

Towards Evidence-based ICT Policy and Regulation:

ICT access and usage in Africa

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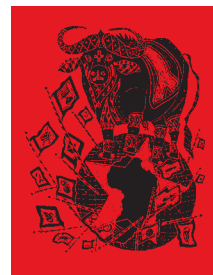
ResearchICTAfrica (RIA) fills a strategic gap in the development of a sustainable information society and network knowledge economy by building the ICT policy and regulatory research capacity needed to inform effective ICT governance in Africa. The network was launched with seed funding from the International Development Research Centre (IDRC) and seeks to extend its activities through national, regional and continental partnerships. The establishment of the RIA network emanates from the growing demand for data and analysis necessary for appropriate but visionary policy required to catapult the continent into the information age. Through network development RIA seeks to build an African knowledge base to support ICT policy and regulatory design processes and to monitor and review policy and regulatory developments on the continent. The research arising from a public interest agenda is available in the public domain and individuals and entities from the public and private sector and civil society are encouraged to use it for teaching, further research or to enable them to participate more effectively in national, regional and global ICT policy formulation and governance. This research is made possible by the significant funding received from the IDRC, Ottawa, Canada and the network members would like to express their gratitude to the IDRC for its support. The network is hosted at The Edge Institute in Johannesburg under the directorship of Alison Gillwald.

This policy paper draws on a rich data set arising from the household and individual access and usage survey conducted across 17 African countries under the project leadership of **Dr Christoph Stork** and at country level: Dr Augustin Chabossou (Benin), Dr Sebusang Sebusag (Botswana), Dr Pam Zahonogo (Burkina Faso), Dr Olivier Nana Nzèpa (Cameroon), Prof Dr Arsene Kouadio (Cote d'Ivoire), Dr Lishan Adam (Ethiopia), Dr Godfred Frempong (Ghana), Dr Tim Waema (Kenya), Francisco Mabila (Mozambique), Dr Christoph Stork (Namibia and South Africa), Prof Dr Ike Mowete (Nigeria), Albert Nsengiyumva (Rwanda), Dr Ray Mfungahema (Tanzania), Dr FF Tusubira and Nora Mulira (Uganda), Sikaaba Mulavu (Zambia).

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SUMMARY

This paper is part of a series that contributes to evidence-based Information Communication Technology (ICT) policy formulation and regulation on the continent by providing decision makers with the information and analysis necessary to assess the regulatory impact and policy outcomes of telecommunications reform against actual sector performance.

This paper reports on the findings of the second household and individual user survey of access and usage conducted by RIA between 2007 and 2008 across 17 African countries. It builds on the first household survey conducted by RIA in 2004/5 and a number of subsequent supply-side studies that have demonstrated that across the continent, even where there has been overall sector growth, sector performance has been sub-optimal. For the most part, the primary national policy objectives of delivering affordable access to telecommunications have not been met.

What the studies confirm is that mobile telephony is addressing the gap between those who have voice services and those who do not. However, the divide between those able to access the Internet and the range of enhanced services that have become necessary for effective citizenry and consumer participation, and those not able, has widened. This is not only as a result of limited access but also due to the high cost of communications that not only inhibits access but also constrains individual communication and inflates the input cost to business.

This demand-side survey provides insight into the continued marginalisation of large numbers of Africans, even from basic communications services, and confirms the sub-optimal use of communications services due to the high cost of access to services. The value attached to accessing and utilising communications is evident in the considerable portion of household income spent on communications and the multiple strategies used by individuals to maintain communication access according to their cash flow and the prices of alternatives.

The willingness-to-pay model arising from the survey suggests that relatively small reductions in the cost of equipment and services would result in increased uptake and usage, with a significant growth in revenue for operators. There is also evidence of considerable pent-up demand in countries such as Côte d'Ivoire, for example, where the amount that those without mobile services would be willing to pay for a handset is roughly the same price as the real cost of a handset.

What these findings indicate is that sector reforms have generally been sub-optimal. The introduction of limited competition particularly in mobile services has indisputably improved access particularly to voice services but insufficient competition or effective price regulation has constrained take-up and usage amongst those who have access to communication services and resulted in high prices.

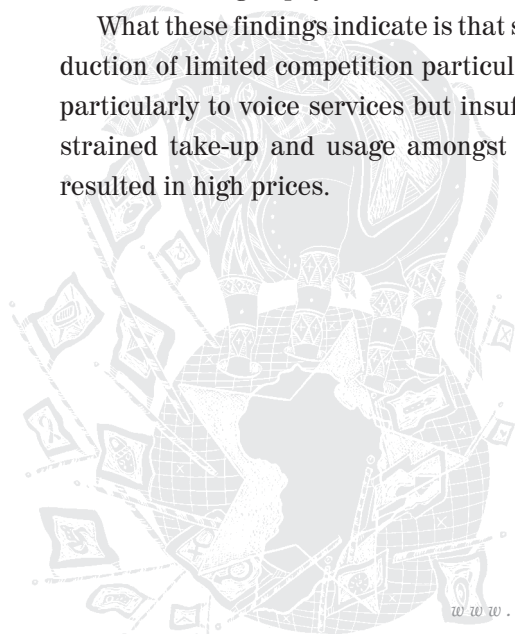




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ICT access and usage in Africa

ALISON GILLWALD and **CHRISTOPH STORK** assess the findings of the only trans-Africa household and individual user survey of fixed and mobile telephony and the Internet to understand what the implications of these are for policy and regulatory strategies across the continent. They find that while the value that Africans place on communications is evident in the extraordinary growth of mobile telephony, and the continued widespread use of public pay phones where they are available, the high cost of communications means that their actual usage of these services is restricted and the portion of their incomes spent on communications is exponentially higher than the average communications spend on other continents.

INTRODUCTION

Across the African continent information communication technologies (ICT) continue to be hailed as the drivers of economic growth and development. However, despite the success of mobile communications in the last decade, there is limited and uneven evidence of its contribution to growth and development, unlike OECD economies.¹ One of the reasons for this is that the necessary reform of telecommunications' markets, essential to the development and incorporation of ICTs into the economy, has been very uneven, producing mixed outcomes. Despite rhetorical and sometimes even legal commitments to securing the development of the sector through private sector participation, the introduction of competition has been limited and many markets have not been restructured fundamentally to realise the positive outcomes for consumers and users associated

¹ See OECD (2005) Good Practice Paper on ICTs for Economic Growth and Poverty Reduction. *Development and Assistance Committee Journal*, vol 6 no 3.



with competitive markets. As a result, despite the exponential growth of mobile services, performance has been sub-optimal: the critical mass of about 40% penetration at which the positive network effects associated with economic growth are believed to kick in, has not been reached in most markets.²

This is not to suggest that the markets will solve all the access problems, but what is often attributed to ‘markets’ not working’ is in fact failure to establish working markets. Across the globe, even in mature markets, governments or their specialised agencies are regulating markets to ensure competitiveness and delivery. While the private sector is increasingly recognised as the key driver of economic growth, effective regulation is acknowledged as necessary, not only to ensure fair competition and economic efficiency, but also to conduct social regulation to address issues of equity and inclusion. This intervention may be required even more in African countries where markets are highly imperfect - dominant operators extract monopoly rents, duopolists and oligopolists engage in price matching rather than competition, and their behaviour is mostly unchecked by regulatory adjustment. This, together with institutional arrangements that often permit political interference or capricious behaviour by regulators, heightens regulatory risk and is not conducive to the long-term investment required to build modern, networked economies.

While less risk-adverse operators, with rapidly deployable networks able to see quick returns on their investment, have risen under these conditions, many African countries have struggled to secure investment in backbone development. This is not because governments have not recognised the important role of a pervasive communications infrastructure to build a modern economy, integrate national economies in the global economy and become globally competitive, but they have often not created conditions conducive to investment. Some governments, such as South Africa, have thus begun pouring significant state money into infrastructure development. These investments, under different conditions, may well have been undertaken by private capital and the re-entry of the state into provisioning within the sector might squeeze out private investment. Others, such as Uganda, have entered into long-term agreements with suppliers to expand networks that may arguably have been more efficiently operated in a more competitive environment. On the other hand the duplication of resources in facilities based competition might not be something most developing countries can support. Aggregating usage into a single national backbone may provide efficiencies that developing countries cannot ignore. However, for these to deliver on these objectives equitable and timely access to facilities and bandwidth are required.

These linkages between new technologies and policies, markets and regulation, on the one hand, and penetration on the other, have been the focus of theoretical debates for more than two decades. However, more recently there have been endeavours to assess these relationships empirically. In mature economies such as those within the OECD, and within agencies such as the International Telecommunications Union (ITU), supply-side indicators have been collected for some time, though in the case of African countries, these were often incomplete. These indicators while providing some benchmark for countries and their ranking on an ICT development index did not provide all the evidence required to understand these relationships. Various e-readiness surveys

² See Leonard and Waverman (2006) *Telecommunications Infrastructure and Economic Development: A Simultaneous Approach*, Centre for Economic Policy Research, London. http://www.shef.ac.uk/uni/academic/N-Q/perc/npe/Ed_stat.html.



(The Economist) and a knowledge economy index (World Bank), as well as innovation measures, have been developed³, but the African research presented in this paper has really focused on filling the information vacuum at the most basic level only. It has tracked and contributed to indices that seek to measure the digital divide and tries to fill some of the basic information gaps required to assess policy outcomes.

With the digital divide increasingly on the global agenda, and the World Summit on the Information Society in 2004 and 2006, greater efforts have been focused on developing more appropriate indicators for measuring this. Initiating this process the ITU developed the Digital Access Index in 2003 that focuses on five factors to measure the overall ability of individuals in a country to access and use ICTs. These include: infrastructure, affordability, knowledge, quality and usage. The indicators used for this include broadband subscribers, Internet users, fixed-telephone subscribers, and mobile cellular subscribers (all per 100 inhabitants); Internet access as a percentage of gross national income (GNI) per capita; and adult literacy, combined primary, secondary and tertiary school enrolment level and international bandwidth per capita. As part of the WSIS thematic on *Measuring the Information Society*, the ICT Development Index which became known as the Digital Opportunity Index (DOI)(2004) sought to develop a composite set of indicators for each country to measure the digital divide and monitor progress towards the Millennium Development Goals and other internationally agreed targets.

The DOI draws on the Orbicom study, *Monitoring the Digital Divide...and Beyond*. The research tries to provide a systematic way to quantify and monitor the digital divide across countries. It provides a conceptual framework that draws on the dynamic notion of an Infostate, as the aggregation of Infodensity and info-use. “Info density refers to the stock of ICT capital and labour, including networks and ICT skills, indicative of a country’s productive capacity...Info-use refers to the uptake and consumption flows of ICTs as well as their intensity of use” The study concludes that the gap between developing and developed countries is huge, with countries at the bottom continuing to lose ground. The study also notes a close correlation between a country’s Infostate and GDP per capita. For every point increase in Info density, GDP per capita increases at around US\$150. Like other studies however causality cannot be determined, specifically not the direction of causality.⁴

Following the call from the WSIS (2003) Geneva Plan of Action for a composite ICT development index, Orbicom together with the International Telecommunications Union undertook a follow-on project. *The ICT Opportunity Index*, that updated the earlier study and provided cross-sectional and time series results – RIA worked on the African case studies for this. It supported the conclusion that despite the enormous success of the introduction of mobile phones on the continent, the gap between sub-Saharan Africa, including South Africa, and the average Infostate (Hypothetica) had increased in the previous decade.

³ Kauffman and Kumar provide a review of the initiatives over the years to improve the measurement of ICT penetration, adoption, diffusion and their impact over the years.

⁴ The actual quantification of the relationship of telecommunication infrastructure investments to higher growth effects and the demonstration of causality has been a much-contested research area. However, the studies seeking to quantify this relationship and demonstrate causality indicate that positive growth effects might be contingent on having achieved a critical mass of users in a given country. Röller and Waverman found this critical threshold to be in fact close to universal access - around 40% of the population, assuming around 2.5 people per household.



In November 2006, during the last Plenipotentiary Conference, ITU's Development Sector (BDT) was instructed to develop a single index for ITU and "to promote an ICT index [...] with a view to achieving international consensus on this index." The arising Digital Opportunity Index proposed by the ITU is a composite index that allows for the tracking and comparison of different aspects of the Information Society. "As a composite index, the DOI allows the tracking and comparison of countries in different aspects of the Information Society. It measures countries' ICT capabilities in infrastructure, access path and device, affordability and coverage, and quality."⁵

While this work was going on at the global level between the summits, the realisation that a research gap existed between the national or harmonised regional policy objectives for the telecommunications sector and policy outcomes had become apparent in various research centres across the globe at the turn of the millennium.⁶ The *Towards an African e-Index* series developed by RIA arose out of the need, not only to fill some of the data gaps that existed on the continent in relation to ICT indicators, but more specifically to assess the regulatory impact and policy outcomes of telecommunications reform against actual sector performance. Starting with the development of more comprehensive and appropriate supply-side indicators the initial assessment of sector development sought to supplement the more limited supply-side indices available internationally. It was soon clear however, that in order to understand the linkages between policies, market structures and services, users of services, particularly the large number of those marginalised from necessary services, was an understanding of the demand side. In 2003 a 14-country household and individual user survey was conducted.

What these supply- and demand-side studies have demonstrated is that across the continent, even where there was overall sector growth, this has often been sub-optimal and, for the most part, the primary national policy objectives of delivering affordable telecommunications access were not being met. Most universal access strategies continued to focus on privatised monopolies in order to roll out fixed telephony and supply-driven telecentres. Yet, despite its relatively high cost, mobile telephony has been more responsive to the pent-up demand for voice telephony, especially following the introduction of flexible pre-paid services, enabling ownership of a telephone for the first time to millions of Africans. However, mobile telephony has addressed the access gap but not the usage gap. Equally it has not addressed the divide between those who are able to access the Internet and other enhanced services necessary for effective participation as a citizen and consumer, and those that do not have access to them.

To understand how ICT services are being used in Africa, the second *Demand-side survey of ICT access and usage* by over 23 000 individuals and households across 17 African countries

⁵ In 2008 the Connectivity Scorecard developed by Prof Leonard Waverman, together with Kalyan Dasgupta and Justin Tonkin, included usage and skills as well as infrastructure as did Sciadas (2007), but recognised that the ability of businesses to use ICT effectively as the primary driver of productivity and economic growth is significantly weighted. The scorecard also draws on the World Economic Forum classification of economies that develops two scorecards using different metrics to assess connectivity in those countries that have innovation-driven economies and those that are resource- or efficiency-driven. The rankings of countries as a result look quite different from many other indices based primarily on infrastructure metrics.

⁶ LIRNE.NET, a collaborative network consisting of the Danish Technical University, Technical University of Delft, the Witwatersrand University LINK Centre, the London School of Economics and LIRNEasia was one such centre. It developed research which sought to assess the impact policy and regulatory frameworks were having on sector development – the Sector Performance Review. This methodology has been adapted and developed and informs the review of telecommunications policy and regulation undertaken in 16 African countries during 2006.



was conducted during 2007 and 2008. This followed on the 2004 survey of 10 African countries, when data was collected from rural, urban and metropolitan areas providing the first disaggregated ICT data in the public domain. Again the disaggregated data includes gender, age, education and limited household income data. The survey was supplemented by focus group studies in five countries, that focused specifically on gender issues. A rich picture emerged of ICT access and usage and the reasons for people's marginalisation from services (see www.researchICTAfrica.net).

While a large number of the people continues to be excluded from access to services, others are excluded from usage by the cost of services and, as services become more complex, by the absence of the necessary skills. Expanding mobile services have improved access to voice services. The survey again revealed that users were adopting a multiple communication strategy where individuals use different services, fixed and mobile, public and private, according to available resources to maintain their access. For example, people with mobile phones often make use of public pay phones, if they are available, because low denomination calls can be made rather than purchasing airtime or because it has run out and there is no where close by to top it up.

The Internet was of limited use in this communications strategy for a number of reasons: perceptions of its unreliability due to poor network quality; limited bandwidth and high costs; or the people communicated with were not using the Internet. This is borne out by the less than 5% of households with a working Internet connection across the countries, surveyed in the 2007- 2008 demand-side survey, with most countries below 1%.

Communications access in Africa is dominated by South Africa across all four key metrics: fixed-line, Internet subscribers, mobile and broadband, despite it having far from the lowest prices. Part of the explanation must lie in the relative size of the economy and, particularly, the much higher level of GDP per capita in South Africa compared to every other country in this report with the exception of Botswana.⁷

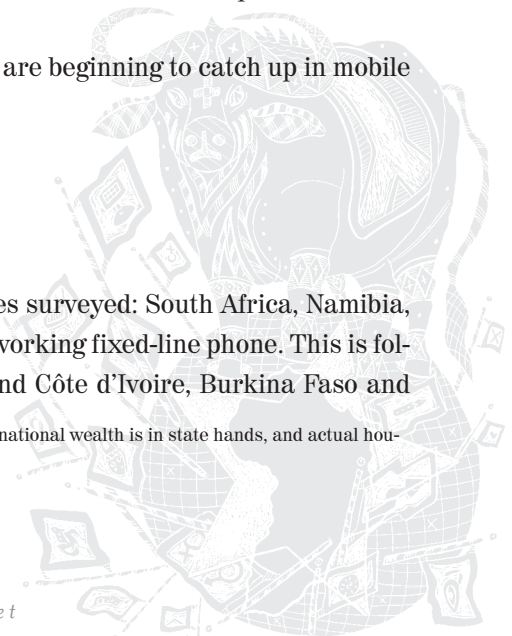
In terms of fixed-lines, South Africa remains the leader, despite its almost stagnant growth in this area. Even with a new fixed-line entrant a dramatic increase in the number of residential lines is unlikely. Though new sources of broadband access will drive take up at the enterprise level and high-end home users.

Despite South Africa's higher GDP per capita, other countries are beginning to catch up in mobile telephony such as Ghana and Nigeria.

FIXED LINE

Four countries dominate fixed-line penetration in the countries surveyed: South Africa, Namibia, Senegal and Botswana with 11 to 18% of households having a working fixed-line phone. This is followed by Ethiopia with 7.6% of households with fixed lines and Côte d'Ivoire, Burkina Faso and

⁷ While Botswana has the highest GDP per capita in sub-Saharan Africa, much of the national wealth is in state hands, and actual household incomes appear not to be higher than South Africa or Namibia.





Benin with 4.6 to 4.8%. In the remaining countries fewer than 3% of household have a fixed-line phone with Rwanda, Tanzania and Uganda having less than 1%.

TABLE 1: FIXED-LINE ACCESS (RIA HH TOTAL/RESIDENTIAL, ITU TOTAL/RESIDENTIAL)

| | RIA | | ITU | | | |
|---------------|------------------------------|---|-------------------------------------|--|---|--|
| | Share of HH with fixed lines | Number of households with fixed in 1000 | Fixed-line subscribers 2007 in 1000 | Residential share % of all fixed lines | Residential fixed-line subscribers 2007 in 1000 | Fixed-line teledensity (per 100 inhabitants) |
| Benin | 4.6% | 66.5 | 110 | 50.5 | 55.70 | 1.22 |
| Botswana | 11.0% | 45.9 | 137 | n/a | - | 7.28 |
| Burkina Faso | 4.7% | 114.2 | 95 | n/a | - | 0.70 ** |
| Cameroon | 1.8% | 47.9 | 131 | 51 | 66.66 | 0.79 ** |
| Côte d'Ivoire | 4.8% | 126.7 | 261 | 82 | 213.94 | 1.41 ** |
| Ethiopia | 7.6% | 1,020.8 | 880 | 74.8 | 658.31 | 1.06 |
| Ghana | 2.6% | 117 | 377 | 69 | 259.79 | 1.60 |
| Kenya | 2.3% | 194.4 | 265 | 36 | 95.33 | 0.71 |
| Mozambique | 1.7% | 22.4 | 67 | n/a | n/a | 0.33 ** |
| Namibia | 17.4% | 66.9 | 138 | 60 | 82.86 | 6.66 |
| Nigeria* | 2.7% | 491.9 | 6,578 | 56 | 3,683.85 | 1.07 |
| Rwanda | 0.1% | 2 | 17 | 84 | 13.86 | 0.24 |
| Senegal | 11.7% | 135.4 | 269 | 69 | 185.68 | 2.17 |
| South Africa | 18.2% | 2,181.2 | 4,642 | 65 | 3,017.30 | 9.56 |
| Tanzania | 0.9% | 61.5 | 237 | 65 | 153.73 | 0.58 |
| Uganda | 0.3% | 17.6 | 162 | n/a | | 0.53 |
| Zambia* | 2.4% | 53 | 92 | 33 | 30.36 | 0.77 |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

** Only values for 2006 were available.

By considering this demand-side data against the supply-side data provided by incumbents in annual reports, or in official figures provided to the ITU, the real reach of fixed lines to household can be assessed. While teledensity figures provide a picture of total lines per 100 persons in the population, the demand-side figures from the national household surveys provide an interesting insight into residential ownership at the household level and show the uneven distribution between residential and business lines. The residential share in high-income OECD countries varies between 62 and 80%.⁸ According to ITU figures Kenya and Zambia with less than 50% residential share of lines are the lowest in Africa.

In the case of South Africa for example, which has highest fixed line penetration on the continent, supply-side indicators alone would suggest that with a penetration level of around 10 per every 100 of the population in 2007. As indicated by the ITU 65% of all existing fixed lines are residential equalling around 3 million residential subscriber lines. However, as the RIA demand-side figures for 2007-2008 show, less than 20% of households have a fixed-line telephone. This adds up

⁸ Source ITU (2008). Figures for 2006.



to about 2.2 million residential subscriber lines. The disparity can be explained by the large-scale disconnection of subscribers unable to afford services after being brought into the fixed-line market over the last 10 years with the universal service targets set by Government as part of the privatisation agreement. Once out of the obligation period, Telkom targeted the corporate market, locking them into long-term, integrated solutions ahead of the entrance of the second fixed line operator. The net effect is a major bias in favour of business lines and the marginal increase in residential lines, if any, during the period when universal service was the primary policy objective.

The urban bias⁹ of fixed-line provisioning is also evident in the figures drawn from the household survey with only Kenya demonstrating some degree of equity between urban and rural provisioning, followed by Nigeria and Botswana.

This distribution is also reflected in the expenditure patterns on fixed-line services. As fixed services are predominantly in urban areas, they service the relatively wealthier segments of the population. In Mozambique and Uganda, which have amongst the lowest GDPs per capita on the continent but where fixed lines are almost entirely available in urban areas only, the expenditure (adjusted for purchasing power parity - PPP) on fixed lines is amongst the highest of the countries surveyed. Cameroon, Rwanda and Zambia in which fixed services are almost exclusively urban, also nominally have amongst the high expenditures, though when adjusted for PPP, Rwanda's figures are about a third more than Cameroon, which is around a third more than Zambia. South Africa and Namibia have the highest expenditure on fixed phones, but while Namibia's are almost entirely monthly-billed subscribers, 35% of South African subscribers are pre-paid.

Botswana despite its relative wealth has the lowest monthly expenditure at US\$20.40 (PPP) a month, with Ethiopia only nominally less and Tanzania at a similar level. Botswana also has the highest proportion of pre-paid fixed subscribers (87%) after Uganda (96%)¹⁰

⁹ The definitions of national statistical offices (NSO) were used for the rural urban distinction. NSOs classify EAs in urban and rural areas. During the survey it became apparent that these definitions are often out-dated judging on the infrastructure that can be found in rural EAs. However, to safeguard compliance with national statistical frameworks the NSO definitions were applied without any modifications.

¹⁰ Following a billing crisis in the incumbent, Botswanans moved *en masse* to pre-paid billing. (See Botswana sector performance review www.researchICTAfrica.net)

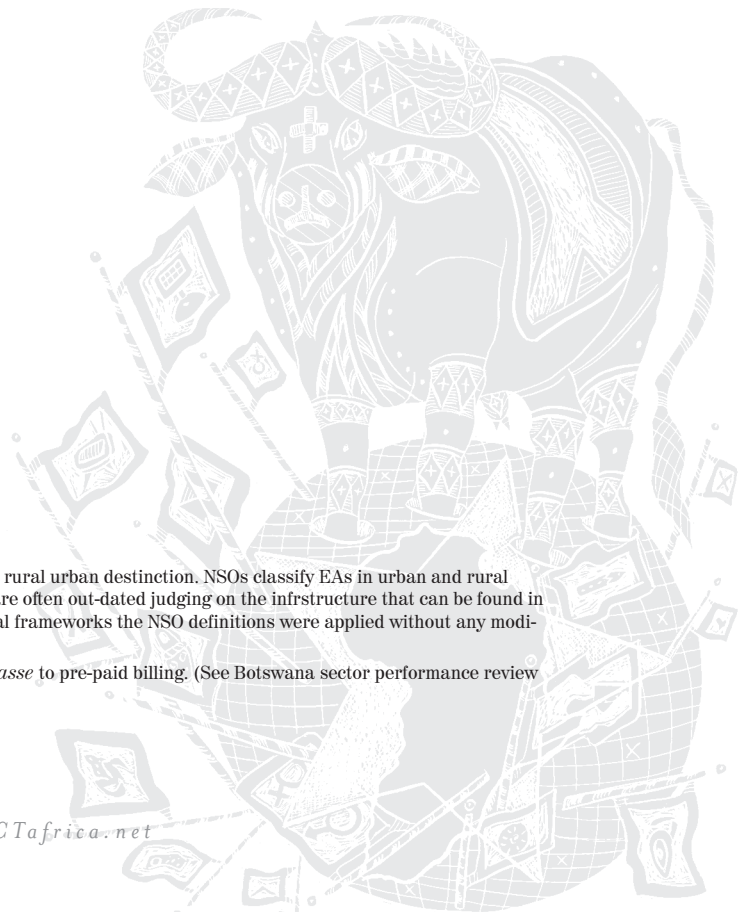




TABLE 2: HOUSEHOLDS WITH FIXED-LINE PHONES

| | Urban Share | Average monthly fixed-line expenditure in US\$ | Average monthly fixed-line expenditure in US\$ using implied PPP conversion rate | What billing type is it? | | |
|---------------|-------------|--|--|--------------------------|---------|---------------------|
| | | | | Monthly | Prepaid | Combination of both |
| Benin | 92.0% | 15.70 | 46.84 | 56% | 25% | 19% |
| Botswana | 66.8% | 5.93 | 20.40 | 13% | 87% | 0% |
| Burkina Faso | 95.3% | 13.27 | 56.25 | 77% | 23% | 0% |
| Cameroon | 100.0% | 16.37 | 48.25 | 78% | 14% | 8% |
| Côte d'Ivoire | 84.9% | 14.47 | 34.09 | 37% | 61% | 2% |
| Ethiopia | 68.8% | 4.30 | 36.74 | 96% | 4% | 0% |
| Ghana | 93.2% | 12.71 | 84.27 | 75% | 25% | 0% |
| Kenya | 54.2% | 20.21 | 51.89 | 35% | 64% | 1% |
| Mozambique | 100.0% | 19.16 | 104.43 | 44% | 56% | 0% |
| Namibia | 72.7% | 27.51 | 113.27 | 90% | 9% | 2% |
| Nigeria* | 66.0% | 11.96 | 27.33 | 43% | 56% | 0% |
| Rwanda | 100.0% | 8.54 | 65.11 | 83% | 17% | 0% |
| Senegal | 97.7% | 17.68 | 60.51 | 85% | 5% | 10% |
| South Africa | 95.7% | 31.31 | 109.71 | 64% | 35% | 0% |
| Tanzania | 81.8% | 5.78 | 20.14 | 25% | 59% | 15% |
| Uganda | 100.0% | 15.50 | 110.61 | 4% | 96% | 0% |
| Zambia* | 100.0% | 15.06 | 27.57 | 97% | 3% | 0% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

The introduction of pre-paid service in the fixed-line segment of the market, which drove the phenomenal uptake of mobile services in the late nineties across the continent and continues to do so, has not had the same remarkable impact. This is largely because the monthly line rental cost is often a barrier to entry, unlike mobile where, after the once-off acquisition of the phone, increasingly low-denomination usage units can be purchased. Namibia introduced prepaid fixed-line services in 2005 but Telecom Namibia requires compulsory recharges for customers to avoid being cut off. This undermines the logic of prepaid services and removes one of the key success factors of prepaid services.

As we can see the fixed-line expenditure correlates by and large to GDP per capita and household incomes as indicated in the survey. This is so everywhere else other than Botswana, which, the survey demonstrates, has, a relatively low average household income, suggesting that national wealth is in state hands. Local calls are also relatively cheap in Botswana though it may still be cross-subsidised by international calls. Mozambique has a relatively high average spend for one of the poorer developing countries, but this may well be a reflection of the high cost of calls or uneven income distribution.

Generally, high access costs will mean that only wealthy households can afford the service and average expenditure will therefore also be higher compared to lower access costs that allow less wealthy households to have access to fixed-line telephony.



What is significant about fixed-line expenditures is that they are roughly double the average expenditure for mobile phones a month as demonstrated in Table 7.¹¹ These figures explain the inability of people to obtain fixed services because of the high access costs.

If these are compared with respondents' (who do not currently have fixed-line services) willingness to pay we also see that the average fixed prices are in many cases beyond that which those currently without services would be willing to pay. An exception is Côte d'Ivoire, where there is an average willingness to pay (amongst those currently without fixed services interested in such a service) at US\$25,80, which is way above the average monthly expenditure for fixed services in the country of US\$14.47. Although it is unclear why this figure is so high in Côte d'Ivoire, where GDP per capita is not higher than countries with far lower average willingness to pay figures, it may indicate the unavailability of fixed-line services in very economically viable parts of the country that are not being covered.

TABLE 3: HOUSEHOLDS WITHOUT FIXED-LINE PHONE

| | Households that previously had a fixed-line phone | Households that applied for a fixed-line phone and never received it | Average willingness and ability to spend monthly on a fixed line for calls and any monthly subscription cost US\$ (only those interested in a fixed line) | Untapped fixed-line market in million US\$ |
|---------------|---|--|---|--|
| Benin | 2.43% | 1.04% | 10.60 | 6.64 |
| Botswana | 5.28% | 1.42% | 7.36 | 1.37 |
| Burkina Faso | 0.99% | 0.57% | 4.65 | 6.57 |
| Cameroon | 2.27% | 2.79% | 7.28 | 4.61 |
| Côte d'Ivoire | 3.10% | 0.61% | 25.79 | 15.75 |
| Ethiopia | 0.22% | 1.88% | 2.40 | 11.55 |
| Ghana | 1.71% | 1.55% | 8.18 | 2.41 |
| Kenya | 3.21% | 1.79% | 9.51 | 8.55 |
| Mozambique | 0.92% | 0.15% | 5.83 | 0.06 |
| Namibia | 4.12% | 2.63% | 11.35 | 0.22 |
| Nigeria* | 1.54% | 1.08% | 12.94 | 76.89 |
| Rwanda | 0.10% | 0.07% | | |
| Senegal | 4.76% | 1.82% | 6.17 | 2.42 |
| South Africa | 8.07% | 5.22% | 10.49 | 29.85 |
| Tanzania | 0.62% | 0.85% | 4.54 | 5.57 |
| Uganda | 0.17% | 0.95% | | |
| Zambia* | 1.25% | 0.61% | 16.67 | 2.91 |

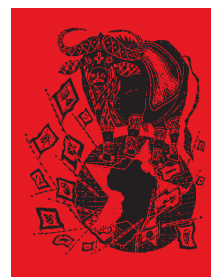
* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Demand for fixed services is likely to be limited by high prices or access charges across the continent.¹²

Unmet demand remains highest in South Africa, where over 5% of respondents had requested, but never received, fixed-line phones. Yet it also seem be the country with the most

¹¹ One needs to keep in mind that mobile expenditure is personal while fixed-line expenditure is a household expense.

¹² See Esselaar, Gillwald and Stork (2007)



disconnections. Over 8% of households in South Africa previously had a fixed line followed by Botswana at over 5%.¹³ In Cameroon, under 3% had never received the phone they had applied for and in all the remaining countries less than 2%. In over half of them, less than 1% had requested a phone and not received one. Yet as much as 90% of respondents in Ghana, Mozambique, Namibia, Rwanda, Zambia do not wish to own a fixed phone. In all countries surveyed over 40% of respondents did not want a fixed phone, and in over half it was 70% or more, all of which suggests high levels of mobile substitution.

This is borne out in the table below which shows that in more than half the countries surveyed, over 40% attribute the absence of a fixed-line phone in the home to the presence of mobile phones, with these figures as high as 78% in Kenya, 69% in Ghana and 60% in Nigeria – all countries that have seen rapid mobile growth and have relatively poor fixed-line penetration.

TABLE 4: SHARE OF HOUSEHOLDS THAT DO NOT WANT A FIXED-LINE PHONE AND REASON WHY

| | Household without fixed-line that do not want it | No need for one since mobiles are being used | Not available in the area | Operator would not provide because of lack of regular income | Having to wait too long for a fixed line |
|---------------|--|--|---------------------------|--|--|
| Benin | 54.7% | 31.1% | 50.9% | 3.7% | 6.4% |
| Botswana | 49.9% | 26.7% | 1.4% | 0.2% | 2.3% |
| Burkina Faso | 37.8% | 34.1% | 35.1% | 0.7% | 0.7% |
| Cameroon | 76.3% | 56.4% | 26.9% | 1.4% | 0.1% |
| Côte d'Ivoire | 78.3% | 37.2% | 30.4% | 0.9% | 2.9% |
| Ethiopia | 53.6% | 5.8% | 28.8% | 0.1% | 0.1% |
| Ghana | 93.9% | 69.1% | 17.0% | 0.4% | 1.5% |
| Kenya | 88.8% | 78.0% | 2.4% | 0.8% | 2.1% |
| Mozambique | 99.1% | 24.1% | 16.7% | 1.0% | 0.3% |
| Namibia | 93.3% | 44.7% | 12.7% | 0.5% | 1.1% |
| Nigeria* | 62.4% | 60.5% | 14.5% | 0.8% | 0.8% |
| Rwanda | 90.4% | 12.6% | 7.9% | 0.6% | 9.1% |
| Senegal | 63.0% | 51.6% | 26.0% | 8.9% | 11.4% |
| South Africa | 69.2% | 38.1% | 15.2% | 2.0% | 4.0% |
| Tanzania | 79.6% | 38.9% | 17.8% | 26.5% | 2.4% |
| Uganda | 70.2% | 31.2% | 1.1% | 13.1% | 0.8% |
| Zambia* | 91.6% | 44.2% | 62.9% | 0.3% | 2.6% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

The dismal penetration rates for fixed services and their stagnant growth across the continent, together with their business and urban bias, are unlikely to change in the short to medium term. Prices tend not to be cost based and are either very high or below cost and mask hidden subsidies that make further network investment unfeasible as described above. Most African countries have struggled to attract foreign direct investment to privatise their incumbents or liberalise the mar-

¹³ Between 2000 and 2003 Telkom South Africa connected nearly 3 millions lines but during the same period disconnected over 3.5 million lines resulting in an overall decline in growth (Telkom Annual Report 2003). Botswana's billing crisis in 2000/2001 caused large number of subscribers to terminate their services (See www.gov.bw/cgi-bin/news.cgi?d=20010427).



ket segment. Internet penetration, as a result, remains low, with many countries having statistically insignificant numbers of subscribers. Broadband penetration is worse, with minimal penetration in sub-Saharan Africa. In contrast, North Africa has increased subscriber numbers rapidly as indicated in the table below.

TABLE 5: INTERNET SUBSCRIBERS (TOTAL FIXED BROADBAND) PER 100 INHABITANTS (SOURCE: ITU 2008 INDICATOR DATABASE)

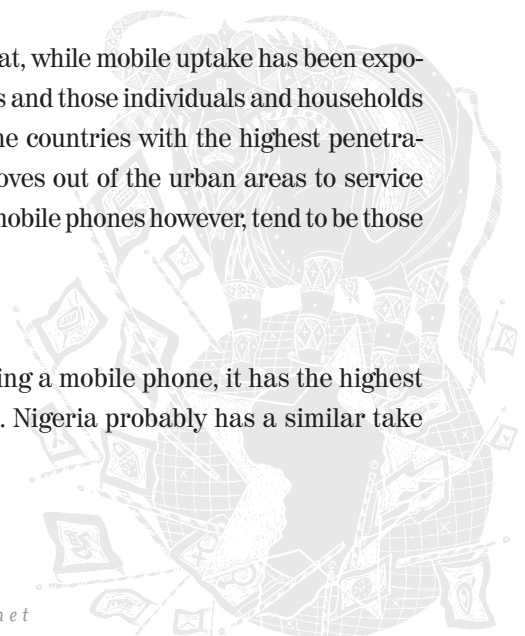
| COUNTRY | YEAR 2007 |
|----------------------|-----------|
| Egypt | 0.57 |
| Tunisia | 1.11 |
| Morocco | 1.53 |
| Benin | 0.02 |
| Botswana | 0.19 |
| Burkina Faso (2006) | 0.01 |
| Cameroon (2006) | 0.00 |
| Côte d'Ivoire (2006) | 0.05 |
| Ethiopia | 0.0004 |
| Ghana | 0.06 |
| Kenya (2006) | 0.05 |
| Mozambique | n/a |
| Namibia | 0.01 |
| Nigeria | n/a |
| Rwanda | 0.02 |
| Senegal | 0.31 |
| South Africa (2006) | 0.70 |
| Tanzania | n/a |
| Uganda | 0.01 |
| Zambia (2006) | 0.02 |

MOBILE PHONE

The 2008 RIA e-Access & Usage Household Survey revealed that, while mobile uptake has been exponential, it is highly concentrated in urban areas, wealthier homes and those individuals and households having access to multiple forms of communication. Amongst the countries with the highest penetrations, the rural-urban divide is not as great, as the network moves out of the urban areas to service rural areas. Countries with the highest average expenditure on mobile phones however, tend to be those with high urban biases in their mobile phone distribution.

Penetration

With over 62% of all individuals surveyed in South Africa having a mobile phone, it has the highest mobile phone take up, followed very closely by Ghana at 59%. Nigeria probably has a similar take



up but the figures for Nigeria cannot be reliably included for purposes of comparative analysis due to the lack of national representivity of the survey. While mobile telephony has grown exponentially over the last few years, it is, however, likely that mobile penetration is significantly lower than indicated by operators.

TABLE 6: 16 YEARS+ WITH MOBILE PHONE OR ACTIVE SIM

| | Total | All | Rural | Urban | Share of prepaid users |
|---------------|------------|---------|-------|-------|------------------------|
| Benin | 1 365 851 | 30.20% | 15.8% | 53.2% | 95.96% |
| Botswana | 654 737 | 59.50% | 51.5% | 65.2% | 99.28% |
| Burkina Faso | 1 844 701 | 27.20% | 19.7% | 55.9% | 96.69% |
| Cameroon | 2 979 597 | 36.50% | 17.9% | 53.9% | 88.04% |
| Côte d'Ivoire | 5 042 524 | 41.80% | 21.5% | 63.5% | 91.77% |
| Ethiopia | 1 387 910 | 3.20% | 0.7% | 15.8% | 88.31% |
| Ghana | 7 491 378 | 59.80% | 48.2% | 74.7% | 99.83% |
| Kenya | 10 772 696 | 52.00% | 51.7% | 53.0% | 98.89% |
| Mozambique | 4 865 758 | 25.70% | 17.3% | 53.6% | 98.89% |
| Namibia | 625 707 | 49.30% | 38.2% | 71.9% | 89.95% |
| Nigeria* | 63 101 014 | 77.3%** | 76.1% | 82.0% | 99.33% |
| Rwanda | 520 259 | 9.90% | 6.5% | 25.8% | 94.77% |
| Senegal | 2 502 300 | 39.80% | 26.1% | 53.8% | 99.70% |
| South Africa | 20 185 135 | 62.10% | 48.9% | 70.6% | 78.64% |
| Tanzania | 4 138 338 | 21.50% | 15.9% | 37.7% | 96.95% |
| Uganda | 2 924 095 | 20.70% | 17.7% | 42.7% | 97.84% |
| Zambia* | 2 459 961 | 45.50% | 31.5% | 72.4% | 99.7% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

** Mobile subscribers in Nigeria include fixed-wireless services. The figures still to be read with caution since the survey methodology was not nationally representative in Nigeria. The results shown here are national extrapolations.

Differences in definitions of 'subscribers', 'active subscribers', and 'SIM cards sold', make subscriber numbers very unreliable, particularly in traditional measures of per 100 of the population.¹⁴ This demand-side survey confirms however that most subscribers have, or have had, multiple SIM cards. In the case of South Africa, for example, supply-side subscribers' numbers provided by the mobile operators and the number of people who said they owned a mobile phone (or had a SIM card without a phone) equated to the official subscriber number, less the 4.5 million who had multiple cards. This means that, while mobile penetration has grown extraordinarily, it may be as much as 10% less than current supply-side figures suggest. As starter packs become cheaper and are bundled with various usage packages, the number of duplicate SIM cards individuals are likely to have owned will increase.

¹⁴ See Sutherland, Ewan (2008) Mene, Mene, Tekel, Upharsin: counting mobile telephones, SIM cards & customers <http://www.researchICTAfrica.net>



Expenditure

Ghana, whose urban concentration of mobile phones at nearly 75% of all subscribers is amongst the highest,¹⁵ has the highest average expenditure for mobile, which probably reflects the relatively low cost of calls as well as a higher disposable income in the urban areas. Over 70% of mobile users in Namibia, South Africa and Zambia are also in urban areas. South Africa has the next highest average expenditure for mobile together with Côte d'Ivoire, which has the second highest concentration of urban subscribers, followed closely by Botswana and Mozambique.

TABLE 7: MOBILE EXPENDITURE AND DUPLICATE SIM CARDS

| | Monthly average mobile expenditure in US\$ | Current market in US\$ million | Disposable income in US\$ | All personal income in US\$ |
|---------------|--|--------------------------------|---------------------------|-----------------------------|
| Benin | 8.33 | 11.38 | 16.63 | 52.76 |
| Botswana | 10.18 | 6.67 | 22.26 | 106.01 |
| Burkina Faso | 5.84 | 10.77 | 15.80 | 41.96 |
| Cameroon | 7.14 | 21.29 | 10.93 | 84.70 |
| Côte d'Ivoire | 12.52 | 63.13 | 21.76 | 114.15 |
| Ethiopia | 3.81 | 5.29 | 2.28 | 14.47 |
| Ghana | 10.44 | 78.23 | 23.56 | 96.79 |
| Kenya | 10.41 | 112.11 | 18.22 | 68.55 |
| Mozambique | 6.26 | 30.47 | 17.97 | 32.79 |
| Namibia | 11.41 | 7.14 | 44.24 | 126.53 |
| Nigeria* | 10.88 | 686.54 | 24.77 | 81.62 |
| Rwanda | 6.02 | 3.13 | 2.95 | 28.23 |
| Senegal | 11.00 | 27.54 | 43.31 | 64.69 |
| South Africa | 15.88 | 320.49 | 70.31 | 207.14 |
| Tanzania | 7.44 | 30.79 | 18.00 | 26.88 |
| Uganda | 5.75 | 16.81 | 7.30 | 28.20 |
| Zambia* | 10.55 | 25.96 | 12.51 | 62.50 |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Those countries with higher GDPs per capita and higher disposable incomes do have the higher mobile phone expenditures. This would be the case for South Africa, Namibia and Botswana. Though the mid-range expenditure of Botswana seems to support the notion that despite relatively high GDP per capita household incomes are average in terms of the continent. In South Africa, clearly there are sufficient numbers of people with high incomes to absorb the reasonably high cost of services. The other countries in the top end of the expenditure scale are from the larger markets surveyed, such as Côte d'Ivoire, Ghana and Kenya.

¹⁵ Ghana's urban concentration is exceeded only by Nigeria (82%), but the survey figures for Nigeria reflect an urban bias which has probably inflated its urban concentration.

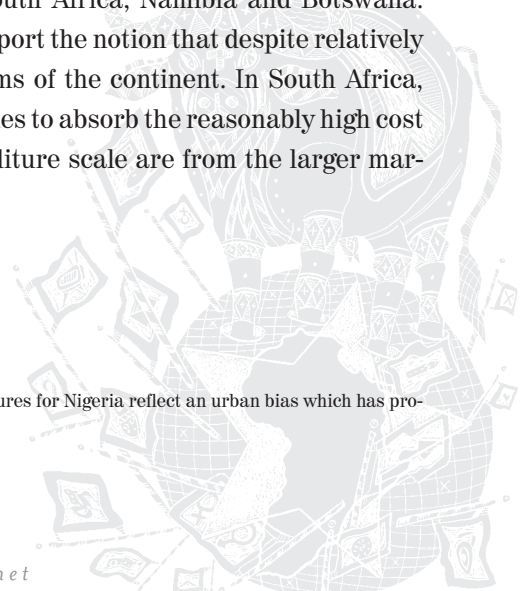




TABLE 8: SIM CARD DUPLICATION

| | Average number of SIM cards per user | Number of duplicated SIM cards | 16+ with duplicated SIM cards |
|---------------|--------------------------------------|--------------------------------|-------------------------------|
| Benin | 1.49 | 676 537 | 36.2% |
| Botswana | 1.10 | 67 653 | 9.4% |
| Burkina Faso | 1.30 | 562 874 | 20.6% |
| Cameroon | 1.12 | 360 283 | 7.8% |
| Côte d'Ivoire | 1.19 | 979 290 | 15.1% |
| Ethiopia | 1.01 | 8 903 | 0.6% |
| Ghana | 1.15 | 1 137 335 | 11.0% |
| Kenya | 1.29 | 3 135 044 | 25.8% |
| Mozambique | 1.03 | 143 404 | 2.9% |
| Namibia | 1.07 | 44 717 | 6.2% |
| Nigeria* | 1.22 | 14 115 760 | 19.2% |
| Rwanda | 1.03 | 16 170 | 3.1% |
| Senegal | 1.07 | 165 992 | 4.9% |
| South Africa | 1.13 | 2 645 260 | 10.8% |
| Tanzania | 1.16 | 699 267 | 13.8% |
| Uganda | 1.19 | 571 276 | 17.9% |
| Zambia* | 1.06 | 676 537 | 4.5% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Kenyan's are spending on average nearly 17% of their individual income on mobile communication, followed closely by Tanzania (15.4%) and Senegal (14.2). This is a reflection of the dynamism of these markets in particular, but the high percentage of individual income spent on mobile is also a reflection of the continued high cost of services on the continent. Other than Ethiopia, which has a far smaller and less dynamic market than any other country surveyed, the lowest percentage of income on mobile telephony is in South Africa at 7.4%. As it has the highest average monthly expenditure at US\$15.88 and the highest average personal income (US\$207), it is clear that the low percentage of individual income spent on mobile communication is more likely to be a reflection of high income than lower costs. These figures compare with average expenditure on communications in OECD of less than 2.5% of household income¹⁶.

¹⁶ See OECD 2007 Communications Outlook which indicates that the amount allocated to communications by households increased from an average of 1.8% in 1991 to 2.3% in 2004.



TABLE 9: MONTHLY EXPENDITURE FOR MOBILE TELEPHONY AS A SHARE OF INCOME AND DISPOSABLE INCOME

| | Monthly mobile expenditure/ monthly individual income: | | | Monthly mobile expenditure/ monthly individual income: | | |
|---------------|---|---|--|---|---|--|
| | All | Bottom 75% in terms of individual income | Top 25% in terms of individual income | All | Bottom 75% in terms of disposable income | Top 25% in terms of disposable income |
| Benin | 11.7% | 18.0% | 7.9% | 32.9% | 39.8% | 28.0% |
| Botswana | 10.4% | 14.9% | 6.1% | 43.2% | 50.4% | 30.6% |
| Burkina Faso | 14.1% | 19.3% | 7.6% | 32.3% | 42.1% | 22.6% |
| Cameroon | 10.8% | 16.0% | 4.8% | 40.9% | 47.0% | 32.8% |
| Côte d'Ivoire | 10.1% | 14.1% | 4.9% | 39.6% | 47.2% | 31.3% |
| Ethiopia | 7.1% | 23.3% | 6.1% | 37.0% | 67.1% | 35.7% |
| Ghana | 13.0% | 16.0% | 7.1% | 47.9% | 55.3% | 34.3% |
| Kenya | 16.7% | 26.6% | 7.8% | 52.5% | 63.6% | 39.9% |
| Mozambique | 11.7% | 17.9% | 9.2% | 32.6% | 50.8% | 18.3% |
| Namibia | 9.2% | 13.1% | 5.7% | 25.3% | 32.9% | 17.8% |
| Nigeria | 13.7% | 17.0% | 8.2% | 52.4% | 60.9% | 28.9% |
| Rwanda | 10.3% | 16.9% | 8.5% | 65.5% | 64.9% | 65.6% |
| Senegal | 14.2% | 19.4% | 9.6% | 22.2% | 30.1% | 13.7% |
| South Africa | 7.4% | 10.9% | 4.8% | 29.3% | 38.2% | 16.7% |
| Tanzania | 15.4% | 22.1% | 11.5% | 28.9% | 40.6% | 20.5% |
| Uganda | 10.8% | 18.0% | 7.4% | 48.6% | 68.9% | 39.0% |
| Zambia* | 10.8% | 14.4% | 8.6% | 60.3% | 73.9% | 44.1% |

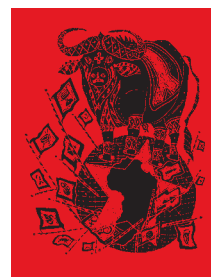
* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

When the percentage of income spent on mobile is assessed in terms of the bottom 75% of households these figures soar to 26.6% for Kenya, 23% for Ethiopia and 22% for Tanzania and 9.4% for Senegal, demonstrating the prohibitively high cost of services to the majority of the population.

*Willingness to pay for mobile services*¹⁷

Randomly selected individuals of 16 years and older from each household without mobile phones or active SIM card were asked for their willingness and ability to pay for a handset and what they think a handset would cost them. These average figures are being shown in Table 10. The difference between average willingness to pay and average expected costs confirms income as the main adoption barrier. Table 10 also indicates the number of new mobile phone users operators could expect should they offer mobiles for US\$20, US\$15 and US\$10 respectively. US\$20 handsets would attract about 3 million new customers in Kenya and Côte d'Ivoire, for example. Ethiopia could expect 2.6 million more users if the handset price would drop to US\$10 and SIM cards were to be available. Ethiopia is the country with the widest gap between willingness to pay and expected cost

¹⁷ South Africa's prices in the 2007 ICT Sector Performance Review were nominally amongst the highest but in the middle range following PPP adjustment. See Esselaar, Gillwald, Stork (2007).



and the country with the lowest mobile penetration among the 17 countries surveyed. (see Table 10) The handset price is also known to fluctuate with the availability of SIM cards.

TABLE 10: WILLINGNESS AND ABILITY TO PAY FOR A HANDSET

| | Average willingness and ability to pay for a mobile handset in US\$ | Average expected cost of a mobile handset in US\$ | New user at a handset price of: | | |
|---------------|---|---|---------------------------------|-----------|-----------|
| | | | US\$20 | US\$15 | US\$10 |
| Benin | 7.45 | 11.44 | 124 972 | 487 176 | 677 715 |
| Botswana | 19.14 | 27.38 | 119 014 | 196 496 | 228 203 |
| Burkina Faso | 9.00 | 12.84 | 428 593 | 1 243 958 | 1 453 007 |
| Cameroon | 15.34 | 22.16 | 868 037 | 1 732 300 | 1 869 861 |
| Côte d'Ivoire | 29.70 | 30.06 | 3 057 420 | 3 539 351 | 3 914 283 |
| Ethiopia | 6.06 | 64.19 | 1 436 628 | 1 637 668 | 2 644 673 |
| Ghana | 14.02 | 23.15 | 1 283 271 | 1 469 652 | 1 841 837 |
| Kenya | 17.12 | 26.68 | 2 862 457 | 4 165 549 | 5 663 481 |
| Mozambique | 4.00 | 23.20 | 56 457 | 79 895 | 287 147 |
| Namibia | 24.64 | 25.12 | 162 992 | 192 395 | 232 584 |
| Nigeria* | 5.65 | 12.57 | 356 907 | 1 004 573 | 2 527 884 |
| Rwanda | 3.69 | 9.34 | n/a | n/a | n/a |
| Senegal | 19.55 | 25.43 | 1 336 691 | 2 169 548 | 2 301 775 |
| South Africa | 19.25 | 32.41 | 2 652 827 | 3 354 797 | 4 094 783 |
| Tanzania | 10.89 | 17.30 | 1 422 927 | 2 102 510 | 3 272 065 |
| Uganda | 5.74 | 14.98 | – | 1 499 | 1 499 |
| Zambia* | 17.4153 | 22.4316 | 682 864 | 1 061 607 | 1 598 555 |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.





TABLE 11: INDIVIDUALS 16 YEARS OR OLDER WITHOUT A MOBILE PHONE OR ACTIVE SIM CARD

| | 16+ without a mobile phone or active SIM card | | Willing and able to spend more than: | | | Average monthly WTP in US\$ of potential users | Monthly untapped market in US\$ million |
|---------------|---|------------|--------------------------------------|-----------|-----------|--|---|
| | | | US\$1 | US\$2 | US\$5 | | |
| Benin | 69.8% | 3 162 099 | 2 797 101 | 1 402 507 | 161 217 | 2.94 | 8.26 |
| Botswana | 40.5% | 446 140 | 311 446 | 199 511 | 66 192 | 4.28 | 1.47 |
| Burkina Faso | 72.8% | 4 929 897 | 4 371 694 | 1 875 892 | 430 952 | 3.13 | 13.71 |
| Cameroon | 63.5% | 5 177 393 | 3 452 460 | 1 855 275 | 550 724 | 3.75 | 13.14 |
| Côte d'Ivoire | 58.2% | 7 033 592 | 4 485 498 | 3 645 855 | 1 677 528 | 6.86 | 31.44 |
| Ethiopia | 96.8% | 42 497 353 | 10 231 145 | 3 104 395 | 74 428 | 1.53 | 25.68 |
| Ghana | 40.2% | 5 036 815 | 2 849 435 | 1 953 135 | 984 279 | 9.34 | 38.40 |
| Kenya | 48.0% | 9 941 748 | 5 866 299 | 5 235 785 | 1 245 083 | 3.30 | 25.69 |
| Mozambique | 74.3% | 14 078 222 | 1 407 840 | 1 199 765 | 376 037 | 2.96 | 6.70 |
| Namibia | 50.7% | 644 056 | 275 364 | 247 254 | 71 171 | 4.88 | 1.35 |
| Nigeria | 22.7% | 18 541 687 | 7 989 151 | 6 234 941 | 5 128 000 | 6.09 | 65.25 |
| Rwanda | 90.1% | 4 735 492 | n/a | n/a | n/a | n/a | n/a |
| Senegal | 60.2% | 3 779 221 | 3 428 481 | 1 294 681 | 502 730 | 3.28 | 11.33 |
| South Africa | 37.9% | 12 331 758 | 7 604 512 | 5 551 777 | 2 209 625 | 4.34 | 36.27 |
| Tanzania | 78.5% | 15 066 652 | 5 560 959 | 4 750 935 | 1 064 087 | 2.61 | 21.42 |
| Uganda | 79.3% | 11 174 801 | 429 585 | 429 585 | 429 585 | 10.09 | 4.51 |
| Zambia* | 45.5% | 2 944 732 | 1 933 833 | 1 310 576 | 329 922 | 3.4549 | 8.20 |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

In terms of the findings on the willingness of those currently not users to pay for mobile services (as Table 11 suggests), relatively small reductions in the cost of equipment and services would result in increased uptake and usage by those who are not currently users, with a significant growth in revenues for operators.

One of the biggest problems in estimating price elasticity of demand for telecom services in developing country situations is the lack of accurate usage data. Unlike in developed countries where usage is easily obtainable from monthly bills for post-paid connections, the vast majority in developing countries (in the case of the current study this is between 78% and 99%) has no billing records (for prepaid shares see Table 6). Many use public phones, phones at work or other people's phones which equally does not generate records.

Another difficulty is that cross-section data, like the one that is being analysed here, is not suitable to calculate price elasticities since it only captures data for one snapshot in time. Changes in consumer behaviour due to price changes can only be analysed using time-series data. Cross-section data only allows a rough glimpse at price elasticities by using contingent valuation methods. Respondents with a mobile phone or active SIM card were asked how they would react to price decreases and increases. The answers to these questions are displayed in Figure 1 and Figure 2.

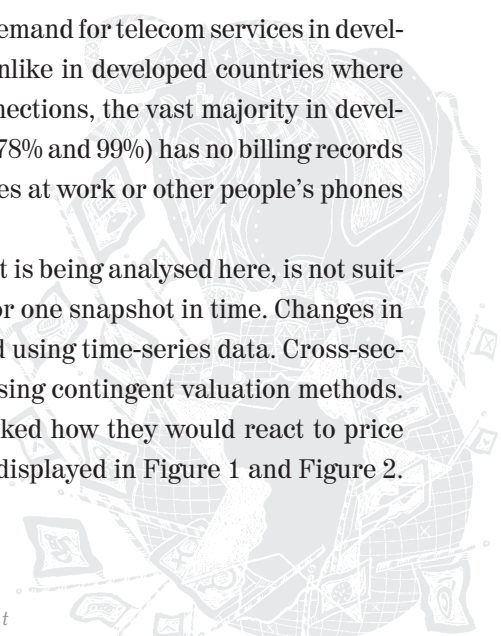




Figure 1 shows that the vast majority of respondents would make more calls if prices were to come down. Senegal and Ethiopia are the two countries with the highest share of respondents that would use the saved money for something else.

FIGURE 1: CONTINGENT VALUATION PRICE DROP¹⁸

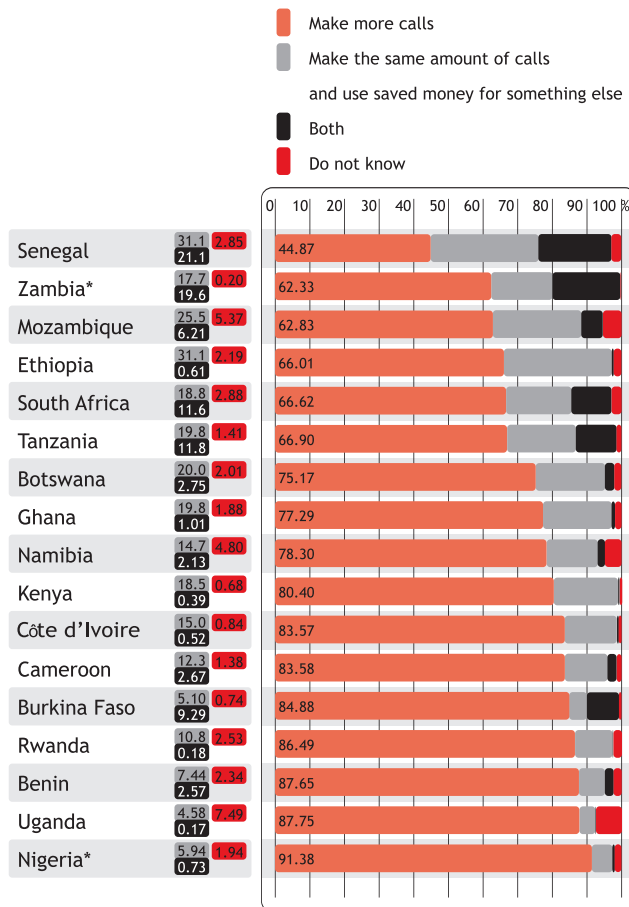
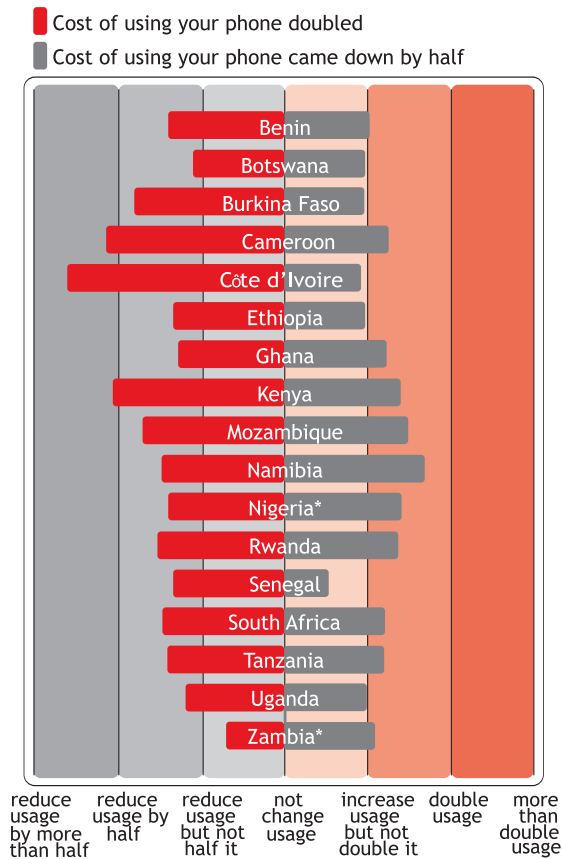


Figure 2 shows how respondents state that they would react to a doubling and halving of call charges. What can be seen is the response is asymmetrical, ie respondents would react to price increases stronger than they would do to price decreases. However, approximating price elasticity from these two contingent valuations results is strictly speaking not possible. Respondents state their preferences and do not reveal it (observed behaviour reacting to price changes).

¹⁸ Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.



FIGURE 2: CONTINGENT VALUATION – HALVING AND DOUBLING OF PRICES¹⁹



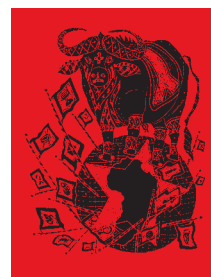
PUBLIC PHONES ²⁰

Despite the widespread access to mobile phones in those countries where public phones are reasonably well-provisioned public pay phones continue to be a major form of access to communications. In Tanzania over 97% of those interviewed had used a public phone in the last three months and nearly 90% in Zambia and 73% Rwanda and nearly 69% in Senegal. Extraordinarily low pay phone use was recorded in Côte d'Ivoire (0.8%), Mozambique (2.7%) and Ghana (6%). (Though Côte d'Ivoire is partially explained by it referring only to traditional fixed-line pay phones.)

However, in those countries with high payphone usage, this was so even for people who own mobile phones or have an active SIM card. For example, in Tanzania of those who had a mobile phone or SIM card, 96% had used a pay phone in the last three months. Zambia tells a similar story with 93% of mobile phone users having used a payphone in the last three months. In South Africa and Nigeria, where both fixed and mobile public phone are widely available, of the more than 40%

¹⁹ Results for Zambia and Nigeria are extropolations to national level but not nationally representative.

²⁰ Public phones refers to any phone available for publicly accessible by payment whether traditional incumbent pay phones, mobile public phone kiosks or telecentres.



of those interviewed who had used a payphone in the past three months, more than 40% of those had a mobile phone or a SIM card. Where mobile phone penetration is lower, for example in Uganda or Burkina Faso, public phones remain widely used (where available). However, in these countries the percentage of those people with mobile phones who also use pay phones is much lower:

TABLE 12: PUBLIC PHONE ACCESS AND USAGE

| | 16+ having used public phones: | | | Public phone use in the last three months: | | | Average public phone expenditure in US\$ |
|-----------------------------|--------------------------------|-------------------|----------------------|--|----------------------|---------------------|--|
| | All | With mobile phone | Without mobile phone | Calling fixed-line phone | Calling mobile phone | International calls | |
| Benin | 16.1% | 22.9% | 13.2% | 78.4% | 86.6% | 9.7% | 1.41 |
| Botswana | 27.4% | 22.4% | 34.7% | 38.8% | 97.8% | 2.0% | 1.85 |
| Burkina Faso | 29.0% | 39.7% | 24.9% | 74.7% | 72.6% | 15.2% | 1.76 |
| Cameroon | 44.1% | 57.5% | 36.4% | 8.6% | 96.6% | 4.8% | 2.47 |
| Côte d'Ivoire ²¹ | 0.8% | 1.5% | 0.2% | 45.2% | 34.0% | 35.7% | 4.92 |
| Ethiopia | 14.7% | 20.9% | 14.5% | 96.4% | 29.4% | 0.0% | 0.43 |
| Ghana | 6.0% | 3.5% | 9.7% | 25.6% | 66.4% | 8.9% | 2.54 |
| Kenya | 24.1% | 14.8% | 34.2% | 24.6% | 92.4% | 0.3% | 1.38 |
| Mozambique | 2.7% | 3.8% | 2.4% | 28.1% | 91.6% | 4.5% | 8.06 |
| Namibia | 14.5% | 16.2% | 12.9% | 77.5% | 64.9% | 7.1% | 3.02 |
| Nigeria* | 40.5% | 42.9% | 32.5% | 28.8% | 97.9% | 8.4% | 3.51 |
| Rwanda | 73.0% | 43.5% | 76.2% | 6.9% | 98.0% | 0.3% | 1.16 |
| Senegal | 68.9% | 74.2% | 65.4% | 69.8% | 61.8% | 8.3% | 1.64 |
| South Africa | 42.2% | 41.1% | 43.8% | 46.3% | 88.3% | 6.7% | 3.24 |
| Tanzania | 97.3% | 96.3% | 97.6% | 22.7% | 70.7% | 0.0% | 1.00 |
| Uganda | 39.5% | 42.1% | 38.9% | 24.4% | 96.6% | 0.7% | 1.48 |
| Zambia* | 89.8% | 93.39% | 86.82% | 52.3% | 93.8% | 1.7% | 1.21 |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

²¹ The results for Côte d'Ivoire relate to public phone booths of the incumbent fixed-line operator only, while for all countries they include any type of public access phones (call boxes, umbrella phones, etc.)



TABLE 13: REASONS FOR USING PUBLIC PHONES

| | I use public phones because I do not have a fixed-line phone at home | I use public phones because I do not have a mobile phone | I use public phones because it is cheaper | I use public phones because it is easier than having to recharge my mobile phone |
|---------------|--|--|---|--|
| Benin | 66.61% | 50.05% | 12.90% | 4.78% |
| Botswana | 6.94% | 47.06% | 16.99% | 34.12% |
| Burkina Faso | 22.34% | 46.21% | 48.19% | 2.52% |
| Cameroon | 6.30% | 46.54% | 62.38% | 6.81% |
| Côte d'Ivoire | 19.76% | 0.00% | 20.62% | 21.83% |
| Ethiopia | 68.82% | 46.48% | 41.27% | 4.96% |
| Ghana | 25.50% | 43.21% | 26.25% | 1.65% |
| Kenya | 12.41% | 65.11% | 16.61% | 18.42% |
| Mozambique | 17.75% | 63.01% | 25.24% | 13.57% |
| Namibia | 44.65% | 36.60% | 57.63% | 11.43% |
| Nigeria* | 8.76% | 13.54% | 50.74% | 26.03% |
| Rwanda | 46.85% | 67.18% | 26.79% | 6.37% |
| Senegal | 57.88% | 59.91% | 30.87% | 10.16% |
| South Africa | 46.32% | 32.85% | 64.24% | 25.11% |
| Tanzania | 21.33% | 56.05% | 5.27% | 8.34% |
| Uganda | 43.98% | 68.91% | 27.57% | 7.73% |
| Zambia* | 68.51% | 64.76% | 51.35% | 11.33% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

The primary reason for the use of pay phones was because respondents did not own a fixed or mobile phone but in several countries with notoriously high mobile-call charges such as Cameroon, Namibia, Nigeria, South Africa and Zambia,²² this accounted for more than 50% of the respondents' reason for using pay phones. A significant number of people used pay phones when they had difficulty charging their phones. This reason was given most frequently in Nigeria, followed by South Africa and Côte d'Ivoire.

²² Using the lowest OECD basket of mobile charges, South Africa and Nigeria were nominally amongst the most expensive. Cameroon came seventh out of 16 and Zambia eighth. (See Esselaar, Gillwald and Stork (2007))

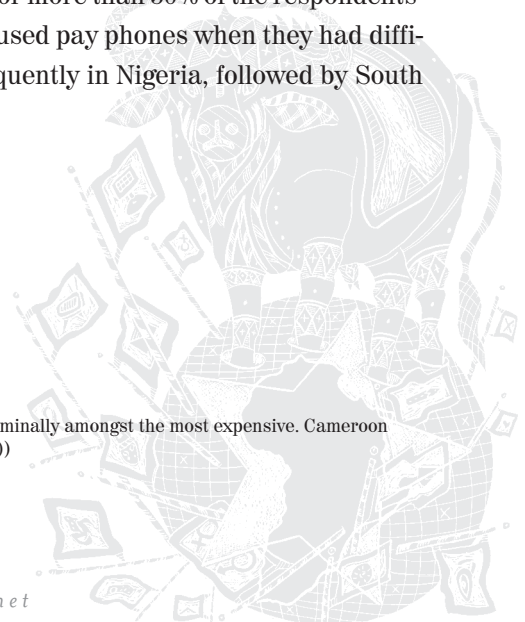




TABLE 14: REASONS FOR NOT USING PUBLIC PHONES

| | Too inconvenient | Not safe to use at night | Too expensive | I prefer to use my phone at home | I prefer to use the fixed-line phone at work or at school | I prefer to use my mobile |
|---------------|------------------|--------------------------|---------------|----------------------------------|---|---------------------------|
| Benin | 19.5% | 4.9% | 23.8% | 2.2% | 0.6% | 17.2% |
| Botswana | 7.8% | 6.5% | 13.3% | 3.3% | 3.6% | 56.7% |
| Burkina Faso | 4.2% | 1.5% | 28.9% | 0.9% | 0.3% | 17.9% |
| Cameroon | 13.5% | 1.3% | 34.8% | 4.4% | 0.1% | 22.2% |
| Côte d'Ivoire | 2.2% | 0.8% | 11.0% | 6.4% | 0.5% | 24.0% |
| Ethiopia | 28.3% | 0.1% | 0.5% | 3.9% | 1.8% | 2.3% |
| Ghana | 13.6% | 2.3% | 16.4% | 5.5% | 1.6% | 56.3% |
| Kenya | 11.7% | 2.7% | 15.0% | 10.6% | 1.9% | 47.1% |
| Mozambique | 5.3% | 0.9% | 6.1% | 0.2% | 0.0% | 17.7% |
| Namibia | 15.8% | 12.4% | 8.7% | 7.1% | 3.7% | 44.9% |
| Nigeria* | 27.5% | 2.8% | 1.7% | 10.6% | 1.3% | 37.3% |
| Rwanda | 24.9% | 3.1% | 55.1% | 0.2% | 0.0% | 5.0% |
| Senegal | 1.3% | 0.8% | 11.1% | 3.2% | 0.7% | 39.8% |
| South Africa | 42.4% | 21.1% | 10.2% | 12.9% | 9.6% | 37.4% |
| Tanzania | 46.8% | 26.7% | 48.5% | 7.2% | 3.0% | 13.6% |
| Uganda | 11.9% | 2.6% | 12.5% | 1.7% | 0.2% | 16.1% |
| Zambia* | 37.3% | 1.8% | 6.7% | 10.0% | 1.1% | 38.4% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Mobile substitution for pay phones was one of the major reasons given for not using pay phones. Over 56% of Botswana and Ghanaians, 47% of Kenyans and 44% of Namibians gave this as the reason. This contrasted sharply with fixed-line usage being preferred by less than 3% of respondents in most countries. This is with the exception of South Africa, where nearly 10% of respondents, roughly the teledensity of the country, said they used their fixed-line phones instead.





TABLE 15: FREQUENCY OF PUBLIC PHONE USE

| | Once a day | More than once a day | Once a week | More than once a week | Once a month |
|---------------|------------|----------------------|-------------|-----------------------|--------------|
| Benin | 2.69% | 4.60% | 22.04% | 41.83% | 28.84% |
| Botswana | 6.67% | 7.10% | 42.80% | 21.53% | 21.90% |
| Burkina Faso | 0.46% | 1.85% | 35.46% | 22.49% | 39.75% |
| Cameroon | 4.98% | 7.81% | 26.36% | 28.97% | 31.87% |
| Côte d'Ivoire | 35.75% | 0.00% | 19.79% | 11.31% | 33.15% |
| Ethiopia | 5.37% | 0.87% | 21.98% | 8.29% | 63.50% |
| Ghana | 7.84% | 8.42% | 37.76% | 11.67% | 34.30% |
| Kenya | 2.56% | 0.80% | 28.25% | 21.94% | 46.45% |
| Mozambique | 5.54% | 11.53% | 32.93% | 14.31% | 35.69% |
| Namibia | 2.90% | 1.44% | 26.66% | 18.37% | 50.62% |
| Nigeria* | 18.30% | 11.93% | 31.65% | 20.89% | 17.22% |
| Rwanda | 2.05% | 4.34% | 21.20% | 22.75% | 49.67% |
| Senegal | 1.96% | 2.02% | 25.61% | 12.07% | 58.35% |
| South Africa | 6.22% | 7.15% | 29.78% | 33.29% | 23.57% |
| Tanzania | 14.34% | 24.99% | 7.40% | 13.81% | 39.47% |
| Uganda | 4.09% | 2.75% | 29.28% | 27.80% | 36.08% |
| Zambia* | 1.15% | 1.48% | 15.75% | 7.12% | 74.50% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Of the very small number of people in Côte d'Ivoire who use public pay phones, 35% use the service daily. This is the case too in over 18% of respondents who used public pay phone in Nigeria and over 14% in Tanzania. However, despite the continued use of pay phones, the average expenditure is miniscule and not even in the range of new, very low cost mobile services being proposed for the bottom of the pyramid users.



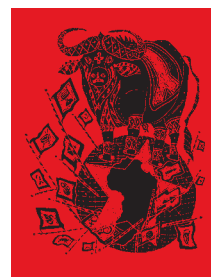


TABLE 16: WHAT MAKES YOU CHOOSE A PARTICULAR PUBLIC PHONE

| | Price of calls | Convenience (eg close to my house/work/shop) | Security while using |
|---------------|----------------|---|----------------------|
| Benin | 60.23% | 27.91% | 5.66% |
| Botswana | 22.85% | 71.65% | 3.98% |
| Burkina Faso | 64.51% | 31.59% | 1.62% |
| Cameroon | 85.21% | 31.47% | 1.07% |
| Côte d'Ivoire | 37.96% | 18.20% | 0.00% |
| Ethiopia | 39.58% | 47.96% | 0.61% |
| Ghana | 32.92% | 24.18% | 0.00% |
| Kenya | 26.39% | 87.72% | 6.47% |
| Mozambique | 41.75% | 49.98% | 14.21% |
| Namibia | 38.70% | 43.02% | 11.99% |
| Nigeria* | 50.35% | 44.09% | 3.25% |
| Rwanda | 37.81% | 39.83% | 1.31% |
| Senegal | 63.05% | 8.26% | 11.63% |
| South Africa | 58.30% | 73.32% | 12.33% |
| Tanzania | 30.21% | 40.39% | 6.21% |
| Uganda | 61.40% | 83.10% | 24.12% |
| Zambia* | 31.71% | 89.77% | 4.12% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

The use of a particular pay phone is again determined by the price of calls amongst over 85% of respondent using payphones in Cameroon, around 64% in Burkina Faso and Senegal and 61 percent in Uganda – all countries with reasonably high call charges. Proximity to a particular call box is the determining factor in selecting a particular payphone in the case of Kenya (87%), South Africa (73%) and Botswana (71%). Security is by and large not a major issue determining the use of pay phones in general except in South Africa (21%), and Tanzania (26%). Though 24% of respondents gave security as the reason to use a particular call box in Uganda and 12% of respondents indicating this to be the reason in Mozambique.





TABLE 17: PUBLIC PHONE ACCESS WITH ADDITTIONAL CAPABILITIES

| If you were given your own personal number so that when you called from a community/public pay phone people could call your personal number and leave you private voice messages, how much more would you use the service: | | | | | |
|--|----------------------|--|--|---|---|
| | The same as I do now | Only a very little more (up to 10% increase a month) | Quite a bit more (11-30% increase a month) | A lot more than I use now (31-50% increase a month) | Very much more than I use now (51+% increase a month) |
| Benin | 30.11% | 18.05% | 13.81% | 25.55% | 12.48% |
| Botswana | 64.54% | 16.92% | 12.21% | 3.78% | 2.55% |
| Burkina Faso | 23.29% | 34.27% | 9.11% | 32.71% | 0.63% |
| Cameroon | 41.61% | 25.93% | 7.88% | 16.70% | 7.88% |
| Côte d'Ivoire | 51.53% | 40.99% | 4.24% | 3.24% | 0.00% |
| Ethiopia | 57.62% | 2.79% | 9.58% | 9.66% | 20.36% |
| Ghana | 60.14% | 27.79% | 4.81% | 5.87% | 1.40% |
| Kenya | 54.31% | 18.60% | 19.14% | 6.37% | 1.58% |
| Mozambique | 86.43% | 5.88% | 5.73% | 1.05% | 0.90% |
| Namibia | 63.23% | 6.97% | 2.87% | 3.68% | 23.24% |
| Nigeria* | 44.99% | 19.23% | 13.28% | 15.93% | 6.57% |
| Rwanda | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Senegal | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| South Africa | 59.57% | 19.90% | 10.54% | 5.07% | 4.91% |
| Tanzania | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Uganda | 46.77% | 20.16% | 12.65% | 11.01% | 9.41% |
| Zambia* | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

In Ethiopia, where mobile and fixed services are more limited, 20% of respondent indicated they would use public pay phones considerably more if they the had a personal universal number they could used to receive calls and voice mail messages. In Nigeria this was as much as 23%, though in most cases minimal increases in public usage were indicated with most respondents indicating that the usage would remain similar to what it currently was.

INTERNET

The Internet was of limited use in the communications strategy of households and individuals for a number of reasons: perceptions of its unreliability due to poor network quality; limited bandwidth and high costs; and/or the people communicated with were not using the Internet. This is borne out by the less than 5% of households with a working Internet connection across the countries surveyed, with most countries below 1%. The great number of homes with computers is found in South Africa at 15% (though only 5% of them have connectivity). This is followed by Namibia, Kenya, Ghana, Nigeria and Botswana, with Ethiopia, Rwanda and Tanzania having the lowest number of home PCs.

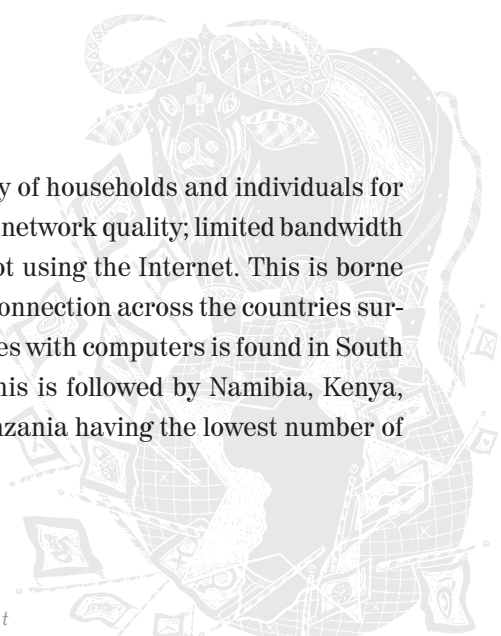
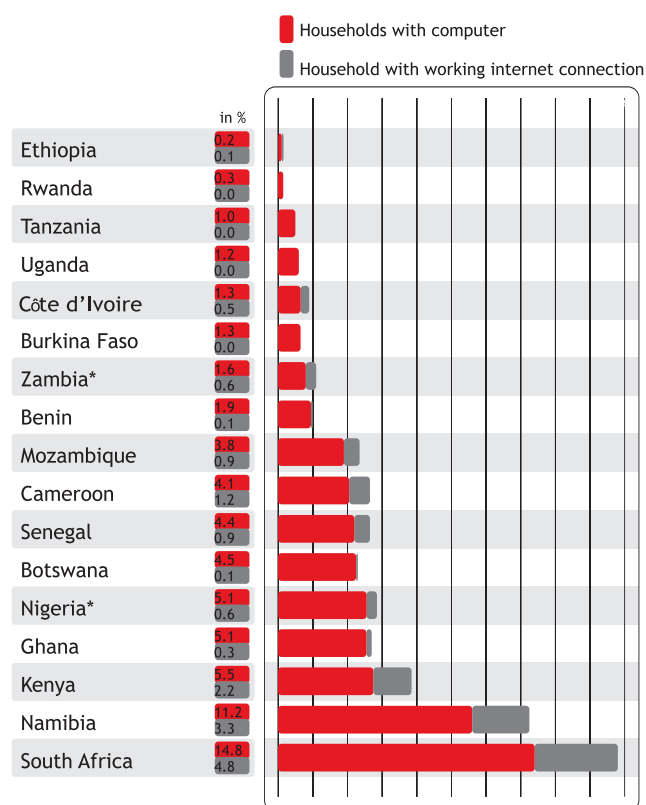




FIGURE 3: COMPUTER OWNERSHIP AND INTERNET CONNECTION AT HOME ²³



Even in terms of wider access to the Internet whether at work or at public access points such as cybercafés, only 15% of adults in the highest scoring country, South Africa, were accessing the Internet and in most countries this was only between 1% and 6%. Awareness of the Internet was greatest in South Africa (50.8%) followed by Senegal 45% and Zambia (43.4%). However, in terms of actual usage of the Internet, Kenya and South Africa at 15% of the population topped Senegal at 10%, followed by Benin and Namibia on 8%. Ethiopia was lowest at 0.7% and followed by Mozambique at 1% of those over 16 years of age using the Internet. Interestingly, while awareness of the Internet stood at only 3% in Mozambique, in Ethiopian it was over 8%. Despite this actual usage of the Internet in Ethiopia is below 1%. Part of the explanation for this is that while Ethiopia had no Internet Service Providers (ISPs) competition at the time of the survey, Mozambique had a fully liberalised ISP segment which only required notification to the regulator. Both countries have no competition for bandwidth and high charges as a result, which is probably inhibiting the competitive effects in the liberalised ISP segment of the market.

The main finding of the survey in relation to the Internet is that disturbingly few people know what the Internet is and even fewer are using it. One percent, and fewer in the case of Ethiopia, of those surveyed in Mozambique, Rwanda, Tanzania, Uganda and Zambia were using the Inter-

²³ Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.



net and only 2% in Botswana (with one of the highest GDPs per capita on the continent) Burkina Faso. In the very low usage countries the top quartile is so low that there is often not a significant difference between usage there and in the bottom three quartiles in terms of disposable income and therefore the average. The most equitable access to the Internet appears to be in Senegal where those within the lowest 75% of disposable income at 9% was not very different from the 14% of those in the top 25% in terms of disposable income. The widest gap between those in the top 25% and bottom 75% in terms of disposable income was in South Africa at 38% to 7% respectively. This was followed by Kenya at 32% of the top 25% as opposed to 9% of the bottom 75% in terms of disposable income.

TABLE 18: INDIVIDUAL INTERNET USAGE

| | 16+ knowing what the Internet is: | | | 16+ that use the Internet: | | | 16+ with email address |
|---------------|-----------------------------------|-------------|--------------|----------------------------|-------------|--------------|------------------------|
| | All | Lower three | Top quartile | All | Lower three | Top quartile | |
| Benin | 21.5% | 17% | 33% | 8.7% | 6% | 16% | 8.0% |
| Botswana | 22.0% | 14% | 52% | 5.8% | 2% | 19% | 4.9% |
| Burkina Faso | 9.0% | 6% | 17% | 4.3% | 2% | 10% | 3.4% |
| Cameroon | 38.9% | 35% | 54% | 13.0% | 10% | 25% | 11.0% |
| Côte d'Ivoire | 17.3% | 12% | 31% | 6.7% | 4% | 14% | 4.1% |
| Ethiopia | 8.6% | 6% | 18% | 0.7% | 0% | 3% | 0.4% |
| Ghana | 26.6% | 26% | 27% | 5.6% | 5% | 8% | 5.2% |
| Kenya | 32.2% | 25% | 52% | 15.0% | 9% | 32% | 13.0% |
| Mozambique | 3.8% | 2% | 10% | 1.0% | 1% | 3% | 0.8% |
| Namibia | 26.7% | 16% | 60% | 8.8% | 4% | 25% | 5.5% |
| Nigeria* | 38.3% | 35% | 52% | 12.7% | 10% | 22% | 10.2% |
| Rwanda | 6.7% | 4% | 13% | 2.0% | 1% | 4% | 2.0% |
| Senegal | 45.0% | 37% | 71% | 10.1% | 9% | 14% | 6.5% |
| South Africa | 50.8% | 42% | 75% | 15.0% | 7% | 38% | 12.6% |
| Tanzania | 8.7% | 6% | 16% | 2.2% | 1% | 4% | 1.6% |
| Uganda | 6.5% | 4% | 15% | 2.4% | 1% | 7% | 2.1% |
| Zambia* | 43.4% | 39% | 60% | 3.3% | 1% | 13% | 2.8% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Where PC ownership is low and connectivity restricted or expensive, cybercafés are the major point of access. With the exception of Botswana, Namibia, South Africa, where the Internet is accessed predominantly at work or educational institutions, over 50% of people in all other countries surveyed use cybercafés to gain access to the Internet. This was even more so in the case of West Africa, where over 80% of people use cybercafés – Benin, Burkina Faso, Côte d'Ivoire, Cameroon, Rwanda and Nigeria.

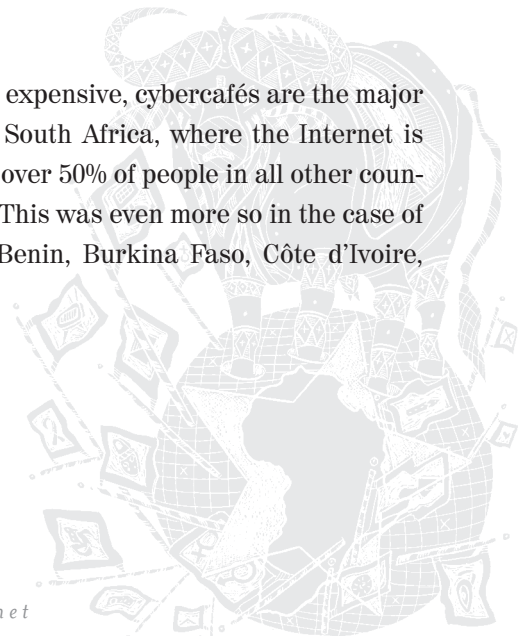
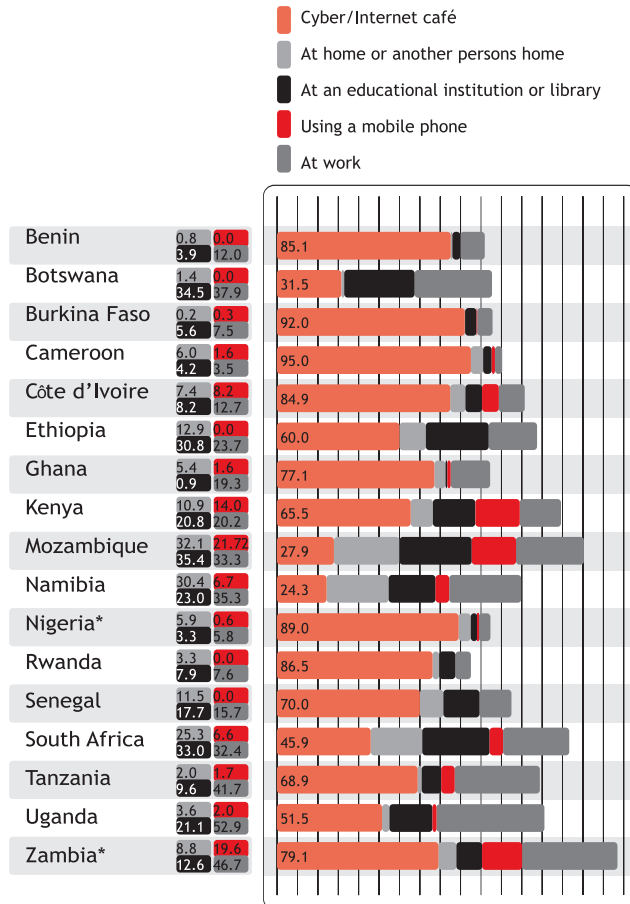
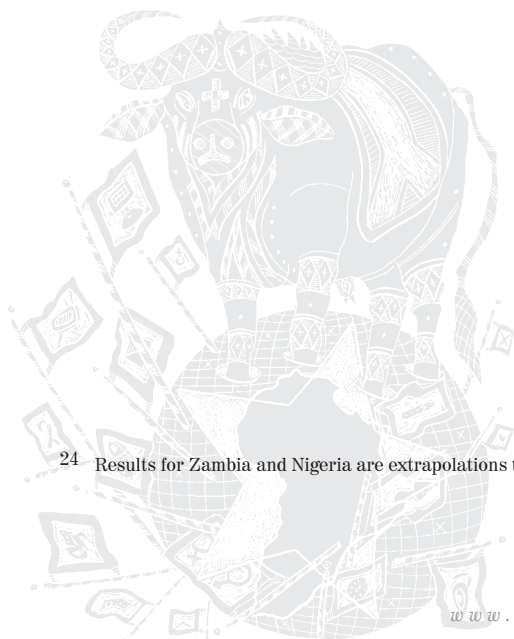




FIGURE 4: POINTS OF ACCESS FOR THOSE WHO USE THE INTERNET.²⁴



Of the limited number of people accessing the Internet, however, most are doing so at least once a week and in many cases daily.



²⁴ Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.



TABLE 19: FREQUENCY OF INTERNET USE

| | Every day or almost every day | At least once a week | At least once a month | Less than once a month |
|---------------|-------------------------------|----------------------|-----------------------|------------------------|
| Benin | 11.8% | 54.7% | 21.5% | 11.9% |
| Botswana | 31.3% | 47.7% | 14.1% | 6.9% |
| Burkina Faso | 13.5% | 31.5% | 30.6% | 24.3% |
| Cameroon | 11.2% | 36.6% | 29.5% | 22.6% |
| Côte d'Ivoire | 15.8% | 36.5% | 27.8% | 19.9% |
| Ethiopia | 14.5% | 48.9% | 9.0% | 27.6% |
| Ghana | 31.9% | 35.2% | 13.6% | 19.2% |
| Kenya | 41.0% | 35.3% | 17.2% | 6.4% |
| Mozambique | 60.0% | 23.7% | 7.9% | 8.3% |
| Namibia | 35.2% | 32.9% | 15.1% | 16.8% |
| Nigeria* | 12.5% | 52.0% | 24.0% | 11.5% |
| Rwanda | 10.7% | 37.5% | 38.9% | 12.8% |
| Senegal | 17.7% | 25.9% | 20.8% | 35.7% |
| South Africa | 56.2% | 30.4% | 9.4% | 4.1% |
| Tanzania | 18.7% | 31.4% | 43.9% | 5.9% |
| Uganda | 15.4% | 78.5% | 4.5% | 1.6% |
| Zambia* | 34.6% | 33.8% | 17.1% | 14.5% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

As we see in Table 19 the primary reasons for those who knew what the Internet was, but were not using it, was the lack of access to a personal computer and an absence of knowledge on how to use it. Over 80% of Ethiopians gave this as their reason, followed by over 70% of Rwanda, Tanzania and Ghana. Lack of access to an Internet facility was also significant, with over 70% of Zambians and 63% of Botswanans providing this reason. More than half of the respondents in Uganda also gave this as their reason. Relatively few of those not using the Internet gave the high cost of access as a reason for not using the Internet, except Cameroon, where Internet awareness is high and over 30% gave the high cost of access as a reasons.





TABLE 20: REASONS WHY REASONS WHY THOSE OVER 16 YEARS OF AGE THAT KNOW THE INTERNET DO NOT USE IT

| | I do not have access to a computer | I do not know how to use computers | I do not want to use the Internet | I have no one to e-mail to | I do not have access to any Internet facilities | Cannot read/write | I cannot afford to use the Internet |
|---------------|------------------------------------|------------------------------------|-----------------------------------|----------------------------|---|-------------------|-------------------------------------|
| Benin | 48.2% | 49.7% | 13.1% | 10.9% | 4.6% | 4.3% | 2.2% |
| Botswana | 52.7% | 17.4% | 3.0% | 6.0% | 63.5% | 0.0% | 6.9% |
| Burkina Faso | 23.1% | 68.9% | 2.3% | 18.7% | 0.6% | 4.2% | 11.5% |
| Cameroon | 67.0% | 66.7% | 14.0% | 16.5% | 50.5% | 1.7% | 33.8% |
| Côte d'Ivoire | 61.3% | 57.0% | 3.3% | 0.0% | 20.1% | 1.1% | 8.5% |
| Ethiopia | 86.7% | 81.1% | 2.1% | 2.8% | 3.8% | 1.6% | 5.4% |
| Ghana | 49.9% | 70.8% | 6.3% | 25.0% | 25.9% | 4.9% | 7.8% |
| Kenya | 35.0% | 40.9% | 24.7% | 27.9% | 37.8% | 0.0% | 2.2% |
| Mozambique | 68.5% | 33.6% | 7.1% | 20.6% | 13.8% | 0.3% | 7.4% |
| Namibia | 63.2% | 15.3% | 3.9% | 5.2% | 38.0% | 0.3% | 13.5% |
| Nigeria* | 47.0% | 48.4% | 3.1% | 15.5% | 30.2% | 0.6% | 1.6% |
| Rwanda | 28.5% | 73.6% | 9.6% | 23.3% | 22.6% | 2.1% | 9.4% |
| Senegal | 30.3% | 54.1% | 7.0% | 11.7% | 18.2% | 43.0% | 7.6% |
| South Africa | 53.1% | 25.4% | 8.0% | 10.0% | 38.1% | 0.5% | 12.9% |
| Tanzania | 64.6% | 71.5% | 5.6% | 18.9% | 19.3% | 0.2% | 15.4% |
| Uganda | 41.6% | 42.1% | 1.6% | 31.0% | 50.2% | 2.3% | 13.8% |
| Zambia* | 26.7% | 20.2% | 0.9% | 3.4% | 70.1% | 0.1% | 10.4% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

For those accessing the Internet however, bandwidth quality and price appear to be among the major reasons given for not finding the Internet useful as Table 20 indicates. In more than eight countries over 40% of those surveyed for example attributed their reluctance to use the Internet to the high cost; in Burkina Faso this rose to over 77%. Another major reason given was lack of access to a home computer with connectivity, as was the slowness of the Internet. Lack of knowledge about how to use the Internet seemed to be less of a factor, though this factor was highest in Côte d'Ivoire (14%), Burkina Faso (13%), Kenya (11%) and Uganda (9%). The lack of utility of content (highest in Mozambique at 22%) and lack of local languages (highest in Ethiopia and Kenya at 12%) were also not given as major reasons for not finding the Internet useful.





TABLE 21: FACTORS THAT LIMIT THE USEFULNES OF THE INTERNET

| | No interesting content | Lack of local language content | Knowledge about how use the Internet | Lack of access to a computer with Internet connection | Slowness of Internet | Cost of access | Lack of time |
|---------------|------------------------|--------------------------------|--------------------------------------|---|----------------------|----------------|--------------|
| Benin | 11.5% | 0.7% | 2.9% | 8.3% | 46.2% | 32.4% | 25.3% |
| Botswana | 0.0% | 2.7% | 0.9% | 41.5% | 30.0% | 13.1% | 13.0% |
| Burkina Faso | 0.3% | 0.3% | 13.0% | 3.0% | 14.8% | 77.9% | 19.5% |
| Cameroon | 6.3% | 2.3% | 8.1% | 25.9% | 19.0% | 48.2% | 43.8% |
| Côte d'Ivoire | 4.5% | 0.0% | 14.1% | 22.3% | 7.4% | 55.1% | 26.5% |
| Ethiopia | 1.2% | 12.6% | 7.4% | 43.9% | 62.2% | 51.4% | 11.5% |
| Ghana | 2.9% | 6.7% | 2.9% | 23.6% | 42.1% | 19.6% | 26.4% |
| Kenya | 9.5% | 12.1% | 11.3% | 30.2% | 25.0% | 28.4% | 37.8% |
| Mozambique | 22.4% | 0.8% | 1.6% | 21.1% | 14.6% | 19.9% | 29.7% |
| Namibia | 3.2% | 3.4% | 3.6% | 19.0% | 18.0% | 16.6% | 32.8% |
| Nigeria* | 5.9% | 4.9% | 7.3% | 15.3% | 16.3% | 50.0% | 31.9% |
| Rwanda | 0.9% | 4.1% | 4.2% | 29.8% | 38.2% | 44.3% | 29.5% |
| Senegal | 0.5% | 2.3% | 1.0% | 30.5% | 5.5% | 16.0% | 31.7% |
| South Africa | 18.0% | 8.8% | 1.7% | 28.6% | 8.5% | 16.0% | 36.1% |
| Tanzania | 2.1% | 1.8% | 1.6% | 35.9% | 21.5% | 40.9% | 11.2% |
| Uganda | 0.7% | 3.0% | 9.8% | 35.7% | 18.3% | 20.7% | 12.0% |
| Zambia* | 4.9% | 0.0% | 0.0% | 21.7% | 13.6% | 48.7% | 69.9% |

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

CONCLUSION & RECOMMENDATIONS

The excitement about the extension of telecommunications networks and services in countries across the continent over the last few years, particularly in the area of mobile telephony, should be tempered by the fact that these have not been optimal. While gains have clearly been made, this review of the *Household and Individual ICT Access & Usage across 17 African Countries* suggests that national policy objectives of pervasive and affordable ICT services are not being met.

While Africa may have the highest growth rate in mobile telephony, this is off a very low base. Large numbers of Africans continue not to have permanent access to basic telephony, and very few have access to the enhanced ICT services required for effective participation in the economy and society. The almost uniformly high cost of communications services across the continent continues to inhibit the uptake of services and their usage by consumers.

The realisation of an equitable information society is often undermined by many countries' own policies and practices, market structures and institutional arrangements. Many jurisdictions continue to be characterised by administrative processes that are not transparent and participatory, and institutional arrangements that constrain the autonomy of regulatory agencies and induce executive determinations. Together with the lack of capacity in regulatory agencies to regulate



effectively, this has created, in many countries surveyed, telecommunication environments not conducive to the significant investment necessary to network extension and the competition needed to drive down prices and extend services.

Telecommunications reform in many African countries has aligned with global strategies which increasingly deploy market mechanisms to achieve the policy goals of improved affordability and access to an increasingly wider range of services. Despite this, in practice, most markets are still structured around vertically integrated incumbents and, as a result, are not very competitive. This is reflected in the *Telecommunications Regulatory Environment* survey – a perception survey conducted to determine the perception of the effectiveness of the policy and regulatory process and outcomes in each country during 2006 and 2007. The policy and regulatory environment were positively perceived in only two countries, Nigeria and Côte d'Ivoire, with some qualifications.

While countries continue to limit entry into their markets in the name of universal access or safeguarding national interests, some countries have seen the gains associated with competition and market innovation. In several markets such as Nigeria, Ghana and Tanzania, where mobile market have been extensively liberalised, billing and bundling innovations have occurred that make access possible. Without effective wholesale (interconnection and facilities) and retail regulation of the imperfect markets that exist even in more open markets, policy objectives will remain elusive. The greatest challenge to policy makers is the creation of competencies and capacity to regulate markets effectively.

Opening up markets to competition will relieve regulators of some of the burdens of regulation and create opportunities for innovation. East Africa provides an example of this where the challenges of regulating extortionate roaming charges which have plagued regulators throughout the world, market-led termination of roaming charges in East Africa (initially by Celtel, but subsequently by the three other operators in the region who were compelled to follow suit) means that mobile users travelling through these countries can make calls, send SMSs and top up their air-time at local rates. This is likely to produce a range of positive multipliers, particularly with regard to trade in the region. This market responsiveness counters a range of constraining national and sectoral policies that have negatively characterised countries in the region, by contributing to high prices, most specifically retrogressive taxes on mobile equipment and services.

These results point to the massive challenge that all regulatory agencies face in the establishment and resourcing of autonomous agencies needed to build effective competition in markets; particularly now, as we moved from more traditional monopoly markets to an increasingly converging environment.

One can assume, therefore, that prices remain substantially above real cost. With the asymmetries of information that exist between regulators and not only the traditional incumbent but new, and often far more resourced, foreign operators, the prospect of regulatory agencies determining cost-based pricing regimes seems remote.

It would appear however that private-sector investors have been attracted by the higher growth potential and lower incremental investment costs of mobile compared to fixed infrastructure, as well as the increased opportunities to compete with often-inefficient incumbents, despite the identified policy and regulatory risk. As a result, mobile is the main means of voice communication in



Africa today. As mobile operators have become the new incumbents and state-owned fixed operators struggle to raise public or private investment in order to extend and modernise their networks, important questions for policy and regulation are raised. The high cost of services, together with the fact that most receivers are not GPRS or 3G compatible, means that, while more and more people are indeed gaining access to voice services, they continue to be marginalised from the enhanced ICT services regarded increasingly as basic services in the more connected economies.

Broadband access across sub-Saharan Africa is still nascent, but with increased roll out of fixed wireless services such as CDMA and Wimax this is beginning to change. The high cost of computers and the low uptake of them by households suggest that limited mobile Internet usage is more likely, though currently far too expensive for generalised use. Only South Africa had any significant uptake of ADSL and mobile HSDPA services, at the time of the survey, but with ADSL offerings emerging in the dynamic Kenyan and Nigerian markets, innovative broadband offerings may emerge there.

Internet penetration is uneven across the continent, though public access appears to be more pervasive in West and East Africa, most particularly Benin, Burkina Faso, Cameroon, Senegal, Nigeria, Tanzania and Kenya. However, with the low home-PC penetration rates across the continent, private access remains very limited, very expensive and way below the critical mass required for it to impact significantly on the economy and society. From the demand-side surveys conducted by RIA, we are aware that in the Southern Africa region the primary point of access to the Internet for many people is at work or school. This is certainly the case for Botswana, Namibia, South Africa and Zambia.

One of the reasons for the high cost of Internet services on the continent is the exceptionally high cost of international bandwidth. The possibility of these costs being driven down with the initiation of several other cable operations, primarily focusing on the un-served East African seaboard in response to the absence of any cable on the Eastern seaboard of the continent at all. The most promising, at one stage, appeared to be the EASSY cable, an initiative that brought together a range of incumbent, private and, for the first time, non-profit interests together. Fearing another club consortium in which they would have no say, African governments intervened in the consortium effectively scuttling it in that form. Without resolution on the EASSY cable, governments have instead turned their effort to creating a massive 3-terrabit US\$2 billion NEPAD cable network that would circumnavigate the entire continent and connect landlocked countries.

While any intervention that would lower the high cost of international bandwidth on the continent must be welcomed, the ramifications for competitiveness and the efficient allocation of resources by the market need to be considered. Rather than acknowledging the poor bandwidth situation on the continent to be the outcome of past policies of protectionism, several governments concerned with the poor access to, and high cost of bandwidth, have explained their need to invest in the network because of the lack of interest by the private sector in infrastructure investment in Africa or because of the negative perception of the SAT3 club consortium. The decision at the recent Meeting of African Ministers in Rwanda in 2008 that cables that were not predominantly locally owned would not in future be permitted to land on the continent does not induce lower prices through the competitive supply of services. How these new regional and continental net-



works complement or contradict current national market strategies adopted across the continent is unclear. The relationship of such a multiple state-owned network as the proposed NEPAD cable to the uneven and unrooted regulation of the sector that characterises the continent is also not clear. Until this is resolved, it will remain unclear how prices will be determined to ensure they meet the public interest objectives that state intervention in countries such as South Africa, Uganda and Rwanda are championing.





TABLE 22: RECOMMENDATIONS

| Survey finding | Recommendation | Objective | Approach |
|---|--|--|---|
| Fixed-line access and usage charges a major obstacle to usage | Reduce access charges (monthly line rental) even if higher usage charges to enable entry of consumers into fixed market Open competition in access network Unbundling local loop | Allow competition to drive down prices Ensure cost-based interconnection pricing to enable competitive entry Enable resale of incumbent access network | Create competition while ensuring adequate return to invest in network extension. |
| Mobile phone access and usage constrained by high costs | Increase competition and remove any existing customs and excise and VAT on handsets below US\$50 and on any additional taxes on communication services | Reduce the access and usage price of mobile communication through competition and regulation of termination charges | Even moderate reductions in the access and usage prices can dramatically increase entry and usage which is currently highly constrained by cost in most countries |
| Payphones still widely used in multiple access and usage strategy of individuals | Regulate pay phone extension and prices for mobile and fixed networks to ensure access for those marginalised from fixed and mobile services, and extend these services at public access points to Internet. Support innovations around a universal number allowing for messaging and charging | Extend full range of services to those currently excluded from them by aggregating access and usage in communities | Ensure that affordable access to a full range of services is available through public access points |
| Internet awareness reasonably high but access limited by absence of skills to use Internet and absence of access points | Extend services at public access points to include Internet Roll out Internet training in schools, community centres and set national targets. Reduce the cost of Internet enabled mobile services | Improve access to affordable Internet and increase computer literacy | Increase the availability of the Internet through liberalising services provision and reducing facilities costs for ISPs, which should reduce barriers to entry to ISP market, increase competition and drive down prices |
| Absence of computer literacy to utilise Internet | Develop and implement dedicated human capital strategies in formal and informal education programme, adult literacy programmes and civil services training | Reduce skills barrier to use of enhanced communication services | Even if affordable Internet available, basic computer literacy inhibits access and usage |
| Unintended policy outcomes, particularly affordable access to full range of communication services | Develop institutional arrangements and transparent administrative procedures that allow for clear division of policy, regulatory and operational functions and participatory policy processes that draw on all available expertise. | Provide policy and regulatory certainty and create conditions conducive to investment. Attract investment by increasing investors confidence in impartiality of regulator and independence from political interference | Draw on national knowledge and expertise through consultative policy processes and ensure capabilities within decision-making bodies to formulate policy, capacity within autonomous regulatory agencies to implement decisions |
| Constrained access and usage of available services | Establish regulatory agencies with the necessary autonomy and resources to regulate effectively within a clear implementation framework | To build the competency and capacity of the regulator, to enable market efficiency and deal with market failure | Tendency towards imperfect markets in infrastructure industries, require effective regulation to ensure benefits of competition |
| High prices constrain the entry of new consumers into markets and inhibit the usage of those in the market | Remove barriers to entry and establish conditions for fair competition. These include cost-based interconnection and access to facilities of incumbents, prevention of the abuse of market dominance and access to spectrum and numbers; regulate bottleneck facilities | To allow for the efficient allocation of resources by the market that should result in lower prices and a wider range of services | Liberalised markets appear to go further in delivering a range of services to consumers than protectionist market strategies |
| Consumers unaware/confused by artificial licensing categories and | Service-neutral licensing | With the dynamic shifts in technology, the negative impact of policy lags can be overcome with service-neutral licensing that allows operators and service providers to develop organically and seamlessly to offer new services | Allow for technological progress in converging environment to meet demand without licence constraint and reduce regulatory and licensing burden |
| Constrained access outside of major metropolitan areas and informal settlements | Develop open-access regimes | Will encourage the optimal use of available spectrum and facilities and encourage entrepreneurship and innovation | Low-cost rapidly deployable wireless technologies can fast overcome local access bottlenecks |



REFERENCES

- Esselaar S, Gillwald A, & Stork C. (2007). Telecommunications Sector Performance in 16 African Countries: A supply-side analysis.
- ITU. (2007). *Digital Opportunity Index*. Retrieved August, 2008.
- ITU. (2008). *African Telecommunication/ICT indicators 2008: At the Crossroads*. Geneva: International Telecommunications Union.
- Jensen, M, & Mahan, A. (2007, 13-15 December 2007). *Toward a Single ICT Index - Considerations for the Formulation of a Single - ICT Index for the ITU*. Paper presented at the Sixth World Telecommunications/ICT indicators Meeting, Geneva.
- Kauffman, R J, & Kumar, A. (2005). *A Critical Assessment of the Capabilities of Five Measure for the ICT Development*. Unpublished manuscript, Minneapolis.
- OECD. (2007). *Communications Outlook*. Paris: OECD.
- Röller, L, & Waverman, L. (2000). *Telecommunications Infrastructure and Economic Development: A Simultaneous Approach*. London: Centre for Economic Policy Research.
- Sciadas, G. (2003). *Measuring the Digital Divide and Beyond*. Montreal: NRC Press.
- Sciadas, G. (2005). *From the Digital Divide to Digital Opportunities: Measuring infostate for development*. Montreal: NRC Press.
- Waverman, L, Dasgupta, K, & Tonkin, J. (2008). *The Connectivity Scorecard*: LECG Nokia Siemens Networks.





APPENDIX: METHODOLOGY

This paper contains an analysis of representative household-level and individual data on ICT use and access for 17 Africa countries from the *2007/8 RIA e-Access & Usage Household Survey*.

The data stems from surveys conducted by RIA in 17 African countries during the end of 2007 and the beginning of 2008. The data is nationally representative on a household level for individuals 16 years of age or older except for Nigeria and Zambia (where the data only allows national extrapolations, due to sampling protocol violations). The survey was stratified into metropolitan, other urban and rural areas. Enumerator areas (EAs) were sampled for each stratum using probability proportional to size (PPS) from national census sample frames. EA sample frames were constructed through listing all households within an EA. Households were then sampled using simple random sampling.

The RIA questionnaire was divided in three sections. The first part, the household rosta, collected information about all household members. The second part collected household-related information. The head of the household or someone that manages the household answered parts one and two. The third part, the individual section, was answered by an individual, 16 years of age or older, randomly selected from those household members and visitors that slept in the house on the night of the interview.

TABLE OF RIA SAMPLE

| | Major urban | Other urban | Rural | Total |
|---------------|-------------|-------------|-------|--------|
| Benin | 432 | 336 | 333 | 1 101 |
| Botswana | 348 | 241 | 229 | 818 |
| Burkina Faso | 416 | 329 | 332 | 1 077 |
| Cameroon | 490 | 347 | 398 | 1 235 |
| Côte d'Ivoire | 502 | 312 | 298 | 1 112 |
| Ethiopia | 1 173 | 631 | 551 | 2 355 |
| Ghana | 473 | 324 | 295 | 1 092 |
| Kenya | 472 | 557 | 432 | 1 461 |
| Mozambique | 562 | 312 | 257 | 1 131 |
| Namibia | 311 | 294 | 280 | 885 |
| Nigeria | 895 | 1 012 | 844 | 2 751 |
| Rwanda | 415 | 333 | 330 | 1 078 |
| Senegal | 432 | 312 | 337 | 1 081 |
| South Africa | 779 | 465 | 527 | 1 771 |
| Tanzania | 634 | 393 | 463 | 1 490 |
| Uganda | 436 | 347 | 344 | 1 127 |
| Zambia | 405 | 212 | 264 | 881 |
| Total | 9 175 | 6 757 | 6 514 | 22 446 |





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