Transforming Governance through Mobile Technology in Developing Nations: Case of Kenya

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Abstract

Increasing penetration of mobile broadband as opposed to fixed broadband in developing nations like Kenya has spurred an extra ordinary uptake of mobile phones in these countries. This has presented a mobile opportunity to public institutions to devise innovative ways of providing access to public information and delivering services. This paper seeks to demonstrate the role played by mobile broadband technology transform governance by providing access to public information and services. A desk methodology was used to gather secondary data related to adoption of mobile phones as a tool for delivering government services in Kenya. Findings indicate that increasing penetration of broadband technology resulted to increased number of government services offered via mobile phones.

Keywords: connectivity, fixed broadband, mobile broadband, e-Governance, m-Governance, m-Opportunity

1. Introduction

Contrary to fixed broadband whose penetration rate has remained low in developing nations, mobile broadband has penetrated rapidly resulting to speedy uptake of mobile phone (ITU, 2012; ITU & OECD, 2011). This scenario provides a splendid opportunity for public institutions in developing nations to offer more responsive public services by innovatively exploiting mobile applications and solutions. For instance, Kenya, which has historically been limited by poor communications infrastructure, that has in turn inhibited social improvement and economic growth, has realized noteworthy progress in mobile broadband penetration. This has resulted to rapid adoption of mobile phones leading to a rise in its use in various sectors other than for social life (Crandall, 2011).

Mobile phones are an important consideration for development because of the benefits offered such as mobility and security to owners (Donner, 2004). Due to their unique characteristics of working using the radio spectrum, mobile phones do not need to rely on physical infrastructure such as phone wires and roads and base-stations can be powered using their own generators in places where there is no electrical grid. Mobile phones only require basic literacy, and therefore are accessible to a large portion of the population (Masuki et al., 2010). Since mobile phones are progressively more affordable to the population of lower strata, they can therefore be used as a mechanism for ensuring greater participation of the groups in the process of development (Rashid & Elder , 2009). In addition, mobile phone coverage has been associated with developments in the job market. The CCK, 2008 recommended that the rise of formal employment in the private and telecommunication sector from by 130% between 2003 and 2007 may be associated with mobile phone penetration (CCK, 2008).

2. Problem Statement

Electronic governance is recognized as an effective tool to bring about 'simple, moral, accountable, responsive and transparent' (SMART) governance (Heeks, 2001; Budhiraja, 2003). However, electronic governance has not proven to be the ultimate solution to governance challenges in Africa since infrastructure required for the connection is largely fixed broadband which is expensive to the low strata population (Harris, 2004). Furthermore penetration rate of fixed broadband has remained low thereby presenting an opportunity for mobile broadband to fill the connectivity void (ITU, 2012). Following the promising takeoff of mobile broadband in developing nations, it is expected to transform governance and support growth in the economy more than fixed broadband has done For instance, according to ITU (2012), mobile broadband has been driving financial

inclusion through mobile banking and mobile money in Africa, and it supports new ways of delivering healthcare in many developing nations.

3. The Mobile Opportunity in Kenya

The fast rate of penetration of mobile phones in developing nations has presented these countries with a grand opportunity to leapfrog in adoption of mobile technologies in their governance structure. This is demonstrated by the fact that governments of developing nations are implementing mobile technology solutions to better deliver government services to the public. Mobile phone penetration rate is a term generally used to describe the number of active mobile beyond 100% due the fact that one person can have more than one SIM-card. This can be noted from countries like Qatar which has 170% and most of Europe with 128% (Langat et al., 2015). According to a study by Mulas (2012), it is estimated that broadband are growing faster in the developing world with a compound average growth rate of over 200% since 2009. However, fixed broadband penetration remains very low in Africa with an estimated penetration of only 0.2% by the end of 2011 (ITU, 2012). According to Lee et al. (2011), initially, mobile broadband complemented fixed broadband but technological progress in mobile broadband has gradually resulted to substitution of fixed broadband by mobile broadband.

Kenya is one of the countries experiencing the highest smart phone growth rate as well as Internet penetration rate in Sub- Saharan Africa. Data from a broadband sector report by ITU show that while the number of fixed telephone lines in Kenya has been decreasing, the number of Mobile cellular subscriptions have been increasing between the years 2002 and 2013 as shown in Table 1 and Figure 1 (ITU, 2015). The proportion of households with fixed broad band decreased between the year 2007 and 2012 but the number of households accessing internet via mobile phones increased

Table 1. number of fixed lines vs. number of mobile subscriptions in Kenya (Source: ITU, 2015)

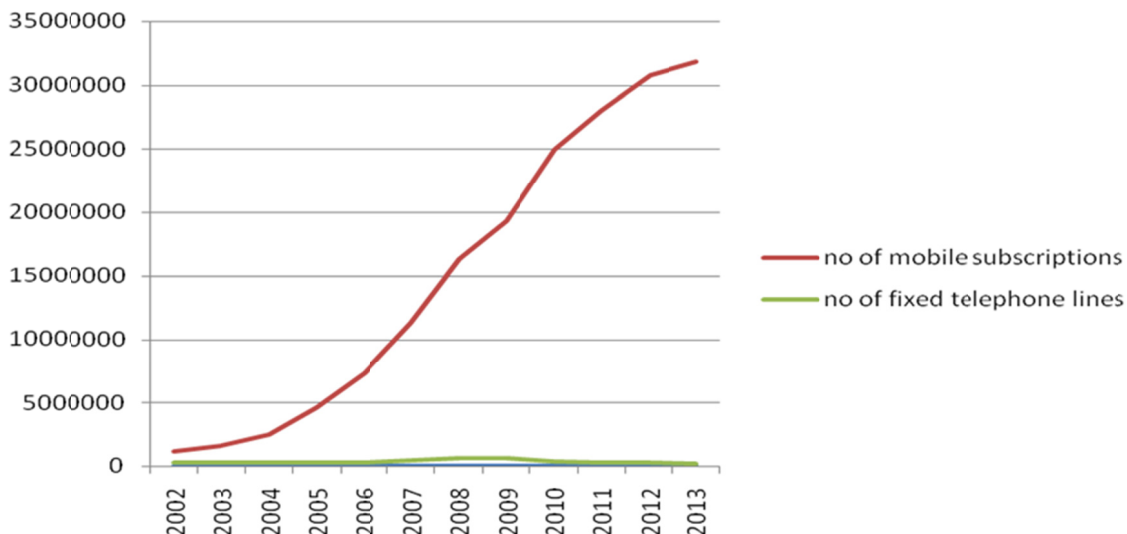| Year	no of mobile subscriptions	no of fixed telephone lines
2002	1,187,122	321,482
2003	1,590,785	328,358
2004	2,546,157	299,255
2005	4,611,970	286,729
2006	7,340,317	293,364
2007	11,349,412	463,766
2008	16,303,573	646,356
2009	19,364,559	664,099
2010	24,968,891	380,748
2011	28,080,771	283,546
2012	30,731,754	251,567
2013	31,830,003	204,354

Figure 1. Number of fixed lines vs. number of mobile subscriptions in Kenya (Source: ITU, 2015)

By the year 2015 there were more than 7 billion mobile cellular subscriptions worldwide, up from less than 1 billion in 2000. Globally 3.2 billion people were using the Internet of which 2 billion were from developing countries (ITU, 2015). According to CCK, at the end of June 2011, Kenya had 25.27 million mobile subscribers (CCK, 2011). Kenya's high mobile subscription number indicated that mobile technology was a promising business opportunity, and an indispensible tool for empowering the country's citizens. Mobile penetration in Kenya between May 2009 and March 2010 as recorded by the Communications Commission of Kenya is shown in Figure 2 (CCK, 2010).
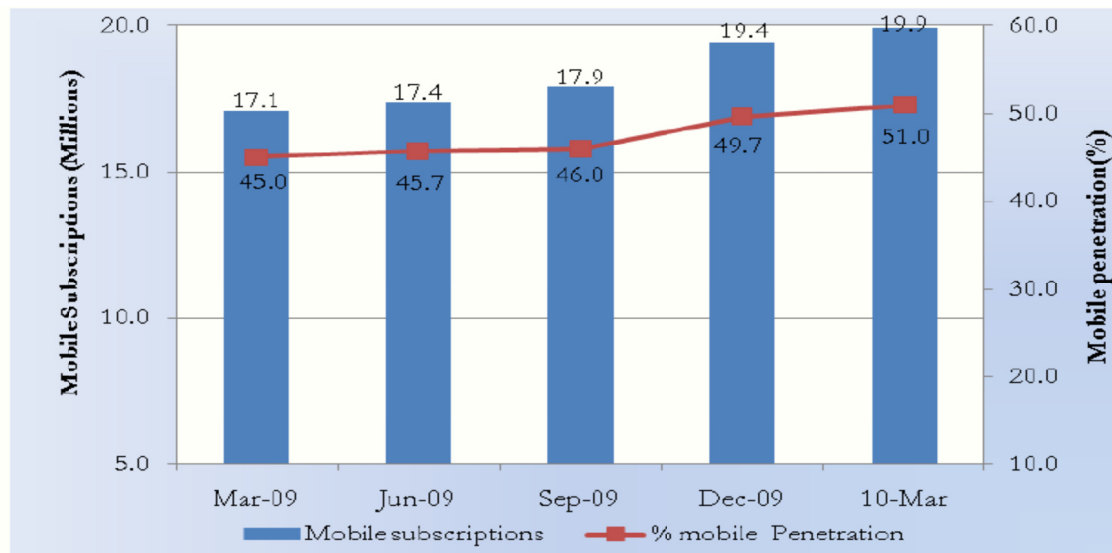

Figure 2. Mobile Penetration in Kenya between May 2009 and March 2010 (Source: CCK, 2010 [18])

The statistics presented above provides a splendid opportunity for the Civil Society and Government agencies to explore the utilization of the mobile / wireless applications to improve access to public services, including electronic government services, to those who can afford to use a personal or shared mobile phone.

4. Justification for Adoption of m-Governance to Complement e-Governance

e-Governance entails application of ICTs in delivery of government services. Advancement of computer networks from intranets to the Internet has played a major role in revolutionizing how governments operate worldwide by creating a wealth of new digital connections within and without government. These connections facilitate governance in the following three main domains of e-governance, illustrated in Figure 1

- Improving government processes: e-Administration
- Connecting citizens: e-Citizens and e-Services
- Building interactions with and within civil society: e-Society

As illustrated in Figure 3, below for e-Governance to succeed an efficient network is a necessity. This implies that broadband connectivity is an essential ingredient of e-Governance. However as observed by ITU (2012) , fixed broadband penetration remains very low in Africa with an estimated penetration of only 0.2% by the end of 2011. For developing nations, rural connectivity challenges has for a long time hindered the progression and adoption of e-Governance.
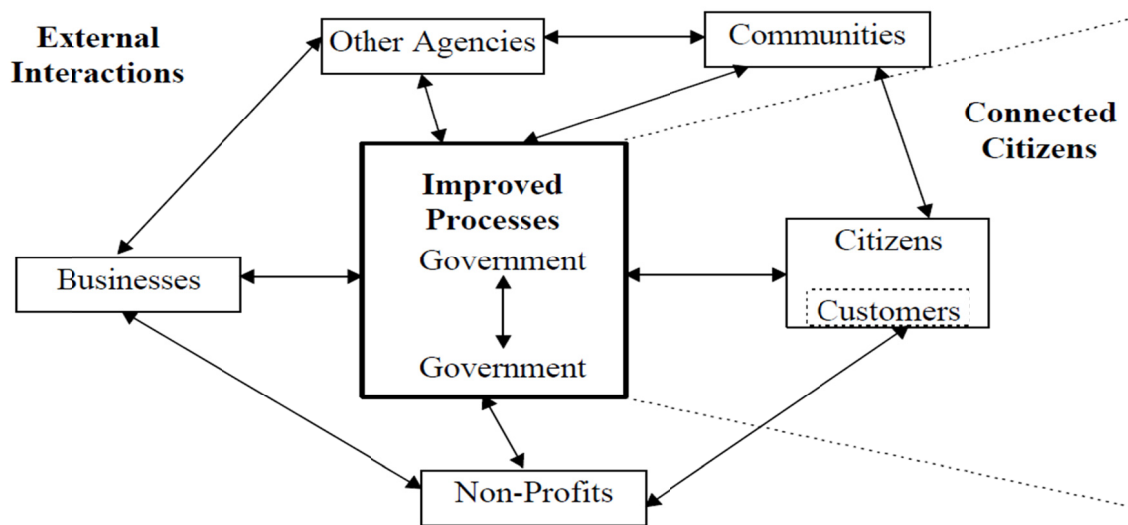
Figure 3. Focal domains of e-Governance initiatives

According to the ITU (2011), the total number of mobile users worldwide as of late 2006 was about 2.7 billion and the number of internet users was just above 1.1 billion. This means that there is at least 23.6% of world population (and at least 22.2% of developing countries population but in reality more) who already have mobile phones but are not yet using the Internet. This situation is illustrated in Figure 4. The situation as presented provide a strong case for leveraging the mobile channel to dramatically improve access to public services, including electronic government services, to those who can afford to use a personal or shared mobile phone (e.g., Village Phone). This creates an opportunity to connect in the near future the next two billion people to some of the benefits of e-government, e-health, e-education, e-banking, e-commerce etc.
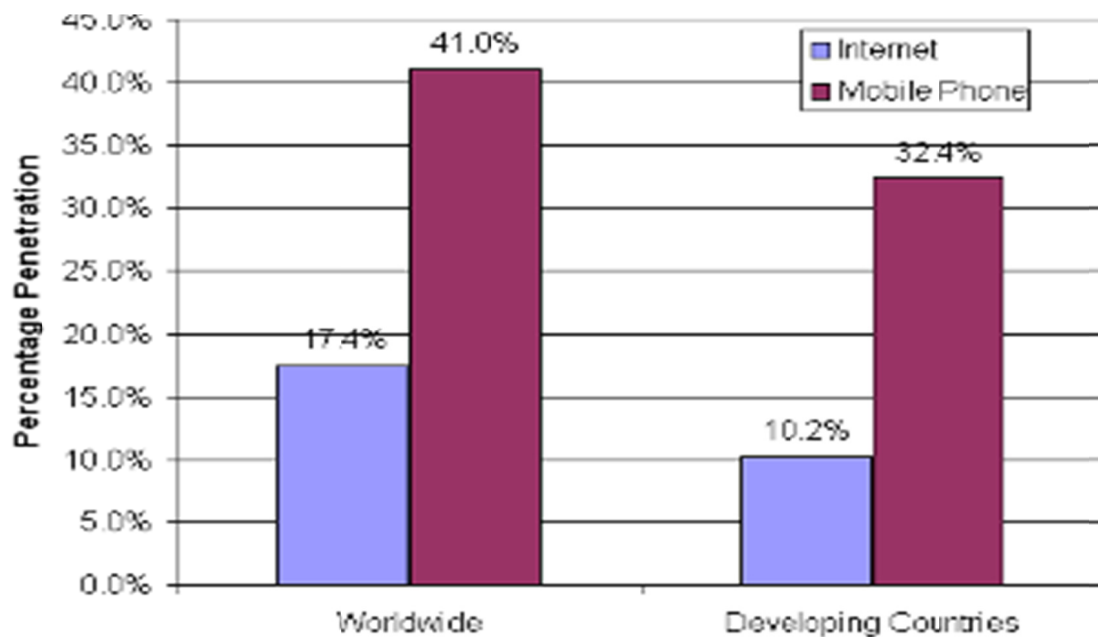

Figure 4. Internet connectivity vs. Mobile connectivity (ITU)

The implication of this scenario is that adoption of mobile phones in provision of government services can transform the lives of common people in developing countries significantly. The next section shows how the

Kenya government has leveraged mobile technology to extend the reach of e-Governance to its citizens.

5. Mobile Governance in Kenya

The Kenya government has made considerable effort to extend the reach of its e-governance services to its citizens by taking advantage of the high rate of penetration of mobile broadband. Several government services are available via mobile phones using short message service (SMS) and Unstructured Supplementary Service Data (USSD) codes. Some of these services are summarized in Table 2:

Table 2. M-services in government departments

Govt. body / parastatal	M-Services provided	USSD, SMS or paybill
Ministry of immigration	Check passport Status	Send tracking no. to 2030
	Check ID card Status	Send 1st 6 digits of waiting card to 2031
The Ministry of Education Science and Technology	Check kcse results via sms	Send index no to 22252
	Check school to Join	Send index no to 20042
Ministry of higher education (KUCCPS)	Degree or diploma course review	Paybill business no. 820201
	Informing successful applicants	sms sent to successful applicants
Kenya Power	e-bill via sms	Check bill by sending account to 95551
	pay bill via mpesa	Pay bill via business no. 888888
Teachers service commission	Inquiry services	Send querry to 5556
Credit reference beaural	Check credit status	SMS name to 21272 or 21CRB
Kenya Revenue Authority (KRA)	Domestic, custom, traffic revenue services	USSD: *572#, sms 22572
eCitizen	Access government services	Pay for government services via mpesa
National Hospital Insurance Fund (NHIF)	Check accounts contribution status	Accounts contribution status via sms
	Remitting NHIF contribution	Remitting NHIF contribution via M-pesa
Independent Elections and Boundaries Commission (IEBC)	Check registration details	sending their national ID card or passport number to 15872
	Transmitting Voting Station Results	Transmit results via sms

As can be observed in Table 2 above, the Kenyan government has adopted the use of mobile phones in provision of a variety of services ranging from enquiry services, online submission of tax returns, verification of credit status of persons etc. This reduces the amount of manpower wasted while travelling to government offices to seek for certain government services and may translate to more productive work. According to Bertot et al., (2010), mobile phone allow access to social site, thus, mobile and fixed line web-based social media in developing countries empower individuals and groups by supporting applications such as crowd sourcing, citizen reporting and education. Social media may also contribute to poverty eradication by facilitating sharing of information such as job opportunities and benefits advice; sharing of resources such as expertise, time and support and sharing of opportunities for capacity-building. Use of mobile technology can also reduce corruption and increase institutional transparency enabling the improvement in the effectiveness of state poverty reduction initiatives. The following sections discusses how mobile technology have impacted various sectors

5.1 Mobile Agriculture

A survey conducted by CountrySTAT indicated that majority of Kenyans (78.4 %) lived in rural areas (CountrySTAT Kenya, 2009). Mobile technology offer potential for rural communities to communicate and exchange information and has brought about revolutionization in the way of living among people, conducting of businesses and the social activities (Litondo et al., 2013). The authors further state that mobile phones have the potential to create wealth for the poor. This can only be made possible by the availability of the mobile phones

together with the capability to use and adapt them which facilitates the generation and access of power, wealth and knowledge.

Initially, a major problem in many rural areas was that small entrepreneurs and farmers had no way of knowing prices before they travel to the market because of poor communication facilities (Rashid & Elder 2009). They had to rely on middlemen who took advantage of their ignorance. This is because small-scale farmers had poor market infrastructure, inadequate agricultural inputs and marketing experience (Munyua, 2007).

The adoption of mobile phones in agriculture positively impacted lives of farmers. This is due to the provision of timely information. According to Rashid and Elder (2009), accurate and timely market information, and that of perishable items in particular, significantly reduces travel, communication and transaction costs making agricultural extension activities more effective, which leads to extra efficient markets that can benefit both consumers and producers. A mechanism through which mobile phones lead to improved market efficiency is a change in the middlemen marketing behavior. The middlemen operating in mobile phone markets search in a greater number of markets sell in more markets and have more market contacts as compared to their non-mobile phone counterparts (Aker, 2011). By reducing communication costs, mobile phones may assist farmers in identifying potential buyers or facilitating the purchase of inputs in rural areas (Aker & Mbiti, 2011).

A study on fish prices by Jensen (2007) provides a strong evidence of the micro-economic impact of mobile phones where he states that the adoption of mobiles brought noteworthy and immediate reductions in the prices variability and the waste amount in the fishing system. Studies by Souter et al., (2005) and Donner, (2004) show greater use of mobile phone for social purposes and emergencies such as calling customers or suppliers which increased the response time. Mobile phones facilitate greater export orientation in agricultural practice and marketing, which potentially brings higher income for farmers (de Silva, 2008) .

A study of animal health workers and farmers in two districts in Kenya in 2007 acknowledged the mobile phone use for the identification and management of diseases in livestock and for coordinating better attendance and participation in organization meetings [29]. From the study, farmers indicated that mobile phones enabled the reduction of their transportation costs by helping them to gain remote access to group support and agricultural information. Also, the adoption of mobile phones by dairy farmers in rural areas highlighted mobile phones' ability to provide advantageous information and encourage greater efficiency. According to Brandie and Abbott (2011), mobile phones are used in agriculture for coordinating access to agricultural inputs, accessing market information, seeking agriculture emergency assistance, monitoring financial transactions and consulting with expert advice.

Muto and Yamano (2009), estimated the impact of mobile phones on agricultural markets in Uganda, focusing on farmers' market participation. Using a panel dataset on farm households between 2003 and 2005, they found out that mobile phone coverage was associated with a 10% increase in farmers' probability of market participation.

Mobile phones may also help with agricultural extension outreach (Crandall, 2011). Short Message Service (SMS) is a widely used application of mobile technology in agriculture (Gichamb etal., 2012) . The farmers can interact with experts and systems via SMS examples being to receive weather updates and information on best practices on various sectors of agriculture.

Also, the Sygenta Foundation established Kilimo Salama, a program that is aimed to support small scale farmers to deal with weather risks by developing and piloting agricultural micro insurance products (Webb, 2010). Murray (2010) presented a report on the impact of mobile technology on farmers through the Kenya Farmers Helpline. It is from the call center that agricultural experts talk to farmers from across the country where they address various issues regarding agriculture.

5.2 Health

Mobile devices facilitate the delivery of important health services in developing countries (Rashid & Elder, 2009). In fact, the mobile phones looked at as a more helpful technology for e-health because of their pervasiveness and relative affordability. Idowu et al. (2003) states that doctors use mobiles to communicate among themselves across different parts of a large hospital, and to take action to emergencies when offsite. Also, Lester et al. (2006) presents the mobile phones are used in facilitating flow of information for HIV AIDS intervention programs. Diverse efforts have been in place to exploit mobile technologies in health communication, including the collection of health data and provision of health information (Muheebwa, 2009). This has especially been applied in malaria and Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS).

5.3 Disaster Management/Environmental Protection

Many developing countries experience natural disasters such as floods. Mobile technologies play an important role in disaster intervention as they can save critical time. LIRNEasia (2008), states that ICT tools can be used as a warning technology. Also, communication is vital in the ability of the strategy of the community in coping with disasters. Inadequate support during and after disaster events can significantly affect survival and livelihoods.

According to Aker and Mbiti (2010), Sub-Saharan Africa is an inherently risky environment since natural disasters, epidemics and conflicts routinely affect households. Kenya being in Sub-Saharan Africa, kinship ties play both important economic and social functions by creating informal insurance networks and increasing access to credit and savings while reducing the risk. Mobile phones allow households to obtain information about potential shocks, enabling them to use the information to make decisions concerning planting and harvesting, which can have important effects on yields (Aker & Mbiti 2010).

Mobile phones have been used in disaster management and rescue missions through the implementation of Ushahidi, a crowdsourcing system developed in Kenya (Gichamba et al., 2012). The platform is used in activities which include rescue missions and monitoring election violence worldwide. The information is then translated into a graphical map that may be viewed from anywhere over the Internet.

6. Conclusion

This paper set out to find out how mobile technology contributes to governance in Kenya. Findings indicate that the mobile phones are not only being adopted for social reasons, but is viewed as a tool to improve governance in various areas which include agriculture, health and many more. Generally, a mobile phone is viewed as a tool that allow for more efficient response to economic opportunities. This can only be achieved if basic knowledge on how to use the mobile device exist among the individuals in Kenya.

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