marital status	0.452	0.858	1.13	0.58	3.45	8.17
Education	1.459	0.166	1.65	0.01	0.19	1.05

### 5.1. Consumer's Mobile Adoption Decision Relative to not Adopting Mobile Banking

From Table 6 it can be concluded that likelihood of adopting mobile banking in rural areas relative to not adopting decision are influenced by factors like perceived usefulness, compatibility perceived ease of use, perceived risk and demographic factors such as age, marital status and level of education. Each of these factor is discussed.

Perceived Usefulness (PU)- If perceived usefulness by a consumer was to increase by one unit, the relative risk for investing relative to not adopting mobile banking would be expected to decrease by a factor of 0.322 given the other variables in the model are held constant. The results suggest that if rural consumers perceive mobile banking as useful to them particularly in meeting transactional, speculative and precautionary demand for money they are likely to adopt it. The results support our hypothesis H<sub>1</sub> that perceived usefulness positively influences the probability of adopting mobile banking in rural areas. Our results are also confirmed by Chitungo and Munongo (2013) who used TAM for Zimbabwe's rural areas. However, for the same country our results do not agree with Mbengo *et al.* (2015) who found perceived usefulness not affecting the decision to adopt mobile banking in rural areas. The difference in the result could be related to the qualitative methodology utilised for these studies.

Perceived Ease of Use (PEU)- If the perceived ease of use of mobile banking was to increase by one unit, the relative risk for not adopting mobile banking would be expected to decrease by a factor of 0.222 given the other variables in the model are held constant. The results show that rural consumers are likely not to adopt mobile banking if such services are difficult to use or access. The results imply that in rural areas perceived ease of use of mobile banking could be affected by various issues such as; poor mobile connectivity and interoperability, complexity of bank websites, short battery life in mobile devices, limited transmission speed and memory, poor accessibility of banking electronic platforms and even the nature of the mobile phone. The variable was also found an important determinant on the adoption of mobile banking in a number of studies.

Social influence (SI)- If positive social influences from other community members were to increase by one unit, the relative risk of not adopting mobile banking would be expected to decrease by a factor of 0.056 given the other variables in the model are held constant. The results imply that due to cultural homogeneity of consumers living in rural areas, most rural consumers are likely to adopt mobile banking should they get positive comments from early adopter's users. This variable has been largely used in behavioural models such as TRA and TPB and not much studies have adopted in extensions of TAM. Nevertheless, our findings agree with Venkatesh *et al.* (2012) who relied on the UTAUT model. Compatibility (CM) - If the compatibility of mobile banking applications with different mobile phones were to increase by one unit, the relative risk of not adopting mobile banking would be expected to decrease by a factor of 0.025. In rural compatibility of mobile banking operations is an important factor considering that these areas are serviced by few operators who often refuse to share their technological infrastructure. Our findings on compatibility are also supported by many studies that used similar structural equation modelling as in this study (Koksal, 2016; Makanyeza, 2017). Trialability (TRIAL) - if rural consumers are given opportunities to try the use of mobile banking before actual usage, the relative risk of not adopting mobile banking is expected to decrease by at least 1 %. The results suggest that the use of new technology such as mobile banking requires trials before actual use in order to increase initial trust, belief in the technology, enhance credibility, to reduce perceptions of risk and insecurity and to heighten performance expectancy on likely adopters. In addition, rural consumers of mobile banking are likely to use trial runs to evaluate other related issues such as perceived ease of use, perceived compatibility, perceived usefulness, privacy and security concerns as well as the likely transactional costs. These issues can only be minimised if rural users are given trial assessment periods where they can evaluate the potential benefits of using mobile banking. Our findings are supported in literature by a number of studies (Koksal, 2016).

Perceived Risk (PR)-if the perceived risks of adopting mobile banking were to increase by one unit, the relative risk of not adopting mobile banking would be expected to decrease by 33%. Perceived risk in using mobile banking platforms is likely to be associated with lower reliability, trustworthiness of banks and their agency, poor network integrity, and concern about privacy of personal information. The results also suggest that anonymity, consistent power outages, feeble regulatory framework, weak consumer protection, feasibility, integration effort, interoperability and scalability are also likely to increase the perception of risk. If users are not assured that using mobile banking is safe from such risks or it takes some time and costs to reverse an incorrect transaction, the likelihood of adoption in rural areas will be very low. Similar findings are confirmed in many Zimbabwean studies (see (Chitungo and Munongo, 2013; Mbengo *et al.*, 2015; Masocha and Dzomonda, 2018)).

Awareness Knowledge (AK) - if awareness of mobile banking through promotional efforts are to increase by 1 percent, the relative risk of not adopting mobile banking would be expected to decrease by 25%. The findings suggest behavioural intention to adopt mobile banking is enhanced if financial institutions are heavily involved in promotional activities during the initial stages of launching mobile banking in rural areas. Promotional activities can be through offering management and training support in order to reduce informational inefficiencies and also counteract negative social influences from opinion leaders. By increasing awareness banks are also likely to understand customers' needs, desires, aspirations and objectives of wanting to use mobile payments. The findings

suggest that rural consumers with high level of knowledge of mobile banking and its expected benefits are likely to adopt it faster than consumers saddled with information asymmetry. Customer knowledge can help consumers to identify what mobile payment can do for them (Oh and Yoon, 2014; Slade *et al.*, 2015).

**Demographic factors-Age-**As a rural consumer's age increases, the relative risk of not adopting mobile banking would be expected to decrease by a factor of 0.08. The findings imply that as people get older they are likely not to trust new technologies due to a combined effect caused by declining memory, fear of the unknown, lack of trust security concerns about privacy and confidentiality. For instance, old people might find mobile banking applications difficult to use as they grow older. Our findings have confirmation in literature that age is an important determinant on the behavioural intention to adopt mobile banking in developing countries (Hosseing M *et al.*, 2015). However, the finding differ from Laukkanen (2016) who reported that in Finland gender and age were insignificant determinants of the adoption of mobile banking services. The different result might be explained by the level of financial deepening in developed countries. In addition, in most rural areas of developing countries, people tend to have a collectivist culture rather than individualist cultures associated with developed economies. **Marital Status-**if a consumer was to change her/his marital status, the relative risk of not adopting mobile banking would be expected to remain constant. Our findings imply that marital status does not likely to influence whether one adopts or not adopts mobile banking in rural areas. The results are surprising given that most rural areas in developing countries are paternalistic societies where men control are likely to control the usage of family resources. Nevertheless, the results have some empirical support from studies of Asian countries (Park *et al.*, 2014; Tan *et al.*, 2016; Poong *et al.*, 2017). **Education-**if a consumer were to change the level of his/her education, the relative risk of not adopting mobile banking would be expected to decrease by 56%. These variables have not received much attention in literature that focus on developing countries. The findings imply that educated people are likely to adopt new innovations such as mobile banking quickly since they are able to quickly discern issues like perceived usefulness and ease of use. They are also likely to have more knowledge on how to minimise risks and security concerns associated with the adoption of mobile banking.

## 5.2. Deferring Mobile Banking Adoption Relative to not Adopting Decision

Table 6 also shows that factors such as perceived usefulness, complexity, social influence, perceived risk and compatibility are likely to cause rural consumers to defer the adoption of mobile banking until these issues are resolved by service providers. Most studies in developing countries focus on the diffusion process of mobile banking and not many studies have been done to assess why consumers in rural areas defer the adoption of mobile banking. For this reason, this section of current study opens the debate further. Using Table 6 we thus discuss some of the factors below. **Perceived Usefulness (PU)** - Table 6 shows that if a consumer's perceived usefulness of mobile banking was to increase by one percent, the relative risk of deferring the mobile banking adoption process would be expected to decrease by 4.5% given the other variables in the model are held constant. The results indicate that if rural consumers perceive mobile banking as likely to be useful they are likely not to defer adopting it. Perceived usefulness is when the adoption of mobile banking in rural areas is useful in their daily routines or meets their performance expectancy. From the first section of our discussion, this finding also suggest that perceived usefulness is an important variable that affect both the adoption and the decision to defer the adoption process by a rural consumer. **Complexity-** If complexities in using mobile banking were to increase by 1%, the relative risk for deferring the adoption process would be expected to increase by a factor of 1.053 given the other variables in the model are held constant. The results suggest that the behavioural intention to adopt mobile banking could be enhanced if the banking platforms and websites are simple to use and ease to access. The results also infer that other exogenous factors in the mobile banking ecosystem such as network reliability, interoperability of different networks, user support and facilitating conditions can increase complexity indirectly, causing the rural consumer to defer the adoption of mobile banking. **Relative Advantages (RA)** - If the relative advantages of using mobile banking

over traditional banking were to increase by one percent, the relative risk for a consumer to defer the adoption process would be expected to decrease by 51% given the other variables in the model are held constant. The findings suggest that consumers in rural areas also assess relative advantages such as convenience, savings of time and money on using new innovation against traditional ones before making the adoption decision. In many rural areas banks are only found in nearby towns and therefore, therefore the ability to reduce cost by using comparative innovations can be a major motivation for adopting alternative innovations.

**Perceived Risk-** If perceived risks of using mobile banking were to increase by one unit, the relative risk ratio of deferring mobile banking adoption would increase by a factor of 1.325 given that all other variables remain constant. The results indicate that rural customers are likely to value safety, privacy and confidentiality when they decide to adopt mobile banking. This because the risk level of economic transactions in a virtual environment is higher than in the traditional banking environment. A number of studies also confirm that consumers are likely to defer the adoption of mobile banking due to high perceived risk (Slade *et al.*, 2015). **Trialability-** the results show that if users in rural areas were given a chance to try the usage of mobile banking before actual use, the relative risk of deferring the adoption process would be expected to decrease by 1%. Trialability diminishes fears such as perceived risk, reachability, convenience, compatibility, complexity and safe to use and at the same time increasing the likelihood of immediate adoption. This is because users are able to try the actual usage in real life circumstances. Trialability also enables users to assess user support and user interface design. They are also able to evaluated transaction costs, agent network coverage, money safety and how errors are quickly resolved.

## 6. CONCLUSIONS AND RECOMMENDATIONS

The paper examined the factors such as perceived usefulness perceived ease of use, trialability, relative advantages, perceived risks, compatibility, complexity, and demographic factors that may affect the probability of adopting mobile banking in rural areas using the case of Zimbabwe. Banks and other financial institutions are recommended to pay special attention to perceived usefulness, perceived ease of use when developing mobile banking platforms and interfaces for their rural customers. This means that banks and financial institutions should portray mobile banking as useful and ease to use and compatible with current economic challenges as well as customers' values, lifestyles, norms, needs and past experience. This can be done through aggressive marketing, increase public relation marketing efforts and offering rural consumers some trial runs at no transaction costs. Perceived ease of use and usefulness can also be accomplished by making use of opinion leaders such as village headman, headmasters and teachers who can encourage other customers to adopt mobile banking. Social networks such as Facebook and WhatsApp can be used to influence consumers to appreciate the benefits adopting mobile banking services in rural areas. Social influence can be done using musicians who are popular in rural areas and also ensuring that even simple mobile devices are able to interface with mobile banking applications. A major finding which is apparent from the studies is perceived risks associated with the usage of mobile banking. Banks and financial institutions are recommended to ensure that security measures are put in place in order to safeguard mobile banking transactions from malware threats such as hacking, key loggers, spyware and other cyber related crimes. Once that has been done, it is imperative that consumers are assured of the security and relative advantages of using mobile banking services against traditional banking. This is particularly important for old customers and educated consumers who are also likely to have some savings particularly in rural settings. Policy makers should ensure that the use of mobile banking remains more affordable for rural consumers who by their nature have low disposable incomes. In addition, policy makers should find ways of eliminating transaction costs associated with the use of mobile banking such as offering fiscal incentives in the form of electronic tax rebates. Future research on the adoption of mobile banking in rural areas should be expanded to include a cross-section of other rural districts.



**Funding:** This study received no specific financial support.

**Competing Interests:** The authors declare that they have no competing interests.

**Acknowledgement:** Both authors contributed equally to the conception and design of the study.

## REFERENCES

- Aijaz, S.A. and H. Karjaluoto, 2015. Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1): 129-142. Available at: <https://doi.org/10.1016/j.tele.2014.05.003>.
- Ajzen, I., 1991. The theory of planned behavior. *Organizational Behaviour and Human Decision Processes*, 50(2): 179-211.
- Alalwan, A.A., Y.K. Dwivedi and N.P. Rana, 2017. Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3): 99-110. Available at: <https://doi.org/10.1016/j.ijinfomgt.2017.01.002>.
- Alalwan, A.A., Y.K. Dwivedi, N.P. Rana and M.D. Williams, 2016. Consumer adoption of mobile banking in Jordan: Examining the role of usefulness, ease of use, perceived risk and self-efficacy. *Journal of Enterprise Information Management*, 29(1): 118-139. Available at: <https://doi.org/10.1108/jeim-04-2015-0035>.
- Arenas, G.J., P. Peral, Begoña and J. Ramón, M, 2015. Elderly and internet banking: An application of UTAUT2. *Journal of Internet Banking and Commerce*, 20(1): 1-23.
- Arunagiri, S., M. Thaz, S. Teoh and C. W., 2014. Factors affecting Malaysian behavioural intention to use mobile banking with mediating effects of attitude. *Academic Research International*, 5(2): 1-18.
- Bashir, I. and C. Madhavaia, 2015. Trust, social influence, self-efficacy, perceived risk and internet banking acceptance: An extension of technology acceptance model in Indian context metamorphosis. *A Journal of Management Research*, 14(1): 25-38. Available at: <https://doi.org/10.1177/0972622520150105>.
- Chauhan, S., 2015. Acceptance of mobile money by poor citizens of India: Integrating trust into the technology acceptance model. *Information*, 17(3): 58-68. Available at: <https://doi.org/10.1108/info-02-2015-0018>.
- Chitungo, S.K. and S. Munongo, 2013. Extending the technology acceptance model to mobile banking adoption in rural Zimbabwe. *Journal of Business Administration and Education*, 3(1): 51-79.
- Dapp, C.A.G., P.A. Anim and J.G.N.T. Nyanyofio, 2015. Determinants of mobile banking adoption in the Ghanaian banking industry: A case of Access Bank Ghana Limited. *Journal of Computer and Communications*, 3(2): 1-19. Available at: <https://doi.org/10.4236/jcc.2015.32001>.
- Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3): 319-340.
- Dismas, A. and D.K. Mutalemwa, 2014. Factors influencing the use of mobile payments in Tanzania: Insights from Zantel's Z-pesa services. *Journal of Language, Technology & Entrepreneurship in Africa*, 5(2): 69-90.
- Gia-Shie, L. and P.T. Tai, 2016. A study of factors affecting the intention to use mobile payment services in Vietnam. *Economics*, 4(6): 249-273. Available at: <https://doi.org/10.17265/2328-7144/2016.06.001>.
- Goodhue, D.L. and R.L. Thompson, 1995. Task-technology fit and individual performance. *MIS Quarterly*, 19(2): 213-236. Available at: <https://doi.org/10.2307/249689>.
- Gulamhuseinwala, I., T. Bull and S. Lewis, 2015. Fintech is gaining traction and young, high-income users are the early adopters. *Journal of Financial Perspectives*, 3(3): 16-23.
- Hanafizadeh, P., M. Behboudi, A.A. Koshksaray and M.J.S. Tabar, 2014. Mobile-banking adoption by Iranian bank clients. *Telematics and Informatics*, 31(1): 62-78. Available at: <https://doi.org/10.1016/j.tele.2012.11.001>.
- Harris, M.A., R. Brookshire and A.G. Chin, 2016. Identifying factors influencing consumers' intent to install mobile applications. *International Journal of Information Management*, 36(3): 441-450. Available at: <https://doi.org/10.1016/j.ijinfomgt.2016.02.004>.
- Hew, J.-J., V.-H. Lee, K.-B. Ooi and J. Wei, 2015. What catalyses mobile apps usage intention: An empirical analysis. *Industrial Management & Data Systems*, 115(7): 1269-1291. Available at: <https://doi.org/10.1108/imds-01-2015-0028>.

- Hosseing M, A., A. Fatemifa and M. Rahimsadeh, 2015. Effective factors of the adoption of mobile banking services by customers. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 4(6): 1-13. Available at: <https://doi.org/10.12816/0018964>.
- Hsu, C.-L. and J.C.-C. Lin, 2016. Effect of perceived value and social influences on mobile app stickiness and in-app purchase intention. *Technological Forecasting and Social Change*, 108: 42-53. Available at: <https://doi.org/10.1016/j.techfore.2016.04.012>.
- Kazemi, S.A., A. Nilipour, N. Kabiry and M. Mohamad, 2013. Factors that affect Ghanaian mobile banking adoption. Based on the decomposed theory of planned behaviour. *International Journal of Academic Research*, 23(3): 436-439.
- Koksal, M.H., 2016. The intentions of Lebanese consumers to adopt mobile banking. *International Journal of Bank Marketing*, 34(3): 327-346. Available at: <https://doi.org/10.1108/ijbm-03-2015-0025>.
- Krishanan, D., A.A. Khin, K.L.L. Teng and K. Chinna, 2016. Consumers' perceived interactivity & intention to use mobile banking in structural equation modeling. *International Review of Management and Marketing*, 6(4): 883-890.
- Laukkanen, T., 2016. Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the internet and mobile banking. *Journal of Business Research*, 69(7): 2432-2439. Available at: <https://doi.org/10.1016/j.jbusres.2016.01.013>.
- Makanyeza, C., 2017. Determinants of consumers' intention to adopt mobile banking services in Zimbabwe. *International Journal of Bank Marketing*, 35(6): 997-1017. Available at: <https://doi.org/10.1108/ijbm-07-2016-0099>.
- Martins, C., T. Oliveira and A. Popovič, 2014. Understanding the internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1): 1-13. Available at: <https://doi.org/10.1016/j.ijinfomgt.2013.06.002>.
- Masocha, R. and O. Dzomonda, 2018. Adoption of mobile money services and the performance of small and medium enterprises in Zimbabwe. *Academy of Accounting and Financial Studies Journal*, 22(3): 12-15.
- Mbengo, P., A. Maxwell and A. Phiri, 2015. Mobile banking adoption: A rural Zimbabwean marketing perspective. *Corporate Ownership & Control Journal*, 13(1): 1-10. Available at: <https://doi.org/10.22495/cocv13i1c1p6>.
- Muzurura, J., 2019. The dynamics of firm-level investment behaviour of private firms in Zimbabwe under uncertainty, corruption and high taxation regime. *Global Journal of Social Sciences Studies*, 5(1): 28-45. Available at: <https://doi.org/10.20448/807.5.1.28.45>.
- Oh, J.-C. and S.-J. Yoon, 2014. Predicting the use of online information services based on a modified UTAUT model. *Behaviour & Information Technology*, 33(7): 716-729. Available at: <https://doi.org/10.1080/0144929x.2013.872187>.
- Park, E., S. Baek, J. Ohm and H.J. Chang, 2014. Determinants of player acceptance of mobile social network games: An application of extended technology acceptance model. *Telematics and Informatics*, 31(1): 3-15. Available at: <https://doi.org/10.1016/j.tele.2013.07.001>.
- Poong, Y.S., S. Yamaguchi and J.-i. Takada, 2017. Investigating the drivers of mobile learning acceptance among young adults in the world Heritage town of Luang Prabang, Laos. *Information Development*, 33(1): 57-71. Available at: <https://doi.org/10.1177/0266666916638136>.
- Ramdhony, D. and S. Munien, 2013. An investigation on mobile banking adoption and usage: A case study of Mauritius. *World Journal of Social Sciences*, 3(3): 197-217.
- Rogers, C.R., 1961. *On becoming a Person*. London: Constable.
- Salimon, M.G., R.Z.B. Yusoff and S.S. Mohd Mokhtar, 2017. The mediating role of hedonic motivation on the relationship between adoption of e-banking and its determinants. *International Journal of Bank Marketing*, 35(4): 558-582. Available at: <https://doi.org/10.1108/ijbm-05-2016-0060>.
- Sellitto, C., 2015. User intentions to adopt mobile payment services: A study of early adopters in Thailand. *Journal of Internet Banking and Commerce*, 20(1): 1-29.
- Shaikh, A.A., H. Karjaluoto and N.B. Chinje, 2015a. Continuous mobile banking usage and relationship commitment: A multi-country assessment. *Journal of Financial Services Marketing*, 20(3): 208-219.

- Slade, E.L., Y.K. Dwivedi, N.C. Piercy and M.D. Williams, 2015. Modeling consumers' adoption intentions of remote mobile payments in the United Kingdom: Extending UTAUT with innovativeness, risk, and trust. *Psychology & Marketing*, 32(8): 860-873.
- Tan, E., J.L. Lau and B. Young, 2016. Behavioural intention to adopt mobile banking among the millennial generation. *Young Consumers*, 17(1): 18-31.
- Venkatesh, V., M.G. Morris, G.B. Davis and F. Davis, 2003. User acceptance of information technology: Toward a unified view. *Management Information System Quarterly*, 27(3): 425-478. Available at: <https://doi.org/10.2307/30036540>.
- Venkatesh, V., J.Y. Thong and X. Xu, 2012. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1): 157-178.

*Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Business, Economics and Management shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.*