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ICT Infrastructure, Mobile Money Systems and Customer Satisfaction in Uganda

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The advent of mobile money transfer and payment systems in Uganda has caused excitement to many people due to the numerous benefits this technology offers. However, some mobile money customers have expressed their dissatisfaction about the technology. This study investigated the current ICT infrastructural situation on which mobile money transfer and mobile payment systems run and the level of customer satisfaction using a survey design. Findings indicate that the ICT infrastructure is inadequate and that although customers are not satisfied with mobile technology, they still embrace it and many would like to continue using it to transfer money and make bills payments.

Key words: ICT Infrastructure, Mobile Money Transfer, Mobile Payment System, Customer Satisfaction, Uganda

Introduction

Today, the world is under the craze of innovative technologies. One of the most technological recent innovations in Uganda and the east African telecommunications sub-sector is Mobile Money. Started in the year 2009, mobile money was initially perceived as a conduit for generating "side income" to supplement revenues of telecom operators. However, mobile money and other mobile payment systems have now become a core business are and basis of competition in the industry. In fact some operators such as MTN Uganda are making profits from mobile than any other business products they offer. Research shows that mobile money came in handy to solve the financial inclusion by the vast unbanked Ugandan population, which problem is manifested in many other developing nations [8]. In the neighbouring Kenya, Safaricom has already proven that mobile money can take off as a cheap and accessible money transfer system [4]. With over 9.5 million registered users as of April 2010, Safaricom's mobile

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money platform, M-PESA registered a huge success [8]. In fact the success and achievements of M-PESA are instigated a mobile money wave across the continent, Uganda inclusive. Unlike Kenya, Uganda has three leading mobile operators offering mobile money to the Ugandan market grooming a hope that the Ugandan economy, too, will be transformed through mobile finance [1].

The idea of mobile money transfer services first caught the attention of poorer urban migrants who used it to safely send remittances to their families in rural areas in a speedy, efficient and cheap way. This came in at the time when sending money was done by courier service providers who would travel long distances with envelops of cash. In return, they would charge their clients handsomely considering the risk and transport costs. Some people would send money via commuter buses and sometimes cargo trucks and Lorries. However this method was limited in many ways. The mere fact of entrusting valuables and hard-earned cash to bus and lorry drivers, mobile person-to-person money transfer was not ideal for many Ugandans [10]. Other than trust, the advent of mobile money technology has potential to be more broadly relevant, and has begun its evolution into a more inclusive and more comprehensive financial system. This is facilitated by the fact that it is relatively simple to open a mobile money account or 'e-wallet'. The long list of conditions for opening bank accounts excluded the largest proportion of Ugandans from baking, but the 'Know Your Customer' requirements for mobile banking are much laxer. A school or company ID will suffice in the place of a passport, driving license or voter registration card, and if a prospective customer doesn't own any of those, a brief reference letter from his LC will do [9]. Further to this, mobile money proponents argue that the technology is "less intimidating" compared to other formal banking alternatives. This is so because mobile service providers bring the service to local and allow such people as airtime retailers to also offer mobile services. These vendors are usually well known villagers who many times double as relatives, friends and or partners from whom locals have bought telecommunications airtime cards for ages [8].

The benefits of mobile money are numerous. For example, other than sending and receiving cash, a mobile money account can be used to save money for many low income earners. The system is perceived to be more secure since the money is not held on a user's simcard but rather on a central server, which protects it from loss and theft, hence a safer, accessible and more reliable saving option [8]**.** Of late, the evolution of mobile money product itself is making it attractive to a more diverse customer base. Mobile financial services may have begun as a product for the unbanked poor, but it is not only the poor who can benefit from it now. In Kenya, for example, airline tickets can be purchased through M-PESA, and a recent partnership between Safaricom and Equity bank, called M-Kesho, allows customers to transfer funds in and out of their bank accounts using their mobile phones. In Uganda, too, the evolution of mobile banking is yielding facilities targeted at customers further up the social scale [1]. New applications like school fees and bill payment functions have improved domestic productivity by saving working people the time normally spent in queues to pay school fees and utility bills. A 2009 study by the Consultative Group to Assist the Poor (CGAP) says that, at low transaction values, using e-wallets and mobile money transfers is on average 38% cheaper than going through formal financial channels [5]. MAP International, an American company partnering with UTL to provide M-Sente, a mobile financial service platform argues that it is important to recognise that mobile banking is only in its infancy, and is capable of having a tremendous impact in future years. Prabhu suggested that mobile money, which is currently about money transfer will turn out as best savings option by 2015 and argues that this will significantly change the way businesses are conducted the economy by bringing onboard the currently informal banking sector into play on the national financial system.

Mobile Money in Uganda

One of the most remarkable technological success stories in this decade has been the spread of mobile phones across Uganda. This has been propelled by cheap SIM cards, affordable handsets and a significant increase in mobile phone signal coverage within Uganda. Millions of Ugandans have purchased the first phones of their lives (GSMA, 2010). The clearest benefits associated with this telecommunication revolution are associated with the mobile phone's core functions – by allowing people stay in touch, either by voice call or simple short message (SMS). Mobiles help people overcome distance and coordinate their social and economic lives. However, many of these new mobile users live in an informal or cash economy, without access to bank accounts or lines of credit. Indeed across the developing world there are probably more people with mobile phones than bank accounts [7]. Therefore, the appeal and utility for mobile banking and mobile payments services seems inevitable. Mobile phones are increasingly becoming part of the everyday lives of the poor; it has been argued that mobile phones have the potential to become a low cost accessible 'account' or delivery channel for financial services and transactions [7].

Uganda has about 10.3 million mobile phone subscribers

with a mobile penetration rate of approximately 33.6%. The mobile markets are becoming increasingly competitive with four mobile operators as at the end of 2009. Like in other African countries, multiple SIM cards are prevalent and customer loyalty is not that high because people look for "the best deal" that is going to save them the most money. Offering new value services is becoming increasingly important for mobile operators. Mobile money and mobile payments are one of the offerings that have enhanced value propositions and have now become the leading standard in East Africa [1].

Most transactions between individuals and businesses which sell goods to consumers in Uganda are cash-based. This is partly a reflection of the low number of bank accounts in the country. In contrast to mobile subscriptions, there are only an estimated 3.2 million bank account holders in Uganda, indicating that for every one bank account holder there are three mobile phone owners. This translates to 90.1 % of the total population of 32 million people not having a bank account. Simple airtime transfers, where one person buys airtime and transfers it to another, was one of the earliest forms of mobile money transfers, even though the airtime could not be converted into money. Mobile money transfer still makes use of airtime transfer but has incorporated a '*mobile wallet'*, which allows people to transfer money to each other and receive cash [1].

Mobile money first became available in Uganda in March 2009, and presented a potential solution to the poor accessing financial services, which is a serious problem in the country and many developing countries as already highlighted. Uganda has currently four mobile money service providers, with MTN's mobile money being the pioneer, and has about two million subscribers served by 1,500 agents across the country [6]. This is followed by Orange money; formerly ZAP under Zain which was launched two months after MTN Money with close to a million subscribers. In the same breadth, Uganda Telecom (UTL) followed suite with M-Sente, which is largely used to pay for utility bills. Recently Warid Telecom entered the market with a more flexible option of enabling a user to send and/or receive money from or to any network. This has alienated some of other operators' subscribers who wish to send money across networks.

With all these developments, mobile money customers thought that it was a brilliant idea and were confident that sending and receiving money plus making mobile payments would become easy, fast and convenient [1]. However, despite the success of the mobile systems, new challenges have emerged like a sagging network under a fast-growing subscriber base which requires a fresh investment in network upgrade. Besides that, there is the issue of regulating the agents that provide the cash. This has brought about the liquidity problems where customers walk into a shop and there is no money. But the biggest challenge so far is fraud running to one or two cases a week, and is mainly brought about by the low literacy rates of rural users who are ignorant about how the service works, the agents that provide the cash and some employees of the service providers. This has resulted in a loss of income to genuine customers.

Mugabe (2010) argues that one other big challenge of mobile money and payment systems was the web-based nature and platform on which the systems run. This is coupled with many small untrained, unsupervised, poorly coordinated and disorganized agents littered every where. This situation made control against misuse of credentials a difficult challenge, hence promoting fraud [3]. The fraud cases that have been reported on money transactions are alarming [9]. In addition, the network is overloaded by handling both financial and telecommunication services. The literacy level of users is also demanding as most rural populations are illiterate and ignorant about the operations of the service. Therefore this study sought to investigate and provide an understanding of the existing ICT infrastructure for mobile cash transfer/payment systems and customer satisfaction. This was very important in trying to support decision making for better customer satisfaction.

This study was aimed at achieving three objectives i.e. 1) To examine the ICT infrastructure that facilitated mobile money transactions, 2) To determine the requirements for effective mobile money transactions and 3) To determine the level of mobile money customer satisfaction.

The Case for Kano Model of Customer Satisfaction

In order to appreciate the level of mobile money customers' satisfaction, we adopted and used Kano's model of customer satisfaction. Invented by Noriaki Kano, a Japanese professor, the Kano model of customer satisfaction is very useful in determining levels of customer satisfaction through classifying product attributes based on how they are perceived by customers. It helps in synthesizing user research [2]. The model has four types of product/service attributes presented in four quadrants; 1) *threshold attributes, 2) performance attributes, 3) excitement attributes and 4) other Attributes.*

Threshold attributes are the basic attributes of a product/service that every customer expects out of a given product/service and do not provide any comparative advantage over substitute goods/services. On the other hand, *performance attributes* are those that enhance acceptability of a given product and usually influence customer satisfaction. *Excitement attributes* are those attributes that are unexpected that if found on a given product/service, they cause very high levels of customer satisfaction "excitement", however, in the event that they are missing, the customer will still be satisfied as long as *performance attributes* exist. The last category is referred to as *other attributes* i.e. all attributes that cannot be classified according to the Kano Model. Such attributes usually are of little or no significance to the level of customer satisfaction. This paper analyses and classifies mobile money service attributes according to the Kano Model in order to better understand the level of mobile money customer satisfaction.

Methodology

A survey research design was used in order to establish the facts that

Table 1: Validity and Reliability Tests

Variable	N of items	Anchor	Cronbach Alpha Coefficient	Content Validity Index
Mobile Money and Customer Satisfaction	**12**	**5 point**	**0.731**	**0.672**
Challenges with mobile money	**6**	**5 point**	**0.723**	**0.742**
Suggested Solutions for improved Customer satisfaction	**7**	**5 point**	**0.735**	**0.622**

Table 2: ICT Infrastructural Requirements

Salient ICT infrastructure Requirements		
	Frequency	**Percent**
Electricity	15	10.2
Wide Network Coverage	35	23.6
Fast network	96	64.8
Good Fast Phones	2	1.4
Total	148	100.0

Source: Primary data

explained ICT infrastructural issues supporting Mobile Money Transfer Systems and the level of satisfaction of Mobile Money customers in Uganda. Both primary and secondary data were used in this study. Primary data was collected from the field while secondary data was obtained from published material in journals and other recognized media. A self administered questionnaire was used to collect primary data after it had been pre-tested for content validity and reliability as seen in table 1.

Sample design

The study covered 310 respondents comprising of mobile money service providers, entrepreneurs, ICT regulators, bankers and mobile money customers in Uganda. The 310 respondents were selected carefully using purposive sampling method i.e. we selected 4 mobile money service providers from each of the 5 Divisions in Kampala City Council Authority (KCCA). These organizations were then grouped in 4 categories i.e. 1) category A: those with less than 5 employees, 2) category B: those with less than 20 employees, 3) category C: those with less than 50 employees and 4) category D: those whose employees are greater than or equal to 50. 10 respondents were then picked from each category randomly. To allow diversity of views and opinions, we included 10 respondents from regulatory institutions of mobile money i.e. 5 from Uganda Communications Commission and 5 from Bank of Uganda respectively. Other respondents were mobile money customers i.e. 20 customers were selected from each KCCA division using simple random sampling method. This gave us a total of 100 customers and 310 total numbers of respondents. The data collected was input in SPSS and analyzed to determine the most salient infrastructural factors that affect mobile money transactions and customers' satisfaction.

Research Findings

This section presents the findings of the study in trying to achieve the study objectives.

Findings on the ICT Infrastructure that Facilitates Mobile Money Transactions

Our findings on objective 1 indicate that the most important component of mobile money ICT infrastructure is a fast network (64.8%), followed by the need for a wide network coverage that scored 23.6% as seen in table 2:

In order to deepen our understanding on mobile money ICT infrastructure, we asked our respondents to list their preferred ICT infrastructural requirements for better mobile money transactions. A number of points were given. However, after coding and analyzing the responses, it was established that 37.8% wanted the government to complete the national fiber backbone from Mombasa to Kampala. In addition, 24.3% suggested that the government should allow more telecom players into the market. Other significant responses were that there was a need for laws and policies governing mobile money (12.2%) and also that the government should reduce electricity tariffs (10.8%). Table 3 shows results indicating the suggested ways for improving mobile money ICT infrastructure:

Table 3: Ways of improving ICT Infrastructure

Suggestions for government	(F)	(%)
Reduce electricity tariffs	16	10.8
Provide tax incentives to encourage FDI in ICT	7	4.7
Complete the national fiber backbone	56	37.8
Seek donor support in setting up ICT infrastructure	2	1.4
Allow more telecom players	36	24.3
Encourage public-private partnerships in ICT	5	3.4
Promote regulation	4	2.7
Enact laws and policies governing mobile money	18	12.2
Own back the role of infrastructural developments	3	2.0
Support UCC in promoting universal access to ICTs	1	0.7
Total	148	100.0

Source: Primary data

Table 4: Requirements for effective mobile money transactions

Requirements	N	Min	Max	Mean	SDV
The system should be designed to allow multiple language users	246	1	5	4.41	.959
The system should allow users without mobile phones to use it	246	1	5	2.69	1.084
The network should be re-engineered to reduce breakdowns	246	2	5	4.67	.664
The technology should allow offline transactions where there is no electricity	246	1	5	3.73	1.311
The network security should be improved	246	1	5	4.45	.742
The customer care desk should be improved	246	1	5	4.32	.890
There should multiple help lines numbers	246	1	5	4.61	.738

Source: Primary data

Findings on the Requirements for Effective Mobile Money Transactions

We collected and analyzed the requirements for effective mobile money transactions using descriptive statistics (Means). The Means in table 4 indicate that most of the respondents strongly agreed that the network should be re-engineered to reduce breakdowns (Mean = 4.67) for effective mobile money transactions. This was closely followed by the requirement for multiple help lines (Mean=4.61). Other significant requirements were that the network security should be improved (Mean=4.45), the system should be designed to allow multiple language users (Mean=4.41) and that the customer care desk should be improved (Mean=4.32).

Findings on the Level of Mobile Money Customer Satisfaction

Most mobile money customers indicated that they were not satisfied by way mobile money transactions are carried out. They disagreed with eight customer satisfaction parameters presented to them as follows; 1) there is promptness in handling customer complaints (Mean=2.05); 2) mobile money service is reliable, of high quality and without frequent interruptions (Mean=2.08); 3) restores service very quickly when a service is interrupted (Mean=2.18); 4) the staff are willing to answer questions (Mean=2.54); 5) the staff are sincere and interested in customers problems (2.88); 6) the network is secure (Mean=2.89); 7) responds to customer inquiries in time (Mean=2.93); 8) there is better handling of customers complaints (Mean=2.99).

However, respondents expressed their satisfaction on the basis of the following 1) I understand the language used (Mean=4.53); 2) where a problem has not been solved, the staff promise to do something by a certain time (Mean=4.33); 2) the staff are competent and able to explain service and policy issues (Mean=4.16). Table 5 shows responses on mobile money customer satisfaction.

Suggestions for Improving Mobile Money Customer Satisfaction

The respondents were asked to provide suggestions for improving mobile money customer satisfaction and

Table 5**: Level of mobile money customer satisfaction**

Customer satisfaction parameter	N	Min	Max	Mean	SDV
Mobile money service is reliable, of high quality and without frequent interruptions	246	1	4	2.08	.907
Restores service very quickly when a service is interrupted	246	1	4	2.18	.956
There is a customer care hotline	246	1	5	3.16	.861
Responds to customer inquiries in time	246	1	4	2.93	.725
There better handling of customers complaints	246	1	4	2.99	.994
The staff members are courteous and friendly	246	1	5	3.33	.962
The staff are competent and able to explain service and policy issue	246	1	5	4.16	.993
The staff are willing to answer questions	246	1	5	2.54	1.101
The staff are sincere and interested in customers problems	246	1	5	2.88	.740
There is promptness in handling customer complaints	246	1	4	2.05	.817
Where a problem has not solved, the staff promise to do something by a certain time	246	1	5	4.33	.793
The network is secure	246	1	5	2.89	.949
I understand the language	244	3	5	4.53	.532

Source: Primary data

20.2% suggested that mobile money service providers should reduce transaction charges, while 12.2% indicated that service providers should ensure a constant flow of cash in order to avoid turning away customers as seen in table 6.

Relating Findings to the Kano Model of Customer Satisfaction

From the analysis we identified the need for a fast network, wide network coverage and network security as threshold attributes. Performance attributes include fiber backbone from the sea, support for multiple languages, network stability and reliability while mobile money transaction discounts and introduction of credit facilities on mobile money constitute excitement attributes,

Recommendations

This paper presents recommendation as per objectives of the study as follows:
ICT infrastructure that facilitates mobile money transactions
From the analysis, most respondents indicated that national fiber backbone from Mombasa to Kampala was a key mobile money ICT infrastructural requirement. The researchers therefore recommend that government speeds up the process of establishing the communication link from the sea. This will go a long a way in reducing telecom rates and above all help in improving network coverage, which also scored highly under the analysis.
Government should also open up the telecoms market in order to allow competition, which will help improve service provision. Other recommendations for improving ICT infrastructure are reduction of electricity rates since most of telecoms equipment uses electricity to run their equipment. This would help in easing the service charges that were reported to be so high.

Requirements for effective mobile money transactions

This study recommends that mobile money networks be re-engineered to reduce breakdowns. For example;
Mobile Money network should be separated from the main network that offers voice and data services since it was established that most customers are not satisfied with the network stability and speed.
The service providers should also improve on network security which is a threshold attribute according to the Kano model.
We also recommend the use of multiple languages in order to enable a diversity of users who may not know English or Luganda (a commonly used local language). Other neutral languages such as Kiswahili should be introduced to cater for illiterate users who do not know English and Luganda.

The level of mobile money customer satisfaction

Since most of mobile money customers were not satisfied with the quality of services offered, this study recommends the following for improvement;
The service providers should reduce their transaction

Table 6**: Ways of improving mobile money customer satisfaction**

Suggestions	**(F)**	**(%)**
Ensure a constant flow of cash in order to avoid turning away customers	**30**	**12.2**
The service providers be capable to use multiple languages e.g. Kiswahili	**7**	**2.8**
They should reduce transaction charges	**50**	**20.3**
Provide enough outlets especially in rural areas	**10**	**4.1**
Set up more service desks upcountry	**3**	**1.2**
The system should be compatible with other networks	**8**	**3.3**
Improve on their speed	**24**	**9.8**
They should give discounts	**6**	**2.4**
They should allow large transactions for traders	**17**	**6.9**
They should improve on network security	**5**	**2.0**
They should be able to provide credit to their customers	**14**	**5.7**
Sensitize and train customers especially the illiterate	**15**	**6.1**
They should train service providers on customer care	**8**	**3.3**
They should ensure security at mobile money centers	**4**	**1.6**
Mobile money network should be separated from phone call network	**9**	**3.7**
They should supervise service providers regularly	**5**	**2.0**
There is need for quick activation of customer account numbers	**10**	**4.1**
Create more help lines	**21**	**8.5**
Total	**246**	**100**

Source: Primary data

charges
They should ensure a constant flow of cash in order to avoid turning away customers
Service providers should create more help lines to attend to customers' complaints in a timely manner.

Conclusion

Although mobile money customers are not satisfied, this study established that it is one of the greatest innovations that ever happened in the Ugandan telecommunications sub-sector. The service providers have tried to meet the threshold attributes and some of the performance attributes. However there is need to address more performance attributes highlighted in the and more importantly the excitement attributes since they are the ones that drastically increase customer satisfaction.

Areas for further research

Further research should be aimed at the following;
Analyzing the role of mobile money in economic transformation of Uganda Regulation of mobile money

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