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Mobile telephony services and rural-urban linkages

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1.0 Introduction

The Rurban Africa project is exploring the connections between rural transformations, mobility, and urbanization processes and analyzes how these contribute to an understanding of the scale, nature and location of poverty in Sub-Saharan Africa. It is advancing the research agenda on rural-city connections in Sub-Saharan Africa by addressing a range of crucial components: agricultural transformations, rural livelihoods, city dynamics, and access to services in cities. The project is working in four countries: Cameroon, Ghana, Rwanda and Tanzania.

The aim of work package 4 is to investigate variations in the relationship between poverty and access to services in different types of urban low income areas. The two key objectives are:

1. To map availability and acceptability (including use and affordability) of services in low income urban areas and understand differences in provision and demands made by recent arrivals as compared with established residents, and how these are influenced by rural-urban linkages; and
2. To understand the interconnections between these demands and urban governance, planning and management of services, and the implications for improving poor people's access to services and accommodating urban population growth.

Work package 4 focuses on neighbourhoods in low income densely populated inner city areas and in urban fringe areas where new housing is being built in formal or informal settlements. While the research focus is on access to services in urban areas, the analysis includes comparisons with access to services in rural areas.

The first deliverable under Work Package 4 (D4.1) presents an overview of selected public services in Sub-Saharan Africa, based on a review of literature supported by analysis of Demographic and Health Surveys (DHS) data for the four countries and country reports (Medland et al. 2014a; Ngouanet et al., 2014). The relevant section on mobile phones from D4.1 is summarised in section 2 of this report.

A second WP4 deliverable (D4.2) presents the results of fieldwork on urban residents' perspectives on the accessibility and acceptability of services in four sectors: water, sanitation, electricity & transport (Smout et al., 2015).

This report is the third deliverable under Work Package 4 (D4.3), *Mobile telephony services and rural-urban linkages*.

1.1 Task 4.3

This task focuses on mobile telephony, which has only recently taken hold in many parts of Africa, but which has witnessed phenomenal growth. The aim is to investigate how the quality and acceptability of mobile telephony services influences the livelihoods and mobility of people living in low-income urban areas.

Specific objectives of task 4.3 are:

- To map and review trends in mobile phone network service provision in rural and urban settings
- To map attitudes and behaviour in the use of mobile phones
- To map emerging innovative and practical ways that mobile telephony can be used to enhance livelihoods
- To assess the links between opportunities presented by mobile telephony and migration
- To assess the governance and policy implications of this, taking into account urban growth.

After this introduction, the second section of this report summarises data from the first deliverable 4.1 on access to mobile phone services in the four case study countries. Section 3 presents the methodology for the fieldwork for task 4.3. Sections 4, 5 and 6 present Results from the fieldwork, Discussion and Conclusions. Appendices 1 to 4 present data from Cameroon, Ghana and Tanzania.

2.0 State of the Art overview for mobile phones in Sub-Saharan Africa

The review of literature and secondary data in Deliverable 4.1, Volumes 1 and 2 (Medland et al., 2014a, Medland et al., 2014b and Ngouanet et al., 2014) identified the key points as follows:

2.1 Availability of mobile phone services

- Coverage of mobile networks in the region in urban areas is now over 91% (Foster and Garmendia, 2010). Table 2.1 shows that most urban households have access to a mobile phone in the four case study countries. The figures for rural phone services are much lower at nearer a third of all households.

Table 2.1 Mobile phone service coverage in urban and rural households, 2011

Household location	Cameroon (DHS 2011)	Ghana (DHS 2008)	Rwanda (DHS 2010)	Tanzania (DHS 2010)
Urban	87.8%	78.5%	71.8%	77.5%
Rural	45.8%	37.8%	35.1%	34.5%

Adapted from Medland et al. (2014b)

- The number of cellular phone subscriptions in Sub-Saharan Africa (excluding South Africa) has risen from almost 4000 in 1989 to 462 million in 2011 (with some multiple subscriptions)[1].

- Poorer households are the least likely to have access to mobile phones. In all four case study countries, access to mobile phones is higher for urban households in the poorest and poorer quintiles than those in rural areas. However, the levels of access in those wealth quintiles are significantly lower than those in the higher wealth quintiles for the same area of

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[1] Mobile cellular access statistics are available by country at:
http://data.worldbank.org/indicator/IT.CEL.SETS/countries/1W?display=graph

residence.

- The cost of handsets has reduced and they are becoming more affordable.

- The introduction of pre-paid services means that the cost of using a mobile phone is relatively low. It is estimated that 97% of consumers in Sub-Saharan Africa use the pre-pay service which allows them to buy credit (airtime) in small denominations, according to their budget (Foster and Garmendia, 2010)

- The use of 'call boxes' or kiosks has grown (e.g. in Cameroon), especially in densely populated neighbourhoods and business centres. These provide additional access to mobile communication services on an 'as needed' basis.

2.2 Barriers to mobile phone services

- The main barriers to mobile phone access are handset cost and lack of network coverage.

- In terms of handset affordability, households who cannot afford to own their own mobile most often use a public phone (usually in a shop or with an agent) or use those of family and friends.

- There can also be a barrier to access in terms of credit availability.

- In Rwanda, a language barrier was identified as a constraint on increasing access, as the interface of imported phones requires use of English or French.

2.3 Innovative uses of mobile phones to enhance livelihoods

- The ability to use mobile phone services is very important for maintaining connectivity and links between families and social or business networks spread throughout different urban and rural areas.

- One of the most significant ways that mobile phones are promoting enterprise is through the formalization of previously informal and word of mouth communication networks.

- The responsive nature of mobile services allows small-scale initiatives to access up-to date/real-time market information on commodities being produced in distance locales.

- There have been many benefits in the agriculture sector (including saving time and travel costs, co-ordination, information).

- There has been some limited job creation linked directly to mobile phones including phone and airtime sellers, phone repairs and battery charging services.

- One of the most successful advances has been the introduction of 'mobile money' or money transfer services, especially in urban areas, with support for small and micro enterprises. It allows money to be transferred by anyone with a mobile phone in any location without the need for a bank account.

- Other innovations reported in Rwanda are:
    - Students receive exam results through their mobiles
    - Faster disaster management responses to emergency situations
    - E-health system records clinical data
    - Toll-free numbers available to report offences.

3.0 Methodology

The following data collection activities were used to inform this research:

1. State of the Art overview for mobile phones in Sub-Saharan Africa (see Section 2 of this report]:
    a. Literature review (Medland et al, 2014a)
    b. Secondary data analysis: DHS data on mobile phones for all countries for years 2004 and 2011 (Medland et al, 2014a)
    c. Beyond the mobile phone: The impact of livelihoods in rural Rwanda (van Enckevort, 2014)

2. Empirical data collection:
Appropriate survey and interview questions to be used in household surveys, semi-structured interviews and focus groups were agreed with WP3. In addition focus group data was collected under WP4, specific to this task.

Data were collected from a total of 30 settlements in the six cities - Douala and Bafoussam in Cameroon, Accra and Sekondi-Takoradi in Ghana and Dar es Salaam and Arusha in Tanzania. Information on access to mobile phone services was, however, an added secondary focus, and as it was not a key element at the project's inception, this was therefore not covered as comprehensively as the other services. One dedicated focus group was conducted in Ununio, Tanzania.

The fieldwork findings were written up as 28 Settlement Profiles (Gough et al 2015, Appendices). For this report, the country teams in Cameroon and Ghana also completed a standard table for each settlement, summarising the findings related to network coverage, use, affordability, and livelihood opportunities offered by mobile phones. These tables and further information are included as Appendices 1 to 3 of this report. Finally, MSc theses conducted under the Rurban Africa project by Hekel (2014) in Tanzania and van Enckevort's (2015) in rural Rwanda also inform this work.

3.1 Analytical Approach

A sustainable livelihoods framework is used to explore the relationship between consumers' access to and use of mobile-based and facilitated phone services with the level of migration (both transient and permanent) to and from cities, and the various impacts on livelihoods. Under this framework, the data are categorised as:

- Physical assets: Network coverage and use of mobile phones
- Financial assets: Affordability and payment methods
- Social assets: Accrued and potential livelihood opportunities/benefits

4.0 Results

4.1 Network coverage

As the growth of mobile phones is such a recent phenomenon in Sub-Saharan Africa, DHS data has only been captured in the most recent survey and trends based on longitudinal data cannot therefore be reliably identified (Medland et al, 2014b). Network coverage across the four case study countries varies, and also within the different settlements studied, but it is generally problematic.

In Douala, Cameroon, problems of saturation resulting in either the absence of service or insufficient coverage were encountered in certain areas, such as the rapidly growing settlement of Cité-Beige, where respondents reported climbing trees to get a better signal. The close proximity of this settlement to the airport prohibits the installation of phone masts. The inhabitants of Cité-Beige are essentially poor (motorbike taxi drivers, taxi drivers, lifeguards and small traders) who formerly resided in the peri-central neighbourhood of Douala. One respondent states:

> "The telephone network is a real catastrophe here; it looks like we're forgotten. Still recently, a new operator came to pick a location to install an antenna in the neighbourhood. We hope that this will solve our problem. Even with regard to the internet, we have internet key but the flow is so low that nothing works."

In Bafoussam, Cameroon, Orange, MTN, Camtel and Nexxtel provide good network coverage for the inner city, but areas at a distance from the wireless station and confined valleys at the periphery are disadvantaged. In rural areas such as Kouogouo'o village settlement, internet access is only possible along the main roads. Bonendale settlement is largely covered by Orange, MTN and CAMTEL networks. Internet access is reduced because "cybercafés" are only on the main tarred road of Bonaberi.

75% of users in Accra, Ghana experienced problems such as high call congestion irrespective of the network, with the most severe at Achimota, Dome, and Kwabenya settlements (NCA, 2010). Residents stated that mobile phone coverage in Gbawe settlement, Accra suffers from issues that are common across the city, such as random signal loss and dropped calls.

Focus group participants in Ununio settlement, Dar es Salaam, Tanzania all used the Tigo network. Four of the ten also used Voda and Airtel as Tigo was unreliable. All Tigo subscribers reported network problems, worsening after 6pm when the network is used most. Network users in Br. Mwinyi settlement also reported inadequate mobile phone signal although any problems were usually perceived to be nationwide. Residents of Madukani sub ward, Arusha said network problems were rare and then usually the result of a problem for the whole city or country.

In spite of obvious problems with network reliability, users surveyed in Ghana and Tanzania on the need for service improvement ranked mobile phones as generally the least priority, compared to

water supply, sanitation, electricity, and transport services. Hekel (2014) also found in Charambe and Kilakala, Tanzania, that mobile phone services were available and were ranked highest for quality compared to these other services in both settlements; therefore they were not seen to be a priority for improvement.

4.2 Electricity supply for phone charging

Unreliable electricity supply leads to difficulties in charging mobile phones. However, people develop strategies to overcome this. For example, in Bafoussam settlement, Cameroon, where there are frequent electricity shortages, many phone users take the precaution of having two batteries, with one always charging when electricity is available. Similarly, anticipating power cuts in this way in Kouogouo'o village is important to ensuring constant mobile phone use.

In other settlements in Cameroon, such as Bonendale, Douala, problems of phone charging are rare and arise only after long power cuts. Some low income settlements have recharging points, for example in shops with generators, costing 100 CFA per charge.

Using alternative charging points such as these, or charging phones at work premises is common. In Ghana, in areas such as Gwabe, when electricity is available, and the current is of acceptable quality, most people are able to charge their phones at home. Additional phone charging facilities are available here and in most other settlements, often in shops, for a fee of 50 pesewas for a full recharge.

Residents in Ununio settlement, Dar es Salaam, Tanzania have problems with electricity supply and only half of the focus group participants live in houses with electricity. Those without electricity charge their phones in kiosks and shops for 300 shillings per recharge. Respondents reported frequent charging with two people charging their phones three times a day, and all others once a day. Although charging is expensive, respondents were aware that they might lose an opportunity if they are not contactable. Many normally pay on a credit basis so they can then settle this bill later when they have sufficient funds.

4.3 Access to mobile phones

4.3.1 Ownership
Three of the four case study countries have more people with access to a mobile phone than to an improved latrine, piped water or electricity. Ghana is the exception to this, where piped water and electricity coverage is slightly higher than mobile phone access (Medland et al., 2014b).

In Ununio settlement, Dar es Salaam, Tanzania, all ten focus group participants had a mobile phone; six of these were smart phones. In Cameroon, mobile phone access has risen from 23.8% in 2004 to 67.2% in 2011. City dwellers are most likely to have a phone, although younger people may have a lower quality or second hand phone, with fewer functions. Van Enckevort (2015) found that the quality of a phone influenced its usability, with some limited to calling and texting.

4.3.2 Multiple phones and SIM cards

Due to network unreliability, it is common for users to either have more than one SIM card or to use several phones with a different SIM card in each, in order to change to an alternative network when required. Examples of this were found in all study settlements in Cameroon, where users might have two or three different SIM cards. Four of the 10 focus group participants in Ununio, Dar es Salaam, have more than one SIM card for their phone. In Accra, 91.5% of phone users have multiple phones (Dziwornu, 2013) and 51% have multiple SIM cards (Bentil, 2012). In New Town, Accra, the network is erratic and residents often own multiple SIM cards to overcome signal losses and reduce costs, as it is also more expensive calling across networks. One New Town respondent described the situation as follows:

> *''The reason why I use two lines is because the bad nature if the network so I had to use two lines. Moreover almost all my friends use MTN so I don't use the other one like I use the mtn. so I am more on the MTN... when you are calling someone it says cannot be reached or out of coverage area. But the person will be right beside you''*

4.3.3 Alternative means of access

Those without their own mobile phone might use their friends' phones, sometimes inserting their SIM into these, or calling quickly in order for the person they are calling to call them back (e.g. Ununio settlement, Tanzania). In Bafoussam, Cameroon, call boxes or kiosks are commonly used by those in low-income areas as a low-cost alternative to owning a phone.

4.4 Use of MPs

Limited information is available on specific uses of mobile phones in terms of texts, calls and data. In Douala, Cameroon, it is known that younger people and students prefer to use SMS services and free calls. Users in Douala make more calls than those in Bafoussam who receive more calls than they make. Six of the ten participants in the Ununio focus group discussions use their phones for linking to social networks; none said they used GPS facilities. Similarly in Accra and Sekondi Takoradi, Ghana mobile data usage is increasing among young people as smartphones produced in China become more readily available and affordable. This is particular evident in Accra where social networking applications such as Facebook and Whatsapp are used not only to keep in touch with friends and family, but as means to advertise goods and business activities.

Permanent promotion campaigns offer free calls in Cameroon, particularly during weekends and public holidays. In Dar es Salaam, Tanzania, services such as Mini Kabang give cheap bundles of calls, news headlines, football news etc. at reduced rates to those who are connected to specific mobile networks etc. Low-income users also benefit from these bundles.

4.5 Affordability and payment

4.5.1 Hand sets

In general, the cost of handsets is decreasing as cheaper imported models of phone become more available (Medland et al., 2014b). An example of this is Rwanda where the cost of handsets has

reduced dramatically through the removal of sales tax and the importation of cheap handsets from China capable of operating multiple SIM cards from multiple networks.The type of phone people buy and its specifications depends on the purchasing power of the user, and their specific needs. All respondents in the Ununio focus group discussion said they could afford to buy a phone. Seven out of 10 said that would spend up to 35,000 Tanzanian shillings for a smart phone, two would pay 80,000, and one would pay 100,000 shillings. No one had taken a loan or any credit facility to buy a phone, and did not know anyone who had done so, although some thought it might enable them to buy a smart phone. Children, adolescents, women and the elderly are often given a phone as gift. In some cases, for example where the phone is purchase by an individual or parent in order to monitor their partner or child, this can lead to conflict and abuse. Other related costs are reported as maintenance, accessories, and charger renewal.

4.5.2 Network connection charges

Mobile phone networks are operated by private companies who compete for customers on price and service (Medland et al., 2014b). Therefore the process of obtaining a network account in cities such as Accra is quick, easy and cheap at GHC 1.00, which often includes some free credit. In Sekondi-Takoradi, Anaji settlement, Ghana, network charges were said to be inexpensive compared to land lines charges, e.g. GHC 5 per week.

Respondents in Ununio, Tanzania claimed that some service providers did not always register customers' recharged credit payments, resulting in an overcharge. This was a common concern and led to the perception that companies were not trustworthy.

4.5.3 Payment methods

All participants of the Ununio focus group discussion use pre-payment methods to buy credit. Most of the respondents paid for this themselves, although one male respondent on a low-income said that the costs are paid for by his girlfriend and best male friend. The phone credit costs for two married women were paid for by their husbands. One of these said:

"when I am given money by my husband for a days' grocery purchase, I somehow deduct some amount and buy a voucher (credit for my phone)."

4.6   Opportunities and benefits for livelihoods

Various positive impacts of using a mobile phone were reported in the case study country field work. They can be grouped according to the three categories of social, employment, and economic related.

4.6.1 Social and family connections

Maintaining contact with family and friends is an important function of mobile phone use. All of the focus group participants in Ununio, Dar es Salaam, use their phone to contact their parents, relatives and friends. As one respondent states:

"I could not know the situation of my parents at the village and this means I would be supposed to frequently go physically to the village to learn of their well-being."

The women reported contacting their relatives and family members more than the men, who were more likely to contact friends and business associates.

The cost of calling is a significant issue and so messaging is often the preferred option:

"…for my friends whom you did not meet for long a time, calling will cost you as one will have so many things to talk about rather we normally chat by messages" (female, Ununio, Dar es Salaam).

Group messaging is also popular as one respondent explains in Ununio settlement *"I often send messages to my group, and this is when I do not have enough credit in my phone."*

This sentiment is echoed by another respondent:

"communication has simplified issues nowadays, for example in WhatsApp group if you say "Hi" it will be seen by everyone connected to you and who has joined the group."

A free Facebook service provided by the Tigo network in Tanzania helps people on low incomes to access information and create online friendships. This service is in Swahili which is understood by almost everybody within the country and removes any language barriers caused by the predominant use of English. A major benefit of mobile phone use in this context is the significant time and cost savings of not needing to travel to other parts of the city or further afield to rural areas for face-to-face visits. Van Enckevort (2015) found that mobile phones allowed users in Rwanda to manage their movements more effectively. There are many examples of this from Ghana, e.g. in New Town, Assake and Kojokrum settlements. One respondent made this point as follows:

> *''I use my phone to call my customers. For example when someone wants my good at a certain quantity he takes my number and I take his and transact our business. Sometimes through WhatsApp I will show sometime I sell. I take a picture of it, show it on WhatsApp as my profile picture. Someone can see it and recommend for it and the business goes on''.*

It is also reported in Kojokrom that money can be sent to family members using mobile banking methods rather than visiting families in person.

4.6.2 Business and employment connections

Business owners and traders in New Takoradi, Ghana, highlighted how mobile phones play a key role in keeping customers in touch with business owners who might have temporarily ceased their economic activities or closed their shops to go on errands within the community or in the city centre. Business owners often own multiple SIM cards to overcome these issues and reduce costs, as it is also more expensive calling across networks. A Ununio focus group participant said

"The phone helps to change my life. It helps to retain me here in Dar es Salaam through the business I am doing rather than being in the village I was leaving before."

Market information is readily available using a mobile phone, saving time and travel expenses. Examples are provided from Ununio settlement, Tanzania:

"I use it to download agricultural information and get different tips about farming." (male, small scale farmer)

"The phone improved my business contact; in case I want to know the status of fishing market at ferry I call the middlemen who are at the ferry to give me information." (Fisherman)

"I can send money to a person who is at Kariakoo market to buy a box of tomato and transport it by bus till here at Ununio." (female, small scale food vendor)

"Before, I used to go all the way to Kariakoo Market just to find out whether they have brought in fresh fruits so that I can buy for retail sale, but these days I just send a message to one of my suppliers and I get information. All this is possible because I have a phone". (female, small scale vendor)

A woman who sells fruit juice says*, "I ask information about availability of fruits from the person who is in the market."*

Price information and availability of goods can be found without the cost and inconvenience of travelling. Other benefits to business interests are price negotiation, planning meetings, and monitoring the movements of employees and goods.

Furthermore, traders no longer have to experience the dangers of travelling with money, such as those in Accra:

"Whenever you send money from Accra to Kumasi, you have to sit on the bus, and there is the tendency for armed robbers. But if you transfer it on the phone, it is much easier and convenient".

In Anaji, Sekondi-Takoradi, Ghana, the unreliability of the electricity supply has necessitated a practice where customers prearrange business meetings and transactions to coincide with when it is known that the supply will be good. These arrangements are made on the phone.

New business opportunities have been created in the mobile phone market, often involving women. In many settlements in Ghana such as New Town, New Takoradi, Kwesimintsim and Anaji, women are working as petty traders selling mobile phone credit and SIM cards, and running phone charging services (which appears to be the most lucrative). There are also a proliferation of call boxes, shops selling accessories and devices, and repair services.

For those seeking employment, a mobile phone can be an empowering mechanism. Van Enckevort (2015) found that notice of employment opportunities received by mobile phone induces people to travel further than they would on a speculative basis, leading to a greater diversification of livelihoods.

4.6.3 Education and information

As well as commercial and business information, mobile phones are used to transmit other general information and educational messages. All of the Ununio respondents agreed that they get information from the Ministry of Health, such as advice about the avoidance and transmission of ebola, dengue and other diseases. In Ununio, a participant stated that:

"There is a big change in my life after the arrival of a phone; it has and still is teaching me so many things in business, social affairs etc. Phone helps me to learn many things in education, health and the like. I could not know many things by not having a phone."

Similarly in Accra, respondents made reference to the ability to access information that would usually be unavailable to them through their mobile phone. A respondent in Accra explained this as follows:

> *''I think using a smart phone is advantageous because instead of buying a newspaper you can just get the information in the internet on your phone. So I think I acquire knowledge through the phone. You can search from google. You can ask any question and google and get an answer. Even with location you can do that on the phone like the demarcation you talked of earlier''.*

4.6.4 Mobile banking

There are distinct methods of using mobile phones to bank and transfer funds to other parties. The main difference between these is that mobile banking requires the user to have a bank account that can be accessed online and various functions performed. However, bank accounts are mainly the preserve of middle and high income individuals (in Cameroon, this is particularly civil servants and businessmen to control and confirm financial transactions).

Alternatively, a mobile phone can be used to transfer money to another party or to pay a bill through the phone network operator. A bank account is not required in this case. For example, in Cameroon, since 2014, MTN and Orange network operators have offered the opportunity to pay electricity bills, taxes, school fees, and to purchase airtime in this way from a pre-paid account.

In Rwanda, many of the national banks have become partners with network operators to provide additional services via the mobile money network via the e-payment system, which allows users to pay for goods and services using credit from their mobile phone. Similarly in Kojokrom, Sekondi-Takoradi, Ghana, mobile money transfers are reported to be faster, more convenient and reduce travel costs for receivers since they can access the many transfer points

Eight out of 10 participants in Ununio settlement, Tanzania use Tigo pesa, another uses Airtel money, and another uses M-pesa by Vodacom. All the respondents said that they trust these services although there are some challenges relating to their use. A respondent said that, *"If you send money the charge transfer is big so it costs us." C*harges for sending and receiving money are reported to be excessive for customers.

5.0 Discussion

Evidence from the four case study countries suggests that these innovations have generally impacted positively on the lives of low-income communities, in respect of the innovative and practical ways they can be used, and the opportunities they provide to enhance livelihoods. Time and cost savings are offered by the use of mobile phones which mean that some journeys are now unnecessary, for both social and business reasons. Furthermore, information seeking behaviours now make use of online information and messaging services, for educational and public health measures and commercial knowledge, and employment options, which has a potentially empowering effect on users. Mobile money transfer is a further important service that reaches the poor and those without a bank account, enabling people to both send funds using mobile phones and receive funds at local transfer points.

Attitudes to mobile phone use are mainly positive, related to the benefits described above. Low-cost bundle promotions are a popular feature making mobile phone use more cost effective for all. For some, however, the initial outlay of a mobile phone is too high, and there are criticisms of the way networks credit user accounts. Furthermore, the costs of mobile banking services for the sender and recipient are still relatively high.

Attitudes of those surveyed generally ranked the quality of network services to be acceptable and that although problems were acknowledged with mobile phone network connections, the need for improvements was ranked lowest compared to other less adequate services (i.e. water, sanitation, transport and electricity).

Case study evidence suggests that differences in network service provision do not necessarily deter individuals from transient and permanent migration to particular areas. For example, in Sekondi-Takori, Ghana, there are noted shortcomings in service provision, but notwithstanding, new comers still seek accommodation in the Assakae and New Takoradi settlements. This suggests that migrants look beyond provision of services in considering where to relocate to.

6.0 Conclusions

This research contributes to an understanding of the availability of mobile telephony services in low income urban communities in sub-Saharan Africa, and of how poor people access these services, with insights on the connections between service availability and mobility/migration. This new understanding about the influence of mobile telephony on poor people's lives by this rapidly developing service could be used to guide development of future policy.

Phone network coverage, mobile phone ownership, and their use have increased rapidly over the past decade. Currently about 75% of individuals in urban areas in the case study countries have access to mobile phone services, even if they do not own their own phone. This compares to about a third of those living in rural areas. Mobile phone access is also positively correlated with wealth, although there are options for those on low-incomes to also enjoy the new connectivity through using other people's phones, call kiosks, and the more cost-effective promotional bundles of services frequently offered by network providers. People have developed strategies to deal with key

challenges that arise in terms of poor and dropped connectivity, and electricity supply for charging, so that they can continue to be connected.

There are distinct benefits to users of these services, in terms of maintaining links to family and friends without the need to travel for visits, and using their phones to further their business interests. Small scale vendors can now check the availability and prices of commodities at markets, meetings can be arranged with suppliers and customers, opportunities for employment can be communicated easily, all of which save travel time and expense. There are also examples of direct income generation related to mobile phone services, such as charging phones, selling credit, and repairs. Mobile banking and money transfer is another major advantage opening up to all, although there are costs associated with this. A further point made by van Enckevort (2015) is that those surveyed in Rwanda would actually travel further for certain work opportunities that they had learned about using their phones, than they would on a speculative basis.

People are using their phones in innovative and practical ways to enhance their own livelihoods. While these options may not yet be available in remote rural areas, or to the poorest in a community, nevertheless, the costs associated with mobile phone use are decreasing, and network coverage is being extended ever further.

Some comments can be made on the effects of these changes on migration, either between different parts of a city, or moving between rural and urban areas. It is noted that network coverage is often only available on the major roads between rural and urban areas, and not in the rural areas themselves. In urban areas, network coverage seems relatively consistent from one settlement to another, and problems that might occur can be at a regional or national level. The need to travel as frequently for many different reasons is reduced, so residential location is less important on these grounds. It is also noted here that in spite of reported difficulties experienced with network connections, the majority of people do not see the need for improvements to this to be as important as those required for other essential services. Therefore, the quality of network coverage would not necessarily be a disincentive to live in particular urban settlements.

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