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# Use of Mobile Phones in Boosting Socioeconomic Information Access and Utilisation among Tanzania Rural Communities

**Kelefa Mwantimwa**
*Lecturer, Information Studies Unit*
*University of Dar es Salaam*
*P.O. Box 35092, Dar es Salaam, Tanzania*
*mwantimwa3@gmail.com*
*mwantimwa@udsm.ac.tz*

## Abstract

*This paper presents the findings of a study that examined the use of mobile phones in strengthening socioeconomic information in rural Tanzania. The study was carried out in Bagamoyo and Monduli districts. Employing mainly a qualitative research design, the study gathered information from 69 agro-pastoralists drawn from the two districts using a semi-structured interviews and focus group discussions. The data collected was subjected to content and thematic analyses. The key findings suggest that the applications of mobile phones towards strengthening socioeconomic information in the selected districts of rural Tanzania supported the provision of varied socioeconomic information services. In particular, the mobile phone technology was found to support market price, transactions, health, security, banking, transportation and risk mitigation. On the other hand, the application of mobile phone in the provision of information services was found to be beset with challenges that deter the effective utilisation of the technology in rural Tanzania. Thus, the study recommends that rural development strategies should have a built-in element of fostering the application of mobile phone technology for the information accessibility and usability so that the necessary infrastructure and support system can be put in place.*

**Keywords:** Mobile phone, Community information services, Rural Tanzania, Socioeconomic information

## Introduction

Rural-based communities constitute a significant percentage of the population whose members are predominantly agro-pastoralists. These communities largely depend on crop farming and livestock-keeping for their livelihoods (Uzuegbu, 2016). In general, rural communities depend directly or indirectly on natural resources such as land, forest and water resources for their livelihoods (Uzuegbu, 2014). In developing countries, these rural communities experience poverty associated with poor and low agricultural production, poor market access and social services (Kazi *et al*., 2017). The situation is compounded by the fact that the development needs of these communities tend not to be adequately taken care of, as they fail to participate productively in the development process and enjoy the attendant benefits (Chester and Neelaghan, 2006; Kamba, 2007). In consequence, these communities suffer from an acute shortage of social amenities and other important services that can make their life bearable (Harande, 2009). In fact, the success of rural development programmes depends on effective access and use of information in the daily activities of these communities (Harande, 2009). Scholars such as Uzuegbu (2016), Mittal and Mehar (2016), De Silva, Goonetillake, Wikramanayake and Ginige (2017) contend that accessibility and usability of information enhances the decision-making pertaining to markets, services and products, hence fostering the development of rural

communities. Crucial as such information provision might be, the vast majority of the rural populations are subjected to the vagaries of their highly inefficient information asymmetric (Abraham, 2007).

The overriding question concerns why rural communities in Tanzania remain socioeconomically-disadvantaged despite concerted efforts to improve their lot dating back decades since the country gained its independence in 1961. In fact, the country has had prioritised rural development as its mainstay remained agriculture and, hence, has been over-dependent on the agrarian economy. Generally, for information related to socioeconomic and natural aspects, governments in developing countries tend to employ rural extension services, the mass media and print-based services. These systems tend to rely on a top-down approach, which prevents them from achieving a full effect on the rural communities (Mtega, 2012; Ifukor, 2013; Bachhav, 2012; Sturges and Chimseu, 1996). Similarly, Owen (2009) found that poor programme selection and design coupled with poor implementation tend to undermine the effectiveness of accessing socioeconomic information and poverty-reduction strategies. With developments in mobile phone technology that has permeated even areas once-considered as remote and inaccessible areas has offered new opportunities for information dissemination to the rural dwellers. Yet, empirical studies (see, for example, Sife, Kiondo and Lwimo, 2010; Krone, Dannenberg and Ndulu, 2015) indicate that there is relatively little systematic research on the links between mobile phone technology and provision of information in support of socioeconomic activities to improve the welfare of Tanzania's rural communities. As there are hardly any studies that have examined the support that the mobile phone technology renders to meeting the information needs of Tanzania's rural-based socioeconomic services, the present study explored the use of mobile phone technology in strengthening socioeconomic services through information provision to aid poverty reductions programmes in rural Tanzania. Specifically, the study examined the importance of mobile phone in socioeconomic information service provision and determined the challenges limiting the effectiveness of the mobile phone in strengthening socioeconomic information in the rural settings.

## Related Literature

This section reviews literature related to the use of the mobile phone in supporting information access

### Use of Mobile Phone in Socioeconomic Services

Mobile phone can help address the challenges of information access and application in socioeconomic services to alleviate poverty. There is evidence that aspects of poverty cannot be addressed without mobile phone technologies in the current age (Greenberg, 2005). For example, mobile phone technologies have served as effective tools in providing security information (Rao, 2007). Also, the delivery of after-sales services and support can directly lower the costs (Gurstein, 2000). With appropriate communications, the seller can learn about market prices and demand a higher wholesale price. Fishermen, for example, can use mobile phones to determine the port at which to sell their catch. Moreover, a mobile phone can provide access to markets in nearby villages and towns, thereby increasing income for smallholder farmers and producers (Srinivasan and Burrell, 2015; Greenberg, 2005). Furthermore, both farming and non-farming communities can access information on products they want to purchase (Mwantimwa, 2017; Sife, Kiondo and Lyimo, 2010) such as seeds, fertilisers, machinery and pesticides in addition to having access to crucial weather forecasts under climate change challenges (Das, Basu and Goswami, 2012; Etwire *et al*., 2017; Kazi *et al*., 2017).

The mobile phone also enhances the convenience and confidence for travelling it provides relevant information in real-time (TMC, 2010). As mobile remittances also have the potential of reaching the 'unbanked', they are considered to constitute a tool for supporting socioeconomic activities, hence alleviate poverty in many a developing country (see Siegel and Fransen, 2010; World Bank, 2008; Porteous, 2006; Scott, Batchelor, Ridley and Jorgensen, 2004; McNamara, 2009; Munyua, 2000). The mushrooming kiosks, for example, do not only sell prepaid phone vouchers and cards, but also—as agents—receive and send money for customers (Litondo, 2010; Meso *et al* 2005). Weather forecasts, in particular, are invaluable for rural or isolated

settings as they facilitate the monitoring of and response to disease outbreaks (Greenberg, 2005). Indeed, the possessions of the mobile phone technology with which to contact a hospital and describe the symptoms of a critical patient can enhance the survival chances as the doctors can prescribe and describe what to do in the interim period (Accascina, 2000). In this regard, the two-way communication coupled with instant feedback and affordable costs makes the mobile phone a useful tool in crisis management. Additionally, mobile-commerce provides value-added services even in the face of infrastructural limitations (Hamilton, 2001). Furthermore, mobile ICT also serves as a business venue for exponential growth in pre-paid billing in cash-based economies such as the one operating in Tanzania as customers do not always have reliable addresses or bank accounts. The farmers could thus promote their products and handle simple transactions such as orders over the mobile phone but let the payments be handled off-line (O'Farrell, Norrish, and Scott, 1999). In other words, the effective use of the mobile phones can stimulate productivity and enhance commerce to improve local economies (Djohy, Edja, and Schareika, 2017; Peterson, 2009).

Generally, the use of the mobile phone technology reduces transactional costs, time, and space barriers. It can also inform on small-scale enterprises, money transfer, applications for credit, product diversification, market conditions, product specifications, price and input availability, transportation alternatives and schedules, and alternative production techniques (Gupta, Yun, Xu, and Woong, 2016; Das, Basu and Goswami, 2012; Litondo, 2010; Hellstrom, 2010; Siegel and Fransen, 2010; Sife *et al*., 2010; McNamara, 2009; Bhavnani, Won-Wai Chiu, Janakiran, and Silarszky, 2008; Jensen, 2007; Sinha, 2005; Munyua, 2000). With the mobile phone, rural communities can acquire the capacity to improve their living conditions and become motivated through training and dialogue with others to a level where they can make decisions towards their own development (Karimuribo, Batamuzi, Masawe, Silayo, Mgongo and Mgongo, 2016; Balit, 1998). In fact, the telephone is by far the most common communication technology to effect tangible positive change among rural livelihoods such as the market and trade information, emergency and disaster communication and strengthening of kinship relations and health services (De Silva, Goonetillake, Wikramanayake, and Ginige, 2017; Dannenberg and Lakes, 2013; Sife *et al*., 2010). The rapid development of the mobile telephony has a significant role to play in the developing countries where these technologies have become available. Their extensive use is a manifestation of the success that can accrue from providing a climate that encourages innovation and growth in socioeconomic aspects. These information technologies are, indeed, basic tools that also constitute an enabling sector in the poverty alleviation process, which opens up hitherto unknown possibilities for the poor at affordable rates. The flexible nature of these technologies can also allow the poor to address their problems related to health, education and livelihoods. Furthermore, they can empower people in the development process (Kazi *et al*., 2017; Karimuribo, Batamuzi, Masawe, Silayo, Mgongo, and Mgongo, 2016; Greenberg, 2005).

## Challenges of Deploying Mobile Phone

Apart from its potentials, the use of mobile phone technology to support socioeconomic information service provision is exposed to the factors that undermine its effectiveness. Dannenberg and Lakes (2013) observe that the flow of information through mobile phones was characterised by limited volume of data exchange. This shows that the data and information exchanged via the mobile phone do not fulfil the information needs of rural communities. A study by Krone, Dannenberg and Nduru (2015) established that knowledge and skills and low level of education are barriers to effective use of mobile phones in supporting and enhancing the access to socioeconomic information services in the rural areas. Moreover, the use of mobile phones limits the access to complex knowledge and sophisticated markets, the authors contend. In the same vein, Wyche and Steinfield (2016) found that low literate rates and poor skills were barriers utilisation of text messaging among the rural communities of Kenya. Furthermore, many of the rural dwellers who participated in the study faced difficulties in reading the content of the message received from the source. Kazi *et al.* (2017) opine that several challenges that stand in the way

of people living in remote settings. For many of the rural inhabitants, mobile phone networks and charging costs remained beyond their reach in remote regions of Northern Kenya. In fact, Uzuegbu (2016) argues that rural communities in developing countries live mainly on their 'ignorance rather than on knowledge-based information due to lack of awareness on different potential sources of information. On the whole, the main barriers to effective use of mobile phones include inadequate knowledge, skills, low literate rates and low awareness of the viable information sources about the rural sector (Mwantimwa, 2012). These barriers tend to undermine the effective and efficiency use of mobile technology to support access to and utilisation of information services among rural communities in developing countries.

## Research Methodology

The study mainly deployed a qualitative research design to collect and analyse data on the use of mobile phones to strengthen information provision to support rural-based socioeconomic services, hence contribute to poverty reduction in rural Tanzania. Partly, the quantitative design was only used to collect and analyse data pertaining to demographic characteristics of the respondents and the extent to which mobile phones are utilised to strengthen socioeconomic services. The study looked at the use of qualitative design has the advantage of generating better insights into the intricate details of research phenomena that are difficult to convey with the sole use of the quantitative design (see Hecken, 2011; Eliab, 2016).

The study was carried out in Tanzania, particularly in Monduli and Bagamoyo districts of Arusha and Coast regions respectively. The selection of the areas was based on findings from other studies (e.g. Mutega, 2012; Mwantimwa, 2012; Lwoga, Stilwell and Ngulube, 2011; Matovelo, 2007) which revealed that Tanzania's rural communities that depend mainly on agriculture are information poor. This implies that rural communities in different districts experience inadequate access to information resources which results in their low usage. Further to that, Mwantimwa (2012) found that rural communities in Bagamoyo and Monduli districts are not immune to problems associated with inadequate access to and low usage of information resources. Basing on this information, the two districts were purposively selected as research settings to gauge the usage of mobile phones to promoting the accessibility and usability of socioeconomic information among rural communities.

Out of 320 respondents randomly selected from eight villages of Monduli and Bagamoyo districts, 214 rural dwellers that own and use mobile phones were eligible for participation in the study. Of these, 120 were from Bagamoyo and 94 from Monduli district. It is from this pool that 69 respondents were drawn for the study using multiple sampling methods. The sampled agro-pastoralists owned a mobile phone and used it in business transactions and other socioeconomic activities. These mobile phone users were divided into two groups representing Bagamoyo and Monduli, respectively. From the two groups, 21 key village informants were selected for interviews whereas the remaining 48 participated in focus group discussions. On the whole, each village was represented by key informants. The selection of the key informants was based on their experience of using mobile phones in different socioeconomic activities. The snowball sampling technique was used to select the key informants from different households. The key informants were those who represent cross-sections of the cultural and gender groups (e.g. male and female) and socioeconomic activities (crop farming and livestock keeping). Using snowball sampling, the researcher made initial contact with people who met the research criteria (for example owned phones and used them in their socioeconomic activities). These respondents facilitated access to many other potential respondents fitting the selection criteria (see also Bryman, 2001). Purposive sampling, on the other hand, was deployed to select a Village Executive Officer (VEOs) from each village participating in the study.

In-depth interviews and focus group discussions were the instruments used for carrying out this study. Out of 69, twenty-one respondents from the sampled villages were involved in face-to-face interviews from the two districts. These key informants were involved in interviews on the application, attitudes and perceptions of the usefulness of mobile phones in socioeconomic activities. An in-depth and semi-structured interview protocol with open-ended questions was used to collect data from key village

informants. Bailey (1997) affirms that interviews tend to have a better response rate than the questionnaire. In fact, even illiterate persons participated in the interview as opposed to a self-administered questionnaire that requires a person to know how to read and write. Moreover, interviews are also flexible and provide control over the situation.

To obtain more contextual data about each village, focus group discussion (FGD) sessions were held to generate more information. The household representatives were invited to participate in the FGDs. On the whole, 48 participants were involved in these FGDs. The FGDs involved a group of 6-8 participants. Efforts were made to ensure that there was diversity among FGD participants by taking into account the sub-village, age and gender of the participants. The discussion focused on the application, opinions, attitudes and perceptions on potentials of mobile phones in socioeconomic activities as part of efforts to alleviate poverty. A voting procedure was used to ensure different opinions were captured, with scores noted down on the opinions expressed.

During the analysis process, the data were organised categorically and chronologically. The data were reviewed repeatedly and continually coded. The recorded interviews were then transcribed. Field-notes and diary entries were also regularly reviewed. The respondents' verbal answers to open-ended questions were recorded in writing by the researchers. Generally, thematic, narrative, and content analyses were applied to the responses from open-ended questions. The responses from the open-ended questions were grouped according to their themes. They were summarised or presented as they were. Content and thematic analyses, which were applied in the study, are two commonly used approaches to qualitative data analysis, according to Vaismoradi, Turunen and Bondas (2013). Braun and Clarke (2006) contend that thematic analysis helps to identify, analyse, describe and report the themes emerging within the data collected from the field. In addition, demographic characteristics and the extent of mobile usage data were analysed using excel as quantitative data based on frequencies and percentages.

## Results and Discussions

Table 1 shows the demographic characteristics of the respondents. In general, 40 (58%) of the key informants, who participated in the study, were from Bagamoyo whereas 29 (42%) were from Monduli district. In terms of gender, 41(59%) were male and 28 (41%) were female. Regarding age, the results indicate that 27 (39.1%) of the respondents were of ages between 41 and 50, 21(30.4%) belong to 31-40 age range, 9 (13.2%) were between 21 and 30 years, 7 (10.1%) were aged between 51 and 60, while 5 (7.2%) were above 60 years old. Apart from that, the participants were asked to indicate their main occupations and sources of income. Regarding occupation, the results show that 35 (50.7%) of the participants were involved in crop farming, 23 (33.3%) practised livestock keeping, 7 (10.1) owned small business, and 4 (5.8%) were public employees. In terms of income, the results disclose that 36 (52.2%) of the participants had incomes that ranged between Tshs 46,000 and 100,000, 22 (31.9%) of them had incomes that ranged between 0 and 45,000, and 11 (15.9%) of them had incomes of above Tshs.101,000/=.

**Table 1: Demographic characteristics**

| Characteristics (N = 69) | | Frequency | Per cent |
|---|---|---|---|
| District | Bagamoyo | 40 | 58 |
| | Monduli | 29 | 42 |
| Gender | Female | 28 | 41 |
| | Male | 41 | 59 |
| Age | 21-30 | 9 | 13.2 |
| | 31-40 | 21 | 30.4 |
| | 41-50 | 27 | 39.1 |
| | 51-60 | 7 | 10.1 |
| | 60+ | 5 | 7.2 |
| Education level | Never to school | 18 | 26.1 |
| | Primary school | 44 | 63.8 |
| | Secondary | 5 | 8.7 |
| | University/college | 1 | 1.4 |
| Occupation | Crop farming | 35 | 50.7 |
| | Livestock keeping | 23 | 33.3 |
| | Public salaried jobs | 4 | 5.8 |
| | Entrepreneurial business | 7 | 10.1 |

At the district level, the majority (58%) of the participants were drawn from Bagamoyo whereas the minority (42%) came from Monduli. There is a difference in sample size between male and female respondents in the villages under study. Overall, the majority of the key informants of the agro-pastoralists surveyed were males. Besides that, the findings suggest that for most of the participants, their ages ranged between 31 and 50 years old. This is associated with the fact that most of the villagers were young adults and adults, the kind of people known to deploy mobile phones actively for different purposes relating to business, family, and other matters. In addition to age, the findings also reveal that majority of this study's participants generally had a low level of education as confirmed by the majority of the participants who had only completed primary school education. This can be attributed to the fact that some of the surveyed communities, especially those with nomadic lifestyle, usually do not prioritise higher education, let alone value it the same way educated communities do.

Apart from that, the findings suggest that most of the participants, who participated in the study, were mainly involved in crop farming and livestock-keeping. The results also show that the majority of the households in Monduli depended on both crop farming and livestock-keeping as their main sources of income; whereas for those in Bagamoyo, only a few households were involved in both occupations. Also, the majority of the households in Bagamoyo depend on crop farming activities as their source of income and livelihood. For other respondents—a rather small group—in the two districts, their livelihoods were in form of public sector salaried jobs and entrepreneurship. Thus, the major mainstay of the rural communities in Monduli and Bagamoyo were agricultural activities. Despite agro-pastoralist activities being the mainstay of these communities, non-agriculture and off-farm activities were increasingly being adopted by a significant number of the people in the area. In fact, these were found to constitute coping mechanisms in response to weather vagaries and climate variation. Furthermore, the overall findings signify that the level of income of the rural communities is too low to support effectively a decent living standard. However, it has to be recognised that determining the income of rural

households is not easy (Mwantimwa, 2012). As a result, the range of income does not necessarily represent the exact incomes of the participants as they are largely approximations. Based on the findings it can be seen that an insignificant portion of the participants indicated that their monthly incomes were above Tshs. 100,000 which is equivalent to 44 US Dollar per month. This fact can be attributed to the rural households' reliance on crop and livestock farming (the main employment source for rural areas) as their main source of income and their low education which limits participation in other economic activities.

## Use of Mobile Phone to Strengthening Socioeconomic Information Services

The respondents were asked to indicate the extent to which mobile phones contribute to strengthening the accessibility and usability of socioeconomic information in their villages. The percentage was calculated to show the extent as indicated in Table 2.

**Table 2: Mobile phone usage in socioeconomic information services**

| Extent | Per cent |
|---|---|
| Definitely, the usage of mobile phones boosts the accessibility and usability of socioeconomic information | 28.6 |
| To a large extent, the usage of mobile phones boosts the accessibility and usability of socioeconomic information | 52.4 |
| To somewhat extent, the usage of mobile phones boosts the accessibility and usability of socioeconomic information | 19 |

A noticeable per cent (52.4) of the respondents shows that, to a large extent, it can contribute to improvements. This is followed by those who said 'definitely' and 'somewhat'. The overall results show that mobile information services can be used in and contribute to the improvement of socioeconomic activities in the sample villages of the two districts. They further explain that the effective utilisation of mobile phones to access and disseminate information supports socioeconomic services and poverty reduction programmes. These findings are in line with the findings by De Silva *et al*. (2017) that mobile phone application support livelihood activities of the people in developing countries. Evidently, Abraham (2007) supports the view that a significant percentage (80%) of his respondents perceived mobile phones to be useful to enhance the accessibility of information. The following sections discuss different information and socioeconomic activities and services that benefited from the use of mobile phones providing support in their villages through information access and utilisation.

The application of mobile phone was found to enhance information on security among rural communities. Some of the respondents sampled reported that the mobile phones were now commonly used to report on livestock theft in their villages. For example, an individual could send a text message or call the neighbours to inform them about cattle-rustling. Also, in other circumstances, the mobile phone is indirectly used to protect wildlife in Monduli District. As respondent no.16 explained:

> *One day, three poachers killed two giraffes near Lwenja Village of Monduli. There was someone from Lwenja Village who informed our village executive officer about that event. After being tipped off, the village executive officer used his mobile phone to inform the staff of TANAPA [Tanzania National Park]. The TANAPA staff responded immediately and were able to arrest the poachers and impound their car. In this case, mobile phones helped to save the national trophy.*

This narration demonstrates how mobile technology was being deployed in providing security information to enhance security. In Bagamoyo, especially in villages located between Bagomoyo town and Msata (e.g. Kiwangwa and Msinune), it is common for the bandits to block the road and way-lay the travellers. The villagers would alert the authorities whenever this happened. Moreover, participatory security guards (community policing), known as *Sungusungu,* use the phones to communicate diverse security-related information. Respondent no.4 puts it this way:

> *I used to keep all mobile phone numbers of the village leaders, village executive officers, and our* Sungusungu *leaders. When I suspect something, I just text them. This is the way we used to inform each other in our villages. In many occasions, mobile phone serves our life.*

On the whole, the findings show that there were many cases in which mobile phone were being used to report thefts, banditry and other insecurity problems to the police, drivers, travellers and other members of the community.

The application of mobile phones in information service provision improves access to and use of relevant information such as market price from diverse databases hosted by various civil society organisations, mobile service providers, private companies and small-scale farm information networks (for example, *Mtandao wa Vikundi vya Wakulima Tanzania* (MVIWATA), as Swahili for National Networks of Farmers' Groups in Tanzania). The information on the producer and the market prices helps to improve sales and markets, especially among rural communities, that are for the large part hitherto exploited due their lack of information. The ready availability of information on market prices helps farmers and non-farmers alike in Monduli and Bagamoyo to understand, analyse market prices, decide and facilitate the sale of produce such as milk, livestock, animal skins (for the livestock keepers) and maize, beans, pineapples, cashew-nuts, and cassava (for crop growers). A farmer in the sampled villages may advertise his/her products on the MVIWATA networks and BR Solutions (Basic and Rapid Information Solutions) company's database by sending an SMS with information on the types of products, quantity, location and contact details of the sellers as respondents no.13 explains:

> *Products such as milk, livestock and crops were being sold to middleman. The elimination of the middlemen [disintermediation] due to enhanced information flow via phones lowers the transaction costs [including marketing, sales, transaction processing], reduce overheads, inventory and labour costs.*

The rural communities have access to market price information from family, friends and network members present in local markets. As a result, the primary producers could raise more income from these direct sales. In fact, BR Solutions database provided fast and reliable demand-driven information through mobile phones which assisted users in making informed decisions. Similarly, Das et al. (2012), Mittal and Mehar (2016) and Karimuribo *et al*. (2016) have observed that mobile phones help rural communities to pull the market price information from the sources. It is evident that the mobile phone provides opportunities for accessing different markets for their livestock and crops.

Mobile phone application to access transport information depends on an individual's transport information needs. The study findings suggest that the use of mobile phones by agro-pastoralists in the villages surveyed facilitates access transport information. In fact, most of key informants agreed that the mobile phone was a key ICT tool that facilitates the use of transport information. On this aspect, one of the key informants (no. 9) says:

> *A mobile phone simplifies and helps in many things. For example, it reduces the cost of travelling. Today, one thousand shillings [Tanzania shillings 1,000] gives me an ability to communicate with many people in different parts of the country.*

In fact, the majority of the agro-pastoralists are increasingly using the motorcycle as their main means of transport. Motorcycles are cheaper than buying a car, hence affordable for many households in Tanzania, including the rural areas. Moreover, its

far lower fuel consumption and versatility on rough and impassable roads – that dominate the rural landscape – have naturally made this mode of transportation popular in rural areas. Mobile phones are now being used for communication between motorcyclists and their clients. The researcher also relied on this mode of transportation during fieldwork in some of the hard-to-reach villages. He had to use his mobile phone to contact the motorcyclist in many of the villages he surveyed. One of the respondents said: "In our village, we use our mobile phones to access information on transport". Also, the mobile phone is used to access information on the bus schedule and other transport agents for vehicles plying between the villages and other areas. They communicated with the bus-drivers, conductors and other travel agents via the phone. As a result, they reduced the cost of time and physical exertions of travelling over some distance just to make an enquiry. The time saved through such communication cannot be measured in monetary terms but many of the rural dwellers could deploy the time to perform other socioeconomic activities in their villages, in addition to reducing the cost and hassle of travelling frequently. This opinion was mostly prevailed with small business entrepreneurs who have been helped by mobile phones to cut down on their frequent travelling since they can now remotely perform tasks such as buying products and making payments without having to travel.

In Tanzania's rural areas today, mobile phones are being used to send and receive remittances. The sampled rural communities may remit or receive money and airtime from their daughters, sons and other relatives from the cities and towns. Also, they may receive payment for their business transactions conducted with retailers in towns and cities by remote-control. The findings show that most of the agro-pastoralists surveyed have used mobile money services at one time. In fact, rural communities with bank services or without them have access to mobile phone banking systems of the mobile service providers. These convenient and affordable services include M-Pesa (Vodacom), Tigo Pesa (Tigo), Airtel Money (Airtel) and Ezy Pesa (Zantel). Ezy Pesa, with an additional innovative approach, allows customers to pay for micro-insurance policy. This policy targets the informal sector, which accounts for the bulk of employment opportunities in Tanzania. The commercial motorcyclist (*Bodaboda*) and the casual workers could access such medical insurance at a cost a low as Tshs 150 per day. One of the respondents (no. 18) says:

> *Nowadays, when I need financial support from my son, who lives in Dar es Salaam, I just ask him to send me some money via the phone. I always receive the money the same day. In the past, I used to write a letter and await his response.*

In other words, mobile phones are simplifying the life of parents with children in big cities and towns. Even for rural communities in Bagamoyo and Monduli with relatively low access to transportation and financial services, sending mobile remittance remains an option because of its affordability, accessibility, fastness and universal attractiveness. In fact, mobile remittances have the potential to reach the 'unbanked' and are, therefore, considered a tool for poverty alleviation in developing countries (see also Porteous, 2006; Siegel and Fransen, 2010; Gupta, 2016). Basing on the findings of the present study, small business entrepreneurs and other rural dwellers, aware of and in possession of knowledge on the usage of mobile phones, have an advantage of using them as banking tools. Participants of this study were found to mainly use these devices to support mobile money transactions and mobile banking.

The increase in the use of mobile phones in rural Tanzania provides direct and indirect employment for some youths. In the villages surveyed, there are kiosks with big advertisements provided by the service providers to indicate that airtime vouchers were available for sale. In this regard, respondent no. 2 explains:

> *Today, youths and young adults in our villages are employed in small vending kiosks. As you can see, the kiosks are everywhere in our village centre, clubs and near the dispensaries and schools. In those kiosks, you find different services on offer such as charging mobile phones, vouchers, sending and receiving money.*

This testimony implies that the application of mobile phone technology among the selected rural communities provides multiple opportunities, for example, employment and transactions (e.g. information, money and business), which all involve information exchange and commercial transactions. It appeared that many youths in the surveyed areas sell such vouchers to earn income. In addition, access to mobile phones encourages entrepreneurship culture. The mushrooming kiosks do not only sell prepaid phone vouchers and cards, but also receive and send money for customers. It was also observed that, some of the kiosks sell mobile phones, SIM card, covers, chargers, earphone, USB and other mobile phone products, hence spreading the use of these gadgets in the rural areas and broadening the catchment area of people with mobile phones and associated products who can access information via mobile technology. Apart from that, mobile phones support multiple information services by providing job seekers with information on vacancies. Indeed, the application of mobile phone offers both direct and indirect employments in addition to providing an easy-to-access information avenue.

Mobile phone technology is also becoming an indirect tool for climatic risk mitigation. Users can access information on local weather conditions. During the dry season (drought), for example, the Maasai in Monduli district used their mobile phones to access information on the availability of pastures and water for their livestock from fellow Maasai in other districts. As one of the respondents (no.17) explains:

> *In 2010, there was a great drought. A large number of our livestock died. The drought caused a serious famine in most of the villages in Monduli. That event left many Maasai communities without livestock because large herds of livestock perished. We used our mobile phones to access market price information of maize and other types of food available in other villages and in towns. Also, our brethren, who are in other regions, were able transfer money through mobile money services. Mobile phones also helped us to gain information on where there were good pastures in neighbouring districts, where we could take our livestock for grazing.*

It is evident from these findings of the multifaceted nature of the benefits that accrue from the use of mobile phones. Weather forecasts, in particular, are invaluable for rural or isolated settings (see also Das *et al.*, 2012). One of the villages (Mindutulieni) surveyed, for example, experienced floods as rivers in the vicinity swelled their banks. There is no bridge to connect the village to nearby villages. The villagers used the mobile phone as early flood warning tool to inform villagers away from the village to find an alternative way of reaching the village. The livestock keepers also warned others about the threat of floods to their livestock. From these findings, it is worth noting that mobile phone technology is useful to both farmers and livestock keepers. For instance, information on the availability of rains is important for timely preparation of farms for a planting season and helps in selecting the right crop to grow properly with the amount of expected rains. On the other hand, the technology helps livestock keepers with access to information about the growth of pastures.

Effective use of mobile phones can lead to progress in health such as counselling services. The findings show that the rural dwellers use their mobile phones to call doctors or nurses and other people who provided social services within and outside the village. The mobile phones are also found to be commonly used to report disease outbreaks, within and outside the villages. In fact, one of the male respondents (no.20) recollects:

> *In the late of 2010 and the beginning of 2011, there was an outbreak of cholera in Alkaria and Lepurko [Engarooji] villages of Monduli. About two people died. Mobile phones were used to disseminate information and seek medical help from district and regional hospitals. More than 50 people from these villages were saved from death during the outbreak of the disease. Without the mobile phone, no one knows what could have happened. The phones were also used to disseminate information on the cholera outbreak in these villages.*

The mobile technology does not provide direct health benefits that drugs or access to a health-care professional can; however, it has a large potential in helping to improve health care. It can also facilitate the monitoring of and responding to disease outbreaks. Indeed, the possession of the technology with which to contact a hospital and describe the symptoms of a critical patient can enhance the chances of survival since the doctors can describe what to do in the interim period. These findings are supported by Karimuribo *et al.* (2016) who also established that mobile phones were being used to make a linkage between health practitioners and rural communities. In this regard, the rural communities may communicate on plant and animal health and diseases. According to the findings, male participants were found to more actively deploy mobile phones than their female counterparts. Some of the respondents attributed this trend to the two sex's ability to own these devices where it was noted that male participants were more likely to afford a mobile phone, airtime, and Internet bundle as compared to female participants.

Rural communities can also pay their bills, school fees for their sons and daughters and conduct mobile-commerce through the use of the mobile phone technology. Indeed, mobile phone facilitates business transactions between rural and urban areas. For the rural dwellers, using mobile phone services to trade is cheaper and faster than using online or paper-based options. Indeed, new ICTs enable entrepreneurs in rural areas to access market information and open up new markets that fetch better prices to increase their earnings (see also Munyua, 2000; Krone *et al.*, 2015; Das *et al.*, 2012; Mwantimwa, 2017). As respondent no.3 who owned a small business puts it:

> *A mobile phone is a better technological tool; it helps in different occasions… in business, simplification of travel, and communication with people in other places.*

Another respondent (no.1) explains:

> *One day, I cut pineapples in my field for selling to one of my customers who promised to come to buy them. But that day he was unable to come. The next day, he did not come either. By the evening of the following day, I tried to call him using my mobile phone but he was not reachable. I remembered that I had a number of mobile phone of another buyer. I called him. He came the following morning to buy the pineapples. My cell phone saved my produce, my money and my energy that was used in producing those pineapples.*

The two-way communications coupled with instant feedback and affordable cost, makes the mobile phone a useful tool in such crisis moments. Mobile-commerce provides value-added services despite infrastructural limitations (see also Hamilton, 2001; Etwire *et al.*, 2017). Mobile ICT also serves as a business venue for exponential growth in prepaid billing in cash-based economies such as the one operating in Tanzania as customers do not always have reliable addresses or bank accounts. In other words, effective use of the mobile phones can stimulate productivity and enhance commerce to improve local economies (Peterson, 2009; Djohy *et al.*, 2017). In addition to boosting the accessibility and usability of socioeconomic information, mobile phone technology provides direct and indirect benefits for income generation among the rural dwellers involved in small businesses. For example, effective usage of mobile phones increase sales through accessing viable markets, and removes middle men who exploit farmers by offering them low price on their agricultural products (Mwantimwa, 2017). In fact, effective usage of mobile phones among rural communities can boost their incomes.

## Challenges Faced in Utilising Mobile Phone in Rural Information Services

Despite the many benefits accruing from the use of mobile phones to access information, there is a downside to the application of this mobile technology and attendant challenges that need attention. Indeed, there are different barriers to using mobile phone in strengthening information and socioeconomic services to the rural communities in the sampled villages. In this regard, the respondents were asked to identify the obstacles to effective usage of mobile phone in accessing development-related information to

enhance the quality of rural livelihoods. Responding key respondent no.19 explains:

> *The use of mobile phone to support socioeconomic services is impeded by network problems of some mobile service providers in our villages. In some locations the mobile services are not accessible. Sometimes, we are forced to climb onto hills for proper reception of the signals and communication.*

Another key informant (no.7) observes:

> *Today, the risk of abuse and cheating through mobile phone is increasing. Conmen and women are using the mobile phone for abusing and cheating others. Two weeks ago, I received a text message that was requesting me to transfer a certain amount of money to person whose name I know. I tried to call her but she was not responding to my call. The same day I met the person with that name. I asked her about whether she had sent any text message [SMS] asking me for some money. She curtly replied, 'No!! It is not me; it could be someone who knows about our relationship'.*

Accordingly, key informant no. 11 asserts:

> *The main obstacle to effective utilisation of the mobile phone in socioeconomic activities and services is lack of awareness on the sources of development information. Information to enhance socioeconomic activities could be available and accessible but the problem is lack of awareness. Other mobile phone users in our villages lack enough knowledge and skills on utilising mobile technologies and tools. Some own mobile phones with high capacity [smart phones] but end up just using them for calling and text messaging.*

Generally, the potential contribution of mobile phones to enhancing socioeconomic activities in Bagamoyo and Monduli is hindered by different factors. In fact, the mobile phone application, like any other method, might not be immune to challenges in socioeconomic information services and poverty reduction strategies. Some of the challenges to effective applications of this approach in poverty reduction programmes identified from the field include network problems (weak, overloaded), the risk of abuse by mobile phone service providers, and charging costs (as many of the rural dwellers do not have electricity in their homes). Other challenges mentioned are high running costs (for households that usually do not depend on a cash economy), mobile phone user misbehaviour (such as lack of trust), lack of awareness of some useful information (available via the phone) and applications (that could add value to their information access via the mobile phones, particularly smart phones), and low education of the mobile phones users in rural communities. Apart from that, mobile phones can also be used for nefarious activities including committing fraud and organised crime. Other challenges have been noted by Krone *et al.* (2015), who contend that mobile phones are not useful when it comes to sharing complex knowledge such as production techniques. Yet, in the study, the findings point at a different reality on the ground as some of the FGD participants indicated sharing poultry production information and knowledge through text messaging and WhatsApp. On the other hand, the findings from the current study concur with those of Wyche and Steinfield (2016) who identified low literate rate and skills as barriers to effective use of text messaging among rural communities in Kenya. These challenges tend to reduce the effectiveness of the application of mobile phones in improving information services in socioeconomic activities in rural communities.

## Conclusion and Recommendations

The study has established that mobile technology presents a unique opportunity for enhancing access to and utilisation of information related to socioeconomic activities in the rural areas. Using the mobile phone in socioeconomic activities facilitates access to and use of massive information produced from different sources to enhance socioeconomic services and poverty reduction

programmes. In fact, a considerable amount of light has been shed on the potentiality of mobile phone technology in enhancing information access and utilisation in socioeconomic activities conducted in rural areas. Indeed, the application of mobile phones can be translated directly or indirectly into socioeconomic development strategy with the expectation that short-term economic benefits would result. More significantly, productive applications are, for large part, not on the cutting edge of the mobile phone media. The usage behaviour of mobile phones on accessing and using socioeconomic information does not differ among the rural communities in Monduli and Bagamoyo districts. In this regard, ICT interventions that target rural poverty reduction would work best if they are integrated in the wider poverty reduction agenda. Other important development facilitating factors include electrification, provision of accessible all-weather roads and other basic services that can improve the poor's living standards, sustain their efforts to escape poverty, and make them self-reliant. On the whole, poverty reduction policies, strategies, approaches, reforms and programmes should also have a built-in component for fostering the use of mobile technology to enable the marginalised majority of the rural poor to enhance their access to relevant and appropriate development-related information and engender sustainable development among their ranks. The provision of knowledge and skills for application of mobile phones is quite important among rural communities with low literacy rates. This should be accompanied by raising awareness on the relevant government and non-government sources of socioeconomic information that could actually be accessed via mobile phone technology and how to access it.

## References


Abraham, R. (2007). Mobile Phones and Economic Development: Evidence from the Fishing Industry in India. *Information Technologies and International Development*, 4 (1), 5-17

Accascina, G. (2000). *Information Technology and Poverty Alleviation: Knowledge and Communication for Development*. Draft Paper. United Nations Development Programme-Asia Pacific Information Development Programme (UNDP-APDIP).

Bailey, K. (1997). *Methods of Social Research*. New York: Free Press.

Bachhav, N. B. (2012). Information Needs of the Rural Farmers: A Study from Maharashtra, India: A Survey. *Library Philosophy and Practice*. Online. http://digitalcommons.unl.edu/libphilprac/866/ [Accessed 16 April 2017].

Balit, S. (1998). Listening to Farmers: Communication for Participation and Change in Latin America. *Training for Agriculture and Rural Development Report [1997-98]*. Rome: Food and Agriculture Organisation (FAO).

Bhavnani, A., Won-Wai Chiu, R., Janakiran, S. and Silarszky, P. (2008). The Role of Mobile Phones in Sustainable Rural Poverty Reduction. Information and Communication Technology Policy Division, Global Information and Communication (GICT).

Chester, G. and Neelameghan, A. (2006). Information Professional: Knowledge and Skills Development for Serving Marginalised and Rural Communities. *Webology*, 3(3).

Dannenberg, P. and Lakes, T. (2013). The Use of Mobile Phones by Kenyan Export-Oriented Small-Scale Farmers: Insights from Fruit and Vegetable Farming in the Mt. Kenya Region. *Economia Agro-Alimentare,* 3, 55-76.

Das, A., Basu, D. and Goswami, R. (2012). Accessing Agricultural Information through Mobile Phone: Lessons of Iffco Kishan Sanchar Limited (IKSL) Services in West Bengal. *Indian Res. J. Ext. Edu*, 12 (3), 102-107.

De Silva, L.N.C., Goonetillake, J.S., Wikramanayake, G.N. and Ginige, A. (2017). Harnessing Mobile Pervasive Computing to Enhance Livelihood Processes: Farmer Response to a Mobile Agriculture Information System. *Computer Science*, 10232.

Djohy. E., Edja, H. and Schareika, N. (2017). Mobile Phones and Socioeconomic Transformation among Fulani Pastoralists in Northern Benin. *Nomadic Peoples*, 21(1), 111-135.

Etwire, P. M., Buah, S., Ouédraogo, M., Zougmoré, R., Partey, S.T., Martey, E., Dayamba, S.D. and Bayala, J. (2017). An Assessment of Mobile Phone Based Dissemination of Weather and Market Information in the Upper West Region of Ghana. *Agriculture and Food Security*, 6 (8).

Greenberg, A. (2005). Information and Communication Technologies for Poverty Alleviation: Basic Tool and Enabling Sector. *Swedish International Development Cooperation Agency (SIDA) Report*. Online. http://www.sida.se/publications [Accessed 11 June 2015].

Gupta, S., Yun, H., Xu, H. and Kim, H. (2017). An Exploratory Study on Mobile Banking Adoption in Indian Metropolitan and Urban Areas: A Scenario-Based Experiment. *Information Technology for Development*, 23 (1), 127-152.

Gurstein, M. (2000). Rural Development and Food Security: A Community Informatics Based Conceptual Framework for Food and Agriculture Organisation-Sustainable Development Dimensions (FAO-SDD): Knowledge and Communication for Development. Online. http://www.fao.org/sd/cddirect/cdre0055b.htm [Accessed 22 December 2016].

Gurstein, M. (2000). E-commerce and Community Economic Development: Enemy or Ally? Sustainable Development Dimensions (SDD): Knowledge and Communication for Development. Online. http://www.fao.org/sd/cddirect/cdre0055b.htm [Accessed 21 July 2015].

Hamilton, P. (2001). M-commerce in Africa: Innovation Overcoming Barriers. International and Regional Development Projects, 2001.

Harande, Y. I. (2009). Information Services for Rural Community Development in Nigeria. *Library Philosophy and Practice*. http://digitalcommons.unl.edu/libphilprac/271/ [Accessed 20 April, 2017].

Hecken, G. T. V. (2011). Payments for Environmental Services and Governance of Natural Resources for Rural Communities: Beyond the Market Based Model An Institutional Approach, Case Studies From Nicaragua. PhD thesis, University of Antwerp, Belgium.

Hellström, J. (2010). The Innovative Use of Mobile Applications in East Africa. *Swedish Iinternational Development Cooperation Agency (SIDA) Review*, 12.

International Fund for Agricultural Development [IFAD] (2003). Indigenous Peoples and Sustainable Development. Roundtable Discussion Paper for the Twenty-Fifth Anniversary Session of IFAD's Governing Council, February, 2003.

Ifukor, M. O. (2013). Channels of Information Acquisition and Dissemination among Rural Dwellers. *International Journal of Library and Information Science*, 5(10), 306–312.

Jensen, R. (2007). The Digital Provide: Information (Technologies), Market Performance, and Welfare in the Southern India Fisheries Sector. *Quarterly Journal of Economics*, 122: 879-924.

Kamba, M. A. (2009). Access to Information: The Dilemma for Rural Community Development in Africa. Online. http://globelics2009dakar.merit.unu.edu/papers/ [Accessed 26 April, 2017].

Karimuribo, E. D., Batamuzi, E. K., Massawe, L. B., Silayo, R. S., Mgongo, E. K. and Wambura, R. M. (2016). Potential Use of Mobile Phones in Improving Animal Health Service Delivery In Underserved Rural Areas: Experience from Kilosa and Gairo districts in Tanzania. *BMC Veterinary Research*, 12, 219.

Kazi, A. M., Carmichael, J. L., Hapanna, G. W., Wangoo, P. G., Karanja, S., Wanyama, D., Muhula, S. O., Kyomuhangi, L. B., Loolpapit, M., Wangalwa, G. B, Kinagwi, K. and Lester, R. T. (2017). Assessing Mobile Phone Access and Perceptions for Texting–Based Mobile Health Interventions among Expectant Mothers and Child Caregivers in Remote Regions of Northern Kenya: A Survey-Based Descriptive Study. *JMIR Public Surveillance*, 3(1).

Krone, M., Dannenberg, P. and Nduru, G. (2015). The Use of Modern Information and Communication Technologies in Smallholder

Agriculture: Examples from Kenya and Tanzania. *Information Development*, 1-10.

Litondo, K. (2010). *Mobile Phones and Employment among Informal Micro and Small Enterprises in Nairobi*. Nairobi: University of Nairobi.

Lwoga, E. T., Stilwell, C. and Ngulube, P. (2011). Access and Use of Agricultural Information and Knowledge in Tanzania. *Library Review, 60 (5)*.

Matovelo, D. (2008). Enhancing Farmers Access to and Use of Agricultural Information for Empowerment and Improved Livelihoods: A Case of Morogoro Region, Tanzania. PhD Thesis, University of Dar es Salaam, Tanzania.

McNamara, K. S. (2009). The Significance of Mobile Applications for Developing-Country Agriculture. *Draft 1*. Washington DC: American University.

Meso, P., Musa P. and Mbarika, V. (2005). Towards a Model of Consumer Use of Mobile Information and Communication Technology in Least Developed Countries (LDCs): the Case of Sub-Saharan Africa. *Info Systems Journal*, 15, 119–146.

Mittal, S. and Mehar, M. (2016). Socioeconomic Factors Affecting Adoption of Modern Information and Communication Technology by Farmers in India: Analysis Using Multivariate Probit Model. *The Journal of Agricultural Education and Extension*, 22 (2) 199-212.

Mtega, W. P. (2012). Access to and Usage of Information among Rural Communities: A Case Study of Kilosa District Morogoro Region in Tanzania. Partnership: *The Canadian Journal of Library and Information Practice and Research*, 7(1).

Mwantimwa, K. (2012). The Use of Pull Information Model to Support Poverty Reduction Programmes in Rural Tanzania: A Case of Monduli and Bagamoyo Districts. PhD Thesis: University of Antwerp, Belgium.

Mwantimwa, K. (2017). Use of Mobile Phones among Agro-Pastoralist Communities in Tanzania. *Information Development*, 1-15.

Munyua, H. (2000). Application of Information Communication Technologies in the Agricultural Sector in Africa: A Gender Perspective, In: Rathgeber, E. and Adera, E. O. [Eds], *Gender and Information Revolution in Africa* [pp. 85-123], International Development Research Centre (IDRC).

O'Farrell, C., Norrish, P. and Scott, A. (1999). Information and Communication Technologies (ICTs) for Sustainable Livelihoods: Preliminary Study. Sustainable Development Department (SDD), Food and Agriculture Organisation of the United Nations (FAO). Online. http://www.fao.org/sd/cddirect/cdre0055b.htm [Accessed 16 June 2016].

Owen, B. (2009). What is Poverty Reduction? *Center for Global Development (CGD) Working Paper*, no. 170. Washington, D.C.: Center for Global Development. Accessed on 11 March 2016 from: http://www.cgdev.org/content/publications/detail/1421599.

Peterson, K. (2009). Cell Phones: A Platform for Social Innovation in Emerging Markets, Innovation and Design, Microfinance, Social Entrepreneurship. Online. http://inspiredeconomist.com/2009/06/10/cell-phones-a-platform-for-social-innovation-in-emerging-markets/ [Accessed 16 October, 2016].

Porteous, D. (2006). The Enabling Environment for Mobile Banking in Africa. Online. https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-the-enabling-environment-for-mobile-banking-in-africa-may-2006_0.pdf.

Rao, S. (2007). *Tanzania Agriculture Research Report*. Online: www.scrib.com/doc/36202672/Tanzania-AgriResearchReport [Accessed 11 January 2016]

Scott, N., Batchelor, S., Ridley, J. and Jorgensen, B. (2004). The Impact of Mobile Phones in Africa. Online. https://www.solarway.com/the-impact-of-mobile-phones-in-africa.html [Accessed 11 April 2016].

Siegel, M. and S. Fransen. (2010). New Technologies in Remittances Sending: Opportunities for Mobile Remittances in Africa. A Paper Presented at the 8th Globelics International Conference on

Making Innovation Work for Society: Linking, Leveraging and Learning, 1-3 November 2010, Kuala Lumpur, Malaysia.

Sife, A. S., Kiondo, E. and Lyimo, J. G. (2010). Contribution of Mobile Phones to Rural Livelihoods and Poverty Reduction in Morogoro Region, Tanzania. *The Electronic Journal of Information Systems in Developing Countries, 42 (3)*: 1-15.

Sinha, C. (2005). Effect of Mobile Telephony on Empowering Rural Communities in Developing Countries. A Paper Presented at International Research Foundation for Development (IRFD) Conference on Digital Divide, Global Development and the Information Society (GDIS), November 14-16.

Srinivasan, J. and Burrell, J. (2015). On the Importance of Price Information to Fishers and to Economists: Revisiting Mobile Phone Use among Fishers in Kerala. *Information Technologies and International Development*, 11(1), 57-70.

Strauss, A. and Corbin, J. (1990). *Basics of Qualitative Research – Grounded Theory Procedures and Techniques*. California: Sage Publications.

Sturges, P. and Chimseu, G. (1996). The Chain of Information Provision in the Villages of Malawi: A Rapid Rural Appraisal. *International Information and Library Review, 28*, 135-156.

Traffic Management Centres [TMC] (2010). Guidelines for Implementers of Mobile Travel Information Services for the Public. Online. http://www.railtime.be/[Accessed 2 July 2017]

Uzuegbu, C. P. (2016). Effective Information Service Delivery to Rural Dwellers in Sub-Saharan Africa: Whose Job? *International Federation of Library Associations and Institutions*, 42(1), 49-58.

Uzuegbu, C. P. (2014). Rural Information Provision Business: Entrepreneurship Studies and Practices in Library and Information Science. *Umuahia: Zeh Communications*, 253–268.

World Bank (2008). *Finance for All? Policies and Pitfalls in Expanding Access*. Washington D.C: World Bank.

Wyche, S. and Steinfield, C. (2016). Why Don't Farmers Use Cell Phones to Access Market Prices? Technology Affordances and Barriers to Market Information Services Adoption in Rural Kenya. *Information Technology for Development*, 22 (2), 320-333.

**Kelefa Mwantimwa** is a Lecturer in the Information Studies Unit at the University of Dar es Salaam. He has Master's degrees in information studies from University of Dar es Salaam and PhD in Library and Information Science from the University of Antwerp, Belgium.