OBSTACLES TOWARDS ADOPTION OF MOBILE BANKING IN TANZANIA: A REVIEW

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Abstract

Adoption of mobile banking in Tanzania is negatively affected by factors such as theft of mobile handsets, poor network coverage, lack of knowledge of m-banking users, high mobile money transaction fees, irregular standards of mobile money payments, lack of enough float of mobile money agents, ATM breakdown and theft, lack of trust of mobile money agents, and poor security of mobile networks. Fourteen (14) current papers (2010-2014) related to the study were reviewed to extract obstacles which appear most frequently. The frequencies and percentages of eight (8) studied variables were computed using excel and presented in tables and pie chart. The findings reveal that poor network coverage, lack of knowledge of m-banking users, lack of enough float of mobile money agents and ATM breakdown and theft are major obstacles on the way to the adoption of m-banking in Tanzania. The study recommends that, the government and all other stakeholders should hastily focus their first priority to tackle the most critical obstacles instead of dealing with a huge number of obstacles, taking into account the limited resources the country is facing. This approach may be productive since it needs little resources, integrated efforts and strategies which must be implemented in parallel with government policies such as National Strategy for Growth and Reduction of Poverty (NSGRP).

Key words: Obstacles, Adoption, Mobile Banking, Tanzania

INTRODUCTION

Mobile services are highly adopted in developing countries because of the rapid growth in mobile networks [46]. It is on these mobile networks mobile banking (M-banking) services can travel seemingly effortless across distance, and which constitutes the bridge that many donors now put their hope too [11]. In mobile banking the mobile devices have specialized built-in hardware, such as cameras, accelerometers, Global Positioning System (GPS) receivers, and removable media readers. Mobile devices are integrated with multiple wireless communication technologies such as Wireless Fidelity, (Wi-Fi), Worldwide Interoperability for Microwave Access (WiMAX), Bluetooth, Near Field Communications (NFC), and a cellular interface which are configured to use CDMA or GSM network schemes [46].

Worldwide, there is an increase of mobile banking services for example in India banks such as State Bank of India (SBI) provides bank accounts, deposit, withdrawal and remittance services, micro-insurance, and micro-finance facilities to its customers through mobile banking [51]. In the year 2009 Pakistan launched mobile banking solution, in coordination with Taameer Bank, under the label Easy Paisa. In Iran, Guatemala and Mexico consumers can access mobile banking services with local mobile networks, whereas in Saudi Arabia banks like Riyad, Rajhi, Alahali, SAMBA, and SABB have made substantial investments in mobile banking capabilities and smaller banks are not far behind. In African countries companies like Vodafone have launched mobile money transfer for business, known M-Pesa in 2007 and M-Kesho in 2010 in Kenya whereby Equity Bank and Safaricom Mobile phone services
facilitate customers to transfer money to and from their Equity bank account via the mobile phones and still enjoying other benefits which come with the bank accounts [39]. In Rwanda, MTN was authorized to provide mobile money services in February 2010, likewise in Uganda, Airtel and MTN started their mobile money programs in 2009. The mobile banking penetration rates in Africa vary a lot, from under 10% in Ethiopia to nearly 100% in Gabon, where the most responding countries are Ghana (39.3%), Mozambique (49.7%), Nigeria (26.9%), South Africa (30.1%) and Zambia (22.1%). The average growth for mobile banking in whole continent is of about (33%) ([48]; [16]).

According to the statistics from Tanzania Communications Regulatory Authority (TCRA) it shows that, the number of mobile phone subscribers has increased up to (58%) with over 27 million subscribers in 2013 [57]. This indicates that mobile technologies are rapidly being adopted both locally and globally, a situation which has open up new business ventures and hence giving financial institutions some additional channels for them to deliver their services through mobile telecommunication systems. Today, mobile banking systems e.g. electronic payment systems which comprises of Automatic Teller Machines (ATMs), Point of Sale (POS) devices, Electronic Cards, Internet banking, Mobile Payment Services and Money Transfers Services (Remittances) are serviced in most of urban and rural centers and therefore contributing towards wider outreach of financial services to unbanked population of both rural and urban areas of the country [64].

Scientifically, performing transactions using a mobile device, a customer must initiate the request that goes through the mobile network operator (MNO) and then terminates at the server application that can be administered by a technology vendor or independently by a financial institution. The most used data transmission technology is Global System for Mobile (GSM) which can connect the globe and allowing the full access to details and transactions of personal bank accounts. The most famous engrossed telecommunication companies and financial institutions offering mobile money transfer services in Tanzania include: Tigo Tanzania Ltd, Vodacom Tanzania, CRDB Bank, and National Microfinance Bank (NBC) whereby the services offered are Tigopesa, M-Pesa, Ezy-Pesa, Airtel Money, TTCL and NMB Mobile respectively. All of the above mentioned companies are in competition with each other and the entire sector is open to further investment be it local or foreign [57].

Mobile coverage is improving, especially as more competitors enter the market and up to year 2013, (89%) of population is said to be covered to the 95dBm signal level, with (54%) of geography covered [23]. The value of mobile (SMS) banking transactions has increased to (94.36%) in year 2013, whereas the value of internet banking transactions has increased up to (28.05%) in year 2012. This increase is attributed to the increase of the number of banking institutions offering mobile (SMS) and internet banking namely: Equity Bank (T) Ltd, NIC Bank (T) Ltd, Barclays Bank (T) Ltd, Citibank (T) Ltd, CRDB Bank Plc, NBC Bank Ltd, Standard Chartered Bank (T) Ltd, FBME Bank Ltd, Bank M (T) Ltd, United Bank for Africa, Stanbic Bank (T) LTD, Amana Bank Ltd, Azania Bank Ltd, Diamond Trust Bank (T) Ltd, Commercial Bank of Africa Ltd [64].
In addition, the Tanzanian government through its ICT sector has increased broadband connectivity by linking to the SEACOM and Eastern Africa Submarine Cable System (EASSy) networks in 2009-2010, and the launching of the National ICT Broadband Backbone (NICTBB) in year 2012. The Bank of Tanzania has signed a Memorandum of Understanding (MOU) with TCRA with the intention of sharing regulatory and supervisory information. Also, Tanzania is the member of Alliance for Financial Inclusion (AFI), which recently has issued a guideline note for Supervision and Oversight of Mobile Financial Services to its members (SOMFS). Despite the efforts made by the government and private sectors in improving mobile banking systems and apart from the opportunities and services offered by mobile banking companies and despite having almost half of Tanzania population possessing mobile phones and other mobile banking supporting devices still and astonishing there is low rate of mobile banking adoption among most of Tanzanians. This study examines the obstacles towards the adoption of mobile banking in Tanzania.

LITERATURE REVIEW

Theoretical Literature Review
This study adopts the Diffusion Innovation Theory (DIT) which was developed by Rogers in (1983) and modified in (2003). This is due to considering mobile banking as technological innovation and also considering DIT as the theory which attempts to explore the factors which affect an individual to adopt an innovation or new technology. [52] defines diffusion as the adoption of an innovation over time by the given social system. According to Rogers (p.175), there are five perceived characteristics of innovation that can be used to form a favourable or unfavorable attitude toward an innovation, namely: relative advantage, compatibility, complexity,
trialability, and observability. The five attributes and their relationship with m-banking innovation adoption can be summarized as follows: *Relative advantage* is the degree to which an innovation is perceived as being better than the idea it supersedes [13]. For a person to choose to use a technology for a specified task, it should provide some form of benefit for the task concerned. This means that when the users perceive relative advantage or usefulness of a new technology over an old one, they tend to adopt it ([35]; [52]). In mobile banking adoption scenario, advantages like convenience, speed and affordability to customers is reported [30]. Increased performance, cheaper costs and increased social standing brought about by mobile banking show a sense of relative advantage.  

*Compatibility* refers to the degree to which a service is perceived as consistent with users’ existing values, beliefs, habits and present and previous experiences [15]. Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. Compatibility has further been found influential in the adoption of mobile payments and mobile banking ([30]; [27]; [14]). Furthermore, compatibility may be of a technical basis such as software or hardware with a computer and therefore, interruption to one’s workflow should also be minimal and the technology should not cross one’s value or belief system. In mobile banking compatibility represents the ability of users to adopt a reliable system which matches with the existing values, past experiences, and needs of potential adopters.  

*Complexity* refers to the sense of difficulty that the user has in using and understanding an innovation. In m-banking adoption, complexity in use is a major factor [7]. There are significant amount of empirical researches on the mobile technology which suggest that users’ intention to adopt m-banking is hindered by the perceived complexity of the innovation ([10]; [32]. This means that barriers of mobile banking adoption are predominantly related to technical complexity of technical infrastructure and the design of technology. In Tanzanian environment users will reject to use mobile banking services if and only if they find it demanding more mental efforts, time consuming, unstable, risky and even frustrating.  

*Trialability* refers to the capacity to experiment with new technology before adoption and it covers opportunities such as test drives, demonstration units and simulations. Physiologically, if potential adopters are allowed to experiment with an innovation, they will feel more comfortable with it and are more likely to adopt it ([52]; [4]). Also [55] argue that, if customers are given a chance to try the innovation, it will minimize certain unknown fear and lead to adoption of it. In mobile banking perspective, the perception of risk is even more important due to fear of loss of PIN codes, fear of hackers access to bank accounts via stolen PIN codes and fear of loss or theft of mobile device with stored data or information ([50]; [28]; [31]; [17]). Therefore, in Tanzanian environmental context perceived risk is more likely to negatively affect the mobile banking adoption since most of the adopters are afraid of the mentioned risks.  

*Observability* of an innovation describes the extent to which an innovation is visible to the members of a social system, and the benefits can be easily observed and communicated [52]. Rogers found evidence for the power of observability when he plotted the number of adopters over time. These plots revealed a normal Bell curve and adopter categorization on the basis of innovativeness. Examples of these curves are shown in Figure 2. (a and b), both reflecting how knowledge and observability shape the rate of diffusion of the adopters.  

Rogers (2003) defined the adopters and categorized innovation adopters into five groups which are: *Innovators* who are (willing to experience new ideas and thus be prepared to cope with unprofitable and unsuccessful innovations, and a certain level of uncertainty), *Early adopters* who (are more limited with the boundaries of the social system and who are more likely to hold leadership roles in the social system), *Early majority* (who have a good interaction with other members of the social system, though do not have the leadership role but their interpersonal networks are still important in the innovation-diffusion process) *Late majority* (which occupy one-third of all members of the social system and who wait until most of their peers adopt the innovation). The last group is *Laggards* (who have traditional view and they are more skeptical about innovations and change agents than the late majority though they
do not have leadership role). In the context of mobile banking, observability means the ability to access the banking services at any time and from any location without any delay or queue, and seeing the effect of mobile banking transactions immediately, and conveying the accessibility benefits to others [7]. Therefore, in Tanzania context observability has the positive effect on mobile banking adoption.

Figure 2(a): Bell curve of adoption frequency

Source: Rogers (2003)

Figure 2(b): Adopter Categorization on the Basis of Innovativeness

Source: Rogers (2003)
From the above figures adoption is slow in the beginning as awareness of the technology is limited, but as more and more people use the technology, the public becomes more aware of the technology and thus the rate of adoption increases until the technology is in common use and has saturated the market. This means that, for a person to adopt a technology, seeing, hearing about, or otherwise attract other individuals to adopt that technology dramatically. Based on the above view, the suitability of DIT in this study is thus mobile banking adoption in Tanzania can be accepted or rejected if and only if there are clear observed customers’ benefits such as technology flexibility, not time consuming, not prone to insecurity, and creates high degree of interaction. DIT fits the study since it exposes the requirements for adoption of the technology which is related with measuring the attributes of relative advantage, complexity, compatibility, trialability, and observability. These attributes are the most frequently salient factors for adoption of mobile banking technologies and can be used to make decision for full use of an innovation. This study, examines the obstacles which delay the full adoption of mobile banking of most citizens in Tanzania.

Empirical Literature Review
Obstacles Towards Adoption of Mobile Banking in Tanzania
Mobile banking (m-banking) is one of the emerging Information and Communication Technologies (ICT) elements that have changed the operations of the banking sector. In mobile banking refers to the execution of financial services using mobile communication techniques together with mobile devices [24]. Mobile banking services can be classified into SMS Banking, Application (Software) oriented, Browser (Internet) based model and Mobile Apps [19]. Banks are introducing m-banking in order to take advantage of high mobile phone penetration around the world and more specifically in Africa [59]. However, in developing countries for example both in Sub-Saharan Africa and North Africa, there most frequently reported obstacles. Globally, obstacles for mobile banking can mean the confronting events or difficulties which hinder the adoption of certain technology or confronting events which are contrary to the adoption of certain technology. For instance 80% of adults in Sub-Saharan Africa had no formal accounts and 60% in North Africa [18]. This implies that, apart from adoption of ICT for financial services and especially mobile banking service still there are obstacles facing the effectiveness of the technology.

A study of [29] investigating consumers’ attitudes towards online and mobile banking in China reveals fear of security risks to be the main reason for the rejection of internet banking whereby, low computer technological skills and Chinese traditional cash-carry culture are associated to be the main factors for rejection.

In India and Jordan studies of ([19]; [26]) and [54] identify challenges such the rapid changes of technology for example changes like 2 Generation (2G), 3 Generation (3G) and 4 Generation (4G), evolutions of smart phones, evolution of new operating systems such as androids and new mobile Apps as the obstacles for mobile banking adoption. The changes in mobile technology is considered as the stumbling blocks because (53.8%) of mobile banking customers in the country used conventional mobile phones while (46.2%) used smart phones and (75.4%) of customers had not even tested mobile services of their banks up to year 2013. Other challenges reported in that study are risk of mobile phones theft and a lack of awareness on the kind of security mechanism to be followed by a customer for securing their transactions e.g. Password/Mobile PIN number.

[6] study in Nigeria reveals that the main constraint to the adoption of mobile banking are poor network security, poor or unavailable telecommunication infrastructures especially in rural areas and poor internet and computer knowledge whereby mobile phones are as a luxury with only the basic functions utilized, i.e. making and receiving calls and sometimes sending text messages. In the same study the issue of cost of compatible mobile phones. The costs of smart phones devices, cost for repair and maintenance and costs of purchasing internet services are beyond the reach of most workers in both the public and private sectors as a result, they depend on the bank branches and are simply content with the short message services from the banks.

[5]
Furthermore, a study of [22] on Barriers to Adoption of Mobile banking in Ghana states four main reasons contributing to the rejection of mobile banking by the consumers to include: poor knowledge about mobile banking, low consumers’ attitude to learn about mobile banking, poor telecommunication network and enormous consumers’ preference for traditional means of banking instead of mobile enabled banking services.

In Tanzania a study of [33] identifies the obstacles for poor mobile banking in the country to be: fear of security risks such mobile viruses and other form of malware, poor privacy in data protection, poor knowledge on PIN number protection and fear of harassment e.g. female customers as obstacles which hinder mobile banking in the country. Fear of security risks such as viruses and other form of malware is due to the reason that, handheld devices can receive viruses from multiple channels through internet applications technologies such as WAP, Wi-Fi, Instant Messaging (IM) and Bluetooth, which leads to lack of end-to-end security.

The Selected Studies from Tanzanian Context on Obstacles Towards Adoption of Mobile Banking

To accomplish this study, previous studies were reviewed and from which independent variables were selected and measured as shown in the Table 1.0

Table 1.0: Major Findings from Tanzanian Context on Mobile Banking

<table>
<thead>
<tr>
<th>Author(s) and Title</th>
<th>Major Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>[8]. Analysis of Mobile Banking for Financial Inclusion in Tanzania: Case of Kibaha District Council.</td>
<td>i) Poor security of mobile handsets, ii) technological changes e.g. mobile handset, iii) poor m-banking infrastructure to handle exponential growth of the customer base iv) bank system failure e.g. ATM machines.</td>
</tr>
<tr>
<td>[46]. Enhanced Security Model For Mobile Banking Systems In Tanzania.</td>
<td>i) Poor mobile network security, ii) users ignorance to use the m-banking systems, iii) fear of fake base stations especially GSM networks.</td>
</tr>
<tr>
<td>[11]. Mobile Money Transfers and usage among micro-and small businesses in Tanzania.</td>
<td>i) Poor network coverage, ii) large amount charged for e-transactions iii) lack of security arrangement, iv) low knowledge and capacity to use mobile transaction supporting devices and v) low or no enough cash from mobile agents.</td>
</tr>
<tr>
<td>[44]. Challenges of mobile-phone money transfer services’ market penetration and expansion in Singida District, Tanzania.</td>
<td>i) Unavailability of network coverage ii) poor mobile money payment systems arrangement, iii) increased mobile transaction charges, v) fraud issues and insecurity, v) increased unfaithful workers, vi) lack of e-float/cash of mobile agents.</td>
</tr>
<tr>
<td>Source</td>
<td>Challenges/Issues</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
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<tr>
<td>Modeling the Adoption of Mobile Payment System for Primary and Secondary School Student Examination fees in Developing Countries: Tanzanian Experience.</td>
<td>i) Lack of enough cash from mobile agents , ii) lack of trust of m-baking systems iii) Fear of unfaithful workers, iv ) inadequate float or cash of mobile agents to serve the customers.</td>
</tr>
<tr>
<td>Mobile banking services in the East African community (EAC): Challenges to the Existing Legislative and Regulatory Frameworks.</td>
<td>i) High transaction fee, ii) unclear policies of mobile-payment platform, iii) lack of technical experts, iv) low customers’ knowledge on m-banking usage.</td>
</tr>
<tr>
<td>Mobile Money in Tanzania: Use. Barriers and Opportunities (InterMedia, Washington DC).</td>
<td>i) Insufficient knowledge of customers on m-banking, ii) unfaithful mobile money agents, iii) poor network, iv) technical problems on registering for m-money.</td>
</tr>
<tr>
<td>Safety on ATM and Mobile Banking Services - Communication Systems Design-Summer Final Report (Version 1.2).</td>
<td>i) ATM cards skimming, ii) ATM card theft, iii) data compromising via social engineering iv) mishandling of PIN and ATM card, v) collusion with colluded staff from mobile phone operators e.g. SIM Swapping, vi) failure of ATMs.</td>
</tr>
<tr>
<td>Mobile Money: A Path to Financial Inclusion, Tanzania Intermedia.</td>
<td>i) Lack of customers’ understanding of mobile money, ii) increased security risks tied to PIN sharing, iii) problems with registration, iv) poor network service difficulties in charging phones i.e.unstable electricity vi) mistrust with mobile money agents.</td>
</tr>
<tr>
<td>State of Mobile Banking In Tanzania and Security Issues.</td>
<td>i) Mobile network are prone to security, ii) lack of common standard among mobile banking service providers, iii) mobile money agent misconduct, iv) increase of mobile malware e.g. viruses.</td>
</tr>
<tr>
<td>Assessment of Challenges Facing Customers in Automated Teller Machines in the Banking Industry in Tanzania: A Case of Some Selected Banks in Tanzania.</td>
<td>i) ATM card locking, ii) mobile network insecurity, iii) ATM machine breakdown, iv) ATMs out of cash, v) and long time in cash dispensing.</td>
</tr>
<tr>
<td>SURVEY OF MOBILE PHONE USAGE PATTERNS AMONG STREET VENDORS IN DAR ES SALAAM CITY-TANZANIA.</td>
<td>i) Language problem e.g. used mobile language should be Swahili (native language), ii) lack of awareness on the benefits received as regarding the usage of mobile money transfer, iii) poor network infrastructure, iv) mobile phone software and hardware incompatibility.</td>
</tr>
<tr>
<td>Mobile money for the unbanked: Lessons from Tanzania.</td>
<td>i) Unwillingness to use m-banking tools, ii) high cost imposed on mobile transactions, iii) lack of trust of mobile network, iv) lack of knowledge on how to use mobile phones, vi) no access to network agents, vii) lack of mobile handsets.</td>
</tr>
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</table>

Source: Literature Review
METHODOLOGY

This research employs a quantitative approach in which descriptive analysis was adopted. Exhaustive literature review was conducted in order to identify the most frequent obstacles towards the adoption of mobile banking in Tanzania. Different studies from different perspectives worldwide have been reviewed. In order to make the study more focused; variables of the study were extracted from fourteen (14) selected literatures from a Tanzanian environment. The choice of the literatures was based on their relevance to the topic in discussion but also was limited to only five (5) current years. A sample size of 14 literatures was viewed sufficient for statistical analysis since [53] and [37] used a sample of 12 literatures to draw up the conclusions. From the literature, ten (10) challenges were identified and analyzed descriptively and presented in tabular form in which frequencies and percentages were computed. These variables include; (i) increased theft of mobile handsets and ATMs cards, (ii) poor network coverage, (iii) lack or low knowledge of mobile banking system users, (iv) large amount charged on mobile money transactions, (v) irregular standards of mobile money payments, (vi) lack of enough float, ATMs breakdown and theft, (vii) lack of trust of mobile money agents, (viii) poor security of mobile networks. In this study, the choice for the critical obstacles was restricted only to those obstacle which with scores at least 50% ([34]; [53]; [37]).

Conceptual Framework

Based on the literature review, a number of obstacles headed poor adoption of mobile banking in Tanzania have been identified, whereby independent variables are: (i) increased theft of mobile handsets, (ii) poor network coverage, (iii) lack or low knowledge of mobile banking system users, (iv) high mobile money transactions fees, (v) irregular standards on mobile money payments, (vi) lack of enough float and ATMs breakdown, (vii) lack of trust of mobile money agents, (viii) poor security of mobile networks which affect the route for the adoption of mobile banking in Tanzania. The dependent variable in this study is “adoption of mobile banking in Tanzania”.

![Conceptual Framework Diagram]

Figure 4: Conceptual Framework
Source: Developed from Literature Review
Hypotheses
From the literature reviewed, obstacles towards mobile failure banking in Tanzania can lead to having the following hypotheses:
H1: There is a negative relationship between theft of mobile handsets and mobile banking adoption in Tanzania.
H2: There is a negative relationship between poor network coverage and mobile banking adoption in Tanzania.
H3: There is a negative relationship between lack of knowledge of m-banking users and mobile banking adoption in Tanzania.
H4: There is a negative relationship between high mobile money transaction fees and mobile banking adoption in Tanzania.
H5: There is a negative relationship between irregular standards on mobile money payments and mobile banking adoption in Tanzania.
H6: There is a negative relationship between lack of enough float, ATM breakdown and theft and mobile banking adoption in Tanzania.
H7: There is a negative relationship between lack of trust of mobile money agents and mobile banking adoptions in Tanzania.
H8: There is a negative relationship between poor security of mobile networks and mobile banking adoptions in Tanzania.

FINDINGS AND DISCUSSION
After an extensive literature review, the most extracted obstacles headed to mobile banking adoption in Tanzania for are presented in as presented in Table 2.0. The sign (∞) shows the variables which have been found to be the critical challenge as per this study.

Table 2.0: Obstacles Towards Adoption of Mobile Banking Adoption in Tanzania

<table>
<thead>
<tr>
<th>Researcher/Article</th>
<th>(1) TMHs</th>
<th>(2) PNC</th>
<th>(3) LKMU</th>
<th>(4) HTF</th>
<th>(5) ISMP</th>
<th>(6) LFAB</th>
<th>(7) LTMA</th>
<th>(8) PSMN</th>
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<tr>
<td>[8]</td>
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<td>[63]</td>
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<td>[11]</td>
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<td>[44]</td>
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<td>[45]</td>
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</table>
Table 3.0: Frequencies and Percentages of the Obstacles Towards Adoption of Mobile Banking in Tanzania

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Theft of mobile handsets and ATM cards</td>
<td>3</td>
<td>21.4</td>
</tr>
<tr>
<td>Poor network coverage</td>
<td>11</td>
<td>78.6</td>
</tr>
<tr>
<td>Lack of knowledge of mobile banking users</td>
<td>8</td>
<td>57.1</td>
</tr>
<tr>
<td>High mobile money transaction fees</td>
<td>4</td>
<td>28.6</td>
</tr>
<tr>
<td>Irregular standards of mobile money payments</td>
<td>3</td>
<td>21.4</td>
</tr>
<tr>
<td>Lack of enough float, ATMs breakdown and theft</td>
<td>7</td>
<td>50.0</td>
</tr>
<tr>
<td>Lack of trust of mobile money agents</td>
<td>6</td>
<td>42.8</td>
</tr>
<tr>
<td>Poor security of mobile networks</td>
<td>8</td>
<td>57.1</td>
</tr>
</tbody>
</table>

Source: Compiled from Literature Review, 2015

The results (Table 3.0 and Figure 3) indicate poor network coverage (78.6%), lack of knowledge of mobile banking users (57.1%), lack of enough floats, ATMs breakdown and theft (50%), poor security of mobile network (57.1%), are critical obstacles towards the adoption of mobile banking in Tanzania.
Poor network coverage (78.6 %), lack of knowledge of mobile banking users 57.1%, lack of enough floats and ATMs breakdown (50%), poor security of mobile network (57.1%) are critical obstacles towards the adoption of m-banking in Tanzania.

Poor network coverage in Tanzania still persists whereby the network down time increases. The findings noted that, poor network coverage is the result of poor mobile network infrastructure. In both urban and rural areas transactions using a mobile device require a customer to initiates the request that goes through the mobile network operator (MNO) and terminates at the server application that can be administered by a technology vendor or independently by a financial institution. A study [40] identifies that (45%) of Tanzania areas have limited cellular network whereby the urban areas has at least reasonable coverage compared with rural areas. Another cause for poor network coverage may include increased number of customer served by a single base transceiver station (BTS) whereby the same study identifies that (44.6%) of the subscribers at the University of Dodoma claimed of network outage and call dropout a situation caused by lack of sufficient BTS whereby 23,000 customers could be served by only three BTS.

These results are in harmony with Tanzania Infrastructure Report of year 2010 [65] which reveals that only (65%) of the Tanzania population lives within the range of a GSM signal, compared with over (90%) in neighboring Kenya and Uganda. This indicates that network coverage in Tanzania is still inadequate. Also the ITU report of year 2013 shows that, up to May 2014, the Tanzania communication network stretched over 7,560 km across the country, connecting 34 regional headquarters with only 6.1 million users, which is equal to (13.1%) of the population. Inadequate network coverage and low network capacity contributes to failure to adoption of m-banking in Tanzania. However, these results are supported by DIT in one of its constructs attributes.
“observability” which address that, in order to adopt m-banking a user should be able to access the banking services at any time and from any location without any delay or queue, and seeing the effect of m-banking transactions immediately, and conveying the accessibility benefits to others. In this study in order to enhance m-banking, there should be network coverage and ATM machines everywhere and at any time.

Regarding lack of knowledge of mobile banking users, the findings reveals that there is lack of understanding of how mobile banking and mobile related transactions operate. In many cases in the review, the situation shows that most of users have poor or lack skills of using m-banking supporting devices such as mobile phones, ATMs, computers and credit cards. These results are similar to the results of [5] in Nigeria which reveals that (60%) of the population lacks the requisite skills to fully operate most internet technologies (quoted) in [1]. The reason behind such huge percent is that the teaching of technology in most Nigerian primary and secondary schools are usually in theory as there is nothing to practice and hence the condition persist up to adult level. Accordingly, these findings are equivalent with those in [32] which identifies that the early and first barrier to the adoption of mobile payments in Finland was the complex procedures giving an example of SMS formats which are complex, slow to key in various codes and difficult to remember. Using mobile phone requires knowledge and ability to properly follow the procedures as a study of [40] revealing that, the presence of improper charging of the mobile phone battery which limits its life span and hence leading to the poor quality of the handset and susceptible to call or login drop out when used for mobile payments or m-banking. The same study reports the problem of the language whereby most of the mobile handsets are configured to operate in English or other foreign languages, while majority of Tanzanians understand native language known as “Kiswahili”. Similarly, these findings are in harmony with DIT in one of its constituents which claims that complexity in using and understanding an innovation can be the hindrance for user’s intention to adopt it. In this study, the barriers of mobile banking adoption is predominantly related to technical complexity of mobile handsets language, SMS difficult procedures and poor understanding on how to handle the mobile banking supporting devices so that they can survive in service for long time.

Considering, lack of enough floats, ATMs breakdown and theft, the findings identifies the obstacle to be critical with (50%). The case of mobile money agents failure to serve their customers due to having no enough float has been reported in many papers. In the side of ATMs breakdown and lack of cash, the findings have identified the issues ATMs, network downtime which may lead to customer’s disappointments due to time wasted. The issues of cash theft through ATMs and ATM cards involving actions such as card skimming (wireless fake PIN pad overlay), wireless card reader, and wireless miniature camera have also been reported. On the same scenario there are actions executed such as cutting ATM cards’ slits into both sides of the trap which prevents a customers’ card from being returned prior the completion of customers’ transactions. There are other unfaithful behaviors like a criminal pretending to be a Good Samaritan, while he/she wants to observe the customer’s PIN number. The findings have revealed that some of customers feel insecure or fear of being harassed especially when they are requested to provide their details such as mobile phone number and residents [26].

The entire findings are similar to those of reference [9] in Kenya which reveals that mobile money agents have been losing on average of five customers everyday due to lack of float, a situation which has led to (90%) of customers to keep on trusting the physical bank transactions in the country. Accordingly, these findings are in harmony with the results of ([2]; [66]; [5]) in Nigeria which reveal the introduction of ATMs in country to have led to increased number of financial fraud whereby fraudsters, have found it as a new heaven of compromising innocent people’s personal identification numbers (PIN), a chance for bank staff to inspect customers’ account numbers and a chance for information technology experts to claim for ATMs network failure while it isn’t. Also ATMs have been reported to debiting customers’ account without issuing physical cash and being a source of frustrating queues. These results are similar to those of reference [47] which report problems with ATMs in Nigeria to include: ATMs debiting customer’s
account without issuing physical cash (54.9%), ATM cards getting trapped in ATMs and taking time to be recovered (62.1%), ATMs financial fraud (67.6%) and ATMs service network failure (62.6%). These findings can also be supported by reference [12] in Ethiopia which reveals that, large number of people in the country (2.00 mode) fear to adopt e-banking system especially the ATMs due to the risks they possess. These findings are consistent with the findings of [25] in Oman which indicates that the technological barriers such as fear of security risks as the main factor for poor adoption of electronic banking in the country.

In the case of poor security of mobile networks and the adoption of mobile banking, problems arise because mobile transactions in Tanzania use technologies such as Secure Messaging Service (SMS), Unstructured Supplementary Services Data (USSD) and Interactive Voice Response (IVR) which are all widely deployed over GSM generations such as 2G (Second Generation), GPRS (General Packet Radio Services), EDGE (Enhanced Data Rates for GSM Evolution), UMTS (Universal Mobile Telecommunications System), 3G (Third Generation), and LTE (Long Term Evolution) networks whose initial design was meant for voice traffic. Mobile network insecurity has been an obstacle towards adoption of m-baking in Tanzania because SMS service which is the simplest, cheapest, available and most common channels is susceptible to attackers who can read the contents of messages they intercept, due weaknesses at the SMS Center (SMSC). These findings are in correspondence with the findings of [42] in Kenya which reveals the problem of security over the internet as the hindrance to mobile money transfer in country. The study also points out major internet attackers which can lead to slow adoption of mobile banking to include: “hackers” who manipulate technologies to gain unauthorized access to computer networks or divert data to unauthorized access, “eavesdropping /sniffing/snooping” attacks which have the ability to monitor network traffic using some kind of network monitoring software whereby, the sent SMS can be amended and also “password” attacks which is able to know the account ID or password of a particular user and can gain access to the network, gather information hence be able to modification, delete or rerouting of network data. Other forms of attacks posing network insecurity are back doors, Trojan horses, viruses and worms. Furthermore, these findings match with the United Nations Conference on Trade and Development (UNCTAD) report of year 2012 regarding Mobile Money for Business Development in the East African which provides that, data sent via SMS or USSD is vulnerable for interception if it is not well protected. In this study mobile network insecurity is the biggest factor slowing down the growth of mobile banking adoption and the biggest hurdle in the growth of mobile money transfer [63].

CONCLUSION AND RECOMMENDATIONS
This paper examined the obstacles towards the adoption of m-banking in Tanzania. It has been observed poor network coverage (78.6 %), lack of knowledge of mobile banking users (57.1%), lack of enough floats, ATMs breakdown and theft (50%), poor security of mobile network (57.1%), are critical obstacles towards the adoption of mobile banking in Tanzania. Therefore, for the successful and quick adoption of m-banking in the country the government and responsible institutions should take serious measure to improve network coverage i.e. telecomm operators in the country should be ready to expand from urban centres to the rural areas by connecting the whole country to the national fiber optic cable. This will push towards increased use of the mobile phones and Internet broadband services and integrated e-payment systems, which will also simplicity financial transactions such as pay water bills, electricity, communications and other bills. Basically, the opening of sea cable for international high speed Internet connectivity and the expansion of mobile communication networks to 4G technologies will open new rooms of business transactions using payments systems such MasterCard for international banking and transactions. Financial institutions should equally work hard to minimize the rate of network failures since ATMs related fraud can equally be attributed to it.

To overcome a problem of lack of knowledge of m-banking users, the responsible stakeholder should educate customers by giving more details on the benefits and risks of m-banking. The government and responsible institutions should train their customers on how use of mobile devices without regarding their level of literacy. This could be done through posters,
seminars and promotion and will educate customers on understanding the procedures to follow on mobile transactions activities and even how to secure the transactions. Mobile banking education should not be left to mobile money agents or friends because it can lead to exposing of sensitive information of customer a situation which bears risk and fear of customers m-banking adoption

To address the problem of lack of enough floats, ATMs breakdown and theft, responsible companies/institutions should provide sufficient float/cash to mobile money agents. This will reduced the extent of distance to travel by customers looking for agents with enough float or running to physical transactions. For the case of ATMs and theft through the machines, customers should be educated that the only security of their ATMs card is the PIN number, so they should not expose it to any and also be advised to change the PIN number periodically plus not to using PIN number like ones’ birthdates, driving license, or passport. Banks in Tanzania should strive to install ATMs with complex security layers, developing technologies for higher levels of security, such as voice, iris/retina biometrics, which accurately authenticates users based on their voice and face.

Responsible companies should deal with poor security of mobile network by deploying security technologies such as firewalls and proxy servers which are both the best remedy to save guard outside attacks on mobile money transfer transaction. Mechanisms such as confidentiality of data which is enhanced through the use of message encryption to ensure end-to-end security and ensuring that data is only be accessed by authorized parties should implemented. Message integrity should ensured by the use of message digests that are obtained by hashing message contents prior to being transmitted across the network. Finally, improvements on some policies which are guiding m-banking adoption such as, education, infrastructure and security management are recommended.

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