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## Conference Paper

# Internet going mobile: Internet access and usage in eleven African countries

19th Biennial Conference of the International Telecommunications Society (ITS): "Moving Forward with Future Technologies: Opening a Platform for All", Bangkok, Thailand, 18th-21th November 2012

### Provided in Cooperation with:

International Telecommunications Society (ITS)

*Suggested Citation:* Stork, Christoph; Calandro, Enrico; Gillwald, Alison (2012) : Internet going mobile: Internet access and usage in eleven African countries, 19th Biennial Conference of the International Telecommunications Society (ITS): "Moving Forward with Future Technologies: Opening a Platform for All", Bangkok, Thailand, 18th-21th November 2012, International Telecommunications Society (ITS), Calgary

This Version is available at:

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**Proceedings of the 19th ITS Biennial Conference 2012  
Bangkok, Thailand**

**Internet Going Mobile: Internet access and usage in eleven  
African countries**

**By**

**Christoph Stork, Enrico Calandro and Alison Gillwald**

## **Internet Going Mobile: Internet access and usage in eleven African countries**

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### **Abstract**

While the 2007/8 African ICT access and usage survey demonstrated alarmingly little access to the Internet on the continent together with a large-scale absence of computers and smart phones and compounded by the high cost of connectivity, (Gillwald & Stork 2008), the mobile phone is now the key entry point for Internet usage.<sup>1</sup> Internet access has increased significantly across all countries as a result increasing Internet penetration to 15,5% across the ten African countries surveyed on household and individual ICT access and usage by Research ICT Africa in 2011/12.<sup>2</sup> Mobile internet requires less ICT skills, less financial resources and does not rely on electricity at home compared to computer or laptop and generally fixed-Internet access. Other findings highlight the unevenness of Internet take up across and within countries. So while the majority of the countries under investigation demonstrate increased mobile Internet take up, in Rwanda, Tanzania and Ethiopia Internet usage remains negligible. In those countries where mobile Internet is driving connectivity this is being driven by social networking applications. Understanding prepaid mobile Internet further provides a pro-poor dimension to public policies seeking improved Internet access and which was historically available and affordable to the elite, other than through public access points, whether private Internet cafes or schools and libraries, raising significant policy questions with which the paper concludes.

### **Introduction**

Affordable access to ICTs is a policy objective common to all African countries. This is not only as a result of the increasing evidence linking investment in ICT to economic growth but also because some of the less tangible and quantifiable benefits of access to information to active citizenry and social and political participation. Indeed there is considerable evidence that communication and information technologies can make markets function more efficiently and contribute to economic growth<sup>3</sup>. They have increasingly been heralded as a key component for the reduction of poverty in developing nations and economic and social inclusion<sup>4</sup>.

### **ICTs and Social and Economic Development**

At a macro-level, mobile telephony adoption has been found to have a positive impact on economic welfare and GDP, it generates employment opportunities in the sector and it improves productivity of other sectors, as it contributes to business expansion, to entrepreneurship, to banking the unbanked and to reduced transaction costs. Investment in telecommunication infrastructure has a direct and indirect positive effect on economic growth. For instance, Cronin et al. (1993a, 1993b) identifies a positive correlation between telecommunications infrastructure investment and national productivity growth in the US. However studies showing such correlations have been unable to demonstrate causality. Cannig (1999) shows that investment in the telecommunication sector is substantially more productive than investment on average, due to direct and indirect effects. Further, ICT investment generates direct and indirect taxation revenue for governments (Bhavnani et al., 2008).

The study by Röller and Waverman (2001) provides an important qualification to studies which demonstrate such correlations which had previously been conducted only in mature OECD economies. They demonstrated that a critical mass threshold of 40 percent of population connected to voice services needed to be reached before the positive network effects that drive economic growth and development are realised. In most African countries fixed line service has never reached more than a couple of percent, with the most developed fixed line network in sub-saharan Africa, South Africa, never going above 10%. It is only now that mobile penetration is reaching this

critical threshold with the associated positive multipliers and innovations, most obviously in the area of mobile money.

More recently Koutroumpis (2009) demonstrates the existence of several levels of return from broadband infrastructure, based on the level of penetration. He asserts that there is evidence of a critical mass phenomenon in broadband infrastructure investments, and the penetration level that he identifies is a critical mass of 20 percent of the population connected to the network. According to Koutroumpis (2009), this percentage creates a vision for countries to capitalise the beneficial effects that the network can provide and it also implies a 0.89% aggregate growth rate due to broadband externalities.

The World Bank asserts that in low and middle income countries every 10 percentage point increase in broadband penetration accelerate economic growth by 1.38 percentage points (Kim, et al 2010). The economic growth associated with the increase in broadband penetration is even higher than compared with penetration of other telecommunications services, such as fixed or mobile phone (Kim, et al 2010).

At the social or micro-economic level, Bhavnani et al (2008) point out that mobile telephony adoption enhances entrepreneurship and job search, since it reduces costs of starting a business or may even enable to start a new one; further, it reduces information asymmetries and market inefficiencies and in some instances it might substitute transportation. Oyewumi (2006) asserts that despite challenges related to low level or absence of functional literacy and numeracy the availability of market information in the rural agriculture context allows farmers to incorporate market situation analysis and price consideration in their production, financial, investment and strategic decisions. De Silva (2005, in Oyewumi, 2006), argues that equal access to market information would reduce marketing channels costs, transportation costs and would ensure fair transactions.

A study on the impact of mobile telephony on the development of micro-enterprises in Nigeria conducted by Jagun, Heeks, and Whalley (2008) concludes that mobile phones reduce some information failures which constrain investment and business activities in developing countries. The study demonstrates that in the cloth-weaving sector in Nigeria, mobile telephony supported that market to act more efficiently and effectively. In particular, findings reveal that mobile telephony had an impact on economising effects on supply chain processes. However, they can not find indicators showing a significant restructuring effect on the organisation of supply chains.

Using Armartya Sen's (1992) capability approach, a study conducted by Ndung'u and Waema (2011) concludes that the integration of ICT into many aspects of the economy has created a digitally enabled economy and that money transfer services, initially intended for the unbanked segment of the Bottom of the Pyramid (BOP), have been embraced by different other sectors of the economy, improving business productivity.

Other studies investigate the relationship between access and usage of the information. It is widely recognised that the benefits of accessing timely information and market knowledge has mostly benefited those with resources and skills, leaving out the majority of rural population (Bhavnani et al, 2008). For instance, in the case of the farming sector, the high costs associated with accessing relevant and value-added information through ICT and in particular fast-speed Internet represents a disincentive for farmers (Rheingold, 2005), unless the benefits of accessing it will outweigh the costs. However, studies argue that benefits associated with mobile phone adoption in rural areas are higher than in urban areas (Bhavnani et al. 2008). For instance, in the case of mobile banking, mobile phones can reduce transports costs thus reducing expenses of running a business.

Although many barriers to mobile telephony adoption persist in rural and poor communities, most significantly high usage prices, the mobile phone has become the most easily accessible and ubiquitous communications device in rural areas (Bhavnani et al., 2008) due to the affordability of the handset and the prepaid

mechanism. It also reduces entry barriers to telecommunications services in general, since it can be used for text, voice and also the Internet, TV and radio.

### **More than just access: social media applications**

More recent studies on the digital divide also consider social dimensions of improved ICT access, usage and content. In particular, Hatem Ali (2011) acknowledges that the digital divide encompasses more than just physical access to ICTs, and therefore investigates also how and what for ICTs are being used. He argues that as a legacy of measuring connectivity and access to telephony that had only a single use, indicators measure the digital divide only in terms of physical access to infrastructure - for instance, ownership of a phone, number of telephony lines. However, he asserts that the Internet has different possible uses, such as communication, education, commerce, social and professional networking, etc. In the context of the Internet therefore, studies investigating the relationship between ICT and poverty alleviation should take into account, and make a distinction between, physical access to the infrastructure and actual use of the Internet. In particular, making a distinction between access and use of the Internet clarifies the goal of policies aimed at closing the digital divide. These should include not only an equal distribution of physical access to the infrastructure, but also equality in term of full participation and inclusion of the poor, even if they lack the financial resources (Hatem Ali 2011).

Due to its specific characteristics, social media applications, such as Facebook, provide a simple channel of communications which is not dependent on any content published by a proprietary entity or dependent on a particular technology. Social media applications empower people to publish their own content and to share with their community what is relevant for them, in their local language, removing the limiting one-to-many centralised approach of broadcasting information or the restricted one-to-one communication in the form of text messages or emails. Moreover, mobile social media applications lower the ICT skills requirements, requiring less technical training to learn compared to computers.

The content is available for free and may be communicated in local languages - potentially overcoming linguistic barriers. Linguistic barriers represent a major obstacle to Internet adoption in developing countries. Blogging and social networking applications have been solving the technical challenges behind the language barrier and can support any language. Lastly, it has the capacity to foster participation and democratisation, since it shifts the role of users from passive receivers of information to active participants in public debates.

Livingston et al (2011) conducted a face-to-face survey of 25,000 9 to 16 year old Internet users and their parents in 25 countries and found that social networking is the most popular activity among European children with 38 per cent of the 9 -12 year olds and 77 per cent of the 13-16 year olds having a social networking profile (Facebook, for example). Although still nascent in developing countries a similar trend is expected.

In the context of increasing evidence of ICT contributing the economic and social wellbeing and widespread policy commitments to improving affordable access to ICTs to this end, this paper investigates how Ethiopians, Namibians, Rwandese, Tanzanians and Ugandans access and use the Internet and social media applications in both as policy outcomes and to identify points of policy intervention in order to better meet such objectives.

### **Methodology**

The RIA e-Access & Usage survey delivers nationally representative results for households and individuals. Using Enumerator Areas (EA) of the national census sample frames as primary sampling units and sampling households from created listings for each EA. The random sampling was performed in four steps for households and five steps for individuals.

- Step 1: The national census sample frames was split into urban and rural Enumerator areas (EAs).
- Step 2: EAs were sampled for each stratum using probability proportional to size (PPS).
- Step 3: For each EA a listing was compiled, serving as sample frame for the simple random sections.
- Step 4: 24 Households were sampled using simple random samples for each selected EA.
- Step 5: From all household members 15 years or older or visitor staying the night at the house one was randomly selected based on simple random sampling.

The desired level of accuracy for the survey was set to a confidence level of 95% and an absolute precision (relative margin of error) of 5%. The population proportion P was set conservatively to 0.5 which yields the largest sample size (Lwanga & Lemeshow, 1991). The minimum sample size was determined by the following equation (Rea & Parker, 1997):

$$n = \left( \frac{Z_{\alpha} \sqrt{p(1-p)}}{C_p} \right)^2 = \left( \frac{1.96 \sqrt{0.5(1-0.5)}}{0.05} \right)^2 = 384$$

Inserting the parameters for the survey yields the minimum sample size for simple random sampling. Due to the sampling method chosen for the survey the minimum sample size has to be multiplied by the design effect variable (Lwanga & Lemeshow, 1991). In the absence of empirical data from previous surveys that would have suggested a different value, the default value of two was chosen for the design effect (UNSD, 2005). This yields then a minimum sample size of 768 for households and individuals. The actual sample size is slightly larger than the minimum requirement to compensate for clustering effects and to have a wide enough spread of EAs throughout a country.

Table 1: Survey summary	
Target Population	All households and all Individuals 15 years or older.
Domains	1 = national level
Tabulation groups	Urban, Rural
Oversampling	Urban 60% Rural 40%
Clustering	Enumerator Areas (EA) national Census
None Response	Random substitution
Sample Frame	Census sample from NSO
Confidence Level	95%
Design Factor	2
Absolute precision	5%
Population Proportion	0.5, for maximum sample size
Minimum Sample Size	768
Household	Constitutes a person or group of persons, irrespective of whether related or not, who normally live together in the same housing unit or group of housing units and have common cooking arrangements.

Table 1: Survey summary	
Head of household	A head of a household is a person who economically supports or manages the household or, for reasons of age or respect, is considered as head by members of the household, or declares himself as head of a household. The head of a household could be male or female.
Member of a household	All persons who lived and ate with the household for at least six months including those who were not within the household at the time of the survey and were expected to be absent from the household for less than six months. All guests and visitors who ate and stayed with the household for six months and more. Housemaids, guards, baby-sitters, etc. who lived and ate with the household even for less than six months.

Weights were constructed, for households and individuals. The weights are based on the inverse selection probabilities<sup>5</sup> and gross up the data to national level when applied.

$$\text{Household weight: } HH_w = DW \frac{1}{P_{HH} * P_{EA}}$$

$$\text{Individual weight: } IND_w = DW \frac{1}{P_{HH} * P_{EA} * P_I}$$

$$\text{Household Selection Probability: } P_{HH} = \frac{n}{HH_{EA}}$$

$$\text{EA Selection Probability: } P_{EA} = m \frac{HH_{EA}}{HH_{STRATA}}$$

$$\text{Individual selection Probability: } P_I = \frac{1}{HH_{m15+}}$$

$DW$  = design weight compensation for over-sampling of major urban and other urban EAs and under-sampling of rural EAs;

$HH_{EA}$  = number of households in selected EA based on information of last census or updated listing by field team;

$HH_{STRATA}$  = number of households in strata (major urban, other urban, rural);

$HH_{m15+}$  = number of household members or visitors 15 years or older;

$m$  = target number of EAs for each strata, (major urban, other urban, rural);

$n$  = target number of households in EA;

### Household Divide

The digital divide in Africa maps the gap between those who have access to electricity in the first instance and those who have not. Although in most of the countries analysed more than a half of the households have access to electricity, with Ghana and South Africa with more than two third of households connected to the grid, Tanzania, Uganda, Rwanda and Ethiopia have not reached 20% of households connected to the electricity grid.

Radio is confirmed as the medium most widely used at a household level. It is present in more than 60% of households in Botswana, Ghana, Kenya, Namibia, Rwanda, South Africa, Tanzania, Uganda and Nigeria and in only 41% of households in Ethiopia and 33,9% in Cameroon. Ethiopia is the poorest of the countries analysed<sup>6</sup>.



In Cameroon, Ghana and South Africa radio ownership at a household level declined between 2007 and 2011 indicating a substitution of radio by TV, while for Tanzania, Uganda and Rwanda, which have a far lower television penetration, radio access is still on the increase. The share of households with a working TV increased in all countries except Ethiopia where the share stagnated.

Table 1: Households with working ICT appliances or access									
		Electricity from Grid	Cooker or stove	Fridge	Radio	TV	Fixed-line	Computer	Internet
Botswana	2011/12	60.1%	75.5%	53.6%	66.4%	59.4%	15.0%	15.7%	8.6%
	2007/8	47.5%	70.7%	41.4%	65.3%	45.8%	11.0%	4.5%	0.1%
	Change	12.6%	4.8%	12.2%	1.1%	13.6%	4.0%	11.2%	8.5%
Cameroon	2011/12	64.5%	29.8%	14.8%	33.9%	44.3%	2.2%	8.6%	1.3%
	2007/8	57.1%	21.4%	13.7%	62.3%	38.1%	1.8%	4.1%	1.2%
	Change	7.4%	8.4%	1.1%	-28.4%	6.2%	0.4%	4.5%	0.1%
Ethiopia	2011/12	18.1%	3.6%	3.1%	40.7%	10.0%	4.0%	0.7%	0.5%
	2007/8	24.9%	4.0%	2.4%	42.5%	10.1%	7.6%	0.2%	0.1%
	Change	-6.8%	-0.4%	0.7%	-1.8%	-0.1%	-3.6%	0.5%	0.4%
Ghana	2011/12	73.0%	29.4%	36.7%	71.8%	54.1%	1.8%	8.5%	2.7%
	2007/8	62.6%	22.2%	33.3%	81.2%	48.8%	2.6%	5.1%	0.3%
	Change	10.4%	7.2%	3.4%	-9.4%	5.3%	-0.8%	3.4%	2.4%
Kenya	2011/12	60.1%	41.7%	14.1%	80.6%	54.4%	0.6%	12.7%	12.7%
	2007/8	46.6%	20.9%	11.7%	81.2%	46.0%	2.3%	5.5%	2.2%
	Change	13.5%	20.8%	2.4%	-0.6%	8.4%	-1.7%	7.2%	10.5%
Namibia	2011/12	41.8%	42.8%	40.6%	72.0%	40.6%	11.5%	14.7%	11.5%
	2007/8	44.6%	44.0%	41.6%	72.6%	37.9%	17.4%	11.2%	3.3%
	Change	-2.8%	-1.2%	-1.0%	-0.6%	2.7%	-5.9%	3.5%	8.2%
Rwanda	2011/12	15.6%	1.5%	3.0%	72.4%	9.0%	0.2%	2.0%	0.7%
	2007/8	4.7%	0.1%	0.6%	58.1%	2.7%	0.1%	0.3%	0.0%
	Change	10.9%	1.4%	2.4%	14.3%	6.3%	0.1%	1.7%	0.7%
South Africa	2011/12	89.2%	82.0%	74.2%	62.3%	78.2%	18.0%	24.5%	19.7%
	2007/8	77.2%	73.0%	69.8%	77.7%	71.1%	18.2%	14.8%	4.8%
	Change	12.0%	9.0%	4.4%	-15.4%	7.1%	-0.2%	9.7%	14.9%
Tanzania	2011/12	19.4%	5.3%	8.5%	63.1%	18.3%	0.4%	1.6%	0.8%
	2007/8	13.4%	2.0%	4.5%	60.1%	10.6%	0.9%	1.0%	0.0%
	Change	6.0%	3.3%	4.0%	3.0%	7.7%	-0.5%	0.6%	0.8%
Uganda	2011/12	13.4%	3.5%	5.5%	76.6%	12.9%	1.5%	2.2%	0.9%
	2007/8	9.5%	1.5%	3.0%	69.7%	8.3%	0.3%	1.2%	0.0%
	Change	3.9%	2.0%	2.5%	6.9%	4.6%	1.2%	1.0%	0.9%
Nigeria	2011/12	58.4%	27.2%	24.3%	69.5%	53.0%	0.3%	6.6%	3.4%

In line with global trends, most of the countries analysed such as Ethiopia, Ghana, Kenya, Namibia, South African and Tanzania saw a decline in residential fixed-line phones. While Cameroon, Uganda and Rwanda saw a modest increase, Botswana had an increase of 36.4 percentage points compared to 2007/8, reaching a fixed-line penetration of 15%. Also Ethiopia had a relatively high fixed-line penetration with 4% of household having a fixed-line phone following the roll-out of a national VSAT network across the country.

Only Kenya, Namibia, and South Africa had a significant share of households with Internet access. While off a relatively low base, Namibia saw the share of households with Internet access nearly quadruple with an increase from 3.3% to 11.9%, mostly due to individual mobile Internet access used by households. The same effect has



been experienced in Kenya, where the number of Internet connections at home increased from 2.2% in 2007/8 to 12.7% in 2011.

## Mobile

Figure 1 below depicts individual mobile phone ownership in most of the countries except Ethiopia and Rwanda is increasing and it is higher than 40% threshold critical mass in voice networks, which is believed to trigger the network effects associated with economic growth discussed above (See Röller and Waverman, 2001)<sup>7</sup>. Prepaid remains the preferred mode of paying mobile usage in all the countries, with more than 98% of individuals reporting usage of prepaid SIM cards except in Botswana, Ghana, Namibia, Rwanda and South Africa, where post-paid contracts are growing. This might be due to an increasing number of individuals with a regular income, proof of residence and ID, necessary conditions to apply for a mobile phone contract in countries such as Namibia and South Africa.

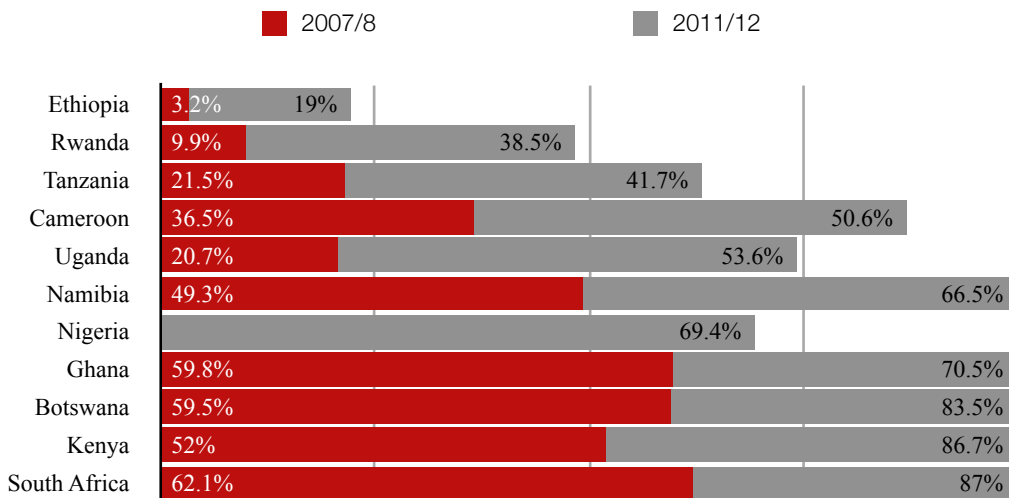


Figure 1: Share of 15+ that owned a mobile phone or active SIM card (2007/8 figure for 16+)

In Tanzania, Uganda and Ghana the number of users that have mobile phones capable of browsing the Internet is two to three times larger than those that actually use it for Internet browsing. Yet, together with the increasing diffusion of smartphone among the population, the mobile phone is becoming the favourite ICT device to access and browse the Internet. For instance in Namibia, where nearly 31% of mobile phone owners have a handset capable of browsing the Internet, 24% of mobile phone owners use their phone for browsing the Internet, while over 12% to read and write emails and 17% to access social networking applications, which is boosting Internet adoption in the country. In countries with lower levels of mobile phone ownership, such as Tanzania, only 5,2% of mobile phone owners use the mobile for browsing the Internet and reading and writing emails and slightly less use their phones to access social networking applications. In most of the countries analysed such as Botswana, Cameroon, Ghana, Kenya, Namibia, Nigeria, Rwanda, South Africa, and Uganda, the usage of social networking applications (such as Facebook) through the mobile phone is higher than using it to read and write emails, indicating a substitution effect of the email with social networking platforms.

	15+ that own a mobile phone	15+ owning a mobile phone					15+ not owning a mobile phone	
		prepaid	Mobile is capable of browsing the Internet	Use social networking (Facebook, etc)	Browse the Internet on mobile	Reading and writing e-mails on mobile	Used a mobile in the past three months	Own active SIM Card
South Africa	84.2%	87.5%	51.0%	25.4%	27.6%	16.7%	53.2%	2.8%
Botswana	80.0%	97.4%	29.5%	18.4%	22.8%	16.5%	56.9%	3.6%
Kenya	74.0%	99.8%	32.3%	24.5%	25.3%	19.7%	93.6%	12.7%
Nigeria	66.4%	99.0%	22.7%	15.8%	16.0%	14.6%	27.0%	3.1%
Ghana	59.5%	97.4%	28.5%	11.3%	13.4%	9.5%	53.9%	10.9%
Namibia	56.1%	91.8%	30.7%	17.3%	23.8%	12.4%	41.6%	10.5%
Uganda	46.7%	98.0%	14.9%	6.7%	7.7%	6.0%	45.3%	7.0%
Cameroon	44.5%	99.0%	14.9%	7.7%	8.1%	4.3%	36.2%	6.1%
Tanzania	35.8%	99.5%	19.2%	4.7%	5.2%	5.2%	53.1%	5.9%
Rwanda	24.4%	90.1%	19.1%	13.6%	14.9%	13.3%	36.2%	14.1%
Ethiopia	18.3%	98.4%	6.5%	2.1%	5.1%	9.7%	31.2%	0.6%

### Individual Computer or Laptop Use

The level of computer usage is still very low in all the countries analysed, except in South Africa and Kenya. Table 4 shows that in Uganda, Rwanda, Ethiopia and Tanzania less than 5% of the population use a computer and even 2% or less in Ethiopia and Tanzania. In countries such as South Africa, Namibia, Ghana, and Nigeria, which have a higher number of households linked to the electricity grid, home was the preferred place to use a computer. Countries such as Tanzania, which has a very low level of electrification, and in countries with a lower level of GDP per capita such as Kenya and Cameroon, the main access location was Internet cafes.

	15+ that use a computer	Location where the computer is used (multiple response)					
		Work	School, University	Library	At home	Internet Café	At a friends place
South Africa	29.1%	40.2%	22.8%	6.1%	61.1%	29.0%	20.7%
Kenya	21.2%	36.8%	40.2%	16.9%	56.0%	68.8%	45.9%
Cameroon	15.1%	20.7%	33.4%	7.7%	38.0%	63.5%	35.9%
Namibia	13.0%	60.6%	36.7%	28.5%	73.1%	28.4%	45.5%
Ghana	10.0%	42.9%	44.5%	6.2%	72.6%	54.4%	24.9%
Nigeria	7.5%	45.9%	36.1%	4.5%	73.1%	61.8%	58.3%
Uganda	4.8%	45.5%	51.4%	25.0%	35.7%	57.0%	60.9%
Rwanda	3.5%	54.5%	35.3%	18.9%	59.4%	45.2%	25.1%
Ethiopia	2.0%	34.1%	48.4%	9.2%	23.9%	28.5%	5.3%
Tanzania	1.9%	41.0%	23.6%	8.5%	47.7%	65.8%	27.8%

By comparison, in Ethiopia - the poorest countries of those analysed, half of computer users primarily access PC at school and university. This may be the result of the 2006 Education Sector Development Programme and the ICT in Education Implementation Strategy and Action Plan (Hare, 2007) which improved computer usage at an educational level.

	<b>Writing letters, editing documents</b>	<b>Calculations using spreadsheets such as Excel</b>	<b>Browsing the Internet</b>	<b>Programming</b>	<b>Remixing content found online</b>	<b>Playing games</b>
South Africa	<b>74.3%</b>	53.5%	71.4%	35.3%	37.2%	62.3%
Kenya	74.0%	60.4%	<b>88.6%</b>	47.5%	48.9%	58.7%
Cameroon	<b>77.8%</b>	52.3%	61.7%	19.3%	41.1%	65.7%
Namibia	<b>90.9%</b>	77.2%	75.8%	48.6%	50.5%	71.9%
Ghana	<b>82.4%</b>	60.6%	56.2%	48.1%	50.1%	80.3%
Nigeria	<b>76.8%</b>	49.1%	75.8%	48.6%	24.6%	66.0%
Uganda	71.1%	60.1%	66.6%	68.4%	65.3%	<b>74.7%</b>
Rwanda	<b>93.9%</b>	79.9%	87.7%	17.0%	26.8%	26.8%
Ethiopia	<b>62.3%</b>	30.8%	37.0%	13.3%	19.0%	52.6%
Tanzania	<b>74.4%</b>	38.6%	69.4%	57.6%	57.6%	58.0%

In all the countries analysed, except Uganda and Kenya, writing letters and editing documents is the most common use of the computer. The high percentage of computer owners who were using the computer for browsing the Internet was observed in particular in Kenya and Rwanda. In these countries, Internet use is becoming one of the main reasons to own a computer or laptop.

### **Individual Internet Access & Usage**

Internet usage has increased in all countries under investigation in the past four years. Growth rates in East African Internet adoption are encouraging despite starting off from a very low base. Uganda, Ethiopia and Rwanda more than tripled the number of Internet users.

	<b>15+ that use the Internet</b>			<b>Where the Internet was first used</b>		<b>Where did you use the Internet in the last 12 months?</b>				
	<b>2007/8</b>	<b>2011/12</b>	<b>Diff.</b>	<b>Computer</b>	<b>Mobile phone</b>	<b>Mobile phone</b>	<b>Work</b>	<b>Place of education</b>	<b>Another persons home</b>	<b>Internet Cafe</b>
South Africa	15.0%	33.7%	18.7%	65.1%	34.9%	<b>70.6%</b>	35.8%	20.9%	14.3%	32.4%
Botswana	5.8%	29.0%	23.2%	70.6%	29.4%	<b>64.1%</b>	51.1%	32.2%	43.7%	58.3%
Kenya	15.0%	26.3%	11.3%	68.9%	31.1%	<b>77.8%</b>	31.4%	38.8%	38.9%	<b>72.4%</b>
Nigeria		18.4%		45.2%	<b>54.8%</b>	<b>74.9%</b>	29.3%	19.6%	30.3%	45.1%
Namibia	8.8%	16.2%	7.4%	50.1%	<b>49.9%</b>	<b>87.3%</b>	48.4%	36.0%	32.6%	22.5%
Cameroon	13.0%	14.1%	1.1%	82.1%	17.9%	29.7%	9.8%	20.1%	18.7%	<b>80.0%</b>
Ghana	5.6%	12.7%	7.1%	70.5%	29.5%	61.2%	34.6%	50.9%	34.5%	<b>84.7%</b>
Uganda	2.4%	7.9%	5.5%	28.2%	<b>71.8%</b>	<b>81.3%</b>	55.0%	51.2%	54.0%	<b>74.0%</b>
Rwanda	2.0%	6.0%	4%	70.8%	29.2%	<b>70.9%</b>	52.1%	30.7%	24.9%	50.2%
Tanzania	2.2%	3.5%	1.3%	45.8%	<b>54.2%</b>	<b>74.7%</b>	44.6%	24.4%	23.9%	62.8%
Ethiopia	0.7%	2.7%	2%	33.3%	<b>66.7%</b>	<b>80.9%</b>	17.4%	20.9%	3.5%	42.2%

South Africa has the highest Internet penetration rate among all the countries under investigation, with 33.7% of the population 15 years or older using the Internet. Namibia also managed to double its Internet users, which can be attributed to general economic growth, but also to falling prices of telecommunication and Internet access due to positive developments in Namibia's policy and regulatory environment. Botswana had the highest growth of Internet users compared to 2007/8. Also Uganda, Rwanda and Tanzania grew Internet users significantly compared to 2007/8, when they had a very low percentage of population connected to the Internet. Ethiopia has the lowest level of Internet penetration with less than 3% of the population using the Internet. This is likely to be the outcome of policies that have prevented the kind of competition that has driven taken up in other jurisdictions. The Ethiopian market remains structured around a monopoly operator where a single operator provides fixed, mobile, and Internet services and maintains the international voice and data gateway (Adam, 2010).

While the first wave of Internet adoption rode on the back of desktop computers at the work place, schools and universities or public access facilities such as Internet Cafes, the second wave is sweeping across Africa through the use of mobile phones. Although the Internet penetration in most countries is still very low, more than 70% of Ugandans and 67% of Ethiopians Internet users first used the Internet on a mobile phone. In Tanzania, Namibia and Nigeria about half of the population use the Internet first on a mobile.

The growing importance of the mobile phone to access the Internet is also stressed by the responses to the question "Where did you use the Internet in the last 12 months?" Either complementarily to computer access or exclusively, above 80% of Internet users in Namibia, Uganda and Ethiopia access the Internet via a mobile phone. For South Africa, Kenya, Nigeria, Tanzania and Rwanda Internet is accessed through a mobile phone by 70% of Internet user. In most of the countries except Cameroon and Ghana the mobile has overtaken Internet cafe, historically the most common way to access the Internet.

Also positive is the increase in usage intensity. Daily use rose over the past four years at the expense of the once-a-week and once -a-month usage in all countries examined. A significant increase was observed in Rwanda and Ethiopia.

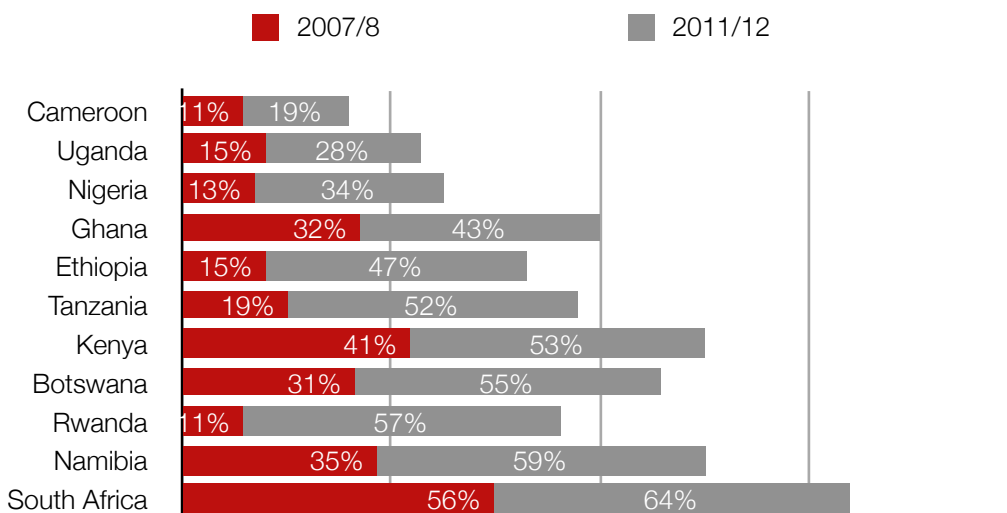


Figure 2: Frequency of Internet daily usage in the last 3 months (Source: RIA, 2011 / RIA 2007).

Linked to the increase in usage density, figure 3 depicts the magnitude of the new wave of Internet users. In Ethiopia almost half of Internet users started browsing the web during the last year. On the contrary, the share of early Internet adopters (share

of Internet users that started using the Internet 4 years or earlier) is larger in Botswana, Rwanda, South Africa and Ghana.

While Namibia reflects early adopters already forming a wider base compared to the other countries, Rwanda's continued low mobile Internet adopters suggests that the country is stuck mostly with the first wave of Internet adopters. This could be the result of a number of factors ranging from lack of 3G or better mobile data access, mobile data pricing to educational limitations.

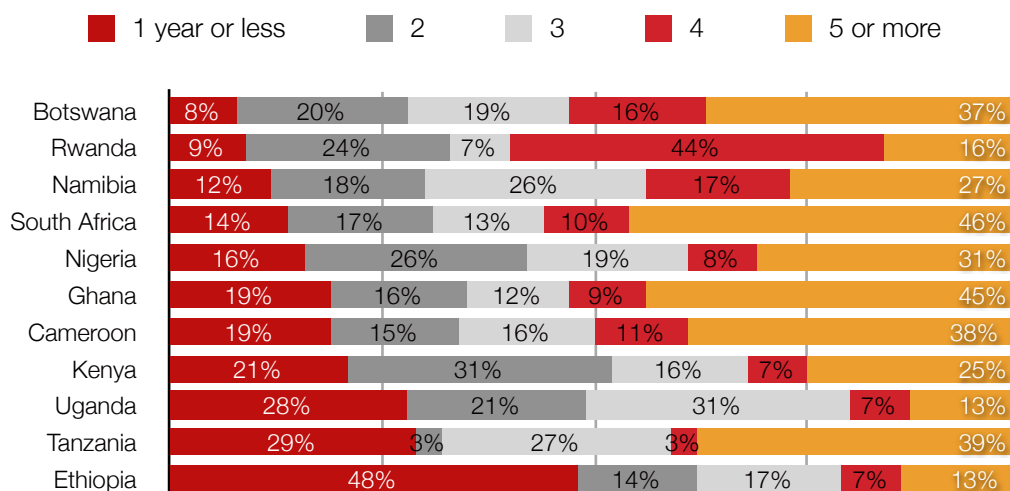


Figure 3: Share of Internet users by years since they first used the Internet

Namibia and South Africa, countries with a significant number of early adopters of Internet and as a result high penetration levels compared to the other countries examined, are the only two countries where social networking has overtaken e-mailing as a communication tool. e-mail is still being used more by Internet users in all the other countries. In particular, in Tanzania, while 86% of Internet users have an email address, only 63% are signed up for social media. This trend is similar across all countries given the only recent rise of social networking applications such as mobile adapted Facebook Zero which allows for free communication and the Opera browser. In contrast, e-mail users are charged per mega byte. Taking into account that social media enhances the communication experience through ICT because lower language barriers, ICT skills requirement and technical training, the trend is clearly towards social networking applications overtaking email as a communication tool of choice.

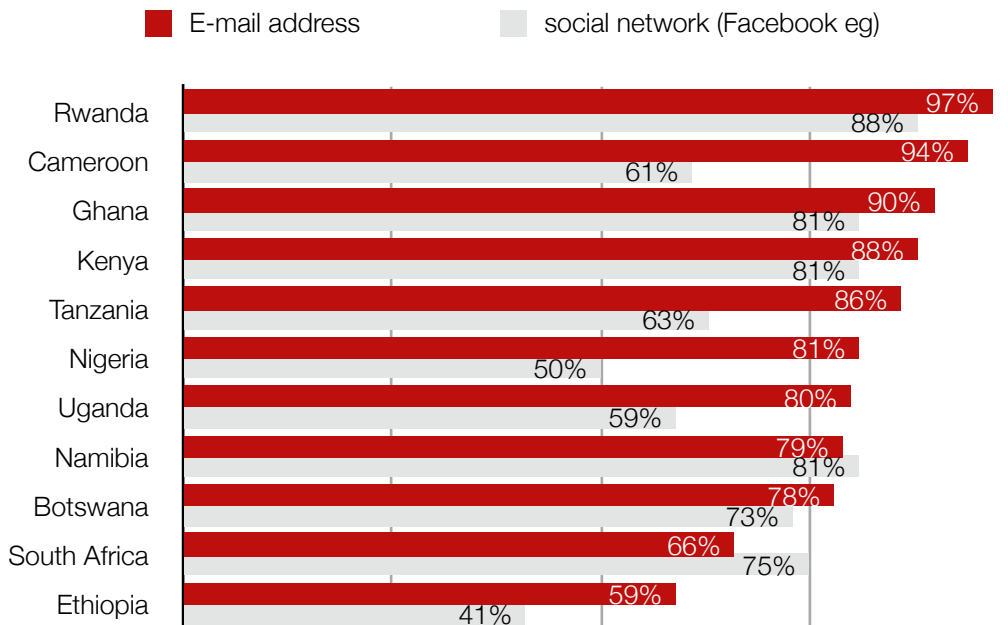


Figure 4: Share of Internet users with an email address and signed up for a online social networking application such as Facebook.

If social networking contributes to the accelerated Internet adoption primarily through mobile platforms, then one would expect mobile Internet users to be younger. One may also expect mobile Internet users to have less income compared to desktop or laptop users since mobiles are cheaper in terms of initial expenditure.

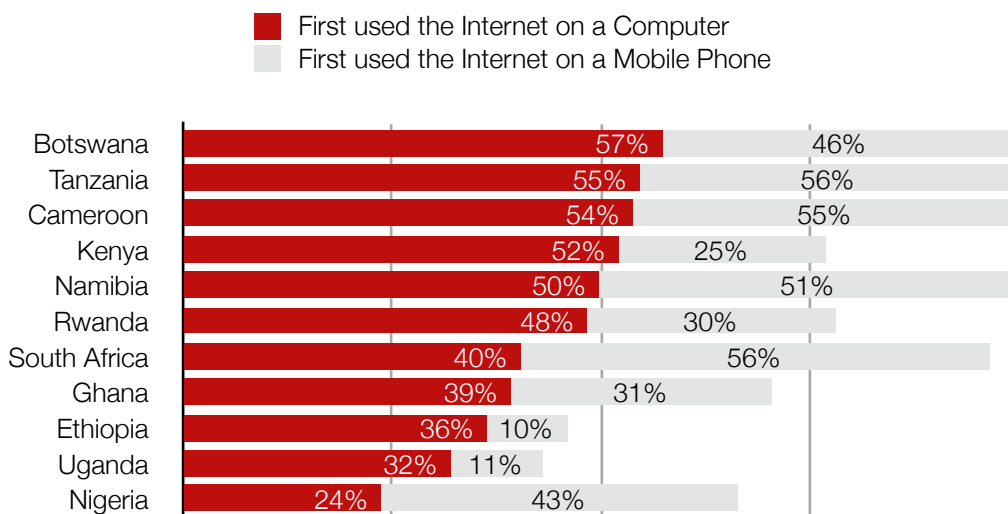


Figure 5: Share of Female Internet users distinguished by whether the Internet was first used on a computer or first on a mobile phone

In Namibia and Tanzania, for example, Internet access is balanced between the genders, while in Uganda, Ethiopia and Rwanda mobile Internet access seems to be the domain of men with only between 10%-30% of mobile Internet users being female. A paper by Milek et al (2010) found that no significant gender effect for mobile phone ownership can be found when including income and education as explanatory variables. This means that women with similar income, education and employment status are as likely as men to own a mobile phone. But as women generally have less access to employment and education this decreases the likelihood of mobile ownership and mobile Internet use.

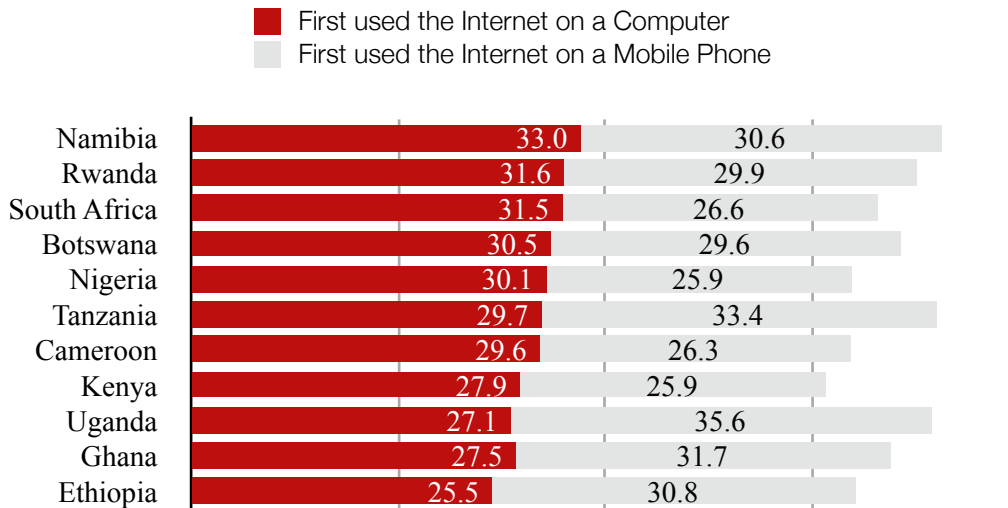


Figure 6: Average age distinguished by whether the Internet was first used on a computer or first on a mobile phone

From figure 6, which depicts the average age distinguished by whether the Internet was first used on a computer or first on a mobile phone, it seems that mobile Internet is not primarily a young-generation phenomenon in all African countries. In Tanzania, Uganda, Ghana and Ethiopia the population which used Internet first on a mobile phone is generally older than those using the Internet first on a PC.

	I dont know what the Internet is	No interest / not useful	I dont know how to use it	No computer / internet connection	Too expensive	No time, too busy	None of my friends use it:	Is too slow, limited bandwidth
Uganda	72.5%	57.9%	89.4%	83.4%	77.3%	36.7%	75.1%	34.6%
Kenya	57.7%	51.6%	81.1%	78.4%	65.2%	30.9%	36.1%	11.0%
Tanzania	77.9%	57.9%	95.6%	96.2%	84.7%	33.4%	87.2%	18.2%
Rwanda	63.6%	43.1%	77.9%	72.5%	74.1%	16.8%	57.1%	14.0%
Ethiopia	86.9%	2.1%	10.1%	9.6%	5.0%	1.6%	7.6%	1.6%
Ghana	51.6%	64.5%	94.2%	85.1%	71.2%	44.0%	67.9%	16.1%
Cameroon	53.6%	64.3%	90.8%	84.2%	56.1%	33.4%	53.5%	25.6%
Nigeria	56.7%	41.6%	87.2%	74.1%	67.5%	21.3%	59.5%	14.4%
Namibia	68.1%	59.1%	88.1%	90.7%	78.4%	42.7%	71.8%	35.5%
South Africa	49.2%	41.6%	75.4%	86.2%	60.2%	21.5%	56.1%	9.8%
Botswana	46.6%	35.1%	75.3%	84.3%	66.9%	29.0%	44.9%	13.1%

Table 7 summarises the main reasons why individuals in the investigated countries do not use the Internet. Both in Namibia, Tanzania, South Africa and Botswana, not having a computer/Internet connection is the main reason for not using the Internet. In Namibia, it is followed by a lack of skills (i.e. I don't know how to use it) and by the cost of the Internet, considered by the 78.4% of non-users as too expensive. While in the majority of the countries lack of skills was identified as a major barrier to Internet adoption, cost was considered as the second biggest barrier in Uganda and Rwanda. In Ethiopia, where the price of the monopoly services are politically determined, though still high, the factor of cost was lowest at 5%.



## Conclusions

Since the 2007/2008 Research ICT Africa household and individual usage survey, Internet penetration has increased significantly across all the countries examined, though other than Namibia, Kenya and South Africa off a very low basis. The first wave of Internet access was through personal computers and laptops, and through fixed lines connections (modem dial-up) - for many Africans only at aggregated access points such as Internet cafes. This however remained the access route for early adopters and the high costs of such services saw these markets rapidly saturated. With the emergence of Internet enabled mobile phones and lower bandwidth adaptations of applications, particularly social media, the mobile phone is increasingly becoming key entry point for Internet adoption on the continent. This is most evident in Nigeria, Uganda, and Ethiopia but also an emerging trend in Namibia and Tanzania. However, in terms of Internet users, Ethiopia is being held back by absence of competition and Uganda by tax and duties on telecommunications services.

The policy implications of this are significant. Traditional reform strategies of increasing competition in the market to increase the choice of services and drive down prices, that would meet pent up demand through improving the efficiency gap in the market are more likely to enhance access to the Internet than traditional universal service strategies that seek to aggregate users or complex mechanisms to subsidise low end users. However, the extension of networks to remote areas that are really uneconomic to service is likely to remain a problem and reverse subsidies to competitively subsidise the extension of networks to these areas may still be required. While greater competition in some of these markets and more effective regulation of them may improve market efficiency and mop up some of the demand for services with lower prices, a real access gap may exist in some currently underserved areas where incomes may be very low and the cost of getting services are high. If however the prices decrease and demand for services is met through addressing the efficiency gap within markets (through competition or effective regulation) there should be a significantly reduced need for such interventions. Consideration should also be given to reducing secondary taxes on operators, such as universal services levies, so that as few investment incentives exist as possible in order to reduce services costs, increase economies of scale and scope of operators and therefore their profitability and taxes. Once off subsidies can then be sought from the national fiscus (tax base) as and when required.

Evidence of a lack of skills being a main deterrent for Internet usage demonstrates that fair competitions and effective regulation thus needs to be complemented by educational, literacy and e-literacy campaigns to enable equitable access to enhanced communication services as will be the development of relevant content and applications.. Likewise, addressing gender equity in access to the Internet more sustainably will only be achieved through more equitable access to education for girls and therefore employment opportunities and income, not narrow based interventions within the sector such as targeting women with gender specific devices or exceptionally priced services.

Other demand stimulation strategies such as reduction of taxes on devices or removal of VAT could also drive take up of Internet enabled devices. Mobile Internet access through more affordable prepaid Internet allows less affluent people to gain access to the Internet. This increases the potential for effective citizen participation and economic inclusion. They can recharge airtime to use the Internet whenever they have money available and use a device for Internet access with which they are already familiar. Mobile phones require less capital to purchase and considerably less skills to operate than computers. Greater emphasis should as result be placed on m-government services rather than traditional e-government services which assume computer access to the Internet.

However, there is still substantial progress to be made in reducing barriers to prepaid mobile broadband, ranging from lowering cost of devices and services, reducing taxation and improving access to underserved areas. Policy in support of greater

Internet access will still need to balance this new opportunity to affordably access the Internet with the demand for high speed always on bandwidth required to optimise Internet usage under particular high usage residential, educational and business circumstances than determine a country's global competitiveness.

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1 The surveys were made possible with a grant by the International Development Research Centre (IDRC) Ottawa, Canada. In Namibia, the survey was conducted in cooperation with the Namibian regulator, Communications Regulatory Authority of Namibia (CRAN) and the Namibian Broadcasting Cooperation (NBC). In South Africa the survey was done in collaboration with the Wits Journalism Media Observatory responsible for the South African Network Society Survey.

2 Nationally representative household and individual surveys were conducted across 17 countries in 2007 and 2008 and 12 countries in 2011-2012. These results only include, Botswana, Cameroon, Ethiopia, Ghana, Kenya, Namibia, Rwanda, South Africa Tanzania and Uganda<sup>3</sup>. The survey results are preliminary results and will be adjusted as soon as latest Census results are released in a number of countries. South Africa and Namibia conducted a census in 2011. For other countries the 2009 and 2010 have not yet been released (Ghana for example). World Bank projections for 2010 are being used for all countries.

3 Jipp (1963) was among the first to identify the positive association between telecommunications infrastructure and economic growth followed by Hardy in 1980. Cronin, Colleran, Parker and Gold (1993) build on the linkages between infrastructure and economic development and Cronin and Colleran together with Hebert and Lewitzky (1993) also demonstrate the contribution of telecommunication infrastructure investment to aggregate and sectoral productivity. Subsequently Röller and Waverman (2001), Koutroumpis (2009) Kim et al 2010) link ITU teledensity figures for fixed, mobile or broadband users to macro-economic variables such as GDP or total factor productivity.

4 ICT for poverty alleviation is a controversial academic topic. There is a wide literature on the correlation between ICT and poverty alleviation. For instance, Flor (2001) identifies an “indisputable link” between a higher human poverty index and a lower penetration rate of ISPs, telephone lines, PCs and TV sets in Southeast Asia. By contrary, a higher value of ICT indicators was found in countries with lower poverty index. The World Bank in 2002 addressed the issue of ICT as a tool for empowerment and income generation in Less Development Countries (LDCs) in a study investigating the cost effectiveness of radio, telephony and the Internet in an LDC case (Kenny, 2002). A study by Obayelu and Ogunlade (2006) describes how ICT could be used for gender empowerment and poverty alleviation in Nigeria concluding that poverty alleviation is unlikely to be achieved without an appropriate use of ICT. Another study based on the linkages between ICT access and poverty conducted in Uganda in 2007 reveals that access to traditional ICTs is associated with lower incidence of poverty. However, ICT access it is not enough as a tool for poverty alleviation and needs to be complemented by other measures (Ssewanyana, 2007).

<sup>5</sup> See UNSD (2005) page 119 for a detailed discussion on sampling weights.

<sup>6</sup> Ethiopia has a GDP per capita of USD 1,100.00 (2011 est.). Source CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html>

<sup>7</sup> Only Rwanda and Ethiopia did not reach the 40% threshold. However, mobile phone ownership grew by 288% in Rwanda and by 493,75% in Ethiopia.