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## **ADOPTION OF MOBILE BANKING SERVICES BY MOBILE PHONE OWNERS IN MOSHI MUNICIPALITY, TANZANIA**

### **Abstract:**

Adoption of mobile banking services by mobile phone owners in terms of level of adoption and usefulness of adoption remained inadequate in Tanzania. Such inadequacy of adoption is a result of utilizing traditional banking services by mobile phone owners which decreases advantage of using mobile banking technology. Mobile banking is a situation whereby the customer interacts with a bank via mobile device, an electronic banking system which allows bank customers to get access to their bank accounts via mobile phone. The establishment of adoption level, the factors influencing adoption and usefulness of mobile banking technology among mobile phone owners remains silent. That was a knowledge gap on which the research for this paper focused. The article is intended to assess adoption of mobile banking services by mobile phone owners in Moshi municipality, Tanzania. The specific objectives were to evaluate the level of adoption of mobile banking, analyse factors influencing adoption of mobile banking and evaluate usefulness of mobile banking services. Primary data were collected using questionnaires. They were administered to 182 mobile phone owners who are bank customers. Descriptive and inferential statistics were used. The adoption level of mobile banking was revealed to be inadequate. The main factors found to be behind non-adoption of mobile banking service was risk of loss and fear of system failure which was found to negatively affect adoption of mobile banking service. The risks found to have the greatest influence were fear of sending money to wrong account or phone number and loss of personal or account information. Perceived convenience was found to positively affect adoption of mobile banking. The usefulness established included; accessibility, saving of time and comfort mostly used to pay bills and funds transfer. It therefore concluded that adoption of mobile banking is inadequate and is affected negatively by risk of loss and fear while affected positively by perceived convenience and mobile banking is useful in various ways. It is argued that mobile banking should be adopted by banks and mobile phone owners in Tanzania.

### **Keywords:**

Adoption, Mobile phone owners, Mobile banking services, Factors, Usefulness, Moshi Tanzania

**JEL Classification:** G21

# 1 Introduction

## 1.1 Background information

Over the past few years now, there have been continuous development of information technology (IT) to help smoothen business operations around the world especially in the banking industry for instance, recent innovations in mobile industry have enabled the launch of new access methods for banking services, one of these is mobile banking, whereby a customer interacts with a bank via mobile phone (Barnes and Corbitt, 2003). Mobile Banking comes into the picture to address the basic limitation of Internet Banking. Slowly but steadily, the traditional method of banking is gradually paving the way for modern method of banking since the 21st century (Wadhe and Ghodke, 2013). If we consider African developing countries, the availability of mobile connectivity is really huge, where one may not find out a landline telephone or an internet connection, but still in those remote places getting mobile connectivity is not a major issue today, so mobile Banking has given the traditional banking a newer look "Anywhere Banking". Now you don't need a PC or a laptop with internet connectivity, just you need your cell phone with you.

The development of the banking industry in Tanzania is also stimulated by the rapid growth of telecommunication industry. The deployment of technology in financial services has changed the nature of selling and buying financial services (Suoranta *et al*, 2003). In response to the technological evolution, banks have adopted strategies by offering better products and services while decreasing and building customer satisfaction concurrently (Sadiqet *al*, 2003). Mobile banking has emerged as new alternative way of banking which is more convenient and user-friendly than traditional form of banking. It is covering the concept of anytime, anywhere banking into reality (Kaur and Madan, 2013). This service provides much convenience and promptness to the bank customers along with cost savings.

In Tanzania, banks and other financial sectors in conjunction with mobile service providers have complemented each other in providing banking services. The services have no limits in terms of geographical location and are user friendly (Porteous, 2006). There is need to expand the services to the unbanked especially those in rural areas as a result a growing number of banks have adopted the mobile banking technology in Tanzania such are, CRDB in 2008, Standard Chartered bank in 2009 and Amana bank in 2012, this has enabled such banks in Tanzania to shorten the time used in conducting financial services but also improve the delivery of bank services to customers. The only barrier to mobile banking will be the mobile phone (Sarker and Wells, 2003). It is been claimed that mobile banking has been adopted around the world and it has brought about positive change from the customers perception, could this be concluded about Tanzania as well? As an emerging technological innovation, especially in the developing countries like Tanzania, mobile banking is yet to gain acceptance on a wide scale but adoption

level is marginally insignificant (Amin *et al*, 2007). This article contributes to the adoption literature which relates to mobile banking in a developing economy.

Despite efforts made by Tanzanian banks to expand the scope and adoption of mobile channels given the convenience and usefulness of mobile banking, there are very few consumers who are actively adopted mobile banking since access to mobile banking services offered by banks is still limited and are still not very popular. An important question here is why bank customers are not adopting mobile banking and prefer banking in the traditional ways. Answer to this question could help banks to come up with a right solution to improve their mobile banking services and mobile banking adoption rate. Most research has taken place on mobile banking, which focuses on the ease of use and usefulness as the prime determinant of adoption (Damesh, 2015; Neha, 2015), but very little consideration has been given to researching the adoption level and the factors affect the adoption of mobile banking locally, and perhaps this is why mobile banking has not been more widely exploited in this country. The fact that Tanzania trails many other countries in the rate of adoption of mobile banking indicates that there is an urgent need for a locally based study of this nature that focuses on the adoption level and factors that affect the adoption of mobile banking in Tanzania. This is a research gap addressed by this study.

The goal of the research for this article was that, "I am studying this topic of adoption of mobile banking services by mobile phone owners because I wonder if mobile phone owners are rejecting mobile banking technology. I want to study this topic in order to help my readers namely bank customers, mobile phone owners, bankers, microfinance institutions stakeholders, bank employees, mobile phone companies, policy makers, researchers, academicians, scholars, financiers, economists and so on in Moshi municipality, Tanzania and other citizens globally to address the bigger and more important question of how to help mobile phone owners to fully adopt into mobile banking. Ultimately, I hope that my readers might develop more effective pedagogies and attitudes toward their mobile banking in their mobile phone.

## **1.2 Research objective**

The overall objective of this article was to assess adoption of mobile banking by mobile phone owners in Moshi municipality, Tanzania. The specific objectives were:

- (a) to evaluate the level of adoption of mobile banking;
- (b) to analyse factors influencing adoption of mobile banking; and
- (c) to evaluate usefulness of mobile banking services.

## **1.3 Research questions**

- (a) How far mobile phone owners have adopted mobile banking?
- (b) What have being usefulness of mobile banking in the study area?

## 1.4 Research hypotheses

- (a) H<sub>1</sub>: Perceived risk will have a negative effect in influencing mobile banking adoption
- (b) H<sub>2</sub>: Convenience will have a positive effect on mobile banking adoption
- (c) H<sub>3</sub>: Relative advantage will have a positive influence on mobile banking adoption

## 1.5 Literature review

Adoption in the context of mobile banking means acceptance, being able to accept a new technology as it is introduced and by accepting the service means a customer willing to use the service (Balasubramanian *et al.* 2002). Adoption can be defined as the use of mobile (handheld) device to conduct banking transactions. If a customer chooses to adopt mobile banking service, Mallat and Tuunainen (2004) explains that they will be able to obtain and interact with mobile services anytime and anywhere which in turn initiate great value for them. Barnes, and Corbitt (2003) defined mobile banking as a situation whereby the customer interacts with a bank via mobile device, such as mobile phone and Personal Digital Assistant (PDA). The service offered when using mobile banking is such as withdrawal, deposits and bill payments.

In Tanzania banks offering mobile banking access are mostly supporting some or all of the following services, Namely Account Balance Enquiry, Account Statement Enquiries, Cheque Status Enquiry, Cheque Book requests, Fund Transfer between Accounts, Credit/Debit Alerts, Minimum Balance Alerts, Bill Payment Alerts, Bill Payment, Recent Transaction history.

Within the context of the current study, perceived risk (PR) is viewed as the user subjective judgment of suffering a loss in pursuit of desired outcome (Pavlou, 2003). PR is a breaking point at which a customer chooses to assume risk or not, according to Lee (2009) he defined perceived risk as one of the five facets of risk which include performance risk, Security or privacy risk, time risk, social risk and financial risk. Convenience (CO) is associated with perceived ease of use (PEoU) and perceived usefulness (PU). PU was defined by (Davis, 1989) as "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease-of-use (PEoU). Davis, (1989) defined this as "the degree to which a person believes that using a particular system would be free from effort. Furthermore, Relative advantage (RA) is associated with time and cost. According to Williamson (1993) it refers to the comparative benefits that a user of mobile banking may avail which he/she could not get from other traditional banking services as mentioned by Pikkarainen *et al* (2004) that users are more likely to adopt mobile banking if they believe using mobile banking will gain more relative advantages as compared to other traditional banking channels such as ATM or non-mobile internet banking. Mobile banking has many benefits for both the banks and the customers, According to Robinson (2000) the

cost of making electronic transaction is lower than the cost of making branch transaction. Mobile banking provides more benefits to its users been more secure means of accessing banking services compared to other forms of banking (Herzberg 2003).

Koenig-Lewis *et al.* (2010) have conducted research on young consumers in Germany and the result of the study showed that compatibility, perceived usefulness, and risk are important factors for the adoption of m-banking services. Compatibility was identified as an important antecedent for perceived ease of use, perceived usefulness and credibility. Creating Credibility and trust by the mobile banking companies are crucial to reduce the overall perceived risk of mobile banking.

Sripalawat *et al.*(2011) They have done Research in Thailand and used TAM Technology acceptance Model and TPB theory of Planned Behaviour in this research and they concluded that the subjective norm is the most significant factor in the adoption of mobile banking while the following factors were perceived usefulness and self-efficacy respectively in this study.

Mohini and Phadtare (2012) they conducted an investigation to study the factors that influence the adoption of mobile banking in Pune city. They used the UTAUT model in their study, the research was Exploratory and adopted the use of quantitative design, the results suggested that mobile banking in Pune city was mostly adopted by married people particularly men. Experience and interface in mobile banking was also found to be non-user friendly people thought it was inconveniencing to use it unlike other services.

Chitungo and Munongo (2013) Zimbabwe, the study was about an analysis of the factors that influence mobile banking adoption in the rural Zimbabwe through extending the technology acceptance model. The researcher adopted use of stratified random sampling and the results of the study suggested that factors such as perceived usefulness, PEOU, relative advantage, personal innovativeness and social norms influenced the intention to accept and use mobile banking.

## 1.6 Theoretical framework

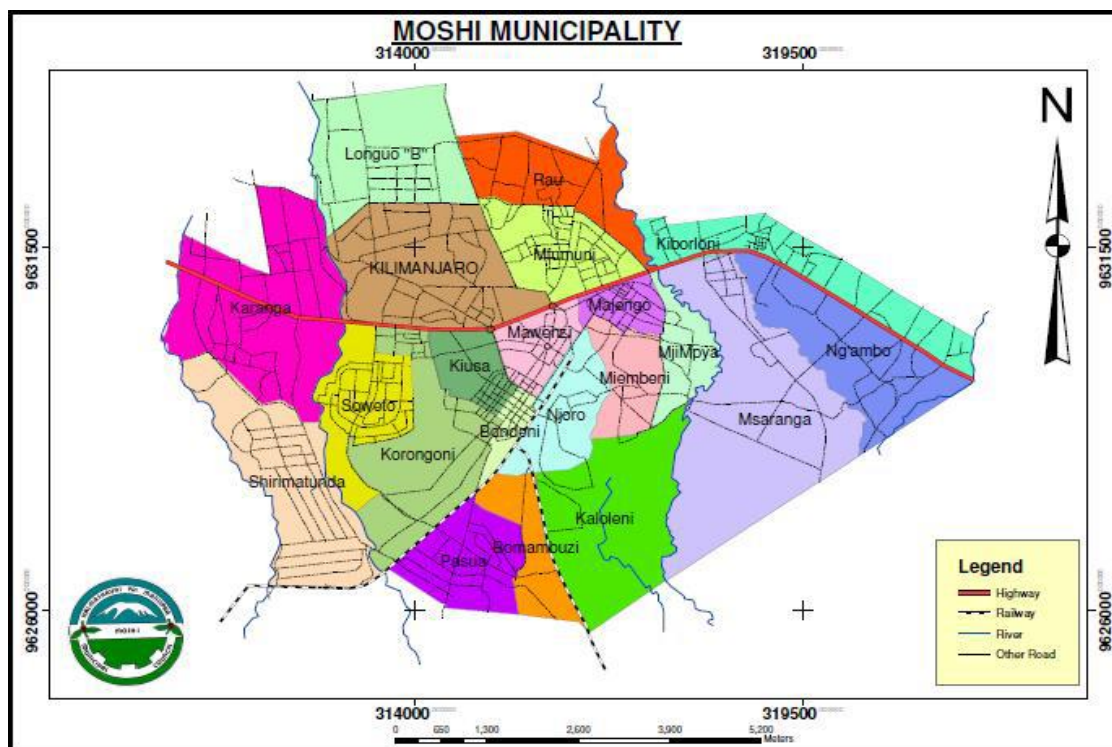
The Technology Acceptance Model (TAM) (Davis, 1989), is adapted from the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1975). The theory forms a theoretical framework of this paper (Jarvis, 2014). The TAM states that a users' adoption of a new information system is determined by that users' intention to use the system, which in turn is determined by the users' beliefs about the system. The TAM further suggests that two beliefs (perceived usefulness and perceived ease of use) are instrumental in explaining the variance in users' intentions. However, Davis (1989) noted, future technology acceptance research must address how other variables affect user acceptance. Therefore, convenience may not fully explain behavioral intentions towards the use of mobile banking, necessitating a search for additional factors that can better predict the acceptance of mobile banking. Consequently this study employ the TAM theory by

investigating how customers perceived convenience affects adoption of mobile banking. Perceived convenience consists of perceived ease of use and perceived usefulness.

## 2 Methodology

The empirical evidence discussed in this article is based on the study which was conducted in Moshi municipality, Kilimanjaro region in Tanzania. This study employed a cross-sectional research design. The design entails collection of data on more than one case (usually quite a lot more than one, the respondents are mobile phone owners who are bank customers hence it is hard to have them at one point) at a single point in time. The design enables a researcher to collect a body of quantitative and/or qualitative data for about two or more variables which are then examined to detect patterns of associations (Bryman, 2004; Rwegoshora, 2006). According to the 2012 Population and Housing Census, Moshi Municipality had a population of 184 292. The Municipality is divided into 15 wards which are; Bondeni, Kaloleni, Karanga, Kiborloni, Kilimanjaro, Kiusa, Korongoni, Longuo, Majengo, Mawenzi, Mji Mpya, Msaranga, Njoro, Pasua and Rau. The map of Moshi municipality is shown in Figure 1.

**Figure 1: Map of Moshi Municipality showing administrative wards**



Source: Moshi Municipality office, 2017

The area consists of various public offices for the Municipality and Kilimanjaro Region government to serve the citizens. The main economic activities in Moshi Municipality include business (both goods and services) and small scale farming in periphery areas of

the Municipality. The study area was selected because of its activeness in business activities, branches of banks with customers some of them be mobile bank owners. A sample of 195 was selected from the 15 wards, each 13 mobile phone owners within Moshi. Out of the 195 mobile phone owners 182 of them return filled questionnaires, 182 mobile phone owners were taken as true sample to represent the entire population. The sample is valid, representative and reliable to generalize findings due to them being picked from the population that are using mobile banking.

Both quantitative and qualitative data were collected as they were important in examining situations of this kind (Gupta, 2008). Quantitative and primary data were gathered through structured interviews using a questionnaire while qualitative data were obtained through semi-structured interviews using checklists of items for discussion. Secondary data were collected through documentary review (Bailey, 2009). SPSS version12 was used for data analysis. The data for the objectives of the study were addressed jointly with findings of TRA and TAM. The analysis of findings in this article is based on the flow of three specific objectives of the article. The data for the first and third objective were descriptive based on the answering the two research questions; the data for objective two were inferential involved testing of three hypotheses written in section 1.4. Pearson Correlation Coefficient is used for test the variables. The variable is the linear relationship exists between two variables which is dependent and independent variable, as seen in the correlation coefficient ( $r$ ). The Pearson correlation coefficient, often referred to as the Pearson R test, is a statistical formula that measures the strength between variables and relationships. To determine how strong the relationship is between two variables, you need to find the coefficient value, which can range between -1.00 and 1.00.(www..statisticsshowto.datasciencecent, June 28 2015).

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

The dependent variable in each hypotheses tested was adoption of mobile banking (AMB). As in all hypothesis tests, the goal is to accept the null hypothesis. In other words, it is to decide that an effect, in this case a relationship exists. The researcher decided to use the suggested interpretation for value or "r" in determining the strength of coefficient as proposed by (Guilford, 1956; Falk and Well, 2007).

H<sub>1</sub> was tested through measuring correlation between AMB and PR based on four variables namely security concern (PR<sub>1</sub>), fear of misuse of personal or account information (PR<sub>2</sub>), fear of loss of money (PR<sub>3</sub>) and fear of unauthorized access (PR<sub>4</sub>). AMB = f(PR) and hence AMB = f(PR<sub>1</sub>, PR<sub>2</sub>, PR<sub>3</sub>, PR<sub>4</sub>) expecting negative corelations after conducting corelation analysis.

H<sub>2</sub> was tested through measuring correlation between AMB and CO based on three variables namely Easy to learn of mobile banking (CO<sub>1</sub>), Easy to use for mobile banking (CO<sub>2</sub>) and Perceived usefulness of mobile banking (CO<sub>3</sub>).  $AMB = f(CO)$  and hence  $AMB = f(CO_1, CO_2, CO_3)$  expecting positive correlations after conducting correlation analysis.

H<sub>3</sub> was tested through measuring correlation between AMB and RA based on four variables namely Time saving (RA<sub>1</sub>), Accessibility/Anytime and anywhere access (RA<sub>2</sub>), Quick task accomplishment system (RA<sub>3</sub>) and Less costly or cheap mobile services transaction (RA<sub>4</sub>).  $AMB = f(RA)$  and hence  $AMB = f(RA_1, RA_2, RA_3)$  expecting positive correlations after conducting correlation analysis.

### 3 Findings and Discussions

The presentation of findings in this article is based on the flow of three specific objectives of the article. However, the socio economic characteristics of respondents namely respondent's sex, age, education level and awareness of mobile banking are presented before findings for the said objectives. Table 1 shows respondent's sex, age, education level and awareness of mobile banking.

**Table 1: Respondent's sex, age, education level and awareness of mobile banking**

|                                    |                   |             |
|------------------------------------|-------------------|-------------|
| Respondents sex                    | Frequency (n=182) | Percent (%) |
| Male                               | 118               | 64.8        |
| Female                             | 64                | 35.2        |
| Respondents age                    | Frequency (n=182) | Percent (%) |
| 21-30                              | 21                | 11.5        |
| 31-40                              | 85                | 46.7        |
| 41-50                              | 67                | 36.8        |
| 50 and Above                       | 9                 | 4.9         |
| Respondents education level        | Frequency n=182)  | Percent (%) |
| No formal education                | 11                | 6.0         |
| Primary education                  | 33                | 18.1        |
| secondary education                | 68                | 37.4        |
| Technical and Vocational education | 24                | 13.2        |
| University                         | 46                | 25.3        |
| Awareness level of customers for   | Frequency (n=182) | Percent (%) |



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|                |    |      |
|----------------|----|------|
| mobile banking |    |      |
| Not aware      | 21 | 11.5 |
| Slightly aware | 34 | 18.7 |
| Aware          | 79 | 43.4 |
| Fully aware    | 48 | 26.4 |

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Source: Research findings, 2017

From Table 1, the sample consisted of 182 respondents, from the respondents who completed the gender information 118 were men which comprised of 64.8% of the study respondents and the number of female respondents accounted for only 64 respondents which comprised of only 35.2% of the total number of respondents in this study. This means that both males and females were represented in the sample for this study so the views and opinions given are representative of all sex, and it shows that the researcher was not biased on the gender when was collecting data from respondents, even though more males were responding than female.

The result for sex potentially shows that males are the most adopter of banking product/services than females. It simply indicates that banking services or products are more convenient for male than females. This is consistent with previous research which found that males are more likely to adopt technological innovation in banks than females (Ainin, *et al*, 2007).

The result for respondent's sex potentially shows that males are more likely to adopt mobile banking services than females. It simply indicates that it is more convenient for male to adopt mobile banking services than females. This is consistent with previous research which found that males are more likely to adopt technological innovation than females (Ainin *et al*, 2007).

The responses indicate that respondents aged between 31-40 were eighty five (85) and were the majority in this study yielding a response rate of 46.7% while respondents from age 41-50 were 67 (36.8%), respondents aged 21-30 were 21 (11.5%) meanwhile the lowest number of respondents were nine (9) came from age group of 50 and above which had only 4.9%. It implies that banking service/products are popular among respondents of the age of 40 years and below. The study collaborates with previous research which found that individuals aged between 30 to 40 years are the dominant bank customers (Kweyu *et al*, 2013). When combining three groups, the group between 21 and 50 years contributed 95% of the respondents, which represents the majority portion of the working population in Tanzania.

Table 1 represents the level of education of 182 respondents. The majority of respondents, 68(37.4%) have a level of education of secondary schooling, followed by respondents, 46 (25.3%) who have a level of education of university. Those having primary level of education include 33 (18.1%), technical and vocational level of education

include 24 (13.2%) while fewer respondents fell in the no formal education category 11 (6.0%). The findings on the level of education shows most of the bank customers in Tanzania are individuals who have education levels at least from secondary education. This is in consistent with the findings of previous researches in more developed countries such as by Ainin *et al* (2007), where they found that bank customers in Malaysia were typically, customers who have high educational background, and it is concurred with the study findings by (Tarimo, 2013)

In order to provide strength to the research study a descriptive analysis was conducted to identify level of customer awareness on the function of mobile banking. Respondents were asked to indicate their level of awareness regarding to the general function of mobile banking, Table 1 presents the findings. A significant majority (88.5%) of the respondents are aware about mobile banking and its role/function in banking services. It can be therefore argued that the informative advertising campaigns done by local banks offering the service have been successful in informing people about mobile banking in Tanzania. A proportion (26.4% )of the respondents affirm that they are fully aware of mobile banking services, 43.4% claim that they are aware, 18.7% have slightly awareness and only 11.5% are not aware at all of mobile banking services provided locally. It can be concluded that awareness is not a major barrier to mobile banking adoption in Tanzania as the level of awareness of bank customers on the mobile banking services is reasonably high. This study is in line with previous study findings by Dineshwar and Steven (2013) and Delport (2010) who claims that awareness is a key factor that negatively affects mobile banking adoption.

However there are other studies that do not support the outcome of this study such as the study by Laforet and Li (2005) in their study of mobile banking adoption in China that lack of awareness is a problem in the country. This is also similar to the findings in Australia that consumers are not aware about the possibilities, advantages/disadvantages involved with online banking. Gao and Owolabi (2008) found the level of awareness to be an important factor in encouraging consumers to adopt related self-service facility (internet banking) in Nigeria.

### **3.1 Adoption level of Mobile Banking**

Respondents were asked whether they had adopted the mobile banking. Table 1 presents the findings that even though most respondents were aware about mobile banking but the researcher found that only 31.3% had adopted the service while 68.7% were not yet to adopt the service. So it nicely showed the objectives of this study, 'assessing the adoption of mobile banking by mobile phone owners' and this evidence has strengthened the objectives of this study.

Basing on the findings from Table 2, it can be therefore argued that the rate of technological adoption concerning mobile banking services in Tanzania is low, since the introduction of mobile banking, banks aimed at capturing all customers who own mobile

phones and who are bank customers. This findings agreed with Chitungo and Munongo (2013) that mobile banking is a new phenomenon in developing countries and has not been well adopted by customers also it is in consistent with the findings of Adesina *et al.* (2010) based on the level of electronic banking acceptance of customers in Nigeria.

**Table 2: Respondent's adoption of mobile banking**

| Adoption | Frequency (n=182) | Percent (%) |
|----------|-------------------|-------------|
| No       | 125               | 68.7        |
| Yes      | 57                | 31.3        |

Source: Research findings, 2017

### 3.2 Factors influencing Adoption of Mobile Banking

The Factors Influencing Adoption of Mobile banking were analysed inferentially through Correlation Coefficient Analysis and presented in Tables 3,4, and 5. The three independent variables were correlated against the dependent variable using 2 tailed pearsons' correlation coefficients at 0.01 level of significance to determine the relationship between the two variables.

#### 3.2.1 Perceived risk

Perceived risk was the first independent variable to be used to assess the relationship with adoption of mobile banking. The Respondents were asked to express the extent to which they agree or disagree with statements relating to perceived risk. The hypothesis statement ( $H_1$ ) was tested using pearsons correlation coefficients and results are presented in Table 3.

**Table 3 : Relationship between customers' perceived risk and adoption of mobile banking Correlations**

|                         |                     | Mobile banking adoption | PR <sub>1</sub> | PR <sub>2</sub> | PR <sub>3</sub> | PR <sub>4</sub> |
|-------------------------|---------------------|-------------------------|-----------------|-----------------|-----------------|-----------------|
| Mobile banking adoption | Pearson Correlation | 1                       | -.805**         | -.728**         | -.613**         | -.738**         |
|                         | Sig. (2-tailed)     |                         | .000            | .000            | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |
| PR <sub>1</sub>         | Pearson Correlation | -.805**                 | 1               | .516**          | .414**          | .922**          |
|                         | Sig. (2-tailed)     | .000                    |                 | .000            | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |
| PR <sub>2</sub>         | Pearson Correlation | -.728**                 | .516**          | 1               | .615**          | .470**          |

|                 |                     |         |        |        |        |        |
|-----------------|---------------------|---------|--------|--------|--------|--------|
|                 | Sig. (2-tailed)     | .000    | .000   | .000   | .000   | .000   |
|                 | N                   | 182     | 182    | 182    | 182    | 182    |
|                 | Pearson Correlation | -.613** | .414** | .615** | 1      | .369** |
| PR <sub>3</sub> | Sig. (2-tailed)     | .000    | .000   | .000   |        | .000   |
|                 | N                   | 182     | 182    | 182    | 182    | 182    |
|                 | Pearson Correlation | -.738** | .922** | .470** | .369** | 1      |
| PR <sub>4</sub> | Sig. (2-tailed)     | .000    | .000   | .000   | .000   |        |
|                 | N                   | 182     | 182    | 182    | 182    | 182    |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: *Research findings, 2017*

Based on the correlation coefficient test in the Table 3, it shows that perceived risk is negatively associated with the customer's adoption of mobile banking. The research findings show that perceived risk negatively affects adoption of mobile banking service as follows, PR<sub>1</sub>, PR<sub>2</sub>, PR<sub>3</sub>, PR<sub>4</sub> with correlation coefficients of  $r=-0.805$ ,  $r=-0.728$ ,  $r=-0.613$  and  $r=-0.738$  respectively. Based on the (Guilford's 1956), PR<sub>1</sub>, PR<sub>2</sub>, PR<sub>4</sub> have high negative correlation with mobile banking adoption while PR<sub>3</sub> have moderate negative correlation.

The negative correlation show that there is an inverse relationship with mobile banking adoption, meaning that with PR<sub>1</sub>, respondents had high concerns for security of their accounts which would leave a lower chance of adopting mobile banking. The same applies to PR<sub>2</sub>, PR<sub>3</sub>, PR<sub>4</sub> which also had a negative correlation with mobile banking services adoption, it means respondents had fear of misuse of personal or account information, had fear of loss of money when using mobile banking for fund transfer and had fear of unauthorized access meaning that they feared that if they were to use mobile banking services someone else might have access to their bank accounts. It is a natural phenomenon that the use of new and innovative technology creates doubts in the mind of customers and they think it a risky one. The use of mobile for banking purpose is also a new technology so there are doubts in the minds of the customers about it.

From this result, H<sub>1</sub> is supported, because perceived risk had a negative effect in mobile banking adoption.

The results of the study concurs with Chitungo and Munongo (2013) who discovered that presence of any perceived risk negatively affects adoption of mobile banking service. Findings of Gao and Owolabi (2008) as they could not establish the relevance of security issue with the adoption of internet banking in Nigeria. Nigerians are generally less risk-averse according to Gao and Owolabi (2008) in their research findings and looking at the current users who went ahead to take up the mobile banking this shows that some customers are willing to take the risk due to the benefits they could get from mobile

banking. Nevertheless, this still shows that, majority of customers are still afraid of the innovation.

On the question regarding perceived risk, a respondent said *“I’m worried about security and privacy of my account and is the main reason I have not decided to adopt mobile banking services”*. This shows that there are customers who wishes to adopt mobile banking services but due to fear of account fraud and uncertainty that may occur has made customers not to adopt the innovation. Security of account is the priority of the majority of customers who not yet adopted mobile banking services.

### 3.2.2 Convenience

The Respondents were asked to express the extent to which they agree or disagree with statements relating to convenience thus perceived ease of use (PEoU) and perceived usefulness (PU). The hypothesis statement (H<sub>2</sub>) was tested using multiple regression and results are presented in Table 4. The Table 4 shows the correlation analysis for convenience (PEOU and PU) and mobile banking adoption, CO<sub>1</sub> (r =0.727), CO<sub>2</sub> (r =0.780), CO<sub>3</sub> (r =0.669) all of these variables have a positive coefficient which suggest that convenience will positively affect mobile banking adoption, meaning that the results in this table confirm that convenience is the key determinant in mobile banking adoption. A large number of previous researches’ have provided support for the convenience variable suggesting that convenience has a significant effect in adoption of mobile banking.

**Table 4 : Relationship between perceived convenience and adoption of mobile banking Correlations**

|                         |                     | Mobile banking adoption | CO <sub>1</sub> | CO <sub>2</sub> | CO <sub>3</sub> |
|-------------------------|---------------------|-------------------------|-----------------|-----------------|-----------------|
| Mobile banking adoption | Pearson Correlation | 1                       | .727**          | .783**          | .669**          |
|                         | Sig. (2-tailed)     |                         | .000            | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             |
| CO <sub>1</sub>         | Pearson Correlation | .727**                  | 1               | .931**          | .886**          |
|                         | Sig. (2-tailed)     | .000                    |                 | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             |
| CO <sub>2</sub>         | Pearson Correlation | .783**                  | .931**          | 1               | .866**          |
|                         | Sig. (2-tailed)     | .000                    | .000            |                 | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             |
| CO <sub>3</sub>         | Pearson Correlation | .669**                  | .886**          | .866**          | 1               |
|                         | Sig. (2-tailed)     | .000                    | .000            | .000            |                 |

| N | 182 | 182 | 182 | 182 |
|---|-----|-----|-----|-----|
|---|-----|-----|-----|-----|

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: *Research findings, 2017*

The results of this study are compatible with the study by Davies (1989) Cruz *et al* (2010) and Laukkanen (2009) respectively in their research, perceived ease of use and perceived usefulness was found to be positively related with the adoption of mobile banking services. Another study by Sripalawat *et al* (2011) found that usefulness of a service makes it attractive to customers.

### 3.2.3 Relative advantage

The Respondents were asked to express the extent to which they agree or disagree with statements relating to relative advantage this included time and cost and results are presented in Table 5 as result of testing hypothesis H<sub>3</sub>. Relative advantages presented by mobile banking service such as accessibility, saving time, less cost have been found to positively affect adoption of mobile banking service with correlation coefficients of  $r = 0.712$ ,  $r=0.778$ ,  $r=0.575$  and  $r =0.529$  respectively.

For the issue of relative advantage, two of the variables had a positive high significance effect according to (Guilford's 1956) in influencing adoption of mobile banking services, thus RA<sub>1</sub> ( $r =0.712$ ), RA<sub>2</sub> ( $r =0.778$ ) on the other hand only two variable, RA<sub>3</sub> ( $r=0.575$ ) and RA<sub>4</sub> ( $r =0.529$ ) had a moderate correlation. This means that, those four variables which came out with a positive coefficient there is a high chance that relative advantage will affect positively mobile banking adoption.

This result supports hypothesis H<sub>3</sub> and is further confirmed by a study conducted by Chitungo and Munungo (2013) who studied mobile banking adoption in rural Zimbabwe (extension of Technology Acceptance Model), the findings revealed that relative advantage influenced adoption and use of mobile banking services. The results of this study is also further confirmed by the findings of other studies by Cruz *et al.*, (2010) and Laukkanen, (2009) whereby perceived relative advantage had a significant positive influence on the adoption of new technology.

**Table 5 : Relationship between relative advantage and adoption of mobile banking Correlations**

|                         |                     | Mobile banking adoption | RA <sub>1</sub> | RA <sub>2</sub> | RA <sub>3</sub> | RA <sub>4</sub> |
|-------------------------|---------------------|-------------------------|-----------------|-----------------|-----------------|-----------------|
| Mobile banking adoption | Pearson Correlation | 1                       | .712**          | .778**          | .575**          | .529**          |
|                         | Sig. (2-tailed)     |                         | .000            | .000            | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |
| RA <sub>1</sub>         | Pearson Correlation | .712**                  | 1               | .937**          | .739**          | .693**          |
|                         | Sig. (2-tailed)     | .000                    |                 | .000            | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |
| RA <sub>2</sub>         | Pearson Correlation | .778**                  | .937**          | 1               | .726**          | .678**          |
|                         | Sig. (2-tailed)     | .000                    | .000            |                 | .000            | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |
| RA <sub>3</sub>         | Pearson Correlation | .575**                  | .739**          | .726**          | 1               | .960**          |
|                         | Sig. (2-tailed)     | .000                    | .000            | .000            |                 | .000            |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |
| RA <sub>4</sub>         | Pearson Correlation | .529**                  | .693**          | .678**          | .960**          | 1               |
|                         | Sig. (2-tailed)     | .000                    | .000            | .000            | .000            |                 |
|                         | N                   | 182                     | 182             | 182             | 182             | 182             |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: *Research findings, 2017*

### 3.3 Usefulness of Mobile Banking

The respondents who had adopted the mobile banking service (57 out of 182) were asked to indicate which services they were mostly using under the mobile banking platform. Table 6, shows the total number of participants were 57, the figure shows that the most mobile banking services in use by the mobile banking adopters is the funds transfer service which in this case had 44.1% followed by pay bills service which had 21.6%, check of account balance had 16.2%, cash withdrawal which had 9.9% and the least service in use by mobile banking adopter is buying airtime.

**Table 6 : Multiple responses for mobile banking services in use**

| Services              | Responses |         |
|-----------------------|-----------|---------|
|                       | Frequency | Percent |
| Buying airtime        | 9         | 8.1%    |
| Cash withdrawal       | 11        | 9.9%    |
| Funds transfer        | 49        | 44.1%   |
| Pay bills             | 24        | 21.6%   |
| Check Account balance | 18        | 16.2%   |

*Source: Research findings, 2017*

Meaning, many respondents used the mobile banking service mostly to transfer funds and pay bills. These findings agree with those of Medhi *et al* (2009) where funds transfer was the most used service while customers preferred to carry out activities such as buying airtime through other means such as buying prepaid talk time cards which are available anywhere and are easy to use.

## 4 Conclusions

The overall objective of this article was to assess adoption of mobile banking by mobile phone owners in Moshi municipality, Tanzania and specific objectives were to evaluate the level of adoption of mobile banking; to analyse factors influencing adoption of mobile banking; and to evaluate usefulness of mobile banking services. Basing on the findings, it was concluded that, the adoption level of mobile banking was revealed to be inadequate. Furthermore the main factors found to be behind non-adoption of mobile banking service was risk of loss and fear of system failure. Customers' perceived risk was found to negatively affect adoption of mobile banking service. The risks found to have the greatest influence were fear of sending money to wrong account or phone number and loss of personal or account information. Perceived convenience and Relative advantage were found to positively affect adoption of mobile banking by being easy to use and being useful in various ways. Finally the usefulness established included; accessibility, saving of time and comfort. Mobile banking services mostly used to pay bills and funds transfer. Mobile banking service was found to possess relative advantages in comparison to traditional banking services. The results of this research support the TAM theory employed by this study. Since perceived convenience; perceived ease of use and perceived usefulness proved to affect adoption of mobile banking. TAM remains important to guide adoption focused researches.



Basing on the conclusions, it is recommended that mobile banking should be adopted by banks and mobile phone owners in Tanzania. The banks should develop more aggressive marketing activities including informing customers about the conveniences and other advantages that come with the service which customers might not be aware and emphasizing on the accessibility, saving of time and ease of use that have been seen to encourage adoption of the service according to the results of the research. In addition, they should ensure that their system is working efficiently and effectively to avoid system failure which may discourage adoption of the service. It should also highlight the conveniences that come with use of mobile banking such as accessibility, saving of time and ease of use that may not be there in use of other services. This will make the service attractive to customers.

The banks should assure customers that the factors which have been found to deter them from adopting the service such as risk of loss and system failure are almost non-existent. Also, they should tighten the security of the system to ensure there are no losses and upgrade their servers to ensure that there is no system failure. Since customers' greatest perceived risk is sending money to wrong account or phone number, the bank should ensure that customers are in a position to recover their money in the shortest period in case of such a scenario. The bank should assure the customers that the risks they perceive in mobile banking are not real.

The customers should also be urged to verify the account and phone numbers they are transferring money to, to avoid the rigorous process that may be involved in retracing the money. To prevent loss of personal/account information the bank should ensure that their system is secure to prevent hacking.

Limitations of the research for this paper were emanated from the expectation that urban areas can be easier than rural areas in terms of data collection, something which was not true. People in urban areas, the Moshi municipality, appeared to be busy and gave the research the last priority. In order to come up with good results, a graduate who was born, grew and hence was familiar with Moshi municipality was hired to assist as an enumerator in Moshi. Furthermore, time was extended to collect data so as to capture the respondents at the time they promised to be available. Some of them had to be visited several times.

Further researches are recommended such as similar study for assessing adoption of mobile banking in rural areas. Large numbers of banks are formed in Tanzania, but still a small part of population join to be customers of banks. There is a need to study customer recruitment, growth and retention in banks, and factors influencing customer's recruitment so as to enhance mobile banking. Banks serve the rich ones and active poor to enable them to access financial services. However, who is responsible to make the poorest of the poor to access the financial services including mobile banking remains silent. A study can be conducted to come up with strategies to include poorest of the poor to financial access and hence in mobile banking. Risks which deter bank customers and mobile phone owners

to use mobile banking services require to be precisely managed. Therefore a study to assess management of financial cyber security risks is recommended.

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