Towards an African e-Index

Household and individual

ICT ACCESS AND USAGE

across 10 African countries

edited by Alison Gillwald

2005

As indicated in the text, the data for Cameroon, Rwanda and in some instances Ghana could not be weighted. These countries figures therefore demonstrate an urban bias that tends to exaggerate most indicators and this should be accounted for in consideration of these countries absolute and relative positioning in the text. Although these figures appear to be indicative of trends within their respective countries, for this reason these countries have been excluded from the actual index.

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DISCLAIMER

While every effort has been made to ensure the veracity of this research and while it is hope that it will be used to stimulate domain in the public domain and inform decision-making within the ICT sector at the national, regional and continental level, Research ICT Africa, the Witwatersrand University LINK Centre, as the host of the project, and any of its sponsors disclaim all liability for any loss, damage or expense arising from the use of this information.

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Research ICT Africa! 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 IDRC and seeks to extend its activities through national, regional and continental partnerships.

The establishment of the Research ICT Africa! network emanates from the growing demand for the 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 in support of 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 made 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. The network currently consists of nodal members from 14 African institutions:

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Chapter 1: Introduction

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GLOBAL ECONOMIC AND SOCIAL CHANGE. Over the past decade, there has been an increasing commentary on the economic, political, and social potential of information communication technologies (ICTs) under the right political and economic conditions. The development of the harmonised, globally interconnected communications infrastructure that is transforming economy and society is highly uneven, and the benefits of instant communication and information-sharing between geographically remote areas at steadily declining costs to the user that characterise it, are far from the experience of most Africans. Despite the improvements in access to voice telephony made possible by mobile phones over the last half a decade, most of the people on the continent continue not to own any type of phone and many more have no regular access to communications. The remarkable gains made towards universal access through the introduction of mobile telephony, and more particularly competition, masks the fact that Africa continues to lag global averages on major ICT indicators. Indeed, since 2003 there has been a growing gap between those countries with access to communications services and those countries without. In terms of a range of ICT indicators, African countries, including South Africa, score lower than the global average, and although progress was made throughout the period, the gaps between African and other developed countries and emerging economies persist; indeed, they have intensified over the last decade, indicative of a growing digital divide (Sciadas 2005).

THE DIGITAL DIVIDE. The significance of this growing digital divide, in which Rodriguez and Wilson (2000) include both ICT products and outputs (Internet access, cellphones) and inputs (engineers, scientists), is that as information becomes ever more central to human activity, the lack of it could make other development gaps impossible to bridge (WSIS Executive Secretariat, 2002). Grace et al (2001) and Rodriguez and Wilson (2000) highlight the potential existence of a poverty trap, where a certain threshold of national communications infrastructure rollout and skilled individuals have to be in place for the positive network effects of these technologies to reach a takeoff point and multiply through the national economies. The danger of the digital divide is that certain countries or regions may fall behind the rest of the world and never reach this threshold point, thereby being permanently excluded from the numerous potential economic and social benefits of ICTs.

What also characterises these global developments is the gap not only between countries – historically between those of the North and those of the South – but within countries, primarily between the urban centres and the rural periphery. Domestic digital divides often mirror existing inequities within developing and developed countries and are therefore likely to reinforce them. The characteristic user of the Internet and other ICTs, for example, is often young, male, well-educated, relatively wealthy, tends to live in the capital city of their country, and is likely to be a member of the dominant ethnic group of their country (Kenny 2002; Human Development Report, 2001; Goldstuck 2001). The continuation of this gap has the ability to exacerbate existing inequities (Kenny et al 2001) and social problems and possibly even lead to conflict (Rodriguez and Wilson 2000).

To best understand the full potential of ICTs, one needs to look beyond their direct impact and understand that they make possible "the access to information that lies at the heart of most human activity" (WSIS Executive

Secretariat, 2002). The very nature of ICTs is pervasive and cuts across all sectors, with applications ranging from personal use to business to government (Human Development Report, 2001). Moreover, ICTs have the ability to be customised for personal needs and local conditions (Digital Opportunity Initiative, 2001). With this pervasiveness in mind, it should not be surprising that that ICTs are increasingly being viewed as a prerequisite for modern human development (Digital Opportunity Task Force, 2002) and the role that they can play in development is being recognised outside of the ICT and development sphere.

ECONOMIC GROWTH AND SOCIAL DEVELOPMENT. With the correct policies and regulatory environment, telecommunications has long been understood as an enabler of economic growth and development. It has increasingly been viewed not only as a significant sector within the economy by itself, but also a vital service to business and industry more generally. With the rise of the information economy, the assumed role of telecommunications, and ICTs more generally, has been expanded to include it being a necessary condition for everything from national innovation and entrepreneurialism to effective government service delivery.

For this reason, governments across the continent unable to capitalise the expansion and modernisation of their networks have privatised them and liberalised their markets, with differing degrees of success. In all cases it has highlighted the pent-up demand for communications – even in the vast areas of the continent that have traditionally been regarded as uneconomic to service.

The rationale for seeking investment in telecommunications infrastructure, that such reforms are meant to induce, is not only the contribution directly to economic activity through demand for the high-cost products used in the build-out of the network. Economic returns on such infrastructure investments are much greater than the investment itself, as they have the potential to reduce the transaction costs between businesses and with customers. This creates positive economic multipliers, as productivity within the economy is increased through more efficient information-gathering and the substitution of communication for higher transactional cost activities. (See Röller and Waverman 2002; and Laffont 2003). Social multipliers associated with safety and survival, and social cohesion more generally, are also well-documented, although not costed or quantified.

A large part of the research concerning the quest for national development revolves around achieving higher rates of economic growth. A 2001 OECD study on the impact of ICT capital accumulation on output growth in Australia, Canada, Finland, France, Germany, Italy, Japan, the United Kingdom and the United States found that investments in national communications infrastructure over the past 20 years resulted in an increase in GDP growth of 0.2% to 0.5% per year over the period studied and that this growth accelerated to 0.3% to 0.9% in the latter half of the 1990s (Colecchia and Schreyer 2001). These findings would indicate that it is possible for countries to accelerate the growth rates of their economies through effective deployment of ICTs.

While there is a growing body of literature delineating potential causal links between telecommunications services and faster rates of economic growth, until recently the empirical evidence of a causal link between ICTs and economic growth remained tentative and very little has focused on developing countries, and Africa in particular. Generally, it is argued that ICTs have the ability both to increase efficiency (by improving the functioning of markets) and productivity (by adding value as an input in the production process), lower costs in the economy (reduce communications costs, improve supply chain management, etc.), and open access to new markets (e-commerce, better provision of information to foreign

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investors). The crucial point made in Grace et al (2001) and Laffont (2003) is that while it is unlikely that there will be conclusive econometric evidence on the direction and size of the effect of ICTs on economic growth in the near future, it would be dangerous for developing countries to use this as an excuse for not developing national e-strategies. The relationship between economic growth and telecommunications services may not be as strongly positive as some of its more optimistic proponents believe, but the balance of the evidence does indicate that such a relationship is present.

In 1996, Lars-Hendrik Röller and Leonard Waverman confirmed what has long been assumed, but not conclusively proven: a positive correlation between communications infrastructure and economic growth. However, they were unable to demonstrate causality. In 2000, after an extensive study of 21 OECD countries over 20 years, they concluded that investments in telecommunications infrastructure had strong growth effects and were able to clarify two vital qualifiers to this correlation around critical mass phenomena associated with network industries and the direction of the causality. The question that had been raised in earlier studies was: did extensive communications infrastructures enable economic growth, or did economic growth create demand for communications?

Röller and Waverman conclude from their study that the causality is two-way and that communications infrastructure development and economic growth catalyse each other. They also found, as others had theorised, that for the positive growth effects of infrastructure investment and expansion to be realised, a critical mass or a threshold of a significant size would be necessary for the network effects to kick in. This critical threshold they found was, in fact, close to universal access – around 40% of the population, assuming around 2.5 people per household. This suggests that in developing countries the positive growth benefits associated with infrastructure investment may not be realised while teledensity remains on an average of less than 4% in non-OECD countries (2000:14).

The implications of such studies are significant for developing countries in which little data exists on which to base reform policies and the application of international models are unlikely to yield the expected dividends in different circumstances.

ICTs and Government/Social Services. Outside of the economic sphere, ICTs can not only improve the internal functioning and administration of government bodies, but can also increase the efficacy of service provision in the health, education, and environment sectors. In a similar vein to the findings on the impact of teledensity on economic growth, Kenny et al (2001) have found that countries with higher teledensity than expected for their income level also have significantly higher rates of literacy and life expectancy.

In the realm of e-government, ICTs can promote better governance by improving the functioning of government through the enhancement of the administrative and planning processes that form the core of government decision-making and the provision of government services (Grace et al 2001). Equally importantly, ICTs can bring government closer to the people by making it accessible through additional channels and increasing the ability of the people and civil society to make their voices heard by government (Commission on Sustainable Development, 2001; United Nations General Assembly, 2002). However, care must be taken in the prioritisation and implementation of these types of programmes. One recent study has found that up to 80% of public sector IT applications have resulted in partial or total failure due to legacies of political patronage, histories of heavily centralised government structures, and fears

of job losses due to redundancies created by technology gains (Grace et al 2001).

CONDITIONS FOR REVERSING THE DIGITAL DIVIDE. ICTs are not a panacea to underdevelopment and will have a range of net effects. Thus, it is important to evaluate the factors that will have the greatest impact on not only ensuring access to ICTs, but also in maximising the positive impact for development of those technologies put in place.

Differences in income per capita account for around 78% of the variation in teledensity levels between countries (Kenny et al 2001). Overcoming the preponderance of this income effect will be one of the key challenges in reducing the imbalances in ICTs. Despite the size of the income effect, there are also several other factors that appear from available research to have a significant impact on the provision and impact of ICT services. Reform mechanisms of privatisation, competition and independent regulation, often only researched in resourced OECD countries, have been hailed as having resulted in price decreases, improvement in service quality, faster roll-out of infrastructure and new technology, and more choice for consumers (OECD, 2002 and Grace et al 2002). A broadly competitive macro policy environment has also been identified as an important contributing factor in increasing the provision of ICT infrastructure and maximising its impact. It is important to realise, however, that it is real competition, and not simply a liberalised environment, that can bring about tariff decreases, which in turn make accessing ICTs a realistic proposition for low-income groups, thereby combating the income effect.

It is on the basis of such studies that telecoms reform has been sold to African countries as a mechanism to transform their debilitated communications infrastructures and integrate their countries into the global economy. The outcomes of the first phases of telecoms reform in Africa have had far more mixed outcomes, however, and in some cases have had a negative impact both on affordable access and sector development (RIA! 2004).

The broadly competitive macro policy environment on which these studies is generally premised in OECD countries is largely absent in African countries. The practice that emerged from this reform model usually focused on privatisation at the expense of other reform drivers such as fair competition and independent regulation, which are critical to secure the investment not only required for network expansion, but for ensuring competitive and affordable services on these networks.

More importantly, while independent regulation made up a critical component of the multilateral agency-driven reform model, in practice the focus was on inducing the opening up of markets to foreign trade and investment rather than on the need for strong institutional arrangements to deal effectively with the regulation of the private monopoly in a partially competitive market and to counter market failure likely to arise in such imperfect markets. This has probably been the most undermining factor of reform efforts in developing countries.

While effective regulation has been a cornerstone of competitive markets in many of the developed countries calling for open access to developing country markets, it has not sufficiently accompanied the introduction of liberalisation policies, often expediently implemented by developing countries to offset debt or secure aid. Privatisation, without the regulatory capacity or political will to manage a private monopoly or, subsequently, its behaviour in a more competitive environment, can be entirely counterproductive to the achievement of the very goals intended by liberalisation, not least of all affordable access.

Introduction

Introduction

Maximising the impact and provision of ICTs. The role that ICTs can play in poverty alleviation and sustainable development has tended to focus either on infrastructure expansion to reach rural areas, or on the deployment of ICTs to sustain those marginalised from global economic and political activity. From this starting point, implementation in many developing countries has resulted in often unsustainable community projects or short-lived government initiatives. The effect of this has been to marginalise the role that ICTs themselves can play in transforming economies and societies and to raise critical questions regarding the contribution that ICTs can make to sustainable development.

For ICTs to contribute to poverty alleviation and sustainable development, they need to be located within an integrated development strategy that is both informed by and informs national policies at the macro economic and sectoral level. Every society needs a guiding vision, policy certainty and transparent regulation to promote the utilisation of ICTs to address economic growth and poverty, global competitiveness and growing employment opportunities and skills provision and to manage the digital divide. Research is critical to establishing the needs of countries and groups within them and to conceptualising approaches that are likely to be effective in resolving country-specific problems. Strengthening institutional capacity for research, analysis and debate in developing countries is an indispensable element in the construction of knowledge societies.

Research, policy and measurement. This research seeks to build an African research base to provide the data and analysis necessary for African decision-making to make informed, evidence-based appropriate policies. The paucity of information on the ICT sector in Africa is self-evident. Where research has been conducted, the data and findings are locked into proprietorial ownership rights. The asymmetries of information between operators and national decision-makers abound, with little public data outside of the incumbent mobile and fixed line operators' annual reports and the largely dated indicators collected by multilateral agencies. Historically, the limited analysis that has been done has relied almost exclusively upon these reports to provide an assessment of the development of the sector. In the light of the growing demand for information, research and analysis on which to base informed decisions in relation to ICTs and development and the absence, by and large, of such resources, Research ICT Africa! (with the support of IDRC) undertook to gather fundamental data on access and usage to inform national public policy on the continent. A major purpose of the e-index is to draw awareness to the importance of developing national statistics and data to inform decision-making, seek to fill the gaps where possible with the development of country and regional databases and begin to develop the kind of metadata decision-makers require to be effective and achieve developmental outcomes.

These activities are aligned with the commitment arising from the first World Summit on the Information Society (WSIS) Geneva Plan of Action, which emphasised the need to more effectively measure the information society to better understand the gaps and devise strategies to overcome them. At a series of thematic meetings since then and in preparation for WSIS II in Tunis in 2005, multilateral agencies have been meeting with national statistical offices and national regulatory agencies to develop a set of standardised ICT indicators to measure the information society that would be collected across all countries and allow for benchmarking and comparison. These meetings have agreed that the limited supply-side figures, where they do exist, do not sufficiently capture the demands and needs of different categories of users.

Various international meetings leading up to WSIS II appear to have concluded that several sets of indicators are required. The first is a set of basic indicators that would take the form of the more traditional supply-side indicators that have been used by the ITU in the past, but that these would be further supplemented with household/individual surveys that would allow for the disaggregation of users and consumers by age, gender, vocation, income, spatial location and communications expenditure – in much the same way as was done for the RIA! national household and individual surveys.

A second set of indicators is required to measure business or enterprise (e-economy) activity in the information society. These seek to establish the extent of computer, telephony and Internet usage. Some of the indicators used in the OECD measurements already being undertaken are quite sophisticated and seek to put values on e-procurement and e-sales, etc.

Within the e-economy debates, the importance of ICTs for enhancing SME competitiveness in developing countries has been identified, as has the need for indicators in this area. To this end, RIA! has embarked on this second layer of understanding of users and consumers by conducting SME surveys in 14 African countries. This makes up Vol 2 of "Towards an African e-Index". A third level of public sector usage often forms a third area of investigation by those countries most advanced in measuring the information society, where e-government is examined separately from e-business. With government the single largest user of ICTs in many African countries, RIA! will conduct a survey of government access, usage and expenditure on communications in 2006. This will constitute Vol 3 of the e-Index.

A further set of indicators in relation to e-society has also been proposed to establish indicators for social and cultural development. This would include assessing a country's human capital through indicators such as literacy, education, ICT skills, availability of local websites and indigenous languages. It is also here that indicators to measure the role of ICTs in health, education, environment and so on are being grappled with. To some degree, these overlap or may be subsumed by e-government assessments.

Evolution of the E-Index. The 2004 Research ICT Africa! (RIA) E-access and Usage Index evolved out of two baseline studies conducted in 2003. The first, the ICT Sector Performance Review, attempted to measure the sector outcomes of policy and regulatory strategies against national ICT objectives for various countries. The second, the Fair Access to ICT Report (FAIR), sought to assess Internet penetration against cost of services and regulatory environments. Both studies were seen as precursors to the E-access & Usage Index.

The hypothesis of the ICT Sector Performance Review was to determine the level of correlation between ICT policies and the performance of the telecommunications sector. Specifically, have the reform models followed by African countries achieved their objectives? The primary policy objective of all the countries surveyed is to increase the penetration of telephony. Various policies were implemented to try and achieve this goal. In those countries that provided the fixed line incumbent with exclusivity while liberalising the mobile sector, fixed line penetration declined and call charges increased. In virtually all countries surveyed, any increase in the penetration of telephony was achieved through mobile. This was achieved despite high mobile call charges. In fact, communication costs in Africa represent up to 10% of income, compared to the developed world average of between 2-3%. The high call charges reflect the weak regulatory regimes in place in many countries. The theme of weak regulatory bodies is repeated in areas such as international connectivity and interconnection, where

high prices have prevented increased penetration. The conclusion of the report was that delivering on the promise of increased telephone penetration at affordable prices can only be achieved through enlightened policies, a vital ingredient that has been missing from the African continent. The success of policies can only be determined by measuring their affect amongst their intended target audience – specifically, users and consumers of communications services. This requires further research, data and analysis.

The Fair Access to ICT Report was premised on the assumption that the regulatory environment has the potential to add costs all along the supply curve of Internet services, thereby influencing the services demanded by consumers and users and consequently having a deleterious impact on Internet penetration. What FAIR established was that the number of factors that impact on the relationship between the regulatory environment and the cost of services (and therefore Internet penetration) was substantially greater than initially anticipated. In fact, the relationship between the regulatory environment and cost of services is not linear, but is rather intermediated by several diverse factors. FAIR began the process of delineating these factors and their relationship to both the regulatory environment and cost of services.

Since the report was attempting to measure the penetration of the Internet, one of the most important indicators is the level of disposable income that individuals are prepared to commit to communications. As technologies converge, so communications must be viewed as a basket of services and the portion of disposable income that individuals will commit to this basket becomes an important indicator. What FAIR established was that the supply side of the equation (namely Internet costs) is too limited to provide a useful understanding of ICT development. This is particularly true on the African continent, where the informal sector is pervasive and yet seldom reflected in formal statistics and data.

Both studies developed new indicators and methodologies to explain the relations between policy and regulatory frameworks and the development of information societies and network economies in developing country contexts. Both studies also revealed the difficulties of trying to quantify and measure ICT penetration meaningfully in a developing country context and to draw correlations with pricing and regulatory practices.

CHARTING THE SUPPLY AND DEMAND SIDE OF THE ICT SECTOR. The studies nevertheless began to explore relatively uncharted territory in terms of developing assessment and analytical tools to understand what was – and what was not – working with regard to creating conditions for improved ICT access and usage in developing countries. Both studies examined the policy, strategies and practices of governments, regulators and operators against ICT practices and usage. What the E-access & Usage Index seeks to do is measure what is happening in the ICT sector from the lens of users, consumers and those marginalised from services, and to analyse access, demand and usage patterns in response to services delivered as a result of operators' responses to policy and regulatory frameworks.

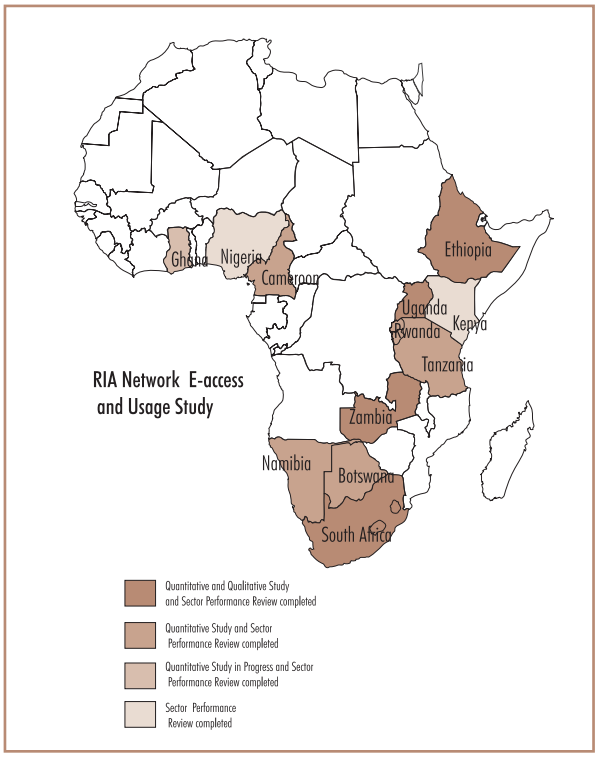
In other words, the supply side of the equation must be allied with an adequate understanding of the demand side. In particular, what factors impact on users and consumers of ICT technologies? How do consumers access communications technologies? How much are users and consumers prepared to allocate to a basket of communications technologies?

RIA NETWORK MEMBERS. Organisations from 14 countries initially agreed to participate, but the studies

for Nigeria and Kenya were not ultimately undertaken. Problems with data gathering in Mozambique resulted in delays that meant it could not be included in this index. Data problems in Rwanda and Ghana have resulted in limited country reports and restricted inclusion in the comparative analysis and e-Index.

The national surveys were conducted by the following countries:

University of Botswana – Botswana
University of Yaoundé II – Cameroon
University of Addis Ababa – Ethiopia
Science and Technology Policy Research Institute – Ghana
Namibia Economic Policy Research Unit – Namibia
National University of Rwanda – Rwanda
University of Witwatersrand – South Africa
University of Dar es Salaam – Tanzania
Makerere University – Uganda
University of Zambia – Zambia



Aki Stavrou

This report is based upon a triangulation of three studies conducted by Research ICT Africa! over the last 18 months in 11 countries to build an index of ICT access and usage. The report is initiated with the supply-side analysis of the ICT sector, assessing its performance against public policy objectives in all countries surveyed. The demand-side analysis follows and is based on both the 11 national surveys that were conducted across 14,635 households and 70,504 individuals, and incorporates a qualitative survey of over 42 focus groups undertaken in five of the countries (adding on an additional 270 individuals to those originally surveyed as part of the quantitative analysis).

METHODOLOGY[1]. The research was based on a triangulation of three methodological approaches, which included a background desktop study, a quantitative survey and qualitative survey, conducted over a 24-month period.

The desktop research, which resulted in the Sector Performance Review, entailed the compilation and analyses of all ICT sector published data. This included the main operators (telecoms, VANS, ISPs, cyber cafés, etc.), regulators and ITU data. This information was collected from published annual reports, data and indicator bases, national census and annual household surveys, published government documentation, the media and various relevant consultant reports. The Sector Performance Review enabled a supply-side analysis of the ICT sector of nine countries, detailing their telecoms markets – fixed and mobile, VANS, Internet and broadband, collective access points such as cyber cafés, telecentres and multipurpose centres[2]. However, no analysis of ICT could be based on supply-side factors alone, therefore research and analysis into the demand side was undertaken.

In an effort to understand ICT demand-side factors in each of the countries, it was necessary to collect a

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mix of hard empirical data using quantitative surveys correlated to information collected via interactive research methodologies, namely through the use of qualitative research.

A quantitative baseline access and usage survey was undertaken in 2004 and 2005 targeting different strata of ICT users – collectively within households, individual users of public telephones, individual owners and users of mobile telephony and Internet users. From the outset, it was imperative that the data collected be extrapolated to the entire country and, as such, probability sampling needed to be applied. The methodology applied has its origins in the World Health Organization's Expanded Programme on Immunisation (EPI), which was developed to be readily and easily used in developing countries and uses probability sampling, thereby ensuring that all individuals in the target population have a known chance of being selected and allowing the findings to be extrapolated to the entire population. This type of program research and monitoring capability, if provided through the conduct of periodic cluster surveys, is especially important in developing country settings, where administrative records are often incomplete. Such a methodology is particularly effective if there are different and often multiple measurement objectives within individual studies; for example, the measurement of E-Access & Usage Index usage patterns and trends, as well as evaluating the success of ICT service delivery programs.

In designing a probability sample, it was necessary to use as recent as possible census data from each of the countries to select a nationally representative sample, to draw a sample whose size was sufficient to achieve reliability requirements and create a logistics framework to enable a field implementation process that would be faithful to the sample design[3]. A second required feature of sample design, however, was that the sample had to be segmented into three uniquely spatially defined strata: metropolitan and or capital city, other urban settlements and rural areas. This was deemed necessary because national records and prior research have shown there to be distinguishable differences in tele-ownership and e-usage patterns by such spatial characteristics[4]. The most obvious is the impact that the availability of infrastructure has on users, but cost, need and tele-dependence are different across the urban-rural divide, thereby influencing usage.

The sample itself was based on a three-stage, stratified, countrywide representative sample of households and individuals. Firstly, all enumerator areas (EAs) in the country were segmented into metropolitan, other urban and rural strata. Secondly, from within each of these strata, systematic random sampling was used to select between 30 and 75 EAs in each country wherein the research was undertaken. The total number of EAs selected in each country was determined by the degree of social diversity of the population. Once each EA was selected, a team was dispatched to map and produce a real-time record of all domestic and non-domestic dwellings from which the surveyed households were selected. The third stage of sampling required the systematic random selection of 30 households to be surveyed from within each EA. Within each household, one or more individuals were asked to complete either the entire interview schedule or specific modules within. The selection of these was not random, with the household head or their spouse asked to complete those sections of the interview schedule relating to household demographics and household fixed telephones. The ownership of a mobile or an Internet address and their availability during three visits dictated which of the other respondents were selected to answer the relevant modules.

The interview tool used was a largely close-ended questionnaire that was modularised into eight sections to solicit information both at a household and individual level. The research in each country was carried out over a six-week period in a year.

The findings from this survey enabled a coupling of the ICT supply and demand for ICT to be analysed. However, one of the limitations of quantitative research is that it does not allow the researcher to probe and gain a better understanding as to why certain processes occur; namely, the reasons (and dynamics) influencing decision-making for those issues that impact on adoption and changes of ICT and how usage patterns of different ICTs develop and then change over time. In addition, the quantitative survey produced certain findings that were difficult to interpret, and so it was decided to test the findings of the quantitative survey against a representative mix of various generic sub-samples of the population – youth, students, professionals, women, unemployed/ employed and foreigners – using qualitative techniques. This was undertaken via the administration of 50 focus groups administered in a sample of five of the countries to ensure a requisite spatial spread of metropolitan, urban and rural areas, which kept as close as possible to the EAs selected for the quantitative survey[5]. Once a list of possible candidates was chosen a sample, of 10 to 12 were selected. On average, between eight and 10 participants attended the 50 focus groups (a further eight focus groups are being completed in Zambia). The research was undertaken during a two-month period in mid-2005 and the findings incorporated into the previous demand side analysis.

The index based upon the findings of the three studies provides an analysis of the state of communications access in the country and a comparative analysis of the widely diverse countries, representative of Sub-Saharan Africa, which participated in the study. ❑

Endnotes:

1 This section is drawn from the methodology report by Aki Stavrou (see Appendix 1 of this report for detailed description).

2 Kenya and Nigeria did not participate in the national household surveys.

3 With the exception of Cameroon (20-year-old and in manual format only) and South Africa (non-cooperation because of poor data), the census' in all the other countries were less than three years old and thus still relevant to the needs of the study.

4 Benjamin, P, Stavrou, A, Burton, P, and McCarthy, C (2000), *Telecentre 2000,* Link Centre.

5 Cameroon, Ethiopia, Rwanda (pilot), South Africa, Uganda and Zambia.

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Chapter 2: A comparative analysis of ICT access and usage in 10 African countries

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INTRODUCTION. This chapter explores the similarities and disparities in ICT access and usage across 11 representative sub-Saharan countries – Botswana, Cameroon, Ghana, Ethiopia, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Uganda and Zambia. It seeks to move beyond the more traditional and limited collection of telecommunications indicators to explore the communications patterns, access strategies and expenditure of consumers, and indeed of those who continue to be marginalised from communications services on the continent.

The comparison of data is the result of supply-side analyses of the performance of national ICT sectors, combined with national household surveys. These findings have been enriched by qualitative focus group surveys with different categories of consumers in five diverse countries within the set. Unfortunately, in Rwanda only individual user information and not household information could be used, and in the case of three countries – Cameroon, Ghana and Mozambique – the data is unweighted. They have nevertheless been included to make available the findings, but for comparative purposes should be treated with caution, as they will reflect an urban bias.[1].

With the dramatic improvement in telecommunications indicators reflecting the successful introduction of mobile services on the continent in the last decade, it is important to remember that the average total telephone penetration across the countries surveyed is over 11% for households (as opposed to per hundred inhabitants) with fixed line phones and over 12% for households with pre-paid mobile phones. This means that vast numbers of Africans still do not have access to affordable communications. It is clear, however, that there is enormous pent-up demand, with the national household access and usage surveys indicating that consumers across Africa are willing to pay a much greater portion of their income for communications technologies than in developed countries. In fact, to optimise their use of communications, consumers have adopted what can be described as a " multiple communications strategy" – utilising whatever medium of communication is available given two key factors: convenience (or accessibility) and disposable income at that particular period. Thus container phones, public payphones, mobile phones and fixed lines are all used, depending upon the need of the consumer and their ability to pay at that particular point in time. For example, a communications expenditure of around US30c in the middle of the month means that a personal mobile phone is unlikely to be used, while a public access phone would be.

And while mobile telephony provides some ray of hope for the development of the critical mass required for the positive multipliers associated with threshold levels of telecommunications expansion to kick in, the Internet – the value layer of the global information infrastructure – is close to non-existent. The relative rarity of Internet usage (outside of work and the upper income households) is indicative of a world where access to the Internet is low and expensive, and people continue to rely largely on traditional information sources – popular press, magazines, radio and television – for information. This has several policy implications that are drawn out in the report, the most severe of which is the potential for the development of a "data digital divide". While we focus on the gap between

those with and without access to traditional voice services, the divide between those with and without access to enhanced services made possible by the Internet – and essential to effective participation in the information economy and society – is growing.

DEMOGRAPHICS. The index covers a diverse range of countries – from Ethiopia in East Africa, with a population of 70 million spread across a vast land mass, but with only 16% urbanisation and a GDP per capita of US$96, to Botswana in Southern Africa, with a population of less than two million on half the land mass of Ethiopia, but with close to half the population in urban areas and a GDP per capita of US$2,939, one of the highest in Africa. Over 80% of Ethiopians live on less than US$1 a day.

Despite the vastly different per capita incomes of Namibia, at just over US$1,523, and South Africa, at US$2,293, their common history has created similar profiles around various socio-economic indicators such as literacy and ICT penetration. With Namibia's population standing at around two million and with urbanisation rates around half of South Africa's – which, with a population of over 45 million, is amongst the most urbanised countries in Africa at close to 60% – the demographics could not be more different, and yet the ICT indicators are not too dissimilar.

Data from Cameroon is difficult to compare as a census has not been conducted in decades. What can be ascertained is that it is fairly densely populated, with around 30 people per sq km, with over half of the country's 15,5 million population living in urban areas (Country at a Glance, United Nations, www.un.org). While GDP per capita of $670 might seem low, this is nearly three times greater than the other West African county in the index, Ghana, which stands at only $209. Ghana has about half the land mass of Cameroon and is somewhat less urbanised.

Country	Population	Poverty (% of population below $1 a day)	Adult literacy rate (% ages 15 and over	Urban population (% of total population)	GDP per capita (US$)	Surface area*
Botswana	1.7	23.5	78.9	49.9	2,939	582
Cameroon	15.5	No data	68	51	670	469
Ethiopia	67.3	81.9	41.5	16.2	96	1104
Ghana	20.1	44.8	73.8	36.7	209	239
Mozambique	18.4	37.9	46.5	34.3	217	801
Namibia	1.8	n/a	83.3	31.9	1,523	824
Rwanda	8.2	n/a	69.2	6.4	210	26
South Africa	43.6	n/a	86	58.4	2,293	1221
Uganda	23.4	26.8	68.9	14.9	282	241
Tanzania	35.2	No data	77.1	34.2	243	945
Zambia	10.5	63.7	79.9	40.1	338	753

Source: ITU World Telecommunication Indicators 2003, World Bank World Development Indicators

* '000 km²

Figure 2.1: Comparative national indicators

Although the population size and land mass of Rwanda and Uganda are quite different, with Uganda several times larger than Rwanda, their GDPs per capita, level of urbanisation and literacy rates are very similar, with Uganda's being marginally higher in each instance, but making them interesting for comparative purposes. Zambia's population size, at around 10 million, is closer to Rwanda's eight million odd, but its GDP per capita, at US$338, is closer to Tanzania's US$282. Their land mass and levels of urbanisation, at 40% for Zambia and 34% for Tanzania, are also closely aligned, making for useful comparison.

These levels of urbanisation are high compared to Uganda and Rwanda, where the vast majority still live in the countryside. In Uganda, 85% of the population lives in rural areas and in Rwanda there is only 6.5% urbanisation. While Uganda seems densely populated, with over 23 million people living on less than 241,000 sq km and a population density of 90 people per sq km, Rwanda is even more densely populated, with over eight million people living on only 26,000 sq km and a population density of 275 people per sq km. Other than Ethiopia, with a per capita income of US$96, these

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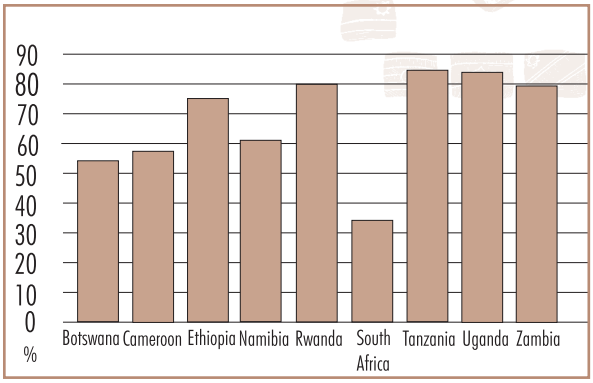
countries are among the poorest surveyed, with a per capita income in Uganda of around US$243 and Rwanda of only US$210.

Although Mozambique has a relatively large land mass, the population size is relatively small given the size of the country. Compared to Uganda and Rwanda, it has a low population density of 24 people per sq km (World Bank, World Development Indicators 2005). Nevertheless, its GDP per capita, at US$217, makes it comparable to Tanzania and the rest of the East African bloc.

HOUSEHOLD INCOME. The household survey indicates significantly different figures for median household incomes as compared to official GDP per capita incomes. These are generally lower, as they fail to take into account the informal sector, which accounts for a significant portion of household income in developing countries. In some of the more industrialised countries, such as South Africa, the household incomes appear lower, as GDP includes business incomes in determining the per capita incomes, which are not reflected in household incomes.

The graph below indicates households surveyed that had incomes below $500 a month and are therefore unlikely to have much discretionary income for communications[5]. More than 80% of Tanzanian households surveyed had incomes below this level, which corresponds with their relatively low communications expenditure. This is true for Uganda, Zambia and Rwanda, all of whom are clustered around 90% of the population living below this income level and with relatively low ICT spend (see figure 2.2 on expenditure).

Figure 2.2: Household income % below $500 per month (PPP)



Country	Mobile penetration – pre-paid (%)	Email penetration – subscribers	Fixed line penetration (%)	Payphone % (used in the last 3 months)
Botswana	20.7%	2.8%	22.4%	65.6%
Ethiopia	0.3%	0.1%	5.1%	29.7%
Namibia	11.3%	1.6%	14.0%	52.6%
Rwanda	6.8%	5.3%	4.4%	65.2%
South Africa	29.9%	5.2%	22.1%	70.6%
Tanzania	9.0%	2.4%	6.1%	30.5%
Uganda	2.3%	0.3%	0.7%	36.1%
Zambia	15.8%	5.6%	18.6%	56.4%

Source: ITU World Telecommunication Indicators 2003, World Bank World Development Indicators

* '000 km²

Figure 2.3: Comparative national ICT indicators

Predictably, the vast portion of households with incomes below $500 a year are located in rural areas, although interestingly, in the case of Tanzania, there is not much distinction between metro, other urban and rural areas, with other urban being the highest. This is the case for Zambia too, although Lusaka (metro) was considerably lower than other urban and rural areas, unlike Tanzania.

ACCESS. The methodology of the survey (see the Appendix to this report) required that each set of data was appropriately weighted. Each of the countries in the above table has been appropriately weighted and the data is representative in each instance. However, for several reasons, the countries in the tables below were not weighted and they have therefore been split from the

Figure 2.4

Country	Fixed line penetration %			Payphone % (used in the last 3 months)			Working computer at home		
	metro	urban	rural	metro	urban	rural	metro	urban	rural
Cameroon	10.9%	7.3%	1.3%	92.6%	75.4%	55.3%	8.6%	3.1%	2.0%
Ghana	20.2%	3.8%	0.4%	61.7%	56.5%	59.3%	5.1%	3.3%	2.9%
Mozambique	37.8%	5.6%	0.2%	61.7%	56.5%	59.3%	37.6%	3.5%	0.4%

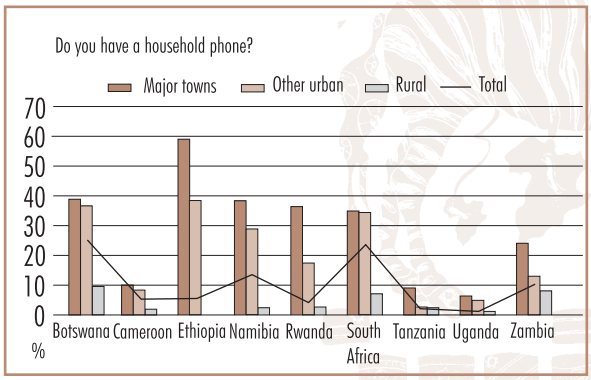
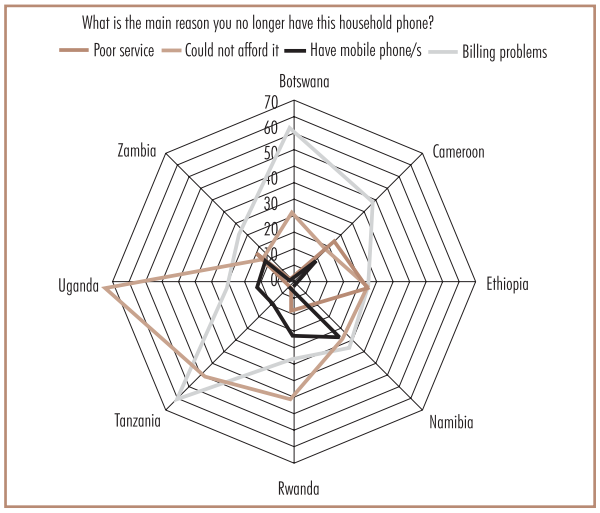


Figure 2.5: Household phone by survey location

main table. The figures from these tables are not representative, but do give an indication of the state of e-access and usage in each country.

FIXED[6]. Botswana has the highest fixed line household penetration at 22.4%, followed closely by South Africa at 22.1%. Zambia is next at 18.6%, with Nambia at 14%. Tanzania has a fixed line penetration of 6.1%, Ethiopia just over 5% and Rwanda 4.4%. Uganda trails far behind the rest, with penetration under 1%. With diminishing numbers of subscribers on fixed networks, the high cost of services (often through tariff rebalancing as a result of, or in preparation for, privatisation) was widely cited as a reason for those who once had fixed lines not longer having one.

Figure 2.6



The variability of access to household fixed line phones is further demonstrated when penetration is broken down into metro, urban and rural areas. Total fixed line penetration is represented by the yellow line graph, while the metro, urban and rural split represents the total number of households with fixed line phones. Unsurprisingly, penetration is far higher in metro areas than their urban and rural counterparts. Ethiopia is particularly notable in that it does not have any rural fixed line phones at all and Uganda has a miniscule amount of rural fixed line access.

For those who are no longer on the network, there are four key reasons why. Poor service seems to be a lesser problem (with the exception of Ethiopia, where, until recently, the waiting list for a fixed line was several years). It is interesting that billing problems feature so highly in the analysis. It is not surprising that billing problems are the primary reason for people terminating their fixed services in countries such as Botswana, where the billing crisis was well documented in the popular media. While various countries have been plagued for years by faulty billing systems, a possible explanation for the high incidence of billings as a problem may also reflect, in some cases, the respondents' discomfort at admitting that they cannot afford a fixed line, preferring to cite billing problems.

While new services have extended access, it is interesting to note that new services tend first to complement the existing services of those who already have services. Of those people with fixed access, 46% had mobile phones as well and 34% had Internet access. Of those with mobile phones, 45% had fixed access as well. Of those who had Internet access, 80% had mobile phones and 100% had fixed access.

MOBILE[7]. Clearly, in many of the low fixed penetration countries, mobile is being used to compensate for the lack of fixed access, with Uganda having a mobile

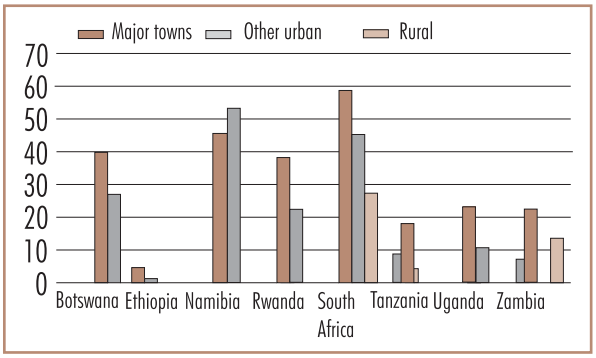


Figure 2.7: Mobile penetration by household by survey location

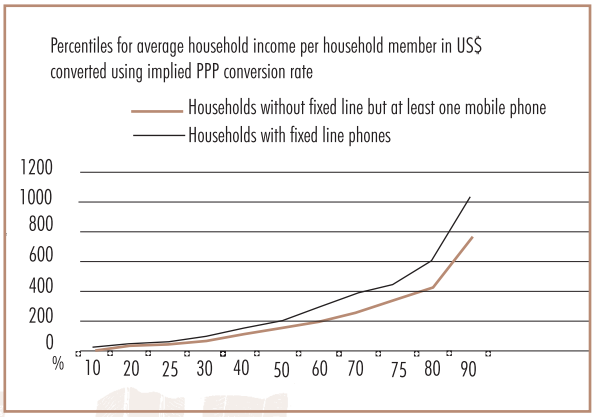


Figure 2.8: Extension of access through mobile

penetration rate at the household level of 3%, compared to its less than 1% fixed-line penetration rate. Rwanda's mobile penetration is higher, at over 8%, even with more than 4% fixed line household penetration. In Ethiopia, on the other hand, with a higher fixed line penetration, less than half a percent of households have mobile penetration (pre-paid). While the incumbent monopoly in Ethiopia has clearly made some gains in the affordable provisioning of fixed services, clearly the extension of the monopoly to mobile services has impacted negatively on mobile penetration. Ethiopia has the lowest mobile access of the countries surveyed. The figure of less than 98,000 mobile subscribers is probably best explained by the lack of competition which is seen in the higher mobile penetration countries.

At the other end of the scale, South Africa has the highest mobile penetration at 32%, a figure similar to the combined figure of nearly 18 million subscribers on all three networks provided by operators for active subscribers. This is followed closely by Botswana at 23%, Zambia at nearly 18% and Namibia at over 12%. Tanzania fits between these two groups of countries with a mobile penetration of 9%.

As anticipated, the distribution of mobile phones was concentrated in urban areas, with Namibia being a bit of an outlier with better penetration in other urban areas. In all countries, however, the drop-off between urban and rural areas is dramatic.

As only 9.24% of sampled households has a fixed line phone at home, it is evident that for the majority of households, mobile phones substitute for, rather than complement, fixed line phones. Clearly, most of those who do have fixed phones (67%) complement their fixed lines with mobile phones. In fact, in Africa it might be more worthwhile to reverse the traditional understanding of mobile being a complement to fixed line phones, to fixed line phones being a complement to mobile telephony. Mobile and fixed line possession are clearly linked to income. Households with a fixed line phone had an average household income of just over US$640, compared to US$246 for those without.

The question that arises is whether, at a given income level, there is a difference in the average number of mobiles per household member between households with and without fixed line phones. If there is, and if households without a fixed line phone have a higher average number of mobiles per household member, then one might conclude mobile substitutes for, rather than complements, fixed line phones.

Looking at the top 10% of households in terms of average household income per household member, converted in US$ using the implied PPP conversion rate,

Figure 2.9: Reasons for not making calls

reveals that households without fixed line phones have, on average, a higher number of mobiles per household member than households with a fixed line phone.

Apart from having turned into a lifestyle product, it is notable that the real breakthrough of mobile telephony has been the introduction of pre-paid services. This survey confirms the figures in the latest ITU report (African Telecommunication Indicators 2004) which states that more than 90% of all mobile phone users in sub-Saharan Africa are pre-paid subscribers.

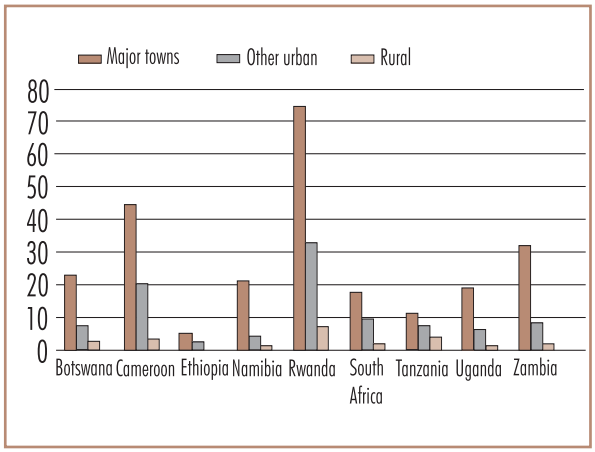
Households with contract mobile phones have far higher household incomes than pre-paid phone users. Households with contract mobiles have, on average, an income of US$1,911 and households with pre-paid US$487 (PPP).

While the growth of mobile has been dramatic and the trend is towards it being a substitute for fixed line access, it is striking that 80% and above of respondents believe that the major obstacle to increased mobile use is the cost of calls. The only outlier to this figure is Ethiopia, but the total number of mobile subscribers is so small that it is still clearly the preserve of the more wealthy segments of Ethiopian society, possibly not as concerned with price.

INTERNET. As anticipated, with low fixed line penetration rates and the generally high cost of both fixed and mobile services, the penetration of the Internet is exceptionally low. The most useful measure of Internet penetration is email addresses, since access at home is entirely dependent upon fixed line access. Due to high fixed line costs, few African homes have access to the Internet, but many people use email at cyber cafés. The highest penetration rates were recorded in South Africa at 5.7%, Tanzania with 2.4%, Namibia with 1.6% and minimal penetration rates for Uganda (0.4%) and Ethiopia (only 0.1%, where local calls are the cheapest). While fixed line local calls are subsidised in Ethiopia, on its own this has not induced Internet penetration. Computer penetration is very low, as is per capita income, and the limited infrastructure would place a cap on Internet uptake in any case.

Again, within these very low Internet penetration rates, the distribution of email addresses was significantly concentrated in urban areas. Close to 30% of metro households have one email address, twice the level of other urban areas. Less than 5% of households in rural areas had an email address. With considerably

Figure 2.10: Households with at least one email address by survey location

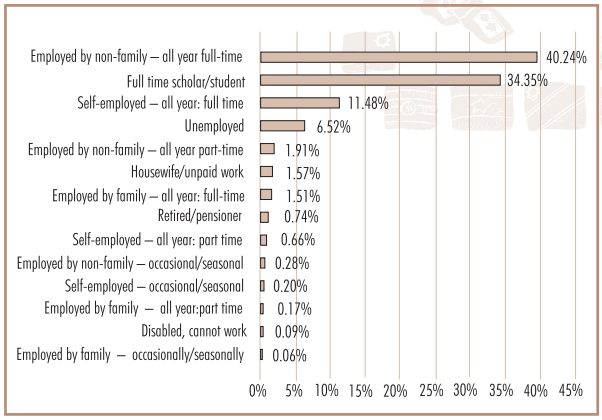


lower penetration rates, Botswana demonstrated a similar pattern, though proportionally more rural households had an email address than in South Africa. Tanzania has significantly more email addresses in other urban areas than in the metropolitan areas, as does Namibia, though the differential was not as dramatic. In Cameroon and Zambia, rural households tended to have more email addresses than other urban areas, but the actual number of email addresses is so small as to be negligible.

The number of household members with email addresses compared to the penetration of household computers raises the question as to how they access the Internet. One of the primary methods of accessing the Internet is at work. Of the 11,626 households in the sample, 1,856 had at least one household member with an email address. 61% of these households did not have a fixed line phone and 63.94% of these households did not have a working Internet connection at home. Looking at individuals, out of 55,982 individuals, 3,511 had an email address. Of these, 34.35% were full-time students, 40.24% full-time employed and 11.48% self-employed.

Nearly 4% of households had a computer at home. By comparison, 15.96% of households surveyed had at least one member of the household with an email address. This indicates that the Internet is predominantly accessed from work or cyber cafés. Around 75% of respondents had access to the Internet via school or work (non-family employed). This data would support the conclusion that cyber cafés provide an alternative mode of access to those that already have access.

Figure 2.11: Nature of employment



PUBLIC ACCESS. Despite the rapid penetration of mobile telephones across the continent, the average individual penetration rate for mobile still stands at less than 15% across the countries surveyed. It is perhaps not surprising, therefore, that large numbers of people are still dependent on and utilise payphones. In Namibia, as many as 83% of the households surveyed said at least one individual in the household had used a payphone in the last three months, and in Zambia nearly 65%. Despite its relatively high private telephone penetration level, 47% of those surveyed in South Africa had used a public payphone in the last three months. This included those with fixed and mobile access. In Uganda, this figure dropped to around 28%, somewhat more than Ethiopia, at over 20%, and Rwanda, at not even 16%. In all these countries the networks are not very extensive outside the main cities, and as a result, payphones are not very pervasive in the rural areas where most of the population lives. In Rwanda, and to some degree in Uganda, the lack of access to public payphones is compensated for by increased usage of private (often GSM) kiosks. Ethiopia, where the state-run operator continues to cross-subsidise payphones, average expenditure is the lowest, at nearly US$2.4 per month. Despite this, due to the limited coverage of the network, usage of public payphones in Ethiopia was among the lowest of the countries surveyed.

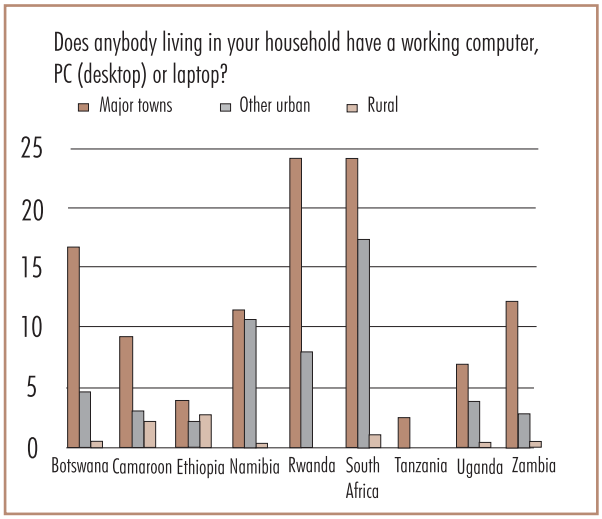
GENDER. In most countries surveyed, the number of men with cellphones outweighs the number of women, other than in Botswana and Namibia. In Botswana, the ratio of women with phones to men was around 54% to 46%. In Namibia, this was close to equitable, with the

ratio of women to men with mobile phones at 52% to 48% – very close to the official demographic split between women (51%) and men (49%). South Africa also came close to an equitable split, with 52% of men having mobile phones compared to 48% of women, roughly an inverse of the national statistical figures for men and women in the country, as did Zambia. Interestingly, those countries with a more equitable distribution of mobile phones between women and men are those which are more economically developed.

The predominance of mobile phones in urban areas, where there is greater economic activity, reinforces this correlation. In fact, if one looks at gender breakdowns for rural areas in Botswana and Namibia, of the few who have phones, considerably more men have phones than women, reflecting the predominance of phone ownership by men in less developed economies.

Ethiopia was the most unbalanced, with over 70% of those with cellphones being men, although the total number of people with mobile phones is negligible. This is followed by Uganda, where over 60% of those with mobile phones are men, as opposed to only 38% of women.

Figure 2.12: Working computer in household



The equity of phone distribution would appear to correlate with those countries with increased urbanisation, and disparities in access appear greater where services represent a scare resource and access is more limited.

In all countries surveyed, other than Namibia, considerably more men than women had email addresses. In Namibia, around 55% of those with email addresses were women, although the total number of people with email addresses was less than 2%. In Botswana, Cameroon, Rwanda, South Africa, Uganda and Zambia, the ratio of men with email addresses to women is roughly 60% to 40%. Only in Cameroon was the number of people with an email address above 10% of the population. This is likely to reflect an urban bias as a result of the inability to weight the data as indicated.

COMPUTER PENETRATION. Computer penetration remains dismally low across the continent. Even in the economic powerhouse of the continent, South Africa, only 12% of households have a working computer at home. This was followed by Botswana at 6.5%, Namibia at 4.5% and Cameroon at just below 4%. Tanzania showed the lowest household PC penetration, at less than 1%, followed by Uganda at 1.5% and Rwanda under 2%. Such low household penetration rates are

Figure 2.13: ICT e-Index

* Cameroon, Ghana and Mozambique have been excluded due to inability to weight data

Country	Mobile penetration – prepaid (%)	Email penetration – subscribers	Fixed line penetration (%)	Payphone % (used in the last 3 months)	e-Index Points
South Africa	8	6	7	8	29
Botswana	7	5	8	7	27
Zambia	6	8	6	5	25
Rwanda	3	7	2	6	18
Namibia	5	3	5	4	17
Tanzania	4	4	4	2	14
Uganda	2	2	1	3	8
Ethiopia	1	1	3	1	6

likely to impact negatively on the pervasive use of the Internet. Even where public access points are available, they tend to be relatively expensive.

E-INDEX. To provide some comparison of indicators, a simple measurement has been used which allocates places from one to ten for each of the surveyed countries for four categories of service – fixed, mobile, payphone and email. While these categories are contestable, they are informed by the following rationale: higher fixed lines are likely to reflected in greater backbone extension of networks, critical not only to extending voice services to remote parts of the country, but vital data services in the short term as well. Mobile telephony has opened up the continent to voice communications in an unprecedented way, but due to the high costs of bandwidth, its utility for enhanced data services will be out of the reach of most consumers, who can barely afford voice services.

Although mobile has made enormous inroads, the continued high payphone usage reflects the continued importance of public access. Payphones are often used where the fixed and mobile services are restricted. However, low payphone usage can also reflect a general lack of provision where not even collective access is made possible. It is also clear that payphones are a critical part of a broader communications strategy.

CONCLUSIONS. While this index provides an interesting baseline from which those countries that participated in the study can assess their delivery in future, there is no direct correlation between those countries that are perceived to have implemented best reform practice and their ranking. This is because other far more fundamental factors, such as GDP per capita or time to market of services, could be far stronger determinants of sector outcomes. South Africa, for example, at the top of the index, has the second-highest GDP per capita and operates in a much larger economy, with the associated economies of scale and scope. The success of its telecoms reform programme can at best be regarded as mixed. One of the major concerns within the South African ICT sector is the high cost of services, particularly resulting from high prices on bottleneck facilities, especially international bandwidth. This is attributed largely to delays in introducing effective competition into the sector. Had this been done more successfully, or if it is done in future, it is possible that the gap between South Africa and those ranked below it would have been greater or may be in future, depending on their performance.

Although Cameroon has been discounted for this index because of an inability to weight its data, in a collaborative attempt to measure the information society by the Canadian group Orbicom and the ITU, Cameroon comes third in terms of “infostates” (general ICT access and usage) behind Zambia and South Africa (Sciadas 2005). So its ranking is probably not far out. Although the ICT sector in Cameroon has grown dramatically, like other African countries this has been driven by the mobile market. The relatively good state of Cameroon reflects early sound policy and infrastructure investments prior to 1995, but since then the relative decline of the sector reflects the behaviour of a sector without direction. Although there was a partial opening of the market to mobile operators, lack of political commitment to reform has created uncertainty in a market that lacks a stable regulatory environment.

The rapid overall growth of mobile communications in Cameroon masks two facts. First, around 90% of the rural population remains uncovered for even basic access. Second, there is a growing digital divide between towns and local areas: only about 120 local areas, out of more than 3,000, have access to fixed and mobile telephony.

Cameroon's relatively high ranking, even if adjusted for lack of weighting, may also be more indicative of the relatively high GDP per capita in the country, with the resources to spend on communications rather than policy or regulatory record. The transition from full monopoly to partial competition was poorly handled and the three privatisation attempts failed, worsening the situation and leaving the development of the sector to the two mobile operators. The ICT sector has become characterised by poor management, a weak and ineffectual regulatory authority, political interference and the prevalence of hidden agendas. From this relatively positive benchmark, Cameroon may in future improve its rankings. There has been a rollout of 1,000km of fibre optic cable along the Doba-Kribi oil pipeline and extensions are envisaged. To raise the capital needed for investment, the government plans again to put the incumbent on the market.

Botswana and Uganda are widely believed to provide examples of best policy and regulatory practice on the continent, being cited in various multilateral and donor agency reports, including the International Telecommunications Union. It might be thought that Botswana, having the highest per capita income in sub-Saharan Africa, combined with its regulatory reputation, would be ranked first, but with Cameroon discounted, it is only ranked third after Zambia, which has a per capita income less than a quarter of Botswana's. In Botswana, diamond-led development has been associated with jobless and skills-less growth. Also, falling overall figures for fixed lines, including public payphones, must have contributed to Botswana's relatively low score. While Zambia has not had a sterling record in terms of its regulatory environment, with failed privatisation attempts, predatory behaviour from its incumbent, regulatory incapacity and low GDP per capita, it has benefited from a number of donor-driven initiatives in the Internet space that have catalysed the liberalisation and uptake of Internet services. Zambia has multiple ISPs, not all dependent on the incumbent for bandwidth, offering competitive prices.

Uganda has shown unremarkable growth in the telecommunications, broadcasting and IT sectors, despite an apparently greater political will than many other countries in the region. Uganda's poor showing, despite its excellent policy and regulatory reputation, is not surprising, considering the well-documented correlation between GDP and teledensity. It has amongst the lowest GDP per capita of the countries surveyed, and a significant improvement in the penetration of services will be required before the critical mass is reached at which positive network effects kick in. While the introduction of competition in network services in Uganda did much to shake up the stagnant incumbent, the competitive focus of the networks has been on mobile rather than fixed services, which remain the lowest among the countries ranked. Traditional main lines were not made a priority, so by 2003 there were barely 61,000 main lines in use for a population of 25.6 million, while xDSL has not been deployed; Internet access and use, therefore, were negligible. Furthermore, the combination of high prices and low incomes makes affordability a very important barrier to uptake: annual income per capita is very low, and more than 40% of the population lives below the poverty line. Local calls are very expensive due to time-based billing, and computer costs are high relative to income despite the government's removal of all taxes, except VAT. Bandwidth costs of access to the international Internet backbone via VSAT are almost 30 times the cost in more industrialised countries. Since 2003, the regulator has introduced a programme of universal access following withdrawal of government

funding, the effects of which will only be seen in data after the period under review.

Uganda performs much better with regard to payphones, where the regulator has placed significant obligations on the incumbents. Perhaps when the rural access programme initiative by the regulator gets under way, progress in sector performance will become more evident from this baseline.

Despite high hopes from the early introduction of competition in the fixed line market, Ghana's sector development has been steady but not spectacular. Factors influencing Ghana's performance, particularly in the fixed line telephone service, include an ineffective strategic investor, management problems, interconnection problems and a weak regulatory regime. Telekom Malaysia, acting as the strategic investor in Ghana Telecom, failed to raise the necessary capital to undertake the major network expansion needed to meet its rollout obligations. The second national network operator, Westel, has not provided effective competition for the highly entrenched incumbent, and management problems have made it unattractive in domestic and international capital markets. As a result, since starting operations in 1999, Westel has rolled out only about 3,000 lines out of its mandatory target of 50,000 by 2002. Difficulties in interconnection negotiations with the incumbent not only delayed the launching of Westel's services by a year, but also adversely affected the penetration rates and service quality. Political interference in the regulatory regime and an ineffectual regulatory authority also contributed to this.

Perhaps among the more disappointing rankings is Tanzania, which has amongst the earliest regulators on the continent. Despite the introduction of competition early on in mobile services, the licences are regional, and therefore have not induced the benefits of competition in relation to efficiencies and pricing. There has also been a relatively high level of political accountability by the regulator, the board of which has been changed several times. There have been several problems with the privatisation of the incumbent and spectrum disputes that have undermined the credibility of the country as a conducive investment environment.

Namibia belongs to the group of lower-middle-income countries and, compared to the average for lower-middle-income countries, is lagging behind in terms of mobile and fixed-line subscribers, as well as in Internet users per 100 inhabitants. 34% of Namibian households are connected to the electricity grid, although electrification varies considerably throughout Namibia. In major urban areas, 94.6% of households are connected to the electricity grid; in other urban areas, it is less with 72.3%, and in rural areas, only 6.1%. 77% of households in Namibia have a working radio at home, but only 43.3% have a cassette player. Only every third household had a working refrigerator, only 4.6% of households have a working computer or laptop and only 1.66% have a working Internet connection at home, all of them in urban areas. In major urban areas, 5.93% of households have a working Internet connection and 3.61% in other urban areas.

Around 65% of Namibian households have access to a post box, 38.3% to a personal or family post box and 27.3% to a communal post box. In Namibia as a whole, 13.2% of households have a phone, 95.6% of which are fixed line telephones and 4.4% mobile phones.

About 83% of households have a household member that used a public payphone during the past three months. Only 3.9% of households had one or more member with an email address. Expenditure for communications has increased disproportionately compared to the rise in disposable income in Namibia.

Poor people have shifted their expenditure to be included in the information society and to be able to stay in contact with family and friends. Owning a mobile is more important to some than owning a refrigerator. However, owning a mobile is only one step towards becoming part of the information society. Direct and indirect costs are the main obstacles to bridging the digital divide. Communication devices that require financial commitment are less successful with poor people, and hence less suitable to bridging the digital divide in Namibia. The success of pre-paid regimes, whether for mobiles, electricity or fixed line telephony, shows that the mechanism of controlling costs and avoiding commitment is preferred over the cheaper form of communication without this flexibility.

Ethiopia's Infostate remains one of the lowest in the world. It has not undertaken the orthodox neo-liberal reforms seen in the other countries. The state-owned monopoly was corporatised in 1996 as the Ethiopian Telecommunications Corporation (ETC), and remains the sole provider of fixed, mobile, public phone and Internet services. A regulator was also established in 1996 to control the behaviour of the monopoly operator, promote the expansion and maintenance of a good quality telecommunications service, license operators, and advance research and education in the telecommunication sector.

However, very limited progress was made on the regulatory front due to the conflict of interest resulting from the government acting both as an operator and a regulator. The number of main lines grew at about 8% per year between 1995 and 2001, but off a very low base. Noticeable progress was made when main lines grew by 19% between 2002 and 2003 following a substantial rise in public investment. While undoubtedly influenced by its large population size and low GDP per capita, Ethiopia's performance reinforces the scepticism about the effectiveness of public monopoly operators to provide communication services at affordable and efficient levels.

Common to all the countries reviewed is that while they have all shown growth over the last half a decade this has been primarily due to mobile, which continues to cost far more across the continent than international average prices. Due to the relatively differential but predominantly low incomes in countries under review, expenditure on telecommunications makes up far more of household income than in households in developed economies, where incomes are magnitudes of scale higher. Even with the best intentions, in the absence of specialised skills and capacity, regulators are rendered unable to regulate incumbents with greater resources and political influence effectively. This means that few countries have realised the benefits of fair competition such as reduced prices and greater choice. Information asymmetries between operators and regulators mean that few regulators have been able to successfully curb the anti-competitive behaviour of incumbents, nor compel them to successfully meet their public service obligations, nor interconnect with competitors at fair prices.

As a result, choices are limited, prices generally high and access remains low. Yet despite this, there is enormous pent-up demand, even in what have been regarded traditionally as uneconomic households to service. Survey findings and focus groups demonstrate that across the board, people value access to communications greatly and are prepared to pay between 5% and 15% of their household incomes for telecommunications. With limited means, households devise various communications strategies to keep them connected during a month, using pre-paid airtime when necessary, but also using payphones and cheaper public access telephones, whether payphones or kiosks.

In addition, large numbers of people, around 80% of the population who do not own phones of any kind, remain highly dependent on public access telephones. While there is considerable overlap between those that have fixed phones, mobile phones and Internet access, there appears to be a growing number of mobile phone users who have substituted their mobile phones for fixed telephones, largely due to convenience and flexibility, but also in some instances due to high fixed line rentals, usage charges or flawed billing. Many people now regard their mobile phone as their primary phone and their fixed phone, if they have one, as the complementary communications service. Significantly, only in South Africa are contract phones statistically significant. In the majority of countries in the e-Index, pre-paid phones are overwhelmingly predominant.

Of concern is the near absence of Internet in many of the countries analysed. Outside South Africa, the incidence of home PCs is negligible and the only access is largely through work and Internet cafés, though in both cases the access is limited and the findings seem to suggest that it is the same people that have work access that use cyber cafés where they are available. The reasons for this are that people who are not using, or have not used, the Internet regard it as unreliable or expensive or both. With such low penetration and usage rates, the concern is that while addressing the digital divide with regard to voice through mobile telephony, a new digital divide is developing around access and usage of the advanced services that drive effective participation in the global economy.

While small gains have been made, generally off very low bases, over the last few years in all the countries reviewed, they are unlikely to see the positive network effects that build the value of infrastructure networks and are associated with economic growth and development unless there is a quantum leap in the numbers of people accessing and using ICTS. This will not happen until the prices of services and equipment across the continent is dramatically reduced. All international evidence suggests that this is only like to happen with policies that allow for the introduction of competition to improve prices and choice. Especially due to the imperfect nature of African markets, this will only be effective if all players can compete fairly. This will require transparent, skilled and publicly accountable regulation to create ICT sector environments which are conducive to investors that will extend networks on which service providers have fair access and are able to meet the diverse needs of the African continent.

This study provides a baseline against which countries can assess their incremental gains, analyse demand and develop policies and strategies that are responsive to them, empowering all their citizens with the benefits of effective participation in the information era. ❑

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World Bank, *World Development Indicators 2005,* www.worldbank.org

Endnotes

1 Cameroon's data cannot be weighted given the absence of a credible census in more than a decade. Weighted data for Ghana and Mozambique's will be available on the www.researchICTafrica.net as necessary information to do the weighting becomes available. The Mozambique findings in this chapter are unfortunately not supported by a country study in this report and the Rwanda household data has been excluded from the comparative analysis and the country study due to data errors , but the individual user data has been included.

2 The ITU points out that there is a much stronger correlation between mobile density and incomes higher than $500. So, for illustrative purposes, $500 was chosen as the break point for showing household income.

3 The measure used in this report is fixed lines per household, in contrast to the ITU definition of fixed line penetration, which is the number of fixed lines per 100 inhabitants. Fixed lines per 100 inhabitants tends to overstate the lack of access.

4 Note that this section refers to pre-paid mobile, given the prevalence of pre-paid in the African market (and specifically amongst the countries surveyed). Pre-paid mobile is the indicator used in building an e-index.

Chapter 3: Botswana

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POLICY AND LEGAL FRAMEWORK. The commercialisation of the telecommunications sector in Botswana started with the creation of the Botswana Telecommunications Corporation (BTC), through the BTC Act of 1980, to develop, operate and manage Botswana's national and international telecommunications services. The BTC Act was repealed through the Telecommunications Act of 1996 that established a regulatory authority, the Botswana Telecommunications Authority (BTA), which is mandated to promote free and fair competition within the telecommunications and ICT sector in the country.

SECTOR GROWTH AND VALUE. Since the liberalisation of the telecommunications sector by the Telecommunications Act of 1996, the entire sector has been growing steadily. In 1998, BTC's monopoly in providing telecommunications services was broken through the awarding of mobile telephony licences to Mascom Wireless and Orange Botswana (formerly Vista Cellular). The subsequent licensing of other service providers such as Internet service providers (ISPs), data service providers and private telecommunications networks (PTNs) has added to the overall growth of the sector (Figure 3.1).

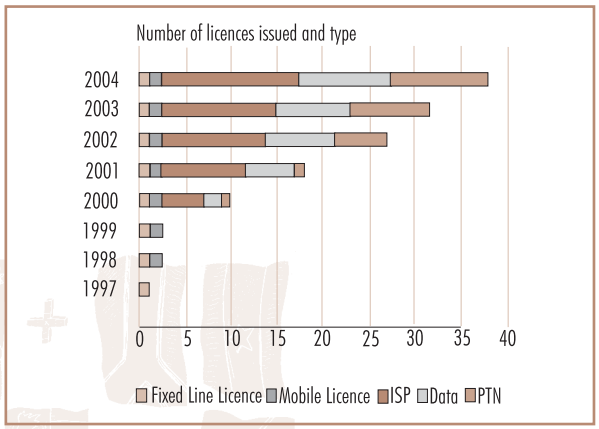


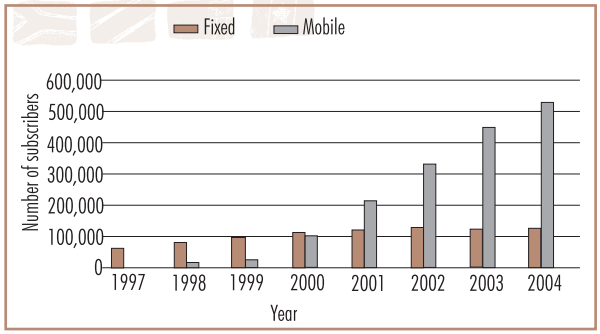
Figure 3.1: Number of licensed operators

As shown in Figure 3.2, the telephone market share of incumbent operator BTC fell from a high of 100% before the introduction of mobile services in 1998 to around 20% six years later, with a teledensity of 7.9%. Mobile telephony has, on the other hand, grown rapidly, capturing an 80% market share with a mobile teledensity of 31%.

There are two main reasons behind the rapid growth of the mobile market from 1999 to about 2002. First, the demand for fixed line telephony was not being fulfilled by BTC at the time that mobile operators began operating in the market. But more devastating for the incumbent operator was the loss of trust that resulted from a billing fiasco in 2000. Some clients went without bills for six months, and were then either sent huge or

National Indicators in 2003 (ITU)	1998	2002
Population (million)	1.57	1.72
Area (1000 sq km)	582	
Personal computers (per 1000 people)	40	70
Internet users (per 1000 people)	10	60
GDP per capital (US$ PPP)	6947.97	8023.53
US$ exchange rate (2004)	P4.5	

Figure 3.2. Number of subscribers a year



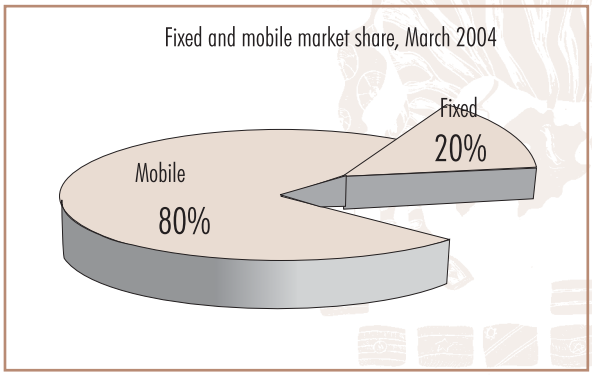


Figure 3.3: Telecommunications market for both fixed and mobile phones

incorrect bills. People terminated their fixed line services in droves and switched to mobile completely.

The revenue history of BTA, whose income is derived mainly from the licence fees it charges the operators, provides an interesting indication of the growth of the sector. BTA's annual revenue continues to grow yearly, as can be seen in the table. In the year ending 31 March 2004, BTA recorded revenues of P50.3m (US$11.8m) and a surplus of P37.3m (US$8.29m)[1].

INFRASTRUCTURE. The existing telecommunications infrastructure consists of a fixed telecommunications network, owned and operated by BTC, and a mobile telecommunications network owned and operated by Mascom Wireless (Pty) Ltd and Orange Botswana (Pty) Ltd.

The fixed telecommunications network consists of digital main switching centres at all the major centres of the country. The exchanges are connected to each other via a high capacity backbone microwave radio system that forms a ring around the country. The eastern side of the country is covered by a microwave radio system supplemented by a high capacity fibre optic network, which links all the major centres in this part of the country.

Figure 3.4: BTA's Annual Revenues and surplus

	1997	1998	1999	2000	2001	2002	2003	2004
Revenue (Million)	0.0	10.1[2]	8.9	17.2	31.7	43.8	47.2	50.3
Surplus (Million)	0.0	7.2	3.6	10.4	20.8	36.5	32.0	37.3

In general, the mobile network tends to follow the BTC network, since mobile operators rent capacity from the incumbent to link their base stations to their switching centres in Gaborone. The BTC launched its ADSL service commercially in 2005, and the challenge will be to ensure that despite the monopoly on service, it is priced affordably.

ACCESS. Access to ICT technologies in Botswana is very low, with less than 2% of the population owning Internet subscriptions. In urban areas, the Internet is accessed in three main ways: Internet cafés, educational institutions and workplaces. In the rural areas, where more than 50% of the population lives, there is virtually no access to the Internet.

Access to Internet cafés is on an individual basis, and relatively few people use them due to the high costs of Internet connectivity, bandwidth and basic computing hardware, as well as the lack of local content creation.

Mobile phones and radio enjoy the largest diffusion rate of ICT technologies. Access to radio is enjoyed by more than 70% countrywide[3], whilst mobile teledensity is 31%. Television is also becoming more pervasive in urban areas, where there is ready access to electricity. Fixed line telephony, at a teledensity of 7.9%, is still struggling to break through the 10% barrier, further constraining the spread of the latest ICT technologies such as the Internet. Payphones (both mobile and fixed line) constitute a small percentage of ICT tools available for use by the general public, although the number of mobile payphones is increasing rapidly.

VANS. The value-added network services (VANS) market in Botswana consists of private data networks (PDNs), international data gateway service providers

and Internet service providers (ISPs). The PDNs use VSAT (very small aperture terminal) network services for data.

The VANS market is liberalised and varied. It currently consists of seven operators providing PDNs, 10 operators with licensed international data gateway service provision and 16 ISPs. Whilst revenues have not been measured, it seems reasonable to assume that the VANS market share is not insignificant, and is increasing. The incumbent BTC will be launching a VSAT network for data and voice services. These services will enable the creation of truly seamless networks supporting cost effective point-to-point and point to multi-point applications.

Further growth of VANS has been hampered by bandwidth costs. Broadband access and ICT affordability is an issue in Botswana. While prices are globally competitive, the relatively low household incomes suggest that much of the population cannot afford the service.

INTERNET. The total Internet market in Botswana stands at about 15,000 dial-up customers and about 1,000 leased line/wireless corporate customers. It has been estimated that, in total, about 40,000 people have access to Internet via their home connection or from their workplace.[4] However, the table shows some telecommunications indicators as per the ITU estimates, which are higher than recent estimates done locally (IFC 2004).

BROADBAND. In moving towards broadband service, the BTC has tried to utilise its ISDN as its key high bandwidth Internet service for as long as possible. As in other countries, this has not picked up as the BTC would have liked it to. This could be due to the pricing strategy used for the service. Experiences from other similar markets show that real broadband, if supplied at mass market prices, will make the Internet market grow and be profitable.

BTC introduced a limited ADSL service in the capital city of Gaborone in 2005, with plans to have it rolled out in the second city, Francistown, by year-end. If the pricing of the ADSL service is kept at current pricing levels, it may not take off and produce the critical mass needed for it to break even. The economic construction of DSL network needs mass marketing for it to prove profitable.[4]

COLLECTIVE ACCESS POINTS. The number of fixed line public payphones has continued its downward trend, falling from a high of 2,964 in 2002 to 1,900 in 2004[5]. This means the number of access points for the public has fallen by a drastic 36% in a period of two years, without any indication that the trend will stop any time soon.

As if this were not bad enough, tariffs have been revised (effective October 1, 2005) as part of the tariff rebalancing process. This has seen the costs per minute of local calls by postpaid customers increase by 53% (P0.17 to P0.26, or US$0.04 to US$0.06) in peak times and by 50% (P0.10 to P0.20, or US$0.02 toUS$0.04) off-peak. Once the new tariffs force some households to cut their services, the continuing decline in payphones could leave the majority of the population with no affordable access to telecommunications services.

There would still be the pre-paid option, whose tariffs per minute are unchanged at P0.34 (US$0.08) (peak) and P0.22 (US$0.05) (off-peak). Tariff rebalancing has also not affected the rates for public payphones, remaining at P0.50 (US$0.11) per metering period (162 and 264 seconds peak and off-peak, respectively) for local calls. However, the fact that the number of payphones is decreasing points to the increasing lack of access to fixed telecommunication services, particularly in rural areas, where no business case can be made for retaining some of the initially installed phones.

Whilst the fixed phone as a medium of communications has declined, the cellular phone

seems to have filled the gap left by BTC, since mobile payphones and kiosks are to be seen in most villages covered by the mobile phone network. In towns, mobile is even more prevalent, with virtually every street corner having one or two cellular phone operators offering their services. Because these street traders are mostly informal businesses and the intermediaries (those who sell the public cellular payphones) are private companies with no obligations to disclose their business details, it is not possible to get an accurate figure of how many such phones exist in the country. It seems reasonable to speculate that they must be more pervasive than those offered by the fixed line operator.

Botswana has no telecentres to talk of, other than the few dedicated business centres mostly offering their services from major hotels, shopping malls or perhaps as part of Internet cafes.

PRICING AND AFFORDABILITY. The international bandwidth price for ISPs is reported to be about P72,000 (US$16,000)/Mbps per month, as compared to the European prices which are equivalent to P1,500 (US$333)/Mbps. This high price of international bandwidth is passed on to end-users. For example, a dial-up connection is typically priced at P100 (US$22) per month, excluding telephone usage, which is high for small and medium enterprises (SMEs). It is cheaper than BTC's ISDN (64kbps) which is priced at P235 (US$52) per month.

BTC has just started a scheme for revenue-sharing with ISPs. However, the scheme is in danger of collapse since most of the big ISPs have not signed up. They feel the scheme will cost their customers more, even though the ISPs are creating substantial amounts of traffic for BTC.[6]

Without aggressive investment in the sector, the objectives of universal access and getting more citizens to use available ICT services and making Botswana SADC's ICT hub are unlikely to be realised.

INVESTMENTS. The fixed capital invested in the transport and communication sector, whilst hovering around 13% as a percentage of the total investment in the country as a whole, has still nonetheless experienced a four-fold increase over the period 1991–2002 (Figure 3.5). The investment has grown from a modest P126.5m (US$28.11m) to well over half a billion Pula (US$111m) in the past 11 years.

EMPLOYMENT AND REMUNERATION. The overall contribution of the transport and communications sector in terms of employee compensation and employment figures (Figure 3.6) is small, and even more so if the telecommunications component is isolated. Whilst there has been some growth in the numbers of employees (10,141 in 2003 as opposed to 8,781 in 1996) and in the overall income consumed over the period 1990/91-2000/01, they have not kept pace with the average growth in the whole economy.

The respective growth rates in employees and employee compensation over similar periods are 1.2 and 3.9 times. From this analysis it seems whilst the employment growth rates for both the sector and the national economy are virtually similar, the sector has failed to keep pace with the growth in incomes (2.6 compared to 3.9 times), thus lagging the latter's growth by a third (33.33%). This might be indicative of problems of the quality of the human resources in the

Figure 3.5: Consumption of fixed capital by sector (CSO 2003), P million

Sector	90/91	96/97	97/98	98/99	99/00	00/01	01/02
Transport and Communication	126.5	295.1	322.4	346.9	399.3	476.0	516.6
% of Total	14.6	13.3	13.3	13.1	13	13.1	12.7
Total all sectors	867.9	2210.7	2421.3	2647.4	3068.5	3623.2	4057.4

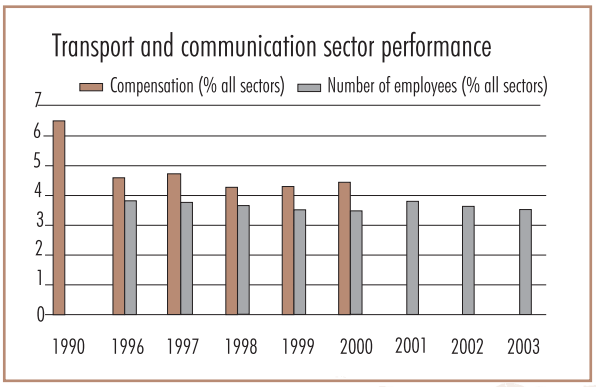


Figure 3.6: Employment and compensation performance of the transport and communications sector (1990-2003) as a percentage of the economy

sector and thus a challenge the country must confront to derive benefits from ICT.

POLICY DEVELOPMENT AND PROJECTIONS. Currently the Ministry of Communications, Science and Technology (MCST) is developing a strategy and action plan as part of the national ICT Policy project called the "ICT Master Plan". This plan covers several issues ranging from e-readiness to the privatisation of the BTC.

The key issues in the master plan for telecommunications are the further liberalisation of the sector; the form of privatisation of BTC; and how to guarantee access to ICT services in remote areas.

Another independent study is being conducted by the Botswana Telecommunications Authority (BTA) with respect to the further liberalisation of the telecommunications sector. The background to this study specifies the following as reasons why it has been undertaken.

Although the Telecommunications Policy and the Act are clearly in support of full liberalisation of the market, the government and the BTA have, however, adopted a gradual liberalisation of the market to ensure sustainability of the market. In this context, some of the market segments remain a de facto monopoly of the Botswana Telecommunications Corporation. These include the international voice gateway and the provision of fixed telephony. Currently mobile operators are required, in terms of their licences, to route their international voice traffic through BTC's international gateway.

The telecommunications policy in Botswana is widely considered to be one of the most progressive in Africa and is cited by the ITU as a case study on best practice[7]. But despite the telecommunications act being viewed positively externally, it has recently come under attack by the government for giving the regulator "too much" independence.

POLICY REVIEW. As already indicated, the regulator, the BTA, started from scratch in 1996 as part of government's liberalisation policy. By 1997 it had already started licensing operators, and a year later (1998) competition was introduced in the mobile phone sector. As part of its mandate to restructure and introduce competition in the telecommunications industry, BTA has had to hit the ground running, as it had to deal with a new concept (regulation), with no models to provide guidance.

It has not only had to develop and implement regulations, but has had to contend with the issue of privatisation and the splitting of the regulatory function over broadcasting from itself to a new body, the National Broadcasting Board, whilst providing secretariat functions to the latter. To remain relevant, the authority has had to keep abreast of the international best practices in regulation. It has attracted the attention of the International Telecommunications Union (ITU), and has been used twice as an ITU case study for regulation (2001) and dispute resolution (2003).

The challenges to a new regulator are considerable in an environment where the incumbent fixed line operator is a government-owned monopoly that has acted as a semi-regulator in the past. One example of

this is the "denial" of the BTC's request to be one of the two licencees to operate cellular telephony. This was an unprecedented decision, particularly since almost all other countries to have introduced competition through the licensing of mobile operators had always favoured the incumbent with a licence, reasoning that it was some form of compensation to the predictable loss of earnings that competition brings.

As the case study on regulation makes clear, the force of personality of the founding executive chairman, Moshe Lekaukau, ensured that any potential storm over this controversial decision never arose. Whilst this turn of events set up the BTA as an independent, professional regulator, it also suggests possible turbulence in the future: what happens when the current chief retires? Is the independence of the regulator immune from government intervention in ways that might not necessarily be positive for the sector development? Can operators (in the changed circumstances) continue to trust the regulator to act fairly and resolutely on matters of disputes between the operators as well as over matters of tariff setting?

One way to address future uncertainty is through the development of adequate human resources, endowed with both theoretical and practical regulatory experiences. Already, 28 BTA employees have post-graduate qualifications, of which 16 were acquired through BTA's sponsorship.

As for the continued independence of the regulator – and, by implication, the confidence that the telecommunications operators can have in BTA – the enactment of the Telecommunications Amendment Act in December 2004 has been a backward step. It has given the role of tariff setting, the promulgation of regulations and discretion on how the regulator spends surplus resources back to a political head in the office of the Minister of Communications, Science and Technology.

If the BTA must continue as a model regulator, the Botswana government must reverse these changes and give back tariff setting and regulating the industry to the regulator. Whilst the changed legal environment has not had much effect on how the BTA interacts with industry players, it may be simply a question of the benevolence of the current minister. Independence of a regulatory body as important as the telecommunications regulator must not be left to the whims of the politicians, but should rather be legislatively protected.

In fact, the country has been advocating, since the advent of the Science and Technology Policy of 1998, a separation between policy formulation, policy implementation and service providers. Thus, since the government's role is policy formation, the BTA should be left to interpret and give practical meaning to policy as implementer and regulator, whilst the many industry players take their rightful roles as service providers.

Challenges

Policy. On the policy front, the major challenge, other than whether the authority will continue to fulfil its seven core responsibilities/functions listed below, is whether the BTA will continue as a trusted, independent and forward-looking regulator under the amended Telecommunications Act.

i) The promotion of provision of telecommunications services (as part of guaranteeing universal access);
ii) Licensing and equipment type approvals;
iii) The protection of consumers and users;
iv) Frequency management (and the development of a radio frequency plan);
v) Price control, through approval of tariffs (local, national and cellular);
vi) Promotion and maintenance of competition through the licensing of suppliers and the observation of detailed competition rules; and

BOTSWANA

vii) Settlement of disputes (thus acting as a quasi-judicial body over sector disputes).

This is in addition to the overarching role of advisor to government on general telecommunications policy and indirectly, broadcasting. The challenge to BTA is whether it can continue to guide the development of the sector, acting as an independent arbiter in the light of the recent amendments of the telecommunications act. The only positive change from a corporate governance standpoint is the separation of chairmanship from CEO role.

Regulation

Competition. In general, Botswana is a fairly liberalised country in terms of telecommunications provision. The only outstanding monopoly is in fixed line voice provision, where the incumbent operator (BTC) is the only service provider. Today BTC still has monopoly in fixed international and domestic voice traffic, but data communications – both domestic and international – have been liberalised. The catch is, however, that enforcement of the policy is very difficult, since whilst VoIP is still illegal, there is some evidence that some operators are actually using it for their own communications.

Access and affordability. The major challenge that not only affects this sector, but all other socio-economic sectors, is how to ensure citizens, both individual and corporate, have access to services at affordable prices. This can only be answered through the ushering in of a vibrant economy that creates the jobs and an education system that produces the requisite human skills.

Empowerment. Policy interventions must be made to deliberately ensure that rural people, females and SMEs are technology empowered, with both skills and finance, for them to be meaningful participants in the information society and networked economy. Unless this is done, these three groupings will lag behind and lose out on opportunities for growth.

Human Resources. In a break from the past, the sector regulator has starting publicly reporting the number of employees; whether any of their training was supported by BTA; their home village; as well as their academic/vocational qualifications. A reading of the report indicates considerable commitment to capacity development. The picture is a little hazy when it comes to human resource development of the operators, other than through industry (operational) service courses.

One other challenge that has occupied government recently is the apparent lack of absorption capacity for recent IT graduates by the job market. This is an interesting problem since, on paper, the market for these people cannot be saturated, yet most are still unemployed two years after graduating. The question, and one that government has advertised a consultancy to provide answers to, is whether there is a mismatch of skills between graduates and industry, or whether the market is flooded by experts/expatriates at the expense of local citizens. Is it possible that the financial expectations of these graduates are unrealistic, or could the employers be seeking levels of experience that fresh graduates do not have? Addressing these challenges, together with other economic interventions, will boost the telecommunications sector in Botswana even further.

Demand side analysis

Demographics. The Botswana survey sample covered a total of 3,361 individuals, distributed amongst 776 households. The sample population came from towns and major urban areas (32.2%), other urban villages/areas (29.8%) and rural areas (38.0%). The corresponding numbers of households in major urban, other urban and rural villages were 34.7%, 27.3% and 38.0%. The major towns included Gaborone, Francistown, Selebi Phikwe and Lobatse. Other urban

villages were Mogoditshane, Tlokweng, Kanye, Mochudi, Shoshong, Palapye, Serowe, Letlhakane and Tutume. The rural areas were the villages of Khakhea, Morwa, Gakgatla, Kgaphamadi, Mogorosi, Lecheng, Malatswai, Gulubane, Ranaka and Ralekgetho.

The individuals represented are slightly off the Botswana population profile in terms of gender, with 44.2% male and 55.8% female (compared with a demographic of 48.4% male and 51.6% female as per the 2001 census)[8]. The age profile generally followed the national trend, with the majority (57.1%) being persons below 25 years. The highest concentration, at 22.3%, were children below 10, followed by 10-14 and 20-24 (12%), 15-19 (10.8%) and 25-29 (10.6%). The lowest percentages were over 79 (0.7%) and 75-79 (0.9%).

The relationship between household members and the head showed the majority (36.8%) were children of the head, followed by the head (22.3%), with grandchildren being 16.9% of the sample, spouse or partner of the head (8.9%), other relative (6%) and sibling (4.7%). A summary of the demographics of the survey is captured in Figure 3.7.

Figure 3.7: Demographics

Age	%
<10	22.1
10-14	11.7
15-19	10.7
20-24	12.1
25-29	10.5
30-34	7.2
35-39	5.4
40-44	5.1
45-49	4.2
50-54	3.4
55-59	1.7
60-64	1.7
65-69	1.8
70-74	1.0
75-79	0.8
>79	0.7
Total	**100.0**

Income	%
<P500	47.4
P501-P1,000	19.4
P1,001-P2,000	13.7
P2,001-P3,000	5.6
P3,001-P4,000	5.3
P4,001-P6,000	3.7
P6,001-P8,000	2.3
P8,001-P10,000	1.4
P10,001-P15,000	0.7
P15,001-P20,000	0.5
P20,000+	0.2
Total	**100.0**

Location	%	Gender	%
Major towns	32.2	Male	44.2
Other Urban	29.8	Female	55.8
Rural	38.0	Total	100.0
Total	100.0		

The marital status of individuals often plays an important role in their consumption patterns, including in their access and use of communications services. Nearly three-fifths (56.8%) of the sample were single at the time of the survey, with just a third (34.5%) married or cohabitating. This latter statistic is a further reflection of the youthfulness of the surveyed population.

In terms of schooling level, 76% had completed or were in both primary and secondary school. Only 6.5% of the individuals had completed or were in tertiary education, with nearly 15% of all individuals having no education at all. From this, 65.3% were literate enough and found reading a newspaper easy. The number of people who could not read at all (15.8%) closely correlated with those that had no education.

The employment and income profiles of the surveyed individuals, which is equally significant in influencing spending patterns, shows that 29.9% were unemployed (compared with 23.8% from the 2002/2003 Household Income and Expenditure Survey)[9]. A little less than nine in every 50 people (17.5%) were employed full-time outside of the extended family, with 28.2% being in full-time studies. Income profiles of the sample indicates the extremely low incomes in which the majority of the population must subsist. Almost half (47.4%) earned P500 ($197.63) or less per month, while about a fifth (22.7%) earned between P100 and P200. In total, 91.2% of the individuals were on less than P4000 (US$1581.03) per month. The median income per individual of P550 per month demonstrates half of the population live in poverty. This contrasts sharply with the mean earning of P1320 (US$521.74), which shows the bias that higher income earners can have when simple averaging is done.

The survey shows that broadband access is clearly a preserve of the elite, as are basic utilities and

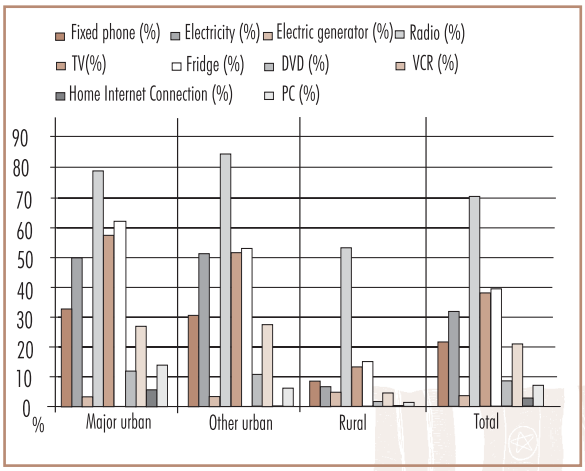


Figure 3.8: Integrated household ICT statistics

appliances (as Figure 3.8 indicates). Radio is the exception, with national census figures indicating its availability in 71% of households, versus 69.7% from the survey. Coming a distant second, at 39.4%, is the refrigerator. But more telling in terms of ICT usage are the low percentage of home PC ownership (6.1%) and individual email addresses (4.29%).

Penetration

Fixed telecommunications. The household penetration of fixed phones was 22.3%, which somewhat masks the divide between rural (9.5%) and major urban (33.2%) and other urban centres (31%). The higher household telephone penetration might seem too high, particularly viewed against the usual ITU/BTA teledensity of about 8%[10]. The major difference in these statistics is that for this survey we captured the household level access, whilst the ITU statistics are for the whole population (per capita figures). An additional qualification is that in the teledensity figures, all fixed telephone connections are attributed to individuals (population) without accounting for the fact that a substantial percentage of the fixed phone network are for corporate customers, contrasting with the e-access survey that determined the numbers from a survey of households. The home telephone was fixed for 98.9% of the households which had phones, and in fact apart from about 6% of rural households, no other households used radio-based phones as a home phone.

The spread of the telephone, like most other information and communication technologies, has been slow in reaching the rural areas. More than half of rural households with telephones have only recently been connected (less than two years), which contrasts with four to five years' median for both major urban and other urban centres/villages.

The rural-urban divide in both access and financial resources to pay for this access is indicated by the monthly household spend on telephones. Whereas 84.2% of rural households spend between P1 and P50 (US$0.40 and US$19.76) on the phone per month, the percentages for major towns and other urban centres are 37% and 72.5% respectively.

The monthly spend on the home phone further illustrates the general divide in town and countryside (where by country we include both rural villages and other urban centres). No households in the countryside spend more than P250 (US$98.81) per month in phone bills, whilst in towns 16.7% of households exceed this watershed, with 3.7% of households actually spending more than P550 (US$217.39), which is the median income of individuals in the survey sample.

The median amount spent by households in Botswana on fixed line telecommunications is P40 (US$15.81) or 1.5% of the mean 2002/03 monthly household gross income of P2,672.40[11] (US$1056.28). (The mean percentage spend is more than double at 3.33%).

Another revealing statistic is the waiting period for initial phone connection. Whereas the median waiting period is two months for the whole surveyed population, which is the same for both rural and other urban areas,

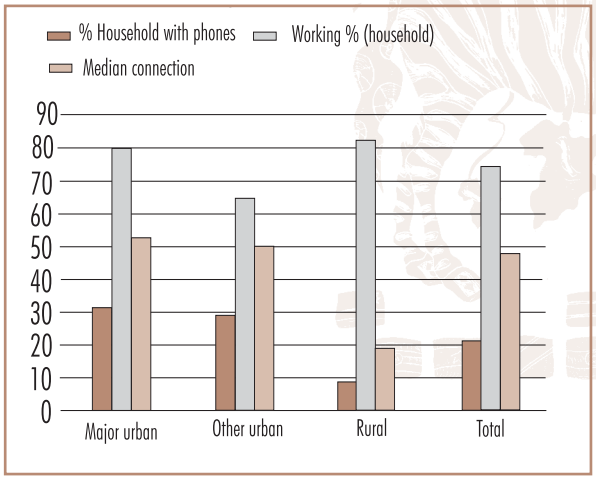
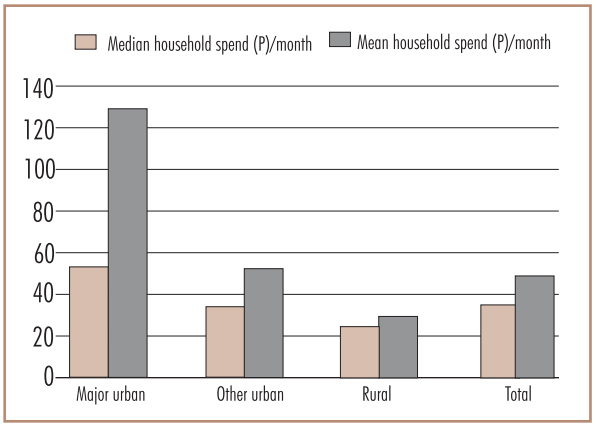


Figure 3.9: penetration of fixed phone

it takes up to a month for households in major urban areas. In spite of this seemingly small waiting period for all three population centre types, a substantial 45% of rural households must wait three months or more for their connections, compared with 37.1% for other urban and 29.3% for major urban.

Public Payphones. The relative access to, and usage of, payphones shows rural people are still lagging behind inhabitants of other areas in much the same way as for household phones (Figures 3.8–3.9). Rural people must walk four minutes more to reach a payphone than those in major urban and other urban areas, and on average,

Figure 3.10: average monthly spend on household phone



use a payphone every 18th day, compared to eight and nine for urban and other urban respectively. The only score on which residents from all three settlement types seem close is on their monthly expenditure, with rural people spending more than three-quarters of the average spend of people living in major urban areas.

The frequency of use of public payphones is skewed towards major urban area dwellers (who also have the most home phones), who use one every 8.43 days compared with 9.45 and 18.41 days for other urban and rural villages respectively, giving an average usage of pay phones every 11.22 days. Telecentres or community public access phones are used principally in major towns (11.3%) and other towns (3.1%), or 5.9% overall. Private telephone kiosks (which almost exclusively use mobile telephony) are by far the most used public phones, at 84.9%, 98.7% and 68.6% for major urban, other urban and rural respectively, giving 84.8% for the whole survey. This phenomenon further illustrates the level of penetration mobile telephony has had in the country, in common with other developing countries. None of the users had used VoIP, which is banned.

To further highlight the access to communications that the mobile telephony has brought, slightly more than half (51.8%) of all people have private telephone kiosks within five minutes of their houses, with the respective disaggregated figures for major urban, other urban and rural, 68.6%, 53.2% and 14.5%. Public payphones (fixed) are within five minutes' walk in towns.

The survey population surprisingly used public payphones more because they were closest to them (55.6%) than on the basis of value for money (22.1%). The trend is most pronounced in other urban areas, where three times more people make a choice on the basis of proximity rather than value for money. The reasons behind this indifference to service offering must lie in the fact that most of the payphones offer the

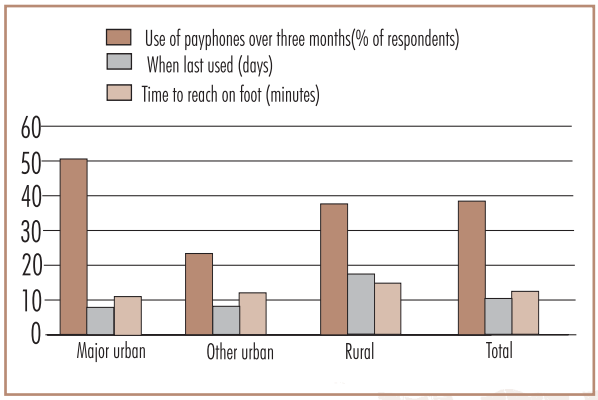


Figure 3.11: Usage and access to public payphones

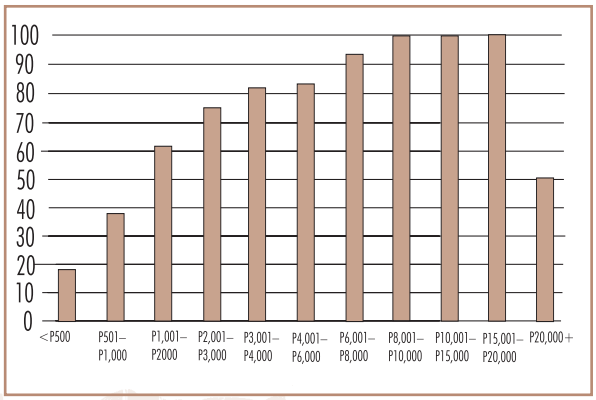


Figure 3.13: Mobile ownership versus the income bracket of user

same rates and those using the fixed mode are probably owned by the incumbent BTC.

Mobile. The picture becomes even more interesting with the examination of mobile phone penetration and usage (figures 3.12, 3.13 and 3.14). Towns experience the highest penetration rates (41.4%) whilst rural areas are at a lowly 11.3%. Overall penetration is 25.3%, somewhat under the figure of 31% provided by operators. It is estimated that over 96% of all cellphones are on pre-paid, which incidentally only contribute P37 (US$14.62) a week, compared with P371 (US$146.64) a month for average contract expenditure. Taken on a monthly basis (using 4.3 weeks in a month), pre-paid still contributes P129 (US$50.99), which is still less than 50% the contribution of contract customers. A clear majority of users only beep (missed call or call me) occasionally (64%), explaining in part the very high percentage of users that make and receive calls (98.8%).

More than half the users have had their handsets for three years or less (median 30 months). More than 90% of users are on pre-paid and have one active SIM card, with 7% of all respondents indicating that they had inactive SIM cards. Owners of handsets share their phones with family the most (62.1%), followed by friends (48.3%), colleagues (38.3%) and neighbours (20%). Only eight people (2.2%) in the survey charged for the use of their mobile phones.

When respondents were asked how many SMSs they sent, 17% have never sent one. However, 74.5% send up to 15 messages in any given week. In terms of location,

Figure 3.12 Monthly spend on payphones

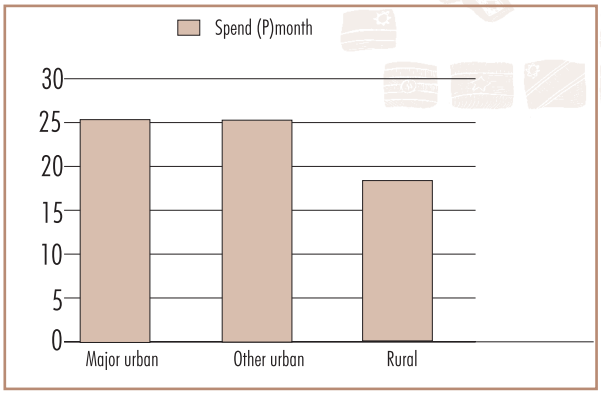
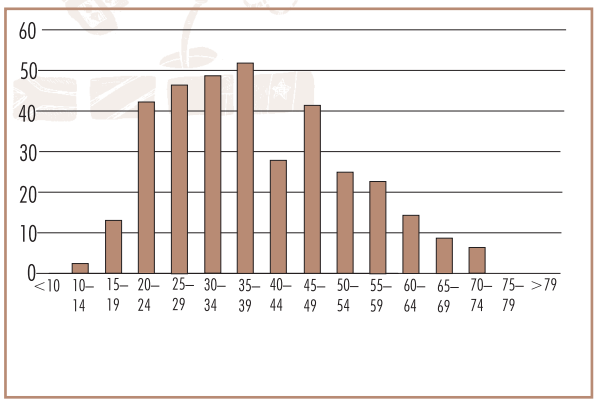


Figure 3.14: Mobile ownership versus age



Percentage of individuals who own a mobile phone by...		
Location	Major towns	41.4
	Other Urban	25.9
	Rural	11.3
Gender	Male	26.0
	Female	24.7

Table 3.15: Mobile phone ownership

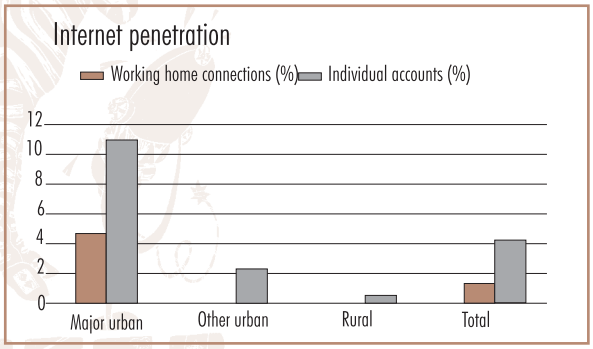


Figure 3.16: Internet penetration by location

59.7%, 57% and 76.4% of people in major urban, other urban centres/villages and rural villages respectively, send between one and 14 messages a week. Whilst nearly three-quarters of mobile phone users would prefer to stay with their current provider even if they were allowed to keep their current numbers, 25.2% would certainly switch. This statistic would be very significant were the country to regulate for number portability between the two mobile operators, and the benefits that would accrue to users in terms of lowering the switching costs.

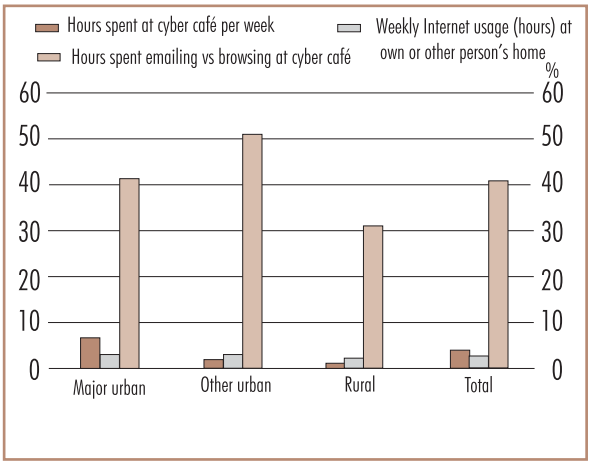
A significant indicator of the value placed on communications is the more than 15% of individuals earning less than P500 (US$197.63) per month who had a working phone, and the nearly 40% ownership amongst those earning between P501 (US$198.02) and P1000 (US$395.26).

INTERNET. From the household survey, Internet penetration (as measured by households with a connection or individuals with active email accounts) stands at 1.24% for households and 4.29% for the general population (Figures 3.16 and 3.17). The latter figure compares quite favourably with the estimated figure of 3.125% (Maitlamo, 2004)[12]. The same urban/rural divide in terms of access persists, since whilst the national penetration figures are as reported, the corresponding ones for rural are 0% and 0.36% compared with 4.55% and 11.11% for major urban.

Schools and workplaces seem to be the principal access points for use of the Internet. 67.8% of respondents indicated that the computer at school/office had Internet that could be used for personal matters. A paltry 1.9% of people access the Internet at home or at a friend's place, which improves to 2.8% when it comes to the use of cyber cafés. In ranking the reasons why the Internet was not used more, top of the list (47.4%) was time, followed by affordability (24%), with access a third constraint at 17.4%.

POST OFFICE. Access to postal services, unlike the other indicators, works in favour of rural inhabitants, with 73.3% of households surveyed being within half an hour of the nearest post office by foot, compared with

Figure 3.17: Weekly Internet usage



BOTSWANA

59.8% and 53.3% for urban villages and major urban centres respectively. This might speak volumes about the subsidy that the post office extends to the rural communities and hence the need to recognise the public service obligations they may be operating under.

The same is true when considering the number of households with access to a post box, whether personal, family or communal one. In the urban villages only 12% had no access at all, followed by about a third each from rural villages (32.6%) and major urban centres (34.7%).

CONCLUSIONS. Whilst Botswana has moved some way in liberalising and extending telecommunications access over the last few years, overall access figures - excluding the mobile phone - are still very low. Worse still is the clear information divide between the rural areas and urban centres. Unless urgently attended to, this will continue to escalate, further sidelining rural communities by denying them opportunities for self-growth. Because of the low levels of electricity access, ICT technologies such as the Internet correspondingly lag behind other middle-income countries that Botswana should be benchmarking itself against.

If access is to be improved, more needs to be done to increase the reach of older technologies like electricity and fixed line phones as platforms for new ICTs.

For the impact of ICTs to be felt, there has to be an appreciably higher usage of the Internet, but for this to happen, more people must use personal computers. Stated differently, a higher usage of the Internet presupposes a higher computer ownership (and with it computer literacy). Hence, higher PC ownership could be the driver for Internet usage, as owners begin seeing the need for services that only the Internet can provide.

The high cost of Internet services in the country does not act as a spur for PC ownership, thus stifling the "services-pull" factor and robbing the country of the necessary economies of scale. Therefore, Botswana must focus on a deliberate policy stand that will bring down telecommunications prices in an environment where the further liberalisation of the telecoms market has meant an increasing costs of local costs whilst international ones decrease[13]). This will develop the critical mass of users that economic theorists have identified as essential (UNDP HDR 2001[14]) to economic growth and human development.

To break the logjam of high prices due to minimal usage figures, the prices of Internet access must come down. The challenge is thus for service providers, particularly the BTC, to wake up to the fact that the future of telecommunications lies in data services, not voice, which mobile operators have long taken over.

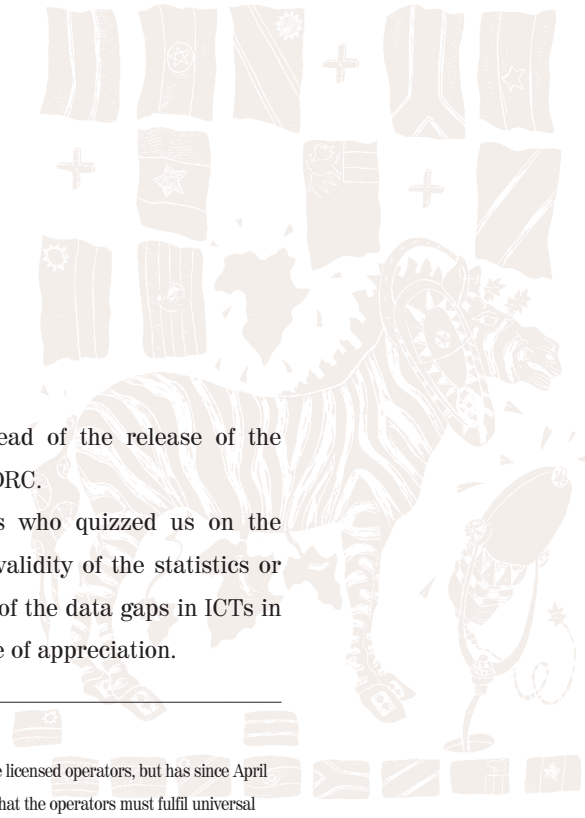
But for the mass of the population, in common with other developing nations, the mobile phone appears to present an opportunity for the provision of enhanced services beyond voice.

Already it has spawned a range of mobile commerce (m-commerce[15]) services, from health to education and beyond. It is such innovations that, if reasonably priced, will achieve the critical mass needed for real gains in telecommunications to be realised. ❑

ACKNOWLEDGEMENTS

This report would not have been possible without the support of our team of research assistants – T Tsobetsi, O Seragi, M Tsie, T Mokgathong, W Naolakgosi, G Modise, K Bafana, K Mogomotsi and O Ramma – who carried out the field interviews.

We equally wish to acknowledge the material and financial assistance we got from both the University of Botswana and the Trust for the Harnessing of Science and Technology for Economic Development (BOTHASTED) for advancing us money to allow the



fieldwork to be started ahead of the release of the official funding from LINK/IDRC.

To all these and others who quizzed us on the significance of our results, validity of the statistics or were excited by the closure of the data gaps in ICTs in Botswana, we express a note of appreciation.

End Notes

1 BTA charged 5% of the gross income of the licensed operators, but has since April 2004 reduced this to 3%, with a provision that the operators must fulfil universal access obligations by extending the infrastructure to under-serviced areas. The explanation for the increasing revenues is generally reflective of the increased traffic (e.g. the growth of the mobile phone) and the recovery of the national telecommunications operator from its earlier problems.

2 This includes a once-off corresponding government grant of P4 million.

3 CSO, Census 2001 (and 2003)

4 IFC Southern Africa Investment opportunities in the Information and Communications Technology (ICT) Sector; BOTSWANA, produced by TELCON for IFC, Nov 2004

5 Annual Report Botswana Telecommunications 2004, www.btc.bw/AboutBTC/AnnualReport2004.asp

6 Southern Africa Investment opportunities in the Information and Communications Technology (ICT) Sector; BOTSWANA, produced by TELCON for IFC, Nov 2004

7 See www.itu.int/treg

8 CSO, 2001 Population and Housing Census

9 Minister of Finance and Development Planning, Budget Speech, Jan 2005

10 ITU World Telecommunication Indicators Database.

11 2002/03 Household Income and Expenditure Survey (HIES)

12 Maitlamo – National Policy ICT development, www.maitlamo.gov.bw

13 Ovum report: *Recommendations on further liberalisation of the telecommunications industry of Botswana: A draft final report to the Botswana Telecommunications Authority,* November 2004. Also Sunday Standard newspaper, September 11-17 2005.

14 UNDP Human Development Report 2001, Making New Technologies Work for Human Development

15 Botswana Human Development Report 2005, Harnessing Science and Technology for Human Development

Chapter 4: Cameroon

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INTRODUCTION. As one of the first African countries to adopt the GSM system back in 1989, Cameroon's telecommunications sector had the potential to become an engine for growth in Central Africa and well beyond.

Sadly, years of ill-fated policies and a lack of investment have undermined the sector to the point where, despite partial liberalisation and the signing of a performance contract between the government and the incumbent operator, Camtel, in 1998, the sector continues to be characterised by low penetration, a growing demand for fixed line services and a stalled Internet sector. The only bright spot has been the phenomenal growth of the mobile sector, which has attracted more than two million customers in less than five years.

The lacklustre development of the fixed line market and resulting low Internet penetration has left the government unsure as to its future direction. Three failed attempts at privatising the incumbent have left most observers sceptical about government's commitment to change, and in the absence of the long-awaited ICT National Agency, there is no coordinating body to promote the sector's growth.

This research aims to go beyond the rough data to track and understand the patterns of e-usage and e-access to telecommunication services in Cameroon. Carried out over 18 months during 2004 and 2005, the first phase consisted of a qualitative survey of urban and rural households to track usage and demand of communication services. The survey adopted the World Health Organization's Expanded Programme in Immunisation (EPI) methodology, and a total of 1,160 households with 7,233 members were visited.

National Indicators	
Country	**Cameroon**
Population	15.5
Poverty (% of population below $1 a day)	No data
Adult literacy rate (% ages 15 and over)	68
Urban population (% of total population)	51
GDP per capita (US$)	670
Surface area (000 km²)	469

Data was collected on the various communication services – including phones, public access, emails and the Internet – using cluster sampling techniques and a questionnaire. For a country where the last census was conducted in 1987, it became obvious that the data gathered through this methodology needed to be reinforced by more qualitative focus group studies. Eight focus groups were therefore conducted in three major cities in 2005, involving a total of 70 people (40 male, 30 female).

The findings confirmed that the Cameroonian telecommunications sector presents a conflicting picture. Despite the increase in the official telecommunications market by more than 30% per year since 2002, penetration and usage is still far from adequate, mainly due to limited availability and affordability. People acknowledge the importance of telecommunications in many of their daily activities, which is why users are prepared to travel long distances to access phone booths or telecentres. In the absence of universal access or a coherent ICT policy, usage and demand patterns are driven either by personal activities or the market strategies of the communications providers.

Important lessons can be drawn from the research. The key finding is that there is an urgent need for a

national policy, framed by universal access needs and demand-oriented strategies. Such research should be conducted on a well-defined and regular basis to enable policy and decision-makers to stay in line with the shifts in usage and demand patterns.

ICT Sector Performance in Cameroon. For the past six years, Cameroon's telecommunications sector has been partially opened to competition. Although the fixed line market remains a state monopoly, the presence of two mobile operators has dramatically changed the telecommunications landscape.

There is still a long way to go as far as access to the Internet and associated ICTs goes, with cyber cafés and call boxes (public telephones) doing their best to fill the void. In all, there are close to 600 cyber cafés and 12,000 call boxes.

Contradictory messages from government about the destiny of the incumbent operator are undermining the whole sector as an economic driver.

The Telecommunication Regulatory Board is proving of little use to the sector, despite full coffers financed by operators to pay for universal access. In the absence of clear policy, the Ministry of Posts and Telecommunications has been engaged in an ongoing battle to take control of this money. Until the landscape is made clearer by a coherent policy, the sector is bound to develop in an uncoordinated manner, and then only thanks to civil society and the private sector.

Camtel has a monopoly over local, long distance and international telephony services. It is the provider of major international bandwidth for the Internet supplier and also competes with the private sector for Internet service provision. It now competes with private VSAT owners who offer wireless local loop access to the Internet backbone directly. The fixed line network has only grown at 2.3% per annum over the past five years and is hopelessly inadequate for the country's needs.

In 2000, the waiting list for fixed lines was more than two million people. It has since been reduced to some 50,000 people, but at the same time, the incumbent's customer numbers have fallen from 115,000 subscribers to 95,000. Many of those have simply moved to mobile services, which accounts for two million subscribers between the two operators. The contract of performance signed between the government and the incumbent in 1999 to increase the number of fixed lines to 850,000 is long forgotten.

The performance of the telecommunications sector in Cameroon will be discussed in the next section. This supply side analysis will be followed by the demand side study based on the national household and individual survey conducted in Cameroon.

Telecommunications sector growth and value. Officially, the government is still seeking to privatise the incumbent, but its actions suggest that it is uncertain. Since the privatisation saga started six years ago, investment in the fixed line market has been close to zero, other than a special equipment renewal ordered by the Presidency.

This explains why the telecommunications infrastructure is significantly underdeveloped, with a fixed teledensity of only 0.67 per 100 (eighth on the continent) and a waiting list of several years based on the current rate of expansion. However, mobile subscriptions have been growing at over 270% per annum for the last five years and now represent well over 80% of all phones in the country.

The mobile operators are now the leaders in infrastructure investment. While the incumbent's revenues have fallen steadily since 2000, the overall revenue of the sector has increased from US$223,599,592 in 2000 to US$384,900,000 in 2002.

CAMEROON

Source : Sectoral strategy of P&T Draft document (2003)

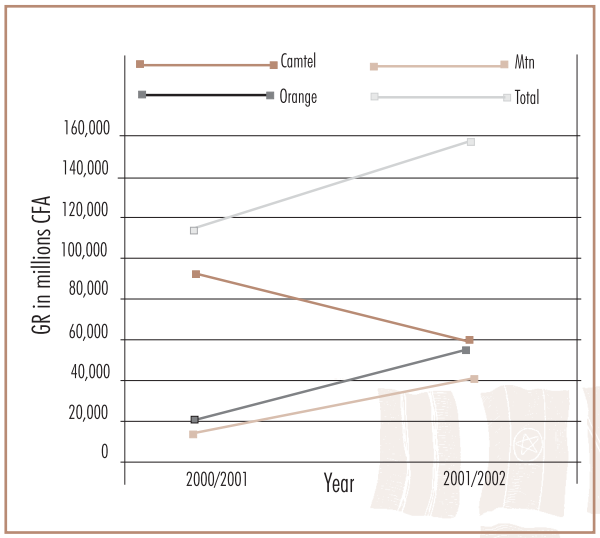


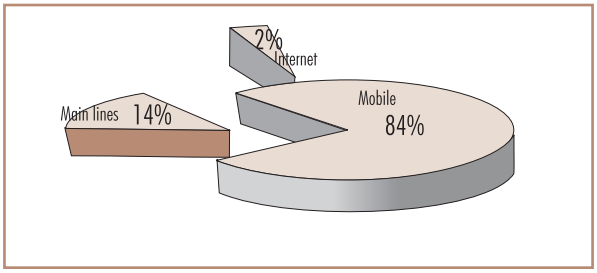
Figure 4.1: Gross revenue curve

Although the figures for 2003 and 2004 were not available at the time of going to print, the increase in the number of new subscribers and the constantly upgrading GSM technology makes it likely that this trend is continuing. From one million subscribers in 2002, the two combined mobile operators are claiming one million each today. The number of fixed line subscribers stays steady at 95,000.

THE MARKET STRUCTURE. The incumbent, Camtel, no longer dominates the local market. Two mobile players are now working to fulfil the considerable demand for telecommunications services: MTN and Orange. One international operator, Saconet, is offering services through Thuraya.

In June 2004, a second fixed line operator was authorised, but most of its energy is wasted in court battles fighting to get the incumbent to put at its disposal the required infrastructure to provide its services. This explains why the second national operator is still not operational.

To regain lost ground, the incumbent is considering setting up a mobile arm, and talks seem well advanced



Source : Sectoral strategy of P&T Draft document (2003)

Figure 4.2: Contribution of mobile, Internet and fixed lines to total revenue

with a strategic partner from China. The impact of this move on the market is yet to be seen.

Telecommunications services are still expensive: where a minute-long call on a mobile phone costs around 250 CFA1 for national calls and 500 CFA for international calls, VoIP service providers are proposing a rate of 100 CFA for international calls. Unlike many other African countries, the government has not banned VoIP services, which are booming thanks to prolific VSAT access providers.

Instead of improving, however, Internet access is worsening. The performance of the incumbent recently led to a complete change of the management team, but the first moves by the new management have not been favourable to Internet growth. The 40% reduction for fixed line access was first scrapped and then reinstated, creating uncertainty.

Figure 4.2 derives from last year's data. Things have not improved substantially since then as far as Internet usage and access are concerned. The failure of the incumbent to provide quality accessible services has laid the ground for a booming underground market in which VSAT providers, through wireless connections, are filling the gap. The cost is still relatively high and the quality of services poor. Consequently, the Internet is unable to attract many subscribers. The last data from the P&T Ministry indicates 8,000 users per day in Yaoundé, the capital city, which has two universities accounting for

around 120,000 students and a population close to two million.

ACCESS. Access to fixed lines has decreased from 115,000 in 2001 to 95,000 in 2003. They barely account for 0.7% of the country's teledensity. Five years ago, the waiting list reached two million, with a waiting time of more than two years. Since 2003, the list has reduced to 45,000, but the waiting time remains long. In the last two years, the government has ordered two special investments to revamp an infrastructure which was in a state of disrepair. The first phase enabled the incumbent to install a digital node in Limbe with a capacity of 50,000 lines. The second phase will enable the state-owned operator to draw a domestic line from the fibre optic access node in Douala. Around 30% of the country is connected, reaching about 40% of the population. Rural areas remain largely unconnected. The two main cities, Douala and Yaoundé, alone account for more than 50% of total subscriptions.

The process of privatising Camtel began in 2000 but has been stalled several times, starting when the highest bidder (Telecel, now owned by Orascom of Egypt) walked away from the deal. The second-highest bidder, Mont Cameroon Communications (MCC, formed by Econet, Tunisie Telecom and British Telecom) was until recently engaged in long-running unresolved negotiations with the government. A major obstacle is the Cameroon government's failure to pay 10 billion CFA (US$12 million) of debts. However, the government said MCC's technical capacity is weak. A report in May 2002 suggested that government considers MCC's and other bids to be "not satisfactory".

The failure of the process, as well as that of the privatisation of other state-owned industries, will hold back the involvement of major investors. The government is now looking for other bidders and is reported to have offered a mobile license as part of the deal.

MOBILE. Camtel's poor performance has wasted enormous opportunities for the development of the fixed line sector. The two mobile operators, Orange and MTN, overwhelmingly exceed the incumbent in terms of performance and revenues. Since July 2005, the two combined claim more than two million subscribers, almost 21 times the number of fixed line subscribers. The phenomenal growth in mobile has helped the country's teledensity reach the 12% level. Innovative pricing strategies are helping even lower income

Cameroon's ICT Profile

Telecoms revenue 2003 (M US$)	275.1
Revenue CAGR (1998-2003)	6%
Rural telecoms revenue potential 2003 (M US$)	26
Fixed CAGR (1999-2003)	2.34%
Main lines 2003	95,155
% residential lines 2003	87
Main lines per 100 people	0.67
Residential main lines per 100 households	3.1
% Digital 2003	68
Public phones 2003	6,550
Estimated rural fixed lines 2003	9,880
Urban-Rural telecom disparity 2003	9.3
Waiting list as % of fixed lines 2003	49.3
Telecom revenue as % of GDP 2003	0.7
Connection charge (US$ residential 2003)	63.00
Residential line rental (US$) 2003	4.50
Basket of fixed line costs	76.50
Basket of cost as % of per capita income	11.5
Mobile subscribers (2005)	2,000,000
Mobile subscribers per 100 people (2003)	6.73
Mobile as % of total subscribers 2003	80.3
Mobile CAGR (1999-2003)	272.5%
Number of ISPs 2002	40+
ISP charge (US$) 2003 30hrs/month	77.20
Monthly cost of 64 kbs data channel	588.00
Internet users 2003	45,000
Cities with local dial-up IP POPs 2001	2
International Internet bandwidth	9,000kbps
PCs 2003	100,000
TVs 2003	650,000
Cyber cafés / telecentres	400

Figure 4.3: Breakdown in fixed lines subscriptions

Category	Number of subscribers
Residential	57 797
Companies	13 551
Public services	15 052
Tele-booths	7 360
Call booths	40
Diplomatic Missions	1 347
TOTAL	**95 155**

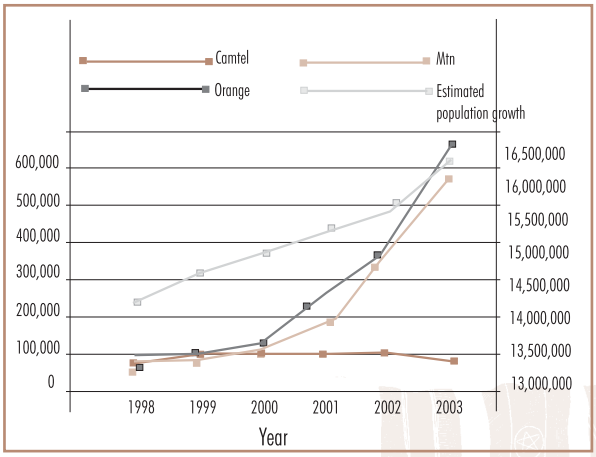


Figure 4.4: Subscription trend vs population growth

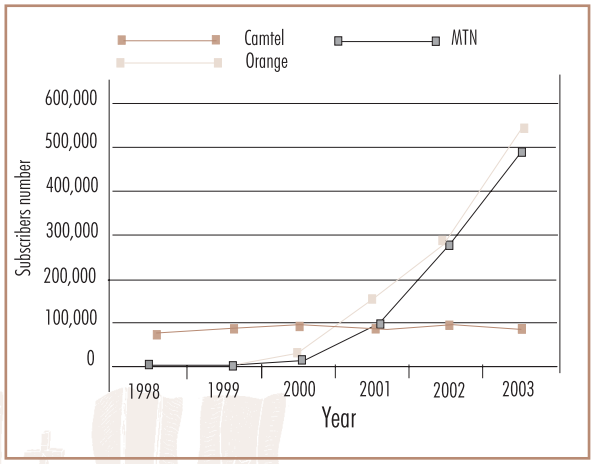


Figure 4.6: Subscribers' evolution curve

Source : Sectoral strategy of P&T Draft document (2003)

people join the mobile market. A grey market for handsets is booming and the number of call boxes is reaching the 20 000 mark.

Despite the toothless regulatory agency, the dynamism of the mobile operators has made telecommunications more affordable than two years ago. But prices are still high for the average Cameroonian and it is hoped that costs will continue to drop. This will undoubtedly change the structure of the national market, opening up unprecedented opportunities. ICTs are "neutral tools" that can be adapted to any circumstance, and the task of the state is to ensure an enabling policy environment for ICTs. Only then will the necessary investments follow.

Figure 4.5: Capacity for growth

Operator	Total capacity/ offered access	Number of lines/ service access	Number of lines available/access available	Observations
CAMTEL	140 000	96 000	44 000	Many lines are available out of asked zones Long extension delay Costly extension
ORANGE	600 000	525 000	75 000	Short delay in setting up
MTN	1 000 000	475 000	525 000	Short delay in setting up

In the meantime, the Telecommunications Regulatory Board (TBR), which was created in 1998, has faced serious issues in its struggle with Camtel, which is reluctant to give up its power. The TBR lacks staff with the appropriate technical skills or regulatory experience. Another issue for Regulatory Board has been a "lack of teeth" to enforce its decisions around the telecoms law of 1998. Consequently, there have been an enormous number of violations. The Board is developing strategies for overcoming this.

INTERNET. The paradox of Internet development in Cameroon is that, according to the law, the incumbent is the sole Internet provider in the country. In reality, more than 20 ISPs are competing for a market that is still undeveloped compared to countries of the same size, such as Senegal. A very rough approximation suggests around 10 000 subscribers, mainly businesses and international organisations. Only about 8 000 people use the Internet in Yaoundé every day.

The quality of the services is erratic, and in the absence of technologies like ADSL, access is very low. This explains the indirect presence of foreign ISPs in Cameroon and the serious fragmentation of the total connected base in Cameroon. More than 20 Internet

access providers, or cyber cafés, in Yaoundé are connected to the Internet by VSAT to a flow of less than 512 Kbps. In 2003, Cameroon had dial-up POPs in only the two main cities, Yaoundé and Douala. Because of the poor microwave links to the telecoms hub in Yaoundé, Camnet (the Internet division of Camtel) is planning a large VSAT-based network of over 100 ground stations to create a nationally available network. There is a project to increase the bandwidth and speed through the deployment of optic fibre throughout the country.

To help increase the Internet access, the TBR has defined a single ISP licence across the entire country, contrary to the former practice where separate licenses were issued for each city. There is no ISP association at this stage, so Internet data is still quite sketchy.

List of key or major players (not exhaustive)	
Fixed telecom operator(s)	Societe des Telecommunications du Cameroun (CAMTEL)
Mobile operator(s)	MTN (475 000 subs as of Dec 2003)
-	Orange (525 000 subs as of Dec 2003)
ISPs	Camtel provides both the international Internet link as well as selling dial-up and leased line Internet access, Web hosting and domain name registration under the name CamNet
-	ICCNET is a private ISP and is focusing on drop-in access
-	CENADI is a government ISP which copetes with the private sector
-	SUP Telecom interactive Africances, New Technology corporation, Africom, Cercom, CKT Distribution, Informatique, Virtual Cameroon, Creolink, Globalnet AdsNet, ICCNET, OSL
VSAT/Satellite	Creolink, Globalnet AdsNet, ICCNET, OSL, Douala1.com (data only)
Wireless local loop	Creolink, Globalnet AdsNet, ICCNET, OSL, Douala1.com (data only)
Data/leased line	Camtel provides both the international Internet link as well as selling dial-up and leased line Internet access, Web hosting and domain name registration under the name CamNet
Other	N/A

UNIVERSAL/RURAL ACCESS. The implementation of the universal access policy is facing various hindrances, not least of which is who is going to manage the money. A special fund exists within the TRB, which is financed by the two mobile operators, the incumbent and some major ISPs. Since the TRB is not an operator and cannot itself provide universal access services, the Ministry of P&T, which has a project to set up community telecentres, is fighting to gain control of the money, and indications are that the Ministry may prevail.

At the moment, rural access is a serious issue, especially in the north of Cameroon, where voice services are extremely sparse, and there is effectively no Internet access. The government has begun to encourage operators to deploy services in rural areas, and promises to support any efforts, and to speedily resolve any regulatory issues that develop. However, with Camtel enjoying a monopoly, the status of potential competitors is unclear.

Generally, private operators target the most densely populated economic zones; to date, close to 55% of the total population of the country is covered by the mobile telephony network, but more than 90% of this population covered is urban. Consequently the prices of fixed and mobile telephone services remain high compared to similar African countries.

Another notable characteristic of rural Cameroon is the prevalence of the informal sector. It is estimated that 90% of the rural economy is in the informal sector, compared with only 60% in urban areas. This rural-urban disparity can be largely attributed to the focus on agriculture in rural areas.

The prevalence of the informal sector in rural areas has, in turn, necessitated the development of informal rural financial institutions. These rotating savings and credit associations, known as “njangis” or tontines, are the only potential source of micro-finance assistance available to many rural dwellers, particularly women. There is confidence among some observers that with government support, a great deal of progress can be made in resolving rural issues. However, there is a long way to go even in the better

CAMEROON

Policy Framework	
Independent regulator	Agence de Regulation des telecommunication (ART)
Liberalisation schedule	Local: 2006 National long distance: 2006 International long distance: 2006 Mobile: 1999
Local services	Monopoly
Domestic long distance	Monopoly
International long distance	Monopoly
Mobile	Full competition
Private VSAT licenses	Full competition
Terminal equipment trade	Full competition
Public VOIP allowed	Yes
Cybercafés, telecentres	Full competition
Wireless local loop	Full competition
Leased lines	Monopoly
Data	Full competition
ISP	Full competition
National ICT policy	None

served areas, as the weak dial-up infrastructure has short-circuited the development of the Internet in Cameroon as a whole.

SATELLITE REGULATION. The TRB has opened the door for the liberalisation of access to VSAT at least for the delivery of public Internet services. Some of the VSAT operators offer international VoIP services without TRB's authorisation.

NATIONAL CYBER CAFÉ NETWORK. Cyber cafés are the chief mode of access for the vast majority of Cameroonian Internet users. Local company Doula1.com believes that a nationwide network of cyber-centres linked to ISPs by VSAT, or terrestrial optical fibre where available, would have enormous potential. The company is currently working on this concept.

One of the main requirements would be to demonstrate that a national cyber café network would both contribute to the viability of the national VSAT network and also become viable in its own right. One way to achieve the latter is to have a mandate to support development activities, and to derive revenues from those activities as well as from purely commercial activities. The development activities could include the provision of training and access time to SchoolNet clients.

SMS AND VOICE MESSAGING-BASED INFORMATION SERVICES. Cameroon is a country where the experience of projects such as SDNP and of educational networking resources could be leveraged into the rollout of a more direct messaging and information content service over the GSM/SMS and voice messaging platform. A potential pilot project has been presented in a Kenyan report. Such a pilot could be attempted in any country where:

- the experience, interest and capacity exists amongst both NGOs and at least one capable entrepreneur who would offer the value-added service;
- one or both of the existing GSM operators has already rolled out an SMS and/or voice messaging platform that is successfully being used already in urban areas; and

Figure 4.7: Service costs in 2003

Cost of fixed line telecommunications (1 US$= 550 CFA)

Connection fee:

Residential	30,000	(US$55)
Business	90,000	(US$164)

Monthly rental:
3,000 CFA (US$ 6)

Local calls 40 CFA for 3 mn	(US$0.07)
Long distance 160 CFA/mn	(US$0.29)
Calls to mobile 180 CFA/mn	(US$0.32)

Off peak calls (8 PM-7 AM):
50% reduction except for mobile calls

International calls

To France 600/mn	(US$1.02)
To USA 1200/mn	(US$2.18)

Cost of Internet bandwidth

Connection fee:	20,000 CFA (US$36.00)
Warranty fee:	50,000 CFA (US$90.00)
Monthly rental fee:	3,740 CFA (US$6.80)
Flat hour:	1,000 CFA (US$1.80)

Access by specialised line (in CFA)

	Connecting fees	Monthly fees	Warranty fees
64 KBS	420,000	900,000	900,000
128 KBS	420,000	1,315,000	1,315,000
256 KBS	420,000	2,460,000	2,460,000
512 KBS	420,000	4,000,000	4,000,000
1024 KBS	420,000	6,000,000	6,000,000

Comparative table of lines and wireless (CFA)

	Fixed Lines	Wireless
64 KBS	900,000	470,658
128 KBS	1,315,000	847,184
256 KBS	2,460,000	1,600,236
512 KBS	4,000,000	3,049,861
1024 KBS	6,000,000	873,806

- GSM coverage into rural areas is sufficient to enable targeting of a sufficiently widespread rural clientele, community organisations and NGOs.

This Kenyan report has highlighted the fact that the experience and capacity appears to exist in Cameroon, as the GSM infrastructure already covers most of the country and significant rural areas. Furthermore, rural coverage can also be enhanced and extended to more communities through the use of simple antennas and higher performance terminals to enhance rural signal reception.

PRICING AND AFFORDABILITY. The uncertainty around Camtel is keeping telecommunications prices artificially high. Price increases in 2002 and early 2003 have made local calls expensive. International long distance prices have been slashed, but remain high in comparison to mobile prices, and out of reach with regard to VoIP prices. Calling America is 12 times more expensive with the incumbent than through VoIP providers. Mobile operators have tried to slash their prices, but this created such an outcry from Camtel that the Minister of P&T stepped in to stop the move. The mobile operators are now offering between 10% to 15% bonuses on pre-paid charging cards.

EMPLOYMENT AND REMUNERATION. The telecommunications sector is still considered as one of the best-paid sectors. This has seen the most skilled engineers leaving the state-owned corporation for the private mobile operators. The impact of this bleeding can be seen in the productivity ratio. Camtel employs 2,167 employees at a ratio of 1 per 44 lines. Orange has 365 employees at a ratio of 1 per 1,438 lines, and MTN has 317 employees at a 1 to 1,498 ratio.

ICT POLICY AND DEVELOPMENT. The country's status on achieving DSPR (Document on the Strategy for Poverty Reduction) targets shows that it is unlikely to reach its ICT and universal access targets. The potential and limitations of ICTs in the development process and poverty reduction are basically determined by three elements:

- Physical infrastructure: conducive telecoms policies, e.g. special provisions and incentives for rural and remote areas, or low cost hard- and software that would be simple for users with low educational background;
- Human resources: e.g. training of poor people, especially women and youth, in ICT skills and supporting development of local language content; and
- Policy environment: e.g. community universal access.

One of the biggest concerns about ICT policies, e-strategies and related implementation plans and initiatives in Cameroon is the lack of a clear direction and a conducive policy framework. These concerns are linked to the absence of a vision and a national policy as well as the difficulties experienced in coordinating the different organisations in charge of designing and implementing Cameroon's ICT policies and strategies. To end this confusion, the President established the National Agency for Information and Communication Technologies (ANTIC), and its organisational and operational framework, in 2002. It was given a large range of functions relating to infrastructure, regulation and security as well as building human capacity in the deployment and use of ICT. Its materialisation is still expected.

This growing interest in using ICTs to support poverty reduction efforts to achieve the Millennium Development Goals (MDGs) highlights the pitfalls and missing elements in the PRSP (Poverty Reduction Strategy Programme) paper adopted in 2002 by the government. The fact that so little was said on how to use ICTs for poverty alleviation and creation of employment sheds some light on the uncertainty in

which decision-makers are mired. At the country level, ICTs are still yet to be effectively integrated into national poverty alleviation and development strategies. This vacuum is exacerbated by the lack of national ICT strategies.

CHALLENGES FACED BY THE ICT SECTOR. The challenges to be overcome include:

- Regulatory uncertainty: Camtel's slowly dying hegemony and the weak regulatory environment leave much uncertainty around investment conditions. Authority has not been clearly defined, and the regulator is wary of creating too much competition, which could make investment in the incumbent unattractive. Many of the upstarts and smaller competitive players are operating clandestinely while waiting for the regulator to fully establish itself. It is currently streamlining the process for telecom licensing.
- Lack of a universal access or rural telecoms policy: Rural telecoms investment needs to be encouraged through a definite universal access policy and universal access fund, which has not been activated yet. The companies currently active in VSAT service provision could potentially also be players in rural telephony for the most remote areas not covered by the mobile operators, as well as for Internet.

The hurdle of import duties and tariffs has been mitigated recently. The elimination of taxes and customs duties on computer and computer network equipment was legalised in the state budget for 2001/2002. The regulator has also helped reduce tariffs for access to spectrum for satellite and wireless communications.

As in other countries, the general impediments outside the telecommunications sector include poor physical infrastructure, lack of commercial power and lack of rural investment incentives. On the negative side, the country has been described as having a difficult and sometimes opaque business environment. It is often difficult to navigate through the government bureaucracy.

The major incentives to invest in this sector in Cameroon are related to tax and duty exemptions on computers and computer networks. There is constant improvement in the regulator's efforts to take control of the sector and to shorten the time required to process license requests for satellite and VSAT installations.

Furthermore, the government has put in place an investment code that is very favourable towards foreign investors in an attempt to attract private foreign investment into all sectors of the economy. The government has embarked on a serious anti-corruption campaign, which seems to be bearing fruit. The most recent Transparency International report saw Cameroon climb six places in the right direction. Finally, the peace and political stability in the country also make the country very attractive for foreign investment and the development of international economic and technical co-operation.

E-ACCESS AND E-USAGE RESEARCH. Cameroon's ICT sector performance shows that the incumbent has negatively affected a sector that could have been an engine for growth. Despite the efforts of the mobile operators, the overall sector performance is low in comparison with countries like Senegal or Kenya. The impact of this on users has yet to be fully measured. A study of user demands for services and access could enlighten the decision-making process, whether for infrastructure rollout or universal access policies.

The e-usage and e-access survey and focus group study could help define more clearly the usage and access patterns in the country. The aim of the combined research methods was to analyse access

and ICT demand and usage patterns in Cameroon in response to services provided by the country's telecommunications operators.

The focus group added a gender perspective in analysing access and usage of fixed lines, public telephones, mobile phones and the Internet in metropolitan and rural areas. The reliable methodology, sampling techniques and comprehensive questionnaires have done a great deal to gauge the success of this liberalising sector and various ICT initiatives in the country. The survey was the first of its kind to collect data on usage patterns of telecommunications services in Cameroon. The focus group study helped to gather further information to enrich and address gaps in the previous survey and gain more insight into users' strategies in coping with scarcity of access and cost of services, and the imbalance between women and men in e-access and usage patterns.

Methodology and Sampling. The quantitative survey used a methodology based on cluster surveying as indicated in the Methodology in Appendix 1.

Three different geographic areas (capital city, urban and rural areas) formed the primary sampling units. This was then broken down into 45 enumeration areas that served as secondary sampling unit from which 30 households were selected randomly. The sample was distributed between these different geographic areas – major town, other urban and rural areas. This falls in line with the approximate distribution of communications services in Cameroon. Four provinces out of ten were surveyed. A sampling of 1,475 households was selected, and 1,286 households and 7,373 individuals were effectively visited. After clearing the findings, 1,136 households and 6,119 individuals were kept in the survey.

The sample distribution was as follows: major towns, including the two main cities of Douala and Yaoundé, 49.6%; other urban areas, 15.1%; and rural areas, 35.1%. The major towns are limited to the two main cities: Douala, the economic hub with a population of about 2.5 million, and Yaoundé, the political capital, with a population of 1.5 million. Other urban areas include Garoua in the North province, with a population of 200,000; Ebolowa, in the South, with close to 50,000 inhabitants; and Bamenda, in the North West, with around 100,000 inhabitants. The rural areas include villages such as Minkoameyos, Bonadale, Arrdo Goni, Koussomo, Emanemvem, Chomba and Santa.

The demographic structure of the survey is inversely proportional to the real composition of the country's population: 51.8% of the respondents being male. This can be explained by the fact the questions were generally directed to the household head. By tradition, males play this role. The composition of the household offers another characteristic of developing countries.

Although 77.2% of house members are composed of nuclear family (husband, wife, son daughter), 22.8% of members are related and 1.4% non-related. 49.7% of respondents are married, 41.2% single, 4.8% widowed, 1.3% divorced and 2% separated. This has an impact on income generation and the use of telecommunication services demonstrated later in the report.

The household survey took place between July and September 2004 and involved 12 enumerators to gather the data at the household levels. The last population census in Cameroon was in 1987. The lack of accurate census data affected the research in two ways: the data gathered in the field couldn't be weighted, and the inaccuracy of national statistics created logistical challenges. In some case, the names of the locations recorded on the census document have been changed or proved to be non-existent. In addition, public authorities and people not accustomed with such in-depth research were

reluctant to cooperate. A substantial amount of time was lost in negotiating permission with public officials to conduct the study.

This quantitative national survey, because of its limitations in giving insights as to how communication users adopt different technologies and cope with cost and access on day-to-day basis, needed to be completed using a qualitative analysis of usage. This explains the recourse to the focus group approach.

From July 11 to July 23, eight focus groups were conducted in three areas (Yaoundé, Douala and Nkoayos). Four focus groups were held in Yaoundé: two mixed groups, one women's group and one professional and workers group. Three were conducted in Douala: two mixed and one youth group. One mixed group was done in a rural area, Nkoayos. In total, 62 people were interviewed; 50% women, 50% men, apart from women group as presented in the matrix below.

Each focus group brought together about eight members. Groups were tape-recorded. For professionals and workers, two separate focus groups were conducted. The combination of focus groups, semi focus groups and analysis of secondary data provides at least a limited form of the triangulation of methods essential in any social research project. It was, moreover, much more rapid and cost-effective than other "rapid appraisal" studies which have been carried out in this field.

The focus group discussions covered similar issues that were raised in the quantitative survey – use of private and fixed phones at home and office, usage of public phones, mobile phones and the Internet and the pattern of communication expenditure. As a method of inquiry, it meant to:

- Fill the gaps from the 2004 quantitative survey;
- Probe deeper into issues raised by the 2004 survey;
- Be cost-effective, relatively cheap and quick to conduct;
- Create interaction between participants that leads to relatively spontaneous responses and creates a high level of involvement;
- Share together a pool of experiences, with discussion providing a consensus on the most typical experiences and shared opinions, but also less typical experiences and differences of opinion, as well as particular examples;
- Enable open-ended questions and discussion, thus preventing interviewers' preconceived ideas from biasing results and placing more emphasis on participants' points of view;
- Render it possible to select theoretically chosen subgroups of the population, i.e. those that are going to provide the most meaningful information, often using selected comparisons (e.g. men/women, low/middle income, centrally/peripherally located); and
- Limit the "bias" when the results are interpreted as not representing the full spectrum of experiences and opinions.

In the case of Cameroon, the gender perspective was embedded in group selection and results interpretation. This gender-sensitive approach affects the research and results interpretation in a way not seen before in RIA research.

LIMITATIONS. There are, however, a number of widely-recognised weaknesses with this methodology, including:

- The researcher has less control over data generated than in individual interviews;
- There is no certainty that individual behavior mirrors group self-reported behaviour; and

Focus Groups

Location	EA Type	Adult	Women	Youth
Yaoundé	Capital city	30	21	
Douala	metropolitan	23	11	8
Nkoayos	rural	9	3	

Research conditions

Some limits and difficulties were encountered in the field during the qualitative data collection.

- In Yaoundé and Douala, it was the rainy season. That meant some focus groups were cancelled because people could not reach the meeting place;
- Some people had difficulty getting to the meetings;
- Some women were not able to attend the meetings without asking their husbands;
- Conducting the focus groups in one hour was not possible if we wanted to cover all the questionnaires and let people talk freely; and
- The time frame for the research was quite short.

- The data generated cannot be regarded as representative in any statistical sense.

MAJOR FINDINGS. Age affects access and usage in variable ways. Cameroon's decision-makers are generally older than 50, and are not frequent or common users of ICTs. Even if mobile usage seems to cut cross all age groups, the usage of the Internet and computers is more common amongst younger people. This creates a gap between the required policies and the ability of the decision-makers to lead the change.

The percentage of economically active people in the survey (between 25 to 60 years old) was 27%. This creates a huge burden on working people, since they have to support the great majority of those not earning a leaving. This earning gap has an effect on spending on electronic commodities, as we'll discuss later in the report.

The age profile explains to some extent the dynamics of the mobile market. Although the household heads in the survey are predominantly the owners of mobile phones, usage and spending patterns indicate that younger people spend close to 30% of their earnings on calls, whereas the household heads spend less than 10%.

The family structure varies from major towns to rural areas. More than 60% of families in metropolitan areas are monogamist. The proportion is the reverse in rural areas, especially in the North region. This also has an effect on the income generation and on the number of people leaving under the same roof. Most of women in polygamist families contribute to the earnings, mainly (80%) through informal activities.

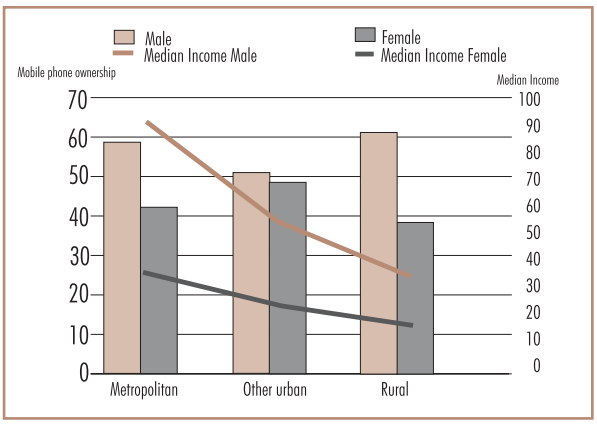
EMPLOYMENT AND EDUCATION. At the time of the survey, 43.1% of children and youth were attending school. This is a blow to a country which sees 100% school attendance by 2015 as a reachable MDG objective. The figure varies from 70% in metropolitan areas to as low as 5% in some rural areas. However, in the rural areas, 28% of children contribute to income generation through informal activities. Most of the

Figure 4.7: Demographics

Age	%	Income	%
0-10	22.2	1-50	39.4
11-14	8.6	51-100	22.8
15-19	12.3	101-150	11.3
20-24	12.9	151-200	8.6
25-29	11.1	201-300	8.2
30-34	7.4	301-400	5.7
35-39	6.4	401-500	1.7
40-44	5.4	501-750	1.4
45-49	3.8	751-1,000	0.4
50-54	3.2	1,000->	0.5
55-59	1.4		
60-64	1.8		
65->	3.3		
Total	**100.0**		

Location	%	Gender	%
Metropolitan	61.6	Male	51.9
Other Urban	21.9	Female	48.1
Rural	16.4		

Figure 4.8: Gender split based on those that own a mobile phone



households surveyed indicated that 82.9% of youth have completed secondary school, while 12.2% have gone through higher training.

As for literacy, 77.4% of the household members say they can read newspapers easily, 10.9% say "with difficulty" and 10.9% say "not at all".

These findings are in sharp contrast with the claim of the Ministry of National Education that 90% of the young are enrolled in school in the metropolitan areas and 70% in rural areas.

The cost of attending school could explain this disappointing figure. The household earning patterns demonstrate that 52% of all the respondents earn less than $50 per month; 70% less than $100 and 3% earn between $391 to $800 per month.

The unemployment rate in Cameroon is among the highest in Africa – 53%, according to the survey. This figure is in line with various estimates made by international institutions, even if the government disputes this from time to time. Amongst employed people, the public sector accounts for 17.5%, parastatals for less than 2% (1.9%), the agricultural sector 18.2% and the informal sector 36.5%. The public service has stopped recruiting since 1986 and most of the private sector either closed down between 1990 and 2000 or downsized. The consequence is that the informal sector has become the main creator of employment. This has an effect on the accurate evaluation of real earnings and certainly has a great impact on spending patterns. This is why 50% of people interviewed say they can't access the Internet because of affordability.

PENETRATION AND USAGE. The amount spent on telecommunications services by households in Cameroon is around $20, which is close to 21% of GDP per capita. People tend to spend more when they earn more, and the households that earn the big income are located mostly in metropolitan areas. Wide recourse to mobile telephony means the cost of telecommunications is similar in rural areas as in urban areas, since mobile communications do not distinguish between local and long-distance calls. Even people with fixed lines use their mobile phones to make long-distance calls.

When asked what prevents them from using more telecommunications services, people rank in order affordability (25%), time (22%), quality of service (9%) and access (less than 2%). It seems quality of the service is not a criteria. One explanation for this can be that quality of service becomes a factor only when there is accessibility.

USE OF OFFICE PHONES. Private fixed lines are considered a luxury because of their scarcity. The unavailability of fixed line phones and the boom of mobile explain the declining use of fixed line phones. Sometimes, people use relatives' or neighbours' fixed phones. In the case of neighbours, it's mostly for received calls, to avoid costs to the phone's owner. Even though office phones are "free", people use them only when it is really necessary; for an important and urgent message to family, friends and for business.

Some youth admit that they use government phones excessively because it is free and paid for by their taxes. The use of state phones by neighbours or relatives of those who have access to them is widespread, but has been declining due to increased accessibility to mobile phones and reduced accessibility to public buildings.

Two years ago, government reduced its public expenditures due to pressure from international institutions to reach the "completion point". This means some professionals and workers no longer have unlimited access to telephones.

FIXED PHONES AT HOME. Ownership of household fixed phones is a privilege of a tiny minority of the population – in the sample, mainly civil servants and

professionals. At home, all family members, without distinction of sex or age, use fixed phones. To monitor usage and avoid misuse, some parents have a pin code which prevents children from making unsupervised calls. Using a pin code is not only to keep an eye on children. Some respondents prefer to use their mobile phones because with pre-paid cards, they have more control of their communications.

Generally, youth between 15 and 20 of both sexes are the main home telephone users. Adult men seem to use it more than women.

When combining fixed line and mobile phone possession, close to 45% of respondents in metropolitan areas indicated they have one of the two or both in the house. The percentage goes down to 23% in other urban areas, while rural areas account for less than 8%. Less than 1% of households have an Internet connection at home, and only 3% of respondents have an email address.

PHONE BOOTHS. One market sector that has suffered severely with the event of mobile is private fixed line phone booths. Close to 80% of people used to rely on these for telecommunications, but they are being replaced by mobile call boxes, which offer more flexibility and competitive prices. The call boxes are a source of self-managed informal economic activity, which has generated more than 10,000 jobs between 2002 and 2004. They are equally distributed between metropolitan urban areas as well as in rural areas. They absorb 80% of the average $10 spent per month by each household on telecommunication.

PUBLIC PHONES. In Cameroon, public telephones mean private phones open to the public. Telephony providers, either fixed or mobile (MTN, Orange and Camtel), don't have their own public phones. In the past, Camtel had telephone booths where users, with a pre-paid card, could phone. This system doesn't exist any more because of act of vandalism and poor management. Thus, public telephony in Cameroon refers to:

- Telephone booths, which offer mostly fixed line telephony;
- Call boxes: These are places on the roadside equipped with a table, umbrella and mobile phone where people can make mobile calls;
- Taxi phones: These are like call boxes, with the difference that they are a little more comfortable than call boxes and they use fixed phones for mobile calls. This type of public phone is mostly found in Douala; and
- Cyber cafés: Mostly for international net phones; some cyber cafés offer fixed and mobile telephony.

Due to the fact that fixed phones at home and office are rare and public phones are cheaper for mobile and international calls, all respondents say they use public phones. Professionals and workers use them less because they have access to phones at home and the office, and adult women use them more than men to save their credit and manage their personal mobile phones. In rural areas, people mainly use mobile-based call boxes.

The choice of one or the other public telephones is motivated by:

- its proximity (especially call boxes);
- the unavailability of fixed phone at home (which is cheaper than calls in telephone booths);
- in some remote areas, the lack of network of one to the other mobile provider; and
- its low cost compared to personal mobile phone and fixed phone at home for what is concerned with international and interurban calls.

Location is a major factor in the choice of a public phone. The nearest it is, the safer the user feels. People use different kinds of public phones depending on the type of communications:

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- Telephone booths for urban calls from fixed line to fixed line, or mobile calls if mobile is provided.
- Call boxes or taxi phones for mobile to mobile calls.
- Cyber cafés for international calls via net phone.

Because of the popularity of mobile, call boxes and taxi phones are the public phones most in use. Call boxes beat taxi phones because of their proximity: they are found all over the country. Some people say they use public phones sometimes for discretion or when they want to protect their identity.

ISSUES OF PRIVACY. For most respondents, privacy, although an important aspect of communication, doesn't exist when you use public places. They perceive privacy at two levels:

- They all recognise there is no privacy with public telephones. To deal with that, they lower their voices or simply don't use public phones for private and confidential communications.
- Some people say public phones are discreet: the number of the public phone, and not your own number, appears on the caller's phone.

ISSUES OF SAFETY. Respondents link safety to privacy. Safety is linked to confidentiality in the communication first, and then physical safety, which is linked to location. Public phones in the user's neighbourhood are seen to be physically safer. Most women avoid going to a public phone at night. In rural areas, safety refers to disclosure of information. For professionals, safety refers to the curiosity of passers-by. For women, safety is all about the integrity of their communication. Youth and some adults define safety as the reliability of the network.

ISSUES OF SOCIALISATION. Cameroonians do not use public telephone areas as social gathering places. Most people go to telephone booths and call boxes to call or receive messages and to buy pre-paid cards. Some youth will meet at public phones for appointments with friends.

COMBINING PUBLIC PHONES WITH OTHER PHONES. Generally, people use all kind of phones: mobile, private fixed line and public phone, depending on the cost of communication, the confidentiality of the communication, the location and the time. In rural areas, people use mostly their mobiles and call boxes because they are accessible. To call fixed phones, they go to the nearest town. For others, fixed phones at home and at public places are kept essentially for fixed calls. Sometime, fixed office telephones are used for calls other than fixed line calls, mostly when the service is free. Women are big consumers of public phones, even for those who have credit on their mobile phones. They use fixed telephones for fixed line calls and mobile phones for mobile calls. Professionals use public phones less because they have more access to telephones than most people.

MOBILE TELEPHONY. Mobile ownership is currently 21.6%, according to the household research. Even if 51.6% of respondents have still to access this commodity, it's fair to say the country has proved to be a fertile ground for mobile operators. For a country which only opened to competition less than five years ago, the penetration rate is on a par with most African countries.

OWNERSHIP OF MOBILE PHONES. With the "collapse" of fixed line services as the main telephony commodity, mobile phones are an absolute necessity nowadays. In the focus groups, the ownership of mobile phones jumps to 80%. This disparity is due to the size of the sampling and the locations selected, but provides a better insight to interpret usage patterns. For the 20% of the sample who don't have a mobile, one mentioned the lack of financial means. This category is composed of youth in college, housewives and women doing menial activities. Others' phones have been stolen or are not working. Some women are still waiting their husband to take the initiative.

In general, all adult members of a family own a mobile phone, and in richer families, even teenagers own one. In poorer families, only adults have them, and there sometimes one fixed mobile phone at home for the rest of the family.

Theft of mobile phones is quite frequent in Cameroon, to the point where most upgrades of old phones is due to theft. Once people get used to a phone, they find they cannot live without them. Women are a particular target for mobile phone thieves, and often tend to use old-fashioned phones which are less desirable to thieves. Most adults change their phone only when it has been stolen or it's not working anymore. The youth like to stay in fashion, so, as soon as they have the means, will acquire a new phone.

All focus group members say they have mobile phones to enable themselves to be contacted and to contact people (family, friends, business partners) anywhere, anytime. Most use their own income to buy their phones, although there are some cases where phones are a gift.

The cost of mobile phones is becoming more and more accessible. Today, US$50 can buy a handset with a SIM card. Those who buy their phones do so without planning beforehand: they just go to the shop and pay cash, although women tend to save up in advance.

According to some respondents, the use of mobile phones should not be related to income levels. The phone is a vital necessity, and with accessibility becoming more and more affordable, all adult Cameroonians should have a mobile phone, they say. Others, mostly women, say mobile phones should be used only if people have a certain income.

USE OF MOBILE TELEPHONES. Mobile phones are becoming an indispensable tool for Cameroonians. They use them for their social and professional communications, to call relatives and friends and as a working tool. Even those who do not own their own phone will borrow phones, for various reasons:

- Lack of credit on their phone;
- Discretion and anonymity;
- Fun to use a different phone (youth); and
- Emergency cases when you don't have your phone near you.

ENTRY LEVELS OF MOBILE OWNERSHIP. Although opinions are quite divided in terms of level of income to start using mobile phones, most people don't think that income should be a prime criterion for the possession of a mobile phone. Still, people who only have a monthly income of US$50 will probably have to sacrifice something else to have their mobile phone, and would probably be better advised to use public phones for communications purposes.

AFFORDABILITY AND CHURN. Apart from the youth, most people change their phones only if they are stolen or not working. Women tend to keep their phones longer than men, for various reasons: less financial means, a dislike of change, or an aversion to new technology.

Similarly, most people consider the cost of the handset before the cost of the actual communications. Staying in touch is the prime criterion. Pre-paid pricing strategies have rendered communication costs more affordable and are reducing the barriers to access.

IMAGE AND STYLE. With the wide availability of mobile phones, it is difficult to determine the social rank of people from their mobile phones. Most respondents don't link the type of mobile phone people carry with their rank in society. Many people will carry expensive phones to portray an image, while others will use old-fashioned phones to avoid theft.

Cameroonians are also very practical. For the majority of respondents, a phone is used to make calls

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and receive messages. Apart from the youth who look for special features like cameras, most people look for these features:

- The reliability and quality of communication (call and reception);
- Good memory capacity;
- Messaging;
- Calculator, clock, organiser;
- Vibration facility; and
- The robustness of the handset.

3G is not yet widely in use.

ISSUES OF CREDIT AND AIR TIME. Mobile operators offer a wide range of communication airtime cards to suit all categories of the population. Cost of pre-paid cards range from US$1 to US$60. With the "Me2U" service introduced a year ago by MTN, a user can transfer credit to another user. Apart from some people who plan their airtime purchases, most respondents buy airtime when their credits are exhausted or when they have the money.

THE NATURE OF "BUZZING". Buzzing, or "beepage" – where one person leaves a missed call on another's phone to get them to call back – is a usage pattern popular in Cameroon. People "beep" even if they have credit on their phones. Among the youth, especially girls, buzzing is a daily activity. Professional men buzz rarely, while professional women buzz their husbands because they know they have credits and will call back. Buzzing is also used as a mean of non-verbal communication: buzzing once means hello, and the receiver doesn't call back. Buzzing more than once means there is an emergency, and the receiver should call back.

SIM CARDS. All owners of mobile phones have at least one SIM card. A second SIM card is generally from a competitor operator to stay in touch all over the country, as the operators do not cover the entire country. Also, the cost of communications between the two mobile providers is not yet harmonised. A call from one provider to another costs more than a call to the same provider.

SMS ISSUES. With the reduction of communication costs and the introduction of new services (more time access, credit transfer, per second pricing), people are using fewer SMSs than before. The main reason for using SMS is because is it cheaper than calling. Although very popular amongst the youth, some respondents, mostly adult women, never use SMS:

- They don't have the patience to formulate sentences in that small space;
- They don't trust the service, and are not sure if the message will arrive at the addressee; and
- They don't have instantaneous answers.

For those who use SMS, they use it because:

- It's cheaper than phone calls;
- A lack of credit;
- Privacy and confidentiality;
- Detail in the message; and
- The ability to save the message you sent.

SERVICE PROVIDERS. For the past five years, the mobile sector has had two operators, MTN and Orange. Users don't really perceive a difference between the two, as the same pricing strategy, the same quality of services and an equal number of customers make them almost indistinguishable. The choice of a mobile service provider is therefore motivated by the perceived quality and the extension of the network. People say MTN is the best choice because its widely represented around the country and its network is more stable and reliable than Orange.

As far as cost, time accessing the network and other optional services goes, people say the two are almost the same. Most people who use Orange do so because:

- of friends or relatives;
- they want to be different from other members of the family;

- by affinity to French people;
- it's a gift;
- you can buzz outside the country; and
- time access for reception of your calls is longer than MTN.

Orange customers are less satisfied because:

- their network is not available right around the country and is not reliable; and
- arbitrary invoicing: sometimes your credit disappears.

INTERNET USAGE. The Internet is becoming increasingly available in the main Cameroonian cities. In the two major towns (Yaoundé and Douala) almost all popular neighbourhoods have their own cyber café. The cost of connection has steadily decreased to between US$0,60 and US$1 per hour. Still, this remains high for the average user. The primary users are mostly the youth and professionals. People use the Internet mostly for email, research, information and chat. The lack of Internet training limits the capacity of people to benefit more fully from Internet. The Internet is also being used as a matchmaking service: one young woman admitted to using the Internet to "find her white husband".

The cyber cafés are the most common places to access the Internet, followed by offices, schools and a tiny minority of houses. The sample shows the same configuration. Professionals and employees connect mainly from the office during work hours. For other categories of users, there is no specific period when they prefer to use the Internet. They go when they feel the need. The speed of the connection and the crowd at the cyber café are also determining factors. Some go to cyber cafés in the morning because it's less crowded at that time, and the speeds fast.

Apart from professionals and some employees who have access to Internet all day in their offices, and therefore use it daily, a good majority of users can't afford access as they want because of the cost. On average, they use Internet once every two weeks and spend about two hours online. Students go almost every day for their research and spend 30 minutes at a time.

COST FACTORS AFFECTING THE USE OF THE INTERNET. The cost of connectivity is a limiting factor for Internet access. Respondents say that the cost is still high. On average, the cost of connection is US$0,80 per hour. One way to cut costs is to look for cyber cafés with high-speed connections. Students, however, particularly struggle to afford connectivity for the amount of time they need to be online. By using the Internet, they don't have enough money for other essential goods as clothes and transport.

Most people don't plan their Internet expenditures because they don't use it frequently. Students go to the university area where the connection is cheap. For those who plan their expenditures, they will buy a three-hour ticket at a cyber café because it is cheaper.

EMAIL. All Internet users have an email address to communicate with their friends, relatives and business partners inside and outside the country. Generally, people receive more mails than they send. With the low frequency of use of the Internet, except students who do more research than email, people receive an average of eight messages and send four per session.

INTERNET CAFÉS. Internet cafés are very popular in the main cities in Cameroon. With VSAT, providers offer a different quality of Internet services in terms of connection speed. The choice of an Internet café is motivated by:

- the quality of the connection;
- the proximity for safety;
- the reception and the behaviour of the manager; and
- the cost of the connection.

The equipment, software, hardware and comfort are not key determinants in choosing an Internet café. Respondents say they are not ready to pay more for

those elements. Most important for them is the speed of the connection because it is strongly correlated with the amount of money they pay. Users are prepared to pay more for a better connection.

ENTRY AGE TO THE INTERNET. The Internet is considered by respondents as a tool which stimulates people's interests and develops individual abilities. But there is an ongoing debate on the best age to start using it. 50% of the respondents say that as soon as children know to read and write, they should be taught to use the Internet. The other 50% feel the Internet should be used only once children reach the age of 18.

SOURCES OF INFORMATION. By order of priority, sources of information are radio, television, newspapers and the Internet. The radio is widely available in homes and can be carried everywhere. Television is popular because of its visual impact and its availability at home. Newspapers are less popular because readers have to buy them and people don't like to read. The Internet is not accessible and is costly.

GENDER, TELEPHONY AND THE INTERNET. The findings of the survey show that men and women behave differently as far as telephony and Internet are concerned. These differences in access, usage and expenditure pattern are the result of disparities observed in society in terms of gender relations.

Generally, women are less educated, less trained and less affluent than men, and very few are at the decision-making level. The disadvantage women have in the information society is also a result of the lack of gender-related issues in policy and strategy formulation. ICT policies and strategies, when they exist, don't mention how gender aspects are going to be taken into consideration. By ignoring this, the majority of the population is ignored. The marginalisation of women in society in general, and the information society in particular, puts them in a position where they can't draw, as men do, on the benefits of the digital society.

From the research, the main gender problems are:

ACCESS AND ACCESSIBILITY. In rural areas, fixed phones and the Internet don't exist. When rural people want to use them, they have to go to the nearest town. Women, with all their responsibilities, are limited in their movements. In towns, very few houses have access to the Internet and fixed phones, and the majority of the population can only access these technologies from public places. Again, this requires availability of the user. Women have triple roles in the society – reproductive, productive and social – which does not leave them much time to do other things.

EDUCATION AND TRAINING. Education and training are limiting factors affecting more women than men in using ICTs. The disparities in education between girls and boys start sometimes at the primary level. Parents who struggle to pay for education will choose to educate their sons to the detriment of their daughters. Another factor is the fact that too few women choose scientific or ICT subjects at school. With these handicaps, women have less of a chance than men to have the required education and training to use Internet and telephony to their best advantage.

CONCLUSION. In an era of globalisation, the availability of modern information and telecommunications networks is not only a determining factor in national and international competitiveness, but also offer opportunities for the creation of wealth and jobs which countries like Cameroon so need. The acceleration of the usage of ICTs in the main economic and social sectors in Cameroon should be prioritised to improve productivity, the quality of products and services and the development of human resources.

Given the findings of the research, the ICT sector, particularly telephony and Internet, still face challenges

in Cameroon. Access to the Internet is still limited for the majority of the population. As for fixed lines, people are turning to mobile phones in increasing numbers. The marginalised position of women in society limits them from enjoying the potential advantages provided by ICTs.

In summary, the demands of the population are:

- Mobile phones:
  - Improve the coverage and quality of the networks of both providers;
  - Reduce the cost of communication so that mobile telephony is accessible to all adult Cameroonians; and
  - Lowered restrictions of time access to the network.
- Fixed phones:
  - Create more lines for customers;
  - Facilitate the process of obtaining a line by improving the quality of service: two years to get a line doesn't make sense; and
  - Accelerate the process of privatisation of the incumbent, Camtel.
- The Internet:
  - Improve the quality of connections by offering high-speed connectivity;
  - Increase access to the Internet by encouraging more cyber cafés in urban and rural areas. Pay special attention to unprivileged groups such as women;
  - Reduce the costs of Internet access;
  - Raise awareness of the benefits of the Internet to women; and
  - Provide more training to use the Internet efficiently.

On the policy front; there is an urgent need for a universal access policy. Universal access must be equitable for all. Those involved in the telecommunications sector, public, private and civil society should reassess and redefine their priorities and objectives according to the needs of the population. Policies and strategies should take into consideration the gap in terms of gender, level of income and education. For equity, developmental, social and economic reasons, the government should accelerate the opening of telecentres in rural areas. Telecentre developments should be integrated with other service delivery by national, provincial and especially local government.

The need for coordinating efforts and creation of synergy requires a multi-stakeholder approach from government, private sector and civil society to tackle the various problems facing the country. The Telecoms Regulatory Board has a key role to play. As the watchdog in the sector, it has to provide human capacity, expertise and the means to provide an conducive environment to the various operators. ❑

Chapter 5: Ethiopia

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with Kifle Woldekidan

INTRODUCTION. This paper provides the first comprehensive supply and demand-side analysis of telecommunications in Ethiopia. It is based on an analysis of the sector's performance, measured against national policy objectives that provide the context for the quantitative and qualitative demand side surveys conducted in 2004 and 2005. These surveys explore the usage and access patterns in Ethiopia from the perspectives of users and consumers and those marginalised from communications.

The first study involved a quantitative survey of urban and rural households on communications services usage and demands using a methodology developed by World Health Organization for their Expanded Programme on Immunisation (EPI). A total of 1,790 households and 1,826 individuals were involved in the survey. Data on the demand for communication services – including phones, public access, email and the Internet – was gathered using reliable cluster sampling techniques and a comprehensive questionnaire.

The second qualitative study focused on gathering further information to enrich and address gaps in the first household survey using focus group (FG) interviews. A total of eight focus groups, involving 63 people (33 male, 30 female), was conducted.

Both surveys showed that telecommunications penetration and usage is inadequate in Ethiopia due to limited availability and affordability. Respondents regard communication as an important component of day-to-day life, and users travel long distances or use different ingenious strategies to access it. However, ICT policies and rollout strategies do not appear to have taken the demands and usage patterns of people into consideration. The findings suggest that the government should consider usage patterns as a basis for developing its universal access strategies; after all, communications should meet the needs of the country's citizens.

OVERALL ICT SECTOR PERFORMANCE IN ETHIOPIA. Although the situation is improving – admittedly, from a very low base – the telecommunications sector in Ethiopia is still characterised by low penetration and a growing waiting list for fixed services, unsatisfied demand in the mobile sector, and a low-quality Internet services sector influenced by a strict public monopoly and ineffectual regulation. Despite the establishment of an ICT coordinating body, the Ethiopian ICT Development Authority, ICT sector development in general, and telecommunications and Internet services in particular, continue to be treated in an ad hoc manner where various sectors and institutions address their needs and concerns independently and projects are implemented on a trial

National Indicators

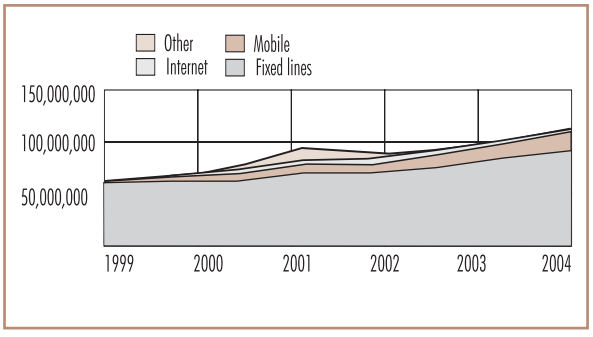
Country	Ethiopia
Location	Eastern and Horn of Africa
Total Area	1,127,127 sq km
Land Mass	1,119,683 sq km
Population	73,000,000 (est. 2005)
Population Growth Rate	2.36%
Labor Force	2.2%
Percentage of population below a poverty line	44%
Urbanisation	16%
Life Expectancy	42 years
Child Mortality	11.4%
Percentage of population with access to drinking water	
Illiteracy rate	59%
GDP per capita	US$120
Structure of the Economy	Agriculture 42%, Industry 11%, Service 47%

Source: World Bank, Ethiopia at a Glance – http://www.worldbank.org/data/countrydata/aag/eth_aag.pdf; CIA the World Fact Book, Ethiopia, www.cia.gov/cia/publications/factbook/geos/et.html

and error basis rather than within a coordinated national framework, resulting from an engagement with civil society and the private sector. The incumbent, rather than the regulator, establishes communications targets, the policy-makers decide rather than the public. Consequently, there has been a limited assessment of the performance of the sector against goals, demands of the user and overall needs of the nation both in accessing and providing ICT services. This next section discusses a brief overview of the telecommunications sector performance, followed by the findings of the household and individual survey that analysed demands for communication services from the lens of users.

TELECOMMUNICATION SECTOR GROWTH AND VALUE. The government, through the monopoly incumbent, the Ethiopian Telecommunications Corporation (ETC), continues to invest in fixed, mobile and broadband services following its commitment to improve access to rural areas along with the strategy for decentralisation of public institutions and services to district (Woreda) levels. Capital investment jumped from US$29.1 million in 2002 to US$128 million in 2003. Although the implementing capacity of the incumbent has been a major shortcoming, the capital budget doubled in 2004 to US$300 million and is expected to rise to about US$500 million in 2005. It is too early to predict the intangible and tangible social and economic benefits of the current investment, as most of the projects are only becoming operational towards the end of 2005.

Figure 5.1: Contribution of fixed, mobile, Internet to gross revenue



Telecommunications revenue grew from US$104.4 million in 2002 to US$118 million in 2003 and to US$132 million in 2004, representing an annual growth rate of about 14%. Annual revenue remains within the range of 1.7% to 1.9% of the GDP, a low figure when compared to neighbouring countries and the African average of over 3% (ITU 2004 and ETC Annual Reports).

The mobile sector is growing in terms of revenue and number of subscribers since its slow start in 1999. The number of cellular subscribers is expected to reach one million and bypass that of fixed line subscribers by the end of 2005, although at the time of this projection it stood at around only a quarter of this. Cellular represented 16% of the gross revenue of the incumbent in 2003 and this has jumped to 22% in 2004. The incumbent had 155,534 cellular subscribers by the end of September 2004 and a revenue of Birr 252 million, giving an average revenue per user (ARPU) of Birr 135 (US$15) – almost half the ARPU of Birr 268 (US$30) in 2003. Many cellular phones were installed towards the end of 2004 and made a late contribution to the gross revenue and ARPU; however, it is evident that ARPU is declining as mobile begins to reach the lower end of the economic strata. The estimated ARPU in 2005 is about Birr 70 (US$8), the lowest in the world. This shows affordability is the major bottleneck to improved communications services in Ethiopia.

Figure 5.2 shows that the contribution of the Internet to gross communications revenues remained flat. Despite reduction of tariffs by 60% in 2002 and 2005, the incumbent is unable to attract Internet subscribers. The low quality of service, coupled with high costs and limitation of broadband services, makes Internet services inaccessible to the majority of subscribers. Although the quality of the infrastructure has improved with a recent introduction of a broadband

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Internet service, the quality of service leaves much to be desired. The cost of broadband access is still high, with a monthly subscription of about US$15 per kilobyte. This is in contrast to the global benchmark of US$2-5$ per kilobyte per month. This points to the fact that the Internet may be better served through competition.

ACCESS. Access to fixed phones showed a modest increase in 2004. The exchange capacity of fixed telephone lines rose by 11.12%, from 649,593 in 2003 to 722,548 lines in 2004, of which 97.3% were digital. There were 486,368 subscribers by September 2004, a 19.7% increase from the previous year. The effective teledensity rose from 0.6% in 2003 to 0.68% in 2004, still a very low figure when compared to the sub-Saharan African average of 2.68% in 2003.

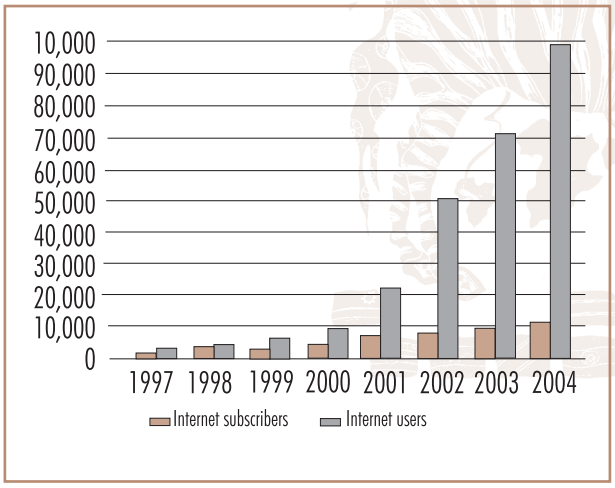
Moreover, the incumbent has been unable to meet a growing demand for fixed lines and reduce the waiting time. The pent-up demand is staggering. The registered waiting list for fixed lines jumped from 146,062 in 2003 to 156,963 in 2004. These figures represent about a third of those who are already connected, and conservative estimates of non-registered subscribers put the figure of those waiting for their first phones to well above a million. The average waiting time was 2.7 years in 2002 (ITU, 2004).

Although efforts were made to connect rural areas, particularly district towns, along with a government policy to decentralise the public administration and make services and utilities available to the rural poor, access to remote areas remains limited. Over 60% of the exchange lines and subscribers are in Addis Ababa and its surrounding towns (within about 100km radius and population of about 5%). The zones that are enjoying the highest degree of connectivity are the southern and eastern zones, where the principal cities such as Nazreth, Dire Dawa and Harar are located. There has also been considerable expansion in the northern towns of Mekele and Bahr Dar, which saw sizeable economic activity in recent years. Positively, the household subscriptions of telephone networks in cities are relatively high compared to other countries. Of the four categories of subscribers in cities and towns, residential subscription accounts for 72.5%, business 16.6%, government 8.6% and international organisations 2.3%. By contrast, the international, business and government segments contribute substantially to the incumbent's revenue.

Mobile subscriptions have been growing and are making up for the lack of adequate fixed lines in Ethiopia. However, access to mobile phones has been very limited, with a high pent-up demand. In September 2004, there were 168,223 registered subscribers waiting for their mobile phones, while the number of subscribers was 155,534, a minuscule figure compared to African countries of comparable population size, even when affordability is taken into account. For example, there were 5.8 million cellular subscribers in Egypt in 2003, where there was competition. Egypt is a country with a GDP 10 times that of Ethiopia, but compares in terms of population size. Ethiopia had only 51,000 mobile subscribers at that time, 100 times less than that of Egypt.

Given the highly successful "pay as you go" business model that suits countries like Ethiopia with low per capita incomes, and an increasing availability of cheap handsets, conservative estimates put the number of those waiting for their mobile phones to 3.5 million (about 5% of the population). The number of pre-paid subscribers grew sharply since the introduction of "pay as you go" in 2002 and has currently reached 70% of total subscribers. The incumbent has plans to raise the figure of subscribers to over one million by the end of 2005, of which most will be pre-paid (ETC, 2005).

INTERNET. The Internet market in Ethiopia is less developed, given the demand and the size of the



Source: Ethiopian Telecommunications Corporation and International Telecommunications Union

Figure 5.2: Internet Service Growth

population, mainly due to the monopoly of ISP services by the incumbent. Although Internet charges are relatively affordable compared to some other African countries, the number of subscribers remained almost constant. ETC had 10,465 subscribers in 2003, of which the majority were business and non-profit organisations. This figure grew by 14% to 12,155 in 2004 – still a small number compared to the Ethiopian population size of more than 70 million.

The quality of the Internet service leaves much to be desired. Access to the Internet has been erratic and painfully slow, often prompting users to download email and files at night. However, the introduction of a broadband Internet service in 2005 is expected to increase nationwide presence by a total of 16 points of presence (PoPs), eight of which will be in Addis Ababa. According to the incumbent, the broadband Internet network was built around two fully redundant PoPs in Addis Ababa and was expected to cater for up to 100,000 dial-up customers and 3,000 broadband users. The network has the capacity to connect over 3,000 dedicated Internet customers with links between 64Kbps and 8Mbps using asymmetric digital subscriber line (ADSL) or fixed wireless access (FWA) devices. Such improved functionality and accessibility should attract more dial-up and broadband users, but in practice the cost of access has not come down sufficiently to promote widespread use.

The number of Internet users is growing in major cities like Addis Ababa due to the increasing popularity of cyber cafés. There were about 100,000 Internet users by the end of 2004. So far, Internet penetration in rural areas is generally limited due to the poor quality of line and services and the lack of access to computers. Internet PoPs are available in major towns like Mekele, Nazreth, Bahr Dar, Awassa, Jima, Dessie, Gondar, Nekempte and Dire Dawa, where users make local phone calls to get access; however, the poor quality and limited accessibility of fixed lines makes it difficult for the majority of users to have the patience to keep on dialling. In addition to providing local dial-up service, the PoPs sell leased line connections to institutions in those towns. Nevertheless, the distribution of Internet users is still strongly skewed to the capital, that provides 94% of Internet users.

VAN AND BROADBAND INTERNET ACCESS. Value-added network services (VANS) (including paging, private voice and data connections to satellite), public telephone, mobile trunked radio and other broadband services all fall under the monopoly of the incumbent. The ETC does not keep a separate account for its VAN services and it is difficult to assess the contribution of VANS to overall revenue. However, it is evident that the sector is growing fast.

The ETC introduced its first five leased lines to consumers in 1999, followed by another five in 2000. A major change did occur in 2001, following the introduction of a dedicated digital data network (DDN) service that provided the ETC's underlying broadband infrastructure with a frame relay connection of up to 2Mbps, although the maximum speed that was available

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for subscription was 512Kbps. In addition to customers in Addis Ababa, the DDN service was then available to subscribers in nine other towns: Bahr Dar, Debre Zeit, Dire Dawa, Awassa, Mekele, Nekempt, Nazreth, Jimma and Dessie.

In 2003, under new management, the ETC issued a strategic plan with a focus on improving its broadband technology to the next-generation networks, diversifying services to meet growing demands for broadband connectivity. It launched nationwide broadband multimedia and Internet network projects that were completed in 2004 and 2005 respectively.

The broadband multimedia network, inaugurated in June 2004, comprises optical network systems with a 2.5Gbps optical ring that interconnects telecommunication services within the capital, a multi-service switching IP/ATM system that provides integrated switching for multimedia traffic in the capital and other regional towns like Bahr Dar, Mekele, Dessie, Debre, Zeit, Nazreth, Dire Dawa, Awassa and Jimma, and a broadband access service to clients through ADSL, FWA and Aironet wireless access.

The network provides virtual private network (VPN) through multi-protocol level switching and broadband Internet access. (ETC Quarterly Bulletin, August 2004)

The number of VANS subscribers has grown ever since. There were 15 broadband subscribers, ranging from major banks to federal government offices, that now rely on broadband VPNs for their financial and other mission-critical transactions. The number of ADSL subscribers in Addis Ababa had reached only 30 by September 2004 but is expected to grow as users become aware of the potential of the service and as the quality of Internet services improves with the introduction of the broadband Internet service in March 2005.

COLLECTIVE ACCESS POINTS. Despite efforts by institutions like the British Council, the United Nations Educational Scientific and Cultural Organization (UNESCO) and the Organization de la Francophonie to introduce pilot community centres throughout the country, Ethiopia has limited experience of public telecentres. Conversely, there has been a long tradition of private access points in the country. Hundreds of village telephone kiosks (souks) have been operating for over 20 years, providing telephone services "illegally" because they were contravening the policy that makes ETC the sole provider of telephone services. Kiosk phones tend to have high mark-ups on their costs with limited services.

Only with the introduction of licensed private phone service providers, now called telecentres, in 2004, were the kiosks forced to reduce their tariffs. Although expanding recently, there has been limited access to public payphones, which are far cheaper than both privately-owned telecentres and village kiosks that sell telephone services with other amenities.

Internet cyber cafés began to appear on the scene in 2000 and their numbers have been growing in the capital and spreading throughout the country. Like village kiosks, cyber cafés were originally discouraged because they were contravening the policy that makes ETC the sole provider of ICT services. The incumbent's apprehension about VoIP led to the forced closure of a number of cyber cafés in 2001 and 2002. However, they remain resilient to the challenges and continue to grow in number.

Despite the poor quality of the dial-up connection, which in itself is shared among five to six cyber café users, there has been a considerable increase in the usage of cyber cafés, particularly by visitors to Ethiopia, people with relatives outside of the country and students. Cyber café users can be grouped into:

- Regular users, who access the web for over 10 hours a month (visit cyber cafés two to four times a week);
- Occasional users, who use cyber cafés once in a while, often for less than 10 hours a month; and
- Seasonal users, who visit cyber cafés less than five times a year. These visit cyber cafés only upon specific needs (e.g. diversity visa applications).

Addis Ababa now has over 200 cyber cafés and the demand for the service has been increasing throughout the country, particularly following the requirement of the United States government to accept online forms for the popular lottery. Most of the cyber cafés have side businesses such as printing, photocopying and sale of stationery products. Moreover, the majority of cyber cafés are engaged in assisting local visitors in composing and printing Amharic texts and filling out and submitting various forms.

The fees for cyber cafés in Addis Ababa vary from Birr 0.20 to Birr 0.35 a minute, with the majority charging Birr 0.30 a minute. The per hour charge ranges between US$1.40 and US$2.40, with an average of US$2.1 an hour. This is relatively high, given the ability of many people to pay for Internet services.

Notwithstanding the public monopoly of communications services, Ethiopia has an original policy with regard to universal access. Unlike many other countries, the Ethiopian government has shown ingenuity in expanding the access to the rural areas. In 2003, the incumbent launched a broadband VSAT network for connecting 560 secondary schools, of which 370 were connected.

The government has also launched a project to connect all of its 611 districts to improve public service delivery and the flow of information between civil service institutions. Plans are underway to connect 18,000 farmers associations, each equipped with computers, telephones, Internet access and fax, through a rural connectivity project. If successful, the rural connectivity project aims to wire the whole nation and provide employment opportunities for more than 36,000 graduates of technical and vocational schools.

However, there is an overall absence of private sector participation in most of these high-profile government initiatives, including the promising rural connectivity project. The achievement of cyber cafés so far shows that the private sector could play a key role in promoting universal access to information and communication in Ethiopia. The success of these initiatives depends heavily on the participation of hundreds of entrepreneurs, including rural cooperatives.

PRICING AND AFFORDABILITY. The incumbent has not adjusted tariffs for local calls and domestic long-distance calls in the last eight years. The international long-distance tariff was revised downward in 2003 in response to increased usage of callback operators (mainly Europe and America) and competition in the long-distance market.

As a consequence, a tariff reduction of more than 50% was achieved in international calls to America and Asia. All long-distance international calls now cost the equivalent of US$1.15. This is in contrast to the previous pricing regime that charged international tariffs based on geographic regions such as Africa, Asia, America and Europe.

Ethiopia's telephone connection charges, the PSTN tariff and cellphone charges are relatively low compared to many other African countries. A three-minute local mobile call is comparable in price to that of more competitive or advanced markets like Botswana, Egypt and Ghana. The ETC also made significant downward revisions to its Internet pricing in 2002. However, income has not changed in real terms over the last 10 years, and even with the lower charges, the cost of communication services remains

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Cost of telecommunications (1 US$= Birr 8.67)	Cost of Internet bandwidth
Connection fee: Birr 305 (US$35)	Connection fee: Birr 156 (US$18)
Monthly rental: Busines: Birr 17 (US$1.96) Residential Birr 8 (US$0.92)	Monthly rental fee: Birr 69 (US$8)
Local calls: 0.2 Birr for 6 minutes (US$0.02)	Set-up/configuration fee: Birr 60 (US$7)
Monthly telephone charge for 30 hours	Internet usage fee schedule: Up to 900 minutes: US$8; 900-1,800 minutes: US$8
Rental+subscription+15% VAT: Birr 75 (US$9) Business 17+200*.2+8.55: Birr 88 (US$10)	Monthly fee for 30 hours Subscription fee +rental fee+15% VAT: Birr 140 (US$16)

Source: Ethiopian Telecommunications Corporation 2005

Figure 5.3: Internet service charges in 2005

high for the majority of Ethiopians. The GDP per capita in purchasing power parity has shown only a modest increase of about 14% over this period. 30 hours of Internet usage costs about US$25 and represents a third of a salary for schoolteachers or nurses in Ethiopia.

EMPLOYMENT AND REMUNERATION. The ETC's services are bundled and it does not have disaggregated figures for those working in the fixed line, mobile and Internet segments. The phone lines per employee (including cellphones) ratio currently stands at a spectacularly low 74 – three times lower than the international productivity rate of 200 for fixed lines. ETC had 7,900 employees in 2003 with a low level of productivity, maintaining excess and unqualified employees. An additional 1,288 employees joined the Corporation in 2004. The total number of employees was 8,619 by September 2004, of which 30% were women and 6% had a university degree. The majority of the employees are in the low remuneration category with an average salary of US$105 per month. 48% of the staff earned less than US$100 a month and another 40% earned between US$100-200 in 2004. Conversely, the contribution of the telecommunications sector to national employment has been rising, as ETC continues to outsource construction and earthmoving work to villagers throughout the country. More than 10,000 daily labourers benefit from ETC construction work annually.

POLICY DEVELOPMENT AND PROJECTIONS. Ethiopia's monopoly market structure and a policy where a sole operator provides fixed, mobile and Internet services has been a major stumbling block for innovation and widespread access to communication services. Although access to telecommunications has improved over the last two years, it trails far behind the levels of access in other countries.

The market structure for telecommunications was fundamentally shaped by two pieces of legislation: Proclamation 49/1996, which established the regulator, the Ethiopian Telecommunications Agency; and the Council of Ministers' Regulation No 10/1996, which established the ETC as a public enterprise with a monopoly over telecommunications services. In effect, this regulation just extended the monopoly of the incumbent. Ever since, the incumbent has become increasingly entrenched, steering the pace of the communication sector while the regulator has remained relatively weak.

The incumbent operates as a commercial company with its own budget and a board of directors that decides the company's strategy while at the same time holding the monopoly on all services. Following restructuring in 1996 and the withdrawal of funds from the World Bank and other donors, ETC was allowed to reinvest its net profits in infrastructure development. Its current projects are financed through revenues, except for long-term loans from the African Development Bank and the European Investment Bank.

Subsequently, with pressure from international financial institutions, there have been attempts to introduce regulated "competition". Although the investment proclamation No 116/1998 stipulates that

private investors shall be allowed to participate in telecommunications services in partnership with the government, this has not happened. A search for a strategic investor that could bring fresh capital, transfer of technical expertise, implementation experience and management skills was activated in 2002. The possibility of selling parts of the ETC to private partners was then explored, with a consulting firm, PriceWaterhouseCoopers, undertaking audits of ETC assets. An international tender calling for private participation in the telecommunication sector followed.

However, the selling-off of shares of the incumbent was called off, partly due to uncertainties as to how to achieve strategic partnership and the government's apprehension about the impact of telecommunications liberalisation in a rapidly changing global environment. The lowered appetite for global investments in telecoms contributed to the reversal. Government instead resorted to overhauling the management of the ETC and adopted a "wait and see" approach rather than pursuing the strategic partnership route.

Some progress has been made since the overhaul of the ETC management in 2003. The introduction of a broadband multimedia and Internet network that connects secondary schools and remote districts using VSATs, the launch of graduate schools on ICTs and the nationwide rollout of mobile services are among the recent achievements. Ambitious plans are under way to roll out 4,000km of fibre optic backbone infrastructure to connect up to 250,000 fixed line and 625,000 cellular subscribers and to link more than 3,000 remote villages using a combination of fixed and wireless technologies. The incumbent has also plans to raise the current number of VANS users from less than 20 to 220 and enlist 100,000 Internet subscribers to access its broadband multimedia and Internet services, inaugurated in March 2005.

Experience suggests that despite increasing investment, the red tape and bureaucracy in implementing projects, lack of incentives and a lack of coordination between various ETC departments and government institutions makes these projections rather ambitious.

Moreover, the incumbent needs a sustained investment to roll out next-generation networks and to improve ICT infrastructure to a level that meets the growing demands. Notwithstanding its growing profits and the introduction of a multimedia and broadband network, the incumbent is unlikely to be able to attract more finances to roll out infrastructure, introduce new services and improve its technical edge without exposure to new skills through gradual liberalisation of the sector. ETC's reputation for low levels of innovation and poor quality of services will not go away without aggressive exposure to new technologies, management and marketing skills. This can only be achieved by changing to a competitive market.

However, despite pressures from international financial institutions to open up at least some value-added services, such as Internet service provision, to private operators, the unyielding monopoly regime remains strong in Ethiopia. Close observation shows it is unlikely that liberalisation will follow the current management overhaul in the short term. Policy-makers have been cautious, and there are no incentives to pursue privatisation:

- The ETC is operating at a profit and reinvesting its revenues in infrastructure development. Investment has skyrocketed recently from US$29.1 million in 2002 to US$500 million plus in 2005.
- There are general concerns about the consequences of liberalisation on job security of ETC staff.
- The domestic private sector that would have provided an alternative avenue for telecoms service

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provision has little or no experience in telecommunications investment and is unlikely to provide the investment capital required.

- The equity market that would stimulate financing and competition is absent, and it may take sometime to create one.
- Some projects drawn up by the incumbent, such as the rural connectivity projects, are proving effective in promoting universal access.
- There is a general feeling by the incumbent that it is doing a great job, therefore promotion of competition is unnecessary.

Moreover, the government continues to argue that liberalisation will not result in positive changes, due to the profit motives of the multinational companies interested in the telecoms market. There is growing anxiety about whether transnational communications corporations will be sensitive to citizens' needs, particularly in deploying communications to the rural areas where it is needed most. The overall policy atmosphere is now focused on promoting the expansion of rural communications through a rural communication project (RCP), while improving the internal capacity of the incumbent to deliver both Internet-enabled services and broadband infrastructure at all levels.

The weak regulatory framework has also contributed to the cautious stance adopted by the government. A successful transition from monopolistic to competitive market often requires bold regulatory interventions that are currently absent in Ethiopia. Without good regulations, some argue that a policy process can hardly foster genuine competition and investment; in fact, it may lead to economic opportunities for corruption or a private monopoly that may not have linkages to the broader national development goals. Others argue that the lack of independence by the regulator would make it difficult for it to develop the capacity to foster access by combining market efficiency and public interest objectives.

The weakness of the regulator has been compounded by a number of institutions competing for leadership in the ICT sector. These include the Ethiopian Science and Technology Commission, that has been responsible for the development of ICT policy in collaboration with donor agencies like the United Nations since 1999; the newly-established Ethiopian Information and Communication Technology Development Agency, that focuses mainly on implementation of ICT projects; the incumbent ETC, with stakes in all ICT projects, including rolling out communication to schools; and the Ethiopian Broadcasting Authority, that has parallel duties with the Ethiopian Telecommunications Agency in the broadcasting sector.

Building the capacity of the regulator and merging different institutions competing for ICT policy and programmes would help to manage convergence, as seen from experiences in multi-sector regulation around the world. This would not only boost the effectiveness and cost benefit of a single entity, but may also improve the independence of the regulatory body and the coordination of policies and programmes at a national level. Approaching the sector from a position of convergence would also strengthen the government's capacity to formulate and oversee broad-based ICT policies and programmes that make ICTs truly accessible to the poor.

AREAS FOR STATE INTERVENTION. The potential for telecommunications development in Ethiopia is high because of the pent-up demand and the current high costs and poor quality services. Demand for mobile and fixed phone lines is high. At least 20% of households can

potentially own both fixed and mobile telephony. While current efforts by the incumbent are commendable, there is still a large gap to achieve a minimum level of ICT access to participate in the information society. This implies a need for a rollout of more than three million fixed lines and another four to five million mobile lines within a couple of years. This undoubtedly requires investment and advanced skills for next-generation networks.

The government is committed to investing in the communications sector. However, experience shows that public capital alone may not sustain infrastructure development in the longer term. The weak implementation capacity of the incumbent so far indicates that even if the resources were available, it would not be able to absorb and execute projects that meet the growing demand and the introduction of innovative technologies in time. Observation shows Ethiopia lags three to five years behind other countries in introducing innovations to the ICT sector. The red tape and limited innovation in pricing and marketing means public resources could be wasted if users do not get the services when needed due to high costs and slow deployment.

Quick progress in the telecommunications sector often demands technical capacity that is difficult to build overnight. The ETC has set up a graduate school on ICT that aims to train students in advanced telecommunication engineering, IT and telecommunications business administration, which would ultimately contribute to the skills pool in this dynamic area. The graduate school covers subjects such as mobile communication technology, computer networks and security, software technology, data management, multimedia data management, Internet and web-based services, and has an ambition to become a centre of excellence for the telecoms industry at national and continental level. Although a graduate school is a good step forward in improving the level of telecommunications skills, observation shows that the new generation ICT skills require direct hands-on experience of cutting edge technologies, improvisation, learning by doing and access to industry insights that can only be attained either through partnership with foreign telecommunications companies or via competition. Progress in the cellular market and wireless networks has already shown that new and smaller companies that use cheaper next-generation networks perform better than the incumbents, who struggle with a hybrid of old and modern technologies.

In effect, the principal economic issue facing the Ethiopian ICT sector is not a lack of commitment, but rather one of efficiency and effectiveness. The government's rejoinder to this requirement is improving the capacity of ETC's top management. Although some effectiveness is expected through a management fix in the short and medium term, historical trends show that a monopoly is inherently inefficient and self-congratulatory, rather than promoting the advancement of the communications sector.

To sustain the current level of investment in infrastructure, policy-makers should pursue a mix of strategies that actively involve the private sector and promote transparent and predictable regulation. It is important that the government considers a gradual introduction of competition in the telecommunication sector to improve ETC's effectiveness and to promote the growth of domestic ICT industry. Experiences of other countries suggest that although privatisation or transferring telecoms from the public to private hands often creates incentives for efficient performances, better results are achieved by increasing competition outright. This suggests that Ethiopia will benefit far more through competition than privatisation of the incumbent, which is already operating at a profit.

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A phased introduction of competition, starting with value-added services like the Internet, private voice and data connections to satellite and content provision, will not only provide cutting-edge technologies and better access to users, but will also improve ETC's competitiveness and service quality, particularly in the most profitable and legitimate areas of monopoly such as bandwidth wholesale and voice services. This will leave time-consuming marketing and customer-care activities such as Internet service provision to the private sector.

This would help the incumbent to adopt a competitive culture. The gradual introduction of competition would also help the government to experiment with various options that could increase value for the people. It would equip the regulator to be able to deal with emerging regulatory issues.

One area where experimenting with private participation becomes useful will be in the delivery of rural communication services. The private sector could play a key role in realising the rural connectivity project developed by the incumbent. The involvement of rural cooperatives and entrepreneurs in the delivery of rural communication would not only relieve the incumbent from managing large-scale and complex distributed projects, but also create opportunities for the regulators to play a key role in licensing and regulating service providers and in carrying out research on cost, infrastructure and technology needs and capacity issues. In short, the participation of the private sector in the rural communications project would enable the regulator to regulate.

The process would unleash creativity in financing rural communications using the popular reverse auction method, in adopting various models including shared access facilities such as telecentres in schools, libraries and clinics, and in utilising different technologies to provide services to diverse rural communities in Ethiopia. This would not only create employment opportunities, but could also have a spillover effect on the development of applications that meet local needs.

In addition, it is important for policy-makers to consider:

- Unbundling the communications market into fixed, mobile and Internet services;
- Granting more licences to the private sector in downstream services such as the public call centres, payphones, messaging services and cyber cafés so as to increase ETC revenue and government tax;
- Granting of licences for ISPs that buy and resell bandwidth, with other value-added services such as content development and network training. The private sector will undoubtedly introduce innovative ideas for providing affordable Internet services;
- Licensing of other VANS such as paging, installation of customer premises equipment and block wiring, private voice and data connections to satellite, trunk radio, website development, domain name reselling, web design and hosting, etc.; and
- Allowing the incumbent to attract the necessary capital, skills and technology through public and private partnerships.

It should be noted that for a gradual introduction of competition to meet pent-up demand and drive down prices, the government and society at large requires an enabling environment in which the private sector can operate effectively. This includes putting in place transparent and efficient regulatory frameworks and robust financial systems and reducing other barriers to competition, including the reduction of bureaucracy, speeding up licensing procedures and establishing and implementing efficient customs clearance procedures.

Above all, improvement in the telecommunications environment in Ethiopia cannot be realised without

revamping the regulatory framework. This demands building the capacity of the regulator to enforce good quality service, maintain transparency, protect consumers, promote an efficient use of resources such as radio spectrum and numbers, and provide guidelines for fair tariffs, interconnection and deployment of next-generation networks. For the regulator to prepare itself for the network economy, it should become independent both financially and in its decision-making process. It should be able to attract highly qualified staff in this complex field. Advanced regulatory training and education should be included in the newly-formed graduate school for ICT.

The government may also have to seriously consider merging of its ICT development agency and the telecommunications and broadcasting regulators, in line with global regulatory convergence trends. This would reduce the duplication of efforts, resources and expertise in this specialised field. Approaching the ICT sector from a position of convergence would strengthen government's capacity to formulate and oversee broad-based ICT policies and make them accessible to the poor by mixing available tools and technologies.

National household and individual ICT access and usage survey

The overall ICT sector performance outlined above shows that policy-makers and the incumbent have intensified investment in the telecommunications sector to increase the penetration of telephones and other communications services to meet government's commitments to decentralise public services to the district (Woreda) and village (Kebele) levels. The success of these efforts can only be determined by measuring their impact on users. Ethiopia has virtually no initiatives to study communications consumers. With a monopoly provider and no alternative providers of services to consumers, market studies are not conducted, nor are user patterns analysed to devise infrastructure rollout plans or establish universal access strategies.

The e-usage and access survey and focus group study were aimed at filling this gap in Ethiopia. The e-usage index and access survey was launched in May 2004 through the Unity University College's collaboration with the Research ICT Africa network. This was followed up with focus groups conducted in August 2005. The purpose of the e-usage and access survey was to analyse access, demand and ICT usage patterns in Ethiopia in response to services provided by ETC. The aim was to survey users and consumers in urban and rural settings with the use of reliable methodology, sampling techniques and comprehensive questionnaires to gauge the success of various ICT initiatives. The survey was the first to collect data on usage patterns of telecommunications services in Ethiopia. The aim of the focus group study was to gather further information to enrich and address gaps in the previous survey and gain more insight into users strategies in coping with scarcity of access and cost of services.

Methodology and sampling. As described in Chapter 1 and Appendix 1, the quantitative survey used a methodology developed by the World Health Organization for their Expanded Programme on Immunisation (EPI) and is based on cluster surveying. The survey in Ethiopia used the EPI technique and covered three different geographic areas (capital city, urban and rural areas) that formed a primary sampling unit. This was then broken down into 60 enumeration areas that served as secondary sampling unit from which 30 households were selected randomly. The sample was distributed between these different geographic areas – major town (capital), 59%; other urban, 31%; and rural areas, 10%. This reflects the

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approximate distribution of communications services in Ethiopia. More than 60% of fixed telephone lines are concentrated in the capital and its environs.

The other urban towns surveyed included Assosa, Jijiga, Dire Dawa, Harar, Mekele and Nazreth. These towns are the capitals of regional governments. Two farmers' associations outside Addis Ababa (Nefas Silk and Akaki) and close to the towns of Assosa, Mekele, Nazreth and Harar formed the rural sample.

Of the 1,800 target samples, 1,793 households, covering 8,888 individuals, were interviewed successfully. This corresponds to a household size of 4.9 persons, slightly higher than the national average of 4.6 as per the national census of 1994.

The survey focused on gathering data on demand for communications services, including phones, public access, email and the Internet. The nine-page questionnaire, that was translated into Amharic, comprised 10 modules from household data to communications usage.

The household survey took place between July and September 2004 and involved 90 individuals who helped the researcher to gather data at the household level. The distance between survey areas created logistical challenges. In some cases, there was a lack of cooperation from government officials in allowing the enumerators to sketch maps of enumeration areas and conduct the household surveys. A substantial amount of time was lost in negotiating permission with public officials to conduct the study. The bureaucratic hurdles that had to be overcome points to a lack of a research culture and limited understanding of the value of research at all levels of government in Ethiopia.

While the quantitative survey was important in providing data on access and the patterns of use of different communication technologies, it had limitations in giving insights as how communication users adopt different technologies and cope with cost and access on day-to-day basis. A qualitative analysis of usage was important to gain better insights into individual strategies for coping with costs and lack of access to communications.

FOCUS GROUPS. A follow-up focus group study was conducted in August 2005. The sample of participants was drawn from a sample of enumeration areas that was used for the 2004 quantitative survey. The enumeration areas that were covered in the household survey in 2004 were first grouped under their respective sub-cities and samples of the enumeration areas were drawn randomly. Six of the focus groups were held in Addis Ababa and two in Dire Dawa. Four of the focus groups in Addis Ababa and the two focus groups in Dire Dawa involved both urban and rural residents. An equal number of women and men were involved in the focus groups. Participants ranged from their mid-20s to their late 40s. The distribution of the focus groups is as follows:

- all-youth focus group (one group from Addis Ababa)
- all-women focus group (from the suburbs of Addis Ababa)
- an all-professional and male focus group (one group from Addis Ababa)
- an all-single people focus group from Addis Ababa
- randomly selected focus group (two groups from Addis Ababa and two groups from Dire Dawa)

Occupation-wise, participants of the focus groups included employees of government and non-governmental organisations, those working in the informal sector and those without jobs. The groups were also mixed in terms of their usage of and access to a range of communication technologies. The majority of the participants were fixed line and public telephone users. Annex I provides a matrix of the participants in the focus groups.

The focus group discussions covered similar issues that were raised in the quantitative survey – use of private and fixed phones at home and office, usage of public phones, mobile phones and the Internet and the pattern of communications expenditure. The main aims of the focus group were to gain insight into the reasons for and the dynamics that influence decisions in adopting specific communications technologies, and to review the usage patterns of communications technologies from the perspectives of the individuals and groups. The focus group discussions were also meant to validate the results of the household survey conducted in 2004.

Focus group interviews are cheap and quick to conduct and create an atmosphere in which interaction between participants leads to relatively spontaneous responses and a high level of involvement. This leads to better insight of the issues under consideration. While focus groups provide a platform for sharing a pool of experiences amongst participants, thus providing a consensus on the most typical experiences and shared opinions, there is no certainty that individual behaviour mirrors group self-reported behaviour and the data generated cannot be regarded as a representative in a statistical sense. Nevertheless, qualitative surveys have become more important to gain insight into individual and group experience of communication services that could not be captured through a predefined quantitative questionnaire.

The focus group interviews in Ethiopia took place in August 2005 amid high political tension following the May 2005 election. Although the government lifted the ban on demonstrations and public meetings imposed in Addis Ababa soon before the start of the study, people were reluctant to take part in an "unknown" study. Getting their consent to participate required a lot of persuasion that the issues were exclusively about ICTs and thus "non-political".

All the same, there were participants who asked for further clarification about the profile of the moderator and their assistants, and whether what they would say would be broadcast. Taking pictures and recording voices, questions regarding the kind of messages they used to exchange through SMS, and whether they use VoIP were some of the sensitive issues that made some focus groups participants uncomfortable to engage in the interaction fully. This also reflects a lack of exposure to market research and fear of public expression.

Demographics of the household survey.

Geographic and age distribution. The household survey showed that the number of female household members is slightly lower than their male counterparts. This is consistent with national statistics (49.8% female, 51.2% male). The age profile was also in line with the national statistical data of 2003. 51% of those covered in the sample were under 19, comparable to the national figure of 53%. Individuals between the ages of 15-54,

Figure 5.4: Demographics

Age	%
<10	24.5
10 to 14	14.2
15 to 19	12.4
20 to 24	10.5
25 to 29	10.2
30 to 34	5.5
35 to 39	6.7
40 to 44	4.4
45 to 49	3.2
50 to 54	3.4
55 to 59	1.3
60 to 64	1.8
65 to 69	0.8
70 to 74	0.5
75 to 79	0.3
>79	1.2
Total	100

Income	%
< 100 Birr	51.4
101-200	23.8
201-300	8.2
301-400	6.3
401-500	3.5
501-600	2.7
601-700	0.8
>700	3.3
Total	100

Location	%
Capital	59
Urban	31
Rural	10
Total	100

Gender	%
Male	52
Female	48
Total	100

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and likely to use most of the communications services, represented 55.4% of the sample. Those between 15 and 29 represented about a third of the sample – a figure consistent with the national average.

About one-fifth of those responded to the survey were household heads and 17.2% were their spouses or partners. Close to three-fifths were children of the head and about 1.4% were grandchildren. Individuals with low levels of education and income reside in rural areas, although, according to the surveyors, urban poverty was more acute than expected. This is not surprising, given a steady migration of displaced people to urban areas over the last decade. The rise in urban poverty has a significant impact on the usage patterns of communications services.

About one-third (31%) of the individuals surveyed were married and half (18.3%) were single. 30% attended school, in line with the national percentage. A third have never attended any form of school.

The focus group study, on the other hand, involved a few individuals and was limited to Addis Ababa and Dire Dawa. Four of the focus groups in Addis Ababa and the two focus groups in Dire Dawa involved both urban and rural residents. One focus group was entirely women, while the other involved young people. As many women as that of men were involved in the focus groups. Participants ranged from those in their mid-20s to those in their late 40s. The groups were also stratified across different social, economic and geographic gaps – those from urban and rural areas, those with access/no access to the Internet and those with and without jobs.

EMPLOYMENT AND EDUCATION. The household survey showed that 27.2% of those who attended school have completed primary education. Interestingly, only about 1% had tertiary education, less than the national tertiary school enrolment of about 1.8%. The number of students that completed traditional (mainly religious) education was 1.8%. This was found to be higher than those that completed pre-school (1.4%) and those with a diploma from tertiary institutions. About 40% of those surveyed indicated that they have difficulty in reading a newspaper, of which 32.7% cannot read at all. This is consistent with the view that illiteracy rates in Ethiopia are on the rise, following a decline in early 1980s through a compulsory literacy campaign. The national literacy rate was 42.7% in 2003.

A fraction of those surveyed (2.2%) were employed by non-family members on a full-time basis. Those employed by a family member represented about 4.1%. The majority were self-employed (12.6%). In fact, a quarter of those surveyed were self-employed (part time and full time). Agriculture and informal trade were cited as the most important sectors of employment. This signifies a predominantly informal sector employment in Ethiopia, which in turn has a substantial implication for the type of communication services used. People involved in this sector often prefer pre-paid mobile phones compared to other communication options.

The informal nature of the economy was also confirmed through income patterns. About a quarter (23%) of those surveyed earned less than US$13 (Birr 100) a month and those that earned over a US$100 (Birr 865) represented only about 1.14%. Even though some of those surveyed were reluctant to reveal their real incomes, the findings demonstrated low levels of earnings that do not correspond to the current pricing of communication services, particularly for accessing advanced services like the Internet.

This is not surprising, given the predominantly informal economy. The capacity to pay for communication services was the main issue that was raised during the focus group interviews. The participants indicated that they use a number of strategies to cope with the cost of communications,

including frequent use of public or office phones, relying on neighbours to transmit messages and locking phones to cut down unsolicited calls.

The ability to pay is one of the main factors behind low levels of Internet penetration and the difficulty in attracting customers, as those who can afford it have already connected. Only 29 individuals (0.1%) of those surveyed had email accounts. 50% of these had free email accounts such as Yahoo, 25% of those 29 individuals reported personal subscriptions to the Internet and the remaining had access to email at their workplaces.

FIXED LINE PENETRATION AND USAGE. There were 484,368 fixed phones in Ethiopia in 2004. This represented a teledensity of 0.68% and a household penetration of about 2.2%. Evidently, household penetration is generally skewed towards urban areas. The capital, Addis Ababa, and Assosa have the highest household penetration of fixed telephone lines. Figure 5.6 shows estimated household penetration of the towns surveyed based on national statistics and data on the breakdown between households and business subscription from the ETC.

The survey found a national household penetration of 5.2% that is comparable to Assosa and slightly higher than that of Jijiga, but higher than that reported by the incumbent. Household penetration of fixed phones in urban areas like Addis Ababa could actually be smaller than figures in Figure 5.6. Most houses in urban areas are rented out to families that do not have access to the household phones. Rentals are often informal and the tenants do not have legal documents to apply for communication services. The number of rural fixed phones is generally insignificant. Wherever available, rural phone lines belong to established businesses or public institutions rather than households. Consequently, no household phones were reported in rural areas covered in the survey.

The scarcity of fixed lines, the difficulty in getting hold of them when needed and the cost of access were described as the main challenges facing communications users in Addis Ababa and Dire Dawa.

According to a 30-year-old woman who participated in the focus group discussions: "My family could not afford to subscribe for a fixed line before, and besides since we all work outside the house, we didn't find it important. Later, as we realised the inconvenience of receiving calls and messages from neighbour's house, we tried to apply, but we were told there is no fixed line in our neighbourhood."

Similarly the household survey showed that Internet penetration was minuscule, a situation confirmed by the focus groups. Only 0.14% of those surveyed indicated that they had Internet access at homes or get access in someone else's home. There were 12,155 Internet subscribers in September 2004, that gives an estimated household penetration of 0.04%. It is estimated that there are 100,000 Internet users, which gives a penetration of about 1.4%, that is higher than the finding of the survey. Even so, the current Internet penetration is one of the lowest in the world.

As expected, access to mobile phones was slightly higher than that of the Internet. The reported household

Figure 5.5: Estimated household penetration of fixed lines

Town	Number of telephones	Teledensity	Population July 2004	HH Size	Household penetration
Addis Ababa	264,754	9.4	2,805,000	5.1	34%
Asossa	1,556	1.6	97,109	4.5	5%
Dire Dawa	11,772	4.5	258,906	4.4	14%
Harar	6,742	3.6	185,000	4.3	11%
Jijiga	2,960	0.9	328,465	6.6	4%
Mekele	11,162	7.2	154,698	4.3	22%
Nazreth	12,783	3.2	390,574	4.4	10%

Source: Ethiopian Telecommunications Corporation Annual Statistical Bulletin, 2004 and Statistical Abstracts 2004.

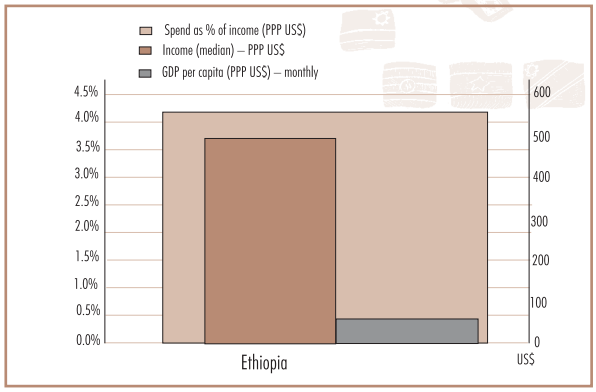
penetration of mobile phones was 0.4%, of which about 71% was pre-paid and 27% contract (post-paid) services. The remaining mobile phones are work-related. This reflects the national distribution between contract and pre-paid mobile phones. According to the participants in the focus groups, the shortage of mobile phones has created a secondary market where SIM card owners sell or rent them at higher prices if they cannot afford to continue the service or want to make some profit.

FIXED TELECOMMUNICATIONS. The e-usage and access household survey found that the average monthly subscriptions and rental charges for fixed telephone lines is Birr 67 (US$8), about 50% of the average revenue per user (ARPU) of Birr 144 (US$16) reported by the incumbent. The median spend on fixed telephone lines is Birr 25 and the median income Birr 600. The median spend represents 4.17% of the GDP per capita adjusted for purchasing power parities (PPP).

Figure 5.7 shows a breakdown of spending on telecommunications services.

The average household expenditure figure of Birr 67 is not entirely surprising as residential (household) phones represent only a marginal part of the incumbent revenues, compared to that from non-governmental organisations and private sector subscribers. The data shows that having at least a primary education was linked to owning phones. Households with phones tend to have relatively well-educated family members.

Figure 5.6: Communications spend in Ethiopia



The household survey showed that heads of the family and their spouses, who pay for the services, use the household phones. Children are also allowed to use phones when appropriate. This implies that if a phone is available at a household level, four to five people will make use of that phone. The household survey showed that current subscribers are anxious about excessive bills. The majority did not want to apply for additional phone lines, even if the prices dropped. This suggests the ability to pay for additional phones is limited. A 50% decrease in current pricing was considered reasonable by most of the respondents.

Those without phones said that it takes two to four years to get hold of a household phone, and pricing is not their key consideration because they do not have one. This does not only correlate with the ITU figure of a waiting time of 2.7 years in 2003, but also indicates the inability of the incumbent to deliver fixed telephone lines to meet pent-up demand.

The focus group discussions confirmed this and provided further insights into a high degree of interdependence in sharing communication services beyond the household levels. All those who participated in the focus group interviews said that cost of communications is the most important factor in accessing communications services. Focus group participants who do not have access to a fixed phone line said their lack of ownership could be attributed to a number of factors. Key among these is affordability, relevance of a phone compared to other priorities such as food, scarcity of fixed phones and home ownership. Ownership of a house is necessary to secure a fixed telephone line. The tenants of a private property or sub-tenants of Kebele (lower level of administration) houses are not allowed to own a fixed line. However, the rules

are not observed entirely, and in one suburb a Kebele sub-tenant was able to secure a wireless phone.

The focus group discussions also showed that almost all participants have some access to a fixed telephone through their neighbours or someone close to their houses or through public phones. Their access to neighbours' phones is normally limited to receiving messages or calls. It is not uncommon for persons with fixed private phones to let neighbours use their phones to make calls under special circumstances, for example in the case of accidents or emergencies, in the evening when it may be unsafe to use public phones, or when people do not have the money to make calls from public phones. The level of solidarity and interdependence is breathtaking. A fixed phone is often shared between up to 10 people in a neighbourhood.

However, the relationship between fixed telephone owners and their neighbours is not without problems. Those who do not own fixed phones complain of neighbours failing to inform them when they had messages, or falsely informing the caller that they are not around. They also indicated the inconvenience of communicating using other people's fixed private phones, as it provides little privacy. The groups also talked about being maltreated by owners or other members of the household when they used the phone. This is one of the main reasons to apply for their own fixed private telephone. A 30-year-old man said: "I have a sister who lives in the Gulf States. My mother used to find it very discomforting to talk about personal matters with my sister using a neighbour's telephone. Now that we have our own phone at home, she talks to anyone freely."

The complaint goes both ways. Owners of private fixed phones who let their neighbours have access to receiving calls complained that certain neighbours would talk for long periods (making it difficult for them to use the phone), or get calls during odd hours (late evenings), or they had to make frequent trips (in the case of incessant calls) to the neighbour's place, causing disruption to their day-to-day lives. Landlords are often unwilling to allow their tenants to use the phones for the same reasons. In some cases, the relationship between those who own phones and those who would like to get access to them becomes edgy.

Nevertheless, most people who do not have phones feel grateful that their neighbours call them to receive messages every now and then. Sharing of phones is part of a wider social interaction and interdependence in Ethiopia that goes beyond communications.

Another interesting practice revealed during the focus group discussions was locking the phones, with handsets accessible to receive calls only. Electrical and physical methods are used to lock the phones, but physical methods are widespread. Locking phones is adopted as a major budgeting strategy, since it stops unauthorised users from making calls. The list of unwelcome users includes children, family members who do not pay the bill and neighbours. The person who pays the phone bill is often the one that decides who should have access to the phone key, who should use the phone, and for what purposes.

Locking fixed home phones was often a measure taken after a relatively exorbitant monthly bill. If the bill remains high with more than one key, then the other keys are taken away.

A 40-year-old man said: "My sister and I used to have the keys for the phone. At one time, the bill was very high, and since she had a knack of forgetting to use the key, we agreed I should keep both keys and she could ask for the keys whenever she wants to make a call."

Respondents who own phones say they use their home phones mostly for receiving calls, due to exorbitant bills and the unpredictable billing system.

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The ETC requires individuals to come to its pay station at a per-determined time to pay their bills every month. Sometimes customers arrive and are told their bill is not ready, or they are surprised by the amount of the bill. As a result, those who own phones prefer to make calls from public phones, where they can budget and do not have to worry about the bill at the end of the month. Since few complaints about overcharging get resolved, using public phones remains a preferred option to cut costs.

OFFICE PHONES. The quantitative survey showed that only 2.7% of those surveyed had access to telephones at their workplace. The majority of the focus group members do not have access to office phones. It is evident that professionals have more access to phones than rank and file workers, and those employed in public institutions and NGOs have more access than those employed in private institutions.

Employees of NGOs say access to office phones is not restricted if they do not make international calls. In the case of those working for government institutions, there are rules that office calls should not exceed a certain amount. The reported amount varies between Birr 50 (US$5.7) and 250 (US$29). If the bill exceeds the set amount, the excess is deducted from the employee's monthly salary. Some of the mechanisms for reducing phone charges include locking phones to prevent others from making calls, avoiding lengthy or unnecessary calls and sometimes buzzing others so that they call back instead.

Office phones are used to communicate with families or friends about urgent matters; to make distant calls on behalf of family members or friends; or to make calls to mobile phones. In the latter two cases, participants prefer to use office phones to public phones or private phones with the intention of reducing their expenses and retaining some privacy. A few respondents said they have no problem letting friends or family members use their office phones.

The situation is different in the case of private institutions, where there is some kind of cost-sharing practice or phone usage is restricted. Sharing phone bills is a common practice if there is prior agreement. There is also high level of trust among people that they will be able to pay their debts. A 25-year-old businesswoman stated:

"I let my families use my office phone to make international calls. But when the bill comes, they have to pay their part."

On the other hand, some respondents working in big government and non-government institutions do not have access to office phones, except for receiving calls, because they are under the scrutiny of their bosses, who only let them make calls for strictly urgent matters. In the all-women focus group, participants receive calls from their families or relatives on office phones. When they call from their offices, they talk for a relatively longer period than they would have otherwise.

PUBLIC PAYPHONES. Payphones are becoming increasingly popular in Ethiopia, although their number remains small compared to the size of the population. There were 1,813 public payphones in September 2004. The majority of the customers use kiosk phones to make phone calls. Use of public payphones is the highest (21%), followed by private kiosks (17.3%) and telecentres (16.7%). About 0.2% of those surveyed indicated that they had access to cheaper phone rates through VoIP when making international calls. Although VoIP is illegal, there is a significant underground international long -distance market. The number of users of VoIP has grown dramatically, as it cuts international communication costs by a factor of four to five.

Most people walk for 30 to 60 minutes to get to public payphones, although this is changing with the

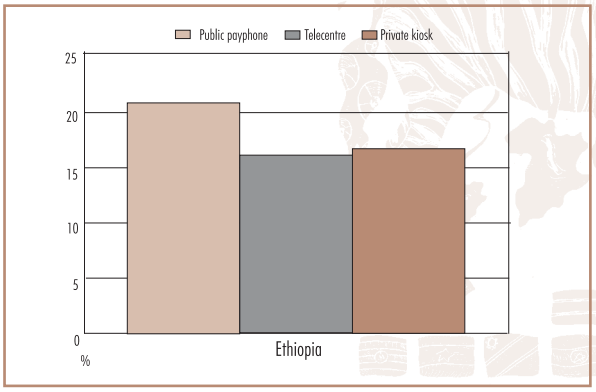


Figure 5.7: Private, telecentre and public telephone usage in last three months

introduction of more public payphones throughout the country. The median time to reach public payphones is 60 minutes and kiosk phones 45 minutes, an indication of the scarcity of public payphones compared to kiosk phones.

Rural people walk for over two hours to get to public phones. Most of these travel long distances (often over 15km) to make their calls. Private kiosks are regarded as expensive but more convenient than public payphones or telecentres. Private phones are often closer to customers. The median time to reach private kiosks is 45 minutes. Moreover, those who use private kiosk phones provide added features such as taking messages, facilitating incoming calls or "beeping".

The survey asked participants why they use public phones ahead of private kiosks and telecentres. Value for money was regarded as an important consideration when making phone calls in Ethiopia – 66% of those who use public and community phones said value for money is the most important factor, followed by 24% who consider proximity a necessity. Those who had access to VoIP indicated that they walk or take public transport for over two hours to get to where they make those international calls.

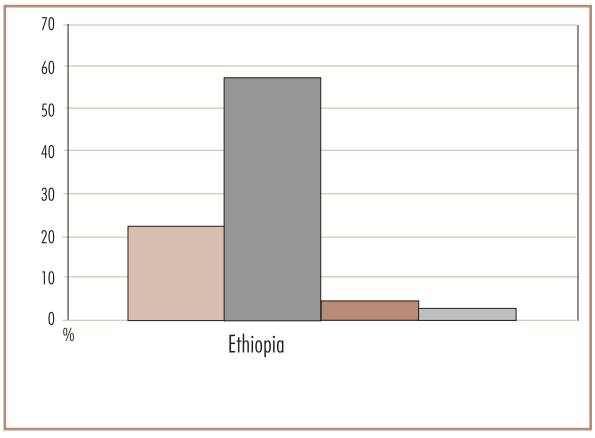
The average spend on public kiosks is Birr 5.50, a reasonable amount when one considers the number of people calling their families abroad or in one of the outer regions.

Focus group discussions showed that individuals' choice of public phones is dictated by cost considerations, distance and privacy. Perhaps due to concerns of safety of facilities or proximity to the majority of people, public payphones are installed near public institutions, or along main roads. They are rarely in residential areas. However, there are a number of kiosk phones and a few telecentres in neighbourhoods, which makes these relatively accessible compared to public payphones. Hence, individuals who make urgent calls, or who are loath to travel, prefer other privately-owned public phones over public payphones. As distance between public payphones and the caller increases, private telecentres or kiosk phones remain the only options to make calls.

Call boxes, which were recently installed by ETC and have their own call rooms/boxes, were identified by most participants as being more secure and private.

In instances when people cannot or do not want to use the ETC's call box booths (due to distance or long queues), and when there is a need for privacy, they opt to use a kiosk or a telecentre further from their homes where they can be more anonymous.

Figure 5.8: Main reason why a public phone is used more than others



In general, call boxes or telecentres are often preferred to kiosk phones, especially when making long-distance calls. Kiosks are the most expensive of all public phone systems, often three to four times that of ETC coin boxes or twice that of telecentres. Telecentres are operated by those who are licensed to provide communication services at a profit. Most telecentres are equipped with two to four lines and some offer Internet and secretarial services. Kiosks normally use a single telephone line and do not have licenses to provide communication services.

Discussants report that women are also often easy targets for taunts or complaints about the time they spend on public payphones. There is a tacit expectation that when other people are waiting, one should not use the phone for more than a certain period (three minutes). This is normally the case during the daytime, when public payphones are busy with long queues. In reality, there is a high degree of helpfulness among public payphone users. Those in the queue are glad to help their fellows with extra coins or give information on the status of the payphone. The introduction of phone cards seems to have reduced the interaction. Callers can now buy airtime from the new breed of "public phone assistants" that operate from public payphone booths.

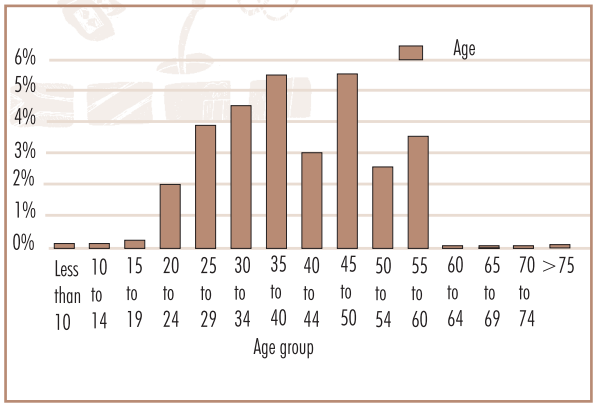
MOBILE TELEPHONY. Mobile access is scarce in Ethiopia. Those who have access to mobile phones say they own one handset and a single SIM card. 95% of those who indicated mobile ownership have said they have only one SIM card. It is a luxury to own more than one SIM card in Ethiopia. Mobile teledensity stands at a dismally low 0.22% and is mainly concentrated in the major towns. The survey indicated a slightly higher penetration rate of 0.3%, of which 71% had pre-paid subscriptions, 27% contract subscriptions and the remaining having subscriptions at their workplaces. However, the number of post-paid subscribers is relatively higher than many countries in Africa because pre-paid subscription was only introduced in 2003 and is relatively new in Ethiopia. Originally, only contract subscriptions were allowed. However, the proportion of pre-paid services is expected to increase.

The ARPU for pre-paid users is Birr 70 (US$8) while that of contract cellular subscribers is Birr 216 (US$25). The average revenue of both pre-paid and contract cellphones is Birr 143 (US$16). This is in line with the ARPU of Birr 135 (US$15) reported by the incumbent in 2004.

The household survey found that the nature of employment has a significant impact on mobile ownership. A third of those who reported mobile ownership were fully employed by a non-family member. Another one-third was self-employed all year. 8.5% were students, 5.1% were housewives and another 5.1% were unemployed. The most common occupation of those who owned mobile phones was formal and informal trading. A further breakdown of employment shows that 30.4% were employed in private service sector, while 21.4 were working as civil servants in government offices.

Those working for NGOs represented 5.4%, an indication that a substantial number of individuals that own mobile phones are employed by international organisations. This is consistent with overall

Figure 5.9: Age distribution of mobile ownership



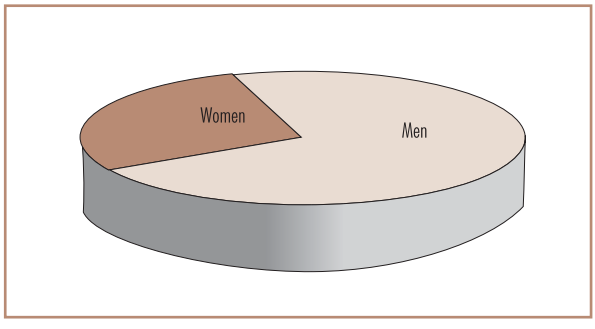
employment patterns in Addis Ababa. The city hosts the African Union, the Economic Commission for Africa, over a hundred embassies, a number of NGOs and international organisations. Individuals working in these organisations often represent the high-income middle-class strata that can afford to access communication services (i.e. mobile, fixed and Internet).

The frequency of use also increases with the level of education. Those who reported mobile ownership have either secondary and tertiary education; the higher the education, the better the ownership facts. 52% of those who have cellphones have college education. Cellphone distribution also tallies with income patterns and age: it is high for those between 21-54 years, and ownership of a pre-paid service begins at the age of 16.

The household survey showed significant gender gaps in the use of mobile phones and email that can be attributed to the economic and educational status of women. Three-quarters of mobile users are men, as are 70% of those with access to email. This does not only indicate historical discrimination against women but also business and livelihood-related issues, which tend to further reflect gender inequalities. Men are the bread-winners who have more employment opportunities.

Household heads or their spouses own 75% of mobiles, while the rest belong to older children. Married people tend to own more mobile phones than singles, although this may change as availability of pre-paid cellphones improves. Of those who reported access to mobile phones, 40% were single and 60% married. This is in contrast to the national statistics, where there is only a slight difference between the number of married and single people (48% married and 43% single). Married people also own more contract phones.

Figure 5.10: Gender disaggregation of mobile phone ownership



Given the scarcity of mobile phones, 40% of mobile owners said they are using them optimally. About 54% said that they are cost-conscious when using their mobile phones, particularly when making calls to fixed phones.

The focus group discussions provided interesting insights as to how users cope with the scarcity of mobile phones. The high cost of the handsets and high subscription fees relative to the income of the majority of the population makes mobile phones very expensive. However, cellular users have been ingenious in working around affordability challenges. The scarcity has created an innovative secondary market of SIM card rentals and used handsets.

Most of the focus groups participants who use mobile phones indicated that friends or relatives at home or abroad have covered subscription charges totally or partially, including the cost of handsets. The diaspora is the main source of handsets. In other cases, the money to buy handsets and the service is sent home. Mobile handsets are generally received as a gift by most women. Respondents also said that as far as they can tell, at least half of them have received partial or total support to secure the mobile phones.

For the majority of the population, initial handset costs and subscription fees are regarded as the major deterrent to mobile ownership. Those who do not own mobile phones also attributed their non-ownership status to the relative lack of importance of mobile phones compared to other urgent needs and priorities,

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and a long waiting list and bureaucratic hassles to secure a cellular service. Those who own fixed phones and stay at home said they do not see the immediate need for a mobile service. A 45-year-old woman said: "I don't need a mobile (phone) because I am a housewife, and I can be reached through the home phone."

Access to mobile services in Ethiopia is characterised by bureaucratic hassles and a long waiting list comprising hundreds of thousands of people. This is a major hindrance to adopting the technology, particularly by those who can afford to have mobiles but have not been able to do so. Some people who get phones often sell their rights at a profit. Registered users who cannot afford the service sell their rights through a guarantor to someone who is willing to cover both the expense of the SIM card and also pay a certain amount of fee for the right. The reported amounts range from Birr 750 to over Birr 1,000 (US$100 to $120). The reported amounts are higher in Dire Dawa, where mobile services are scarce compared to Addis Ababa. There are those who offer a use right for a certain period (extending for months) to cover the initial cost of obtaining the SIM card.

While selling SIM card rights is common in both Dire Dawa and Addis Ababa, renting SIM cards appears to be commonplace only in Addis Ababa. Individuals rent their SIM cards if they are financially constrained to use them themselves or if they think they can do without them. The rate for renting SIMs has undergone a drastic decline, and the common rate in Addis Ababa is Birr 50 per month. Some Ethiopians from the diaspora and foreigners are reported to have paid twice that amount, or more, to rent SIM cards for a short period because it is not possible to get them readily.

Although not widespread, there is also the practice of owning more than one SIM card. The reasons include the need to use different numbers, or as a means of generating income. One respondent claimed to have a friend with three SIM cards who rents out two of them, and uses the income to cover the cost of the third. This is an example of how the scarcity of mobile phones in Ethiopia has created a vibrant secondary market.

Another common practice in Addis Ababa is for individuals who have just acquired their SIM cards to keep the card for a while instead of using it, mainly because they are unable to buy the handset, or want to make optimum use of the air time that is included as part of the subscription. A popular reference to such SIM cards is "Soft net" in reference to the way they are often kept, which is being wrapped in soft paper.

However, a recent decline in the cost of handsets due to availability of second-hand handsets has improved the penetration of mobile phones throughout the country. Low income and first-time users often opt for second-hand handsets. It was also mentioned in the focus group discussions that family members exchange handsets when they buy new ones.

Even when the initial costs of getting a SIM and a handset are resolved, most people have difficulty in meeting the minimum expenses required to keep the SIM card active, reportedly Birr50 (US$7) a month. Some participants are aware of individuals whose mobiles' become inactive because they could not afford to cover the periodic expenses.

According to one teacher: "I had to save, and minimise my other expenses, such as hanging out with friends, and walking on foot instead of using other means of transport. I still maintain this habit since I find covering the expense of top-up a challenge."

Mobile "beeping", or buzzing, is a popular practice in Ethiopia. Buzzing, or "miscall", as it is popularly called in Ethiopia, is the practice of dialling another user's mobile phone and letting it ring but hanging up

before the call is answered, with the primary aim of prompting the person to call back. More incoming buzz to mobile phones was reported than outgoing beeps through the household survey. Most of the beeps are from fixed phones (often from a kiosk) to mobile phones, although mobile-to-mobile beeps are becoming increasingly common. This not only reflects that those who own mobile phones have higher incomes, but also indicate that "beeping" makes it easier for those without phones to get in touch with family and friends. The success of "miscall" suggests the majority of calls are returned.

From the focus group discussions, it was apparent that there is a pattern to the kind of relationship between those who buzz and are buzzed, which also determines to a great extent its success. Those who buzz said that they often buzz friends or family members (particularly to those who are financially better off), and to persons with whom there is an understanding that they wanted to be communicated with. Mobile users say they often respond to buzzing people they know, and may not do so otherwise. People buzz to mobile users from all types of phones, except for the public payphones that do not accept return calls.

All the same, buzzing is preferred to making a proper call to avoid expenses, or when mobile users run out of airtime. Communicating through buzzing has also been reported among close friends, whereby a message is communicated to the receiver depending on the number of rings: buzzing only once is meant to say hi, and buzzing more than once means it is something important and they should call back.

One young man said: "Buzzing my girlfriend twice is my way of telling her that I am home."

The household survey and focus group discussion reported usage of SMS before it was closed down in June 2005. Originally SMS was not part of the package of mobile subscriptions. A separate arrangement and additional fee was required to subscribe to the SMS service. SMS usage picked up as soon as it became part of the cellular subscription package. Focus group members reported that the most popular use of SMS was for greetings to friends and families during holidays and special occasions. SMS was preferable to voice because it was cheaper and more convenient. People also used SMS to send jokes and pictures, and to communicate urgent and personal matters from public places.

There was extensive use of SMS during the campaign for the 2005 elections. SMS was used as a channel by members of both the ruling and opposition parties and supporters to step up their election campaigns. During the unrest after the elections, SMS was used as popular means for sharing information among friends and relatives living in different parts of the country about developments in their respective areas. Some of the messages included calls for demonstrations, and boycotting certain acts. According to one participant: "I participated in a demonstration because I was moved by the text messages I used to receive on my mobile phone."

It was also during this period that the use and benefits of SMS was most recognised among mobile users. One Internet café was registering customers to provide job vacancy notification services through SMS for Birr 20. Such and other optimistic plans regarding SMS were shortlived, as the ETC stopped providing the service, citing expansion-related problems.

INTERNET. Although access to fixed and mobile lines represents a key step in Ethiopia's ICT development, there has been a realisation that access to the Internet is fundamental in achieving development goals. However, in contrast to widespread use of phones, the survey showed a very low household Internet penetration of 0.14%.

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Access to the Internet is partly hampered by lack of computers at household levels but is also due to limited telephone penetration. Only 2.2% of those surveyed said that a member of the household had access to computers. The principal point of access of the Internet was the workplace, followed by cyber cafés. Of those who indicated Internet connections, 55% said that they had access at their workplace, while 22% were able to access to the Internet through cyber cafés. Internet subscribers revealed that their average spend on the Internet is Birr 222 (US$26) per month, with a minimum of Birr 50 and maximum of Birr 500 (US$58). This was in line with the national average expenditure of Birr 204 (US$25) reported by the ETC.

In addition to a gender bias towards men, there are more single email users than married people. This suggests that young people use the Internet the most. Over 60% of those who indicated that they have access to email were between 21-29. There is a virtual absence of children under 15 from the data. Apart from the historical economic and social discrimination against them, women are less likely to travel to cyber cafés crowded with men to access email. However, the situation is beginning to change as more women begin to discover the Internet and manage cyber cafés. Cyber cafés tend to be managed more by women than men; an incentive for more women to get access to the Internet.

Level of education was found to be one of the key factors that influences use of the Internet. Tertiary education was found to be instrumental for exposure to the Internet and to the income possibilities. 80% of those with access to email have college education. This has an indirect implication for gender differences, as more men tend to attend college than women.

Over a third (35.8%) who access email are employed in the private sector while 21.4% are civil servants. College students form a large part of those with access to email. About a third (31%) attend school.

Focus group discussions confirmed similar patterns and challenges in the use of the Internet. It was evident from the discussions that email and web browsing were not the most-used services. Most participants, especially in Dire Dawa, understood the term Internet to mean Internet telephony – proof of the popularity of Internet telephony or services that bypass the incumbent's services, although these remain illegal. The popularity of VoIP to make international calls was attributed to the huge price difference between that of the incumbent and underground VoIP resellers.

To make a call, ETC asks people to pay Birr 50 or 100 in advance and charges about Birr 11.5 (US$1.25) a minute, while the grey market charges between Birr 3 and 4 (US$0.3–0.4). Students and professionals reported to have browsed the Internet in search of information on a range of issues of relevance, and scholarships for further education abroad.

Focus group participants with email addresses use the Internet to send messages to friends and relatives living abroad. They learned how to use email through friends.

Interestingly, those who graduated from university do not usually access the Internet. Responding to a question why he does not have an email address, a professional said: "It is a new technology. It has never occurred to me that I should have my own email address, for none of the people I know ever asked me for or gave me an email address. People are more interested in phone numbers."

CYBER CAFÉS. Although the number is increasing, Internet cafés are a recent phenomenon in Ethiopia. Only 0.1% of those surveyed indicated that they used cyber cafés less than once a week. 36.2% said they visited once a week, while a quarter said they visit cyber cafés more than five times a week for sending and

receiving email and browsing the web. Most cyber café users said their pattern of use did not change over the last six months. This is not entirely surprising, as there has been little change in pricing and quality of service.

Around 60% of those who visit cyber cafés said that they use cafés based on convenience and have no preference for a particular cyber café. The average expense on cyber cafés was Birr 16 (US$2) per week. This translates to usage of about an hour per week.

Focus group participants indicated that they spend between Birr 2 and 10 at a time. They use different strategies to reduce their expenses on the Internet. These include writing messages before getting onto the Internet, asking someone to help them to compose the message and visiting the Internet cafes that give discounts for using the service beyond a certain period.

Conclusion

It can be concluded from the this study that fixed and mobile phone lines are scarce, but there is an increasing use of public access points such as private kiosks, telecentres and public phones in Ethiopia. The survey also indicated a relatively high usage of public telephones, even when the distance is far. The cost of communications is high and per capita income is low; which points to the fact that the demand for mobile and fixed phones is far greater than historically anticipated by policy-makers and the incumbent telecommunications operator. The survey further revealed that efforts and policies to increase telephone penetration have not been successful in making a dent in this universal access problem.

It was also found that post is not the most common means of communication in Ethiopia. Postal services are not adequately diffused throughout the country. Besides being slow, mail often gets lost. As a result, public access points remained the major form of communication. People in rural areas tend to make longer intra-district, national and international phone calls than sending mail. Many Ethiopians work abroad, particularly in Gulf States. ICTs are the most important tool for organising transfer of remittances. Families call relatives abroad (mainly children) to send money home; relatives call when the remittance is sent. This suggests the importance of universal service strategies that promote community access points. Universal service targets and telephone expansion plans should be based on knowledge of these actual patterns of usage of communication services.

The focus group discussions were particularly important in bringing out valuable insights about the actual use of different communications technologies by groups and individuals and problems that users face in adopting and using communications technologies in Ethiopia. Four major conclusions that have implications to policy-making can be drawn from the e-usage study:

Scarcity of communications. Despite increases in telecommunications investment and a recent rollout of communications services (fixed, mobile and the Internet), there is still a huge gap between supply of communications services and demand in Ethiopia. The incumbent has been unable to reduce the waiting list of fixed communication services. Mobile services are in high demand in cities like Dire Dawa, giving rise to a secondary market of SIM card rentals. The household survey showed a significant potential for widespread use of mobile phones by those who are employed in the informal sector. Current projections for increasing penetration from 0.22% to 1.5% are indeed very low. A 5-10% penetration would be more appropriate.

Although Internet bandwidth has improved recently with the introduction of a multimedia network, the majority of the population is unaware of the value of the Internet and does not have the necessary capacity to use it. Internet penetration is very low, due to many factors, including low awareness regarding the value of

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the service, low levels of computer literacy, and a lack of commitment to expand the service beyond major towns. Knowledge of how to use the Internet services is a significant driver of its demand. Where available, Internet was concentrated in high-income, well-educated parts of society and has not had a substantial impact on the majority of Ethiopians.

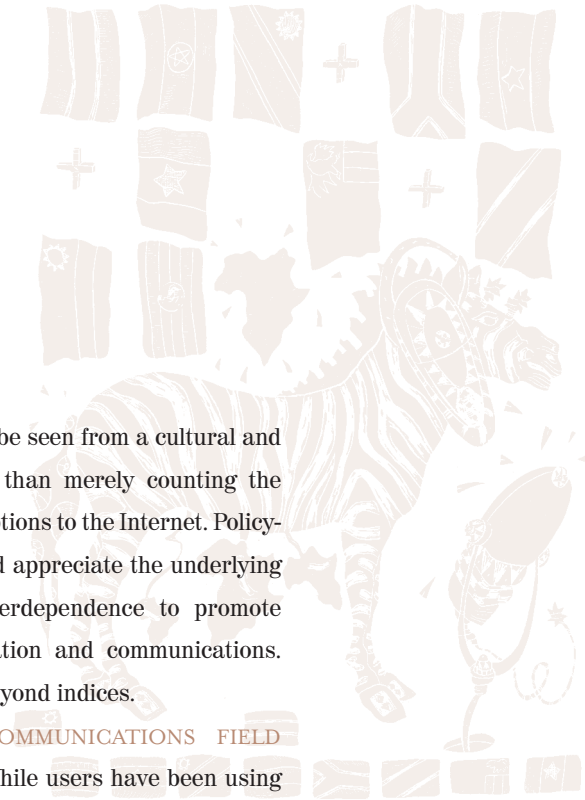
It is critical that policy-makers and the regulator monitor the quality of service and the tariff to respond to user requirements. Stimulating demand in schools and at the workplace would also increase Internet penetration. A course in IT has been recently made an integral component of secondary school education, which will contribute to the increase in the popularity of the Internet and a rise in the number of its users. Promoting community/public Internet access would increase its value to the society. Access to the Internet needs to be matched with availability of the necessary content and competence to make use of the technologies for personal, organisational and community advancement. Making technologies accessible is one challenge; increasing usage is more daunting.

The significant gender gap in accessing communication services in Ethiopia is disconcerting, but should be bridged with growing availability of pre-paid mobile phones and public access points that are run by women. There has been a significant increase in the number of women operating telecentres, following the liberalisation of public call services in 2003. This is expected to improve women's access to communication services. As more women continue to manage cyber cafés, access to these by women is expected to improve.

COSTS OF COMMUNICATION ARE HIGH FOR THE MAJORITY OF ETHIOPIANS. The key finding of the focus group discussions was that there has been limited attention paid to the affordability of communication services for the majority of Ethiopians. While efforts by the incumbent operator to expand its services are commendable, especially to meet the growing demand for communication services, a parallel effort should be made to increase usage of the services by those who need communications the most. Adequate penetration of mobile phones, fixed lines and Internet and a reduction in the gender gap cannot be achieved unless communications become cheaply and widely available throughout the country. Government needs to take proactive steps to promote competition, increase public access and reduce prices of communication services so as to improve access to those who need it the most.

As shown above, those who cannot afford the cost of communications have already resorted to using public phones to make calls and use their mobile and fixed phones to receive calls. Technologies such as VoIP are becoming common and new wireless technologies will continue to create opportunities for users to get around regulations and the monopoly market structure. Communications users will continue to invent new strategies to cope with higher communication costs. Since this will continue to erode the lucrative market share of the incumbent, it is therefore in the interest of the government and the incumbent to take affordability issues seriously and work towards promoting incentives that increase usage.

COMMUNICATION HAS BECOME A SIGNIFICANT COMPONENT OF SOCIAL CAPITAL, INTERDEPENDENCE AND INTERACTION. The focus group discussion revealed a high degree of sharing and interdependence among people in making use of communication services in Ethiopia. Fixed phones are shared among neighbours; friends take messages at offices and make calls on behalf of friends or family members. The majority of mobile handsets are acquired as gifts from family or friends at home and abroad. Cyber cafés are main spots for socialisation. This indicates that access to



communications should also be seen from a cultural and social point of view rather than merely counting the number of phones or subscriptions to the Internet. Policy-makers and operators should appreciate the underlying culture of sharing and interdependence to promote universal access to information and communications. Researchers need to move beyond indices.

INNOVATION IN THE COMMUNICATIONS FIELD SHOULD BE UNLEASHED. While users have been using various strategies to reduce their expenditure on communications, there have been limited initiatives on the part of the government to promote innovations and spin-offs in the communications sector due to the monopoly market structure. For example, the popularity that was gained by SMS and innovative spin-offs, such as advertising, were curtailed due to the suspension of the SMS service in June 2005. Innovations around wireless technologies are virtually absent in Ethiopia. The high demand for mobile telephones, and the low popularity and penetration of the Internet, can best be met by the involvement of the private sector, which would speed up the provision of the services in the major cities and contribute to innovations and the expansion of these services in uncharted geographical areas. ❑

ENDNOTES

For convenience, the Ethiopian Fiscal year was used. The Ethiopian year ends on September 10. For example, figures of year 2003 represent the status at September 10, 2003.

Chapter 6: Ghana

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POLICY AND REGULATORY CHANGES. In response to global policy changes in the ICT industry, Ghana was among the first African countries to reform its ICT sector and establish the necessary legal and regulatory frameworks to support the growth of the sector. Since 1990, the government of Ghana has liberalised the telecommunications sector with the aim of enabling the private sector to participate in the provision of services to increase access and coverage, introduce value-added services and boost consumer access to the state-of-the-art technology (Frempong and Atubra 2001).

The liberalisation policy was based on a five-year accelerated development programme (ADP) for the telecoms sector, introduced in 1994. It aimed to increase teledensity from 0.31% to about 1.5-2.5% through provision of public and private payphones; improve public access in rural and urban areas; expand coverage of mobile services; promote Ghanaian ownership of telecommunications companies; and retain overall public regulatory control of the sector through the creation of a single agency (Spintrack 2004).

The strategies adopted to achieve these objectives included the privatisation of Ghana Telecoms (GT) through the sale of a strategic stake to an international operating company; the creation of a competitive duopoly by licensing a second national network operator with similar rights and obligations as Ghana Telecom; the liberalisation of value-added services, mobile cellular telephone services, data transmission, paging and payphones; the establishment of a regulatory agency for the sector; and allowing large corporate users to develop their own private networks (Ministry of Transport and Communication 1994).

National Indicators	
Country	**Ghana**
Population	20
Poverty (% of population below US$1 a day)	44.8
Adult literacy rate (% ages 15 and over)	73.8
Urban population (% of total population)	36.7
GDP per capita (US$)	209
Surface area (000 km^2)	239

The print and electronic media were also liberalised in response to constitutional provisions and in line with changes in the global environment. The Fourth Republican Constitution called for the removal of impediments to the establishment and operation of both print and electronic media. As a result of these developments, the ICT landscape in Ghana is now characterised by the proliferation of services such as cellphones, pagers, cable TV, the Internet and its ancillary services and a myriad of print and electronic media operators all trying to utilise niches in the market.

The government of Ghana introduced its ICT4AD policy in the latter part of 2003. The overall objective of ICT4AD was to engineer an ICT-led socio-economic development process with the potential to transform Ghana into a middle-income, information-rich, knowledge-based and technology-driven economy and society (Ghana government 2003). The strategic focus of the policy was to simultaneously target the development of the ICT sector and industry and use ICT as a broad-based driver of developmental goals, with emphasis on the development, deployment and exploitation of ICTs as engine for all sectors of the economy (Ghana government 2003). In effect, the national ICT policy was to provide a general framework for ICTs to be developed and utilised for the rapid socio-economic development of the country.

Regulatory Framework. With the introduction of these changes in the sector came the need to evolve new and appropriate institutional and regulatory structures. Prior to the introduction of the reforms, the then P&T Corporation played the roles of both a player and a referee. The Corporation provided licenses to private users who wanted to establish their own radio links after obtaining frequency from the Ghana Frequency Registration Board and also provided equipment standards and granted equipment-type approvals to such private users (World Bank 1988). With the reform of the sector, the regulatory function of the P&T was placed in the hands of the National Communications Authority (NCA), which was established in 1996. The NCA became the central regulatory body tasked with the responsibility of regulating communication by wireless, cable, radio, television, satellite and similar technology for an orderly development and operations of efficient communication services in Ghana.

In addition to the NCA, another regulatory institution, the National Media Commission (NMC), was established to regulate both the electronic and print media, whilst the NCA is mandated with the regulation of communication.

Market Outlook. The implementation of the ADP led to the partial privatisation of Ghana Telecoms through the sale of 30% of its shares to G-Com Limited, a consortium led by Telekom Malaysia, in 1997, with Telekom Malaysia granted the management of the company under a management contract.

A duopoly was created in 1997 by licensing a second national network operator, Western Telesystems Ghana Ltd – a joint venture between Western Wireless Inc of USA and Ghana National Petroleum Corporation, operating under the name of Westel. Both Ghana Telecoms and Westel were granted exclusivity rights for a five-year period in voice telephony. An authorisation was given to Capital Telecoms to provide telecoms services in rural areas in the southern part of the country.

Over the following years, four mobile telephone companies have been licensed – Millicom Ghana Limited, (a subsidiary of Millicom SA), Kasapa Ghana Limited (formerly a joint venture between Kludjeson International and Hutchinson Whampoa of Hong Kong), Scancom Ghana Limited and One Touch, a subsidiary of Ghana Telecom. The four mobile operators made Ghana one of the most liberalised telecoms markets in Africa.

There are a number of companies providing other ICT services in the country. At the end of 2004, NCA had licensed a total of 133 companies to provide Internet services in the country. Of these, only 25 had actually commenced business. In the same vein, of 136 companies licensed to provide VSAT data operations, only 57 were in operation. In all, 166 telecoms equipment dealers (mobile phones and accessories and terminal equipment dealers) were also licensed. Finally, a host of other companies has sprung up to provide ancillary services such as repairs and servicing of terminal equipment, web designers, and LAN and WAN developers.

Access to telecoms services. Access to telephone services improved considerably in the early stages of liberalisation and until recently, landlines dominated the telecoms landscape in Ghana. The teledensity of landlines, especially that of GT, increased from a stable position of 0.3 in the early 1990s to 0.9 in 1999 and 1.4 in 2003. In absolute terms, the number of landlines has increased from a stagnant level of 44,200 in 1990 to 204,700 in 2000 and 363,103 in 2004.

Ghana is one of few countries in Africa where landlines have experienced sustained growth. In South Africa, two million landlines were installed during the past five years, but only 665,819 have remained connected (Gillwald et al 2004). In spite of the inroads

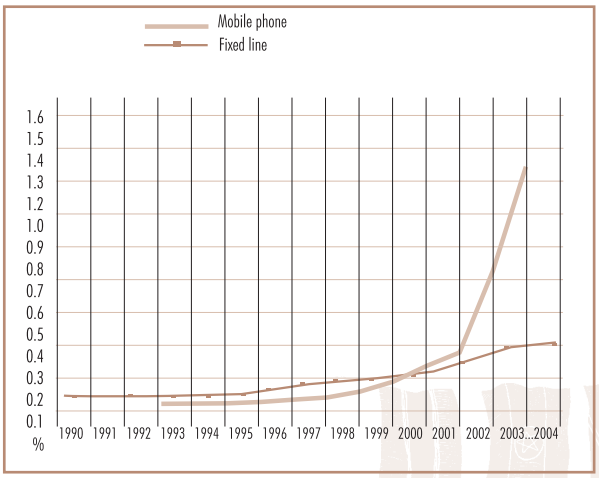
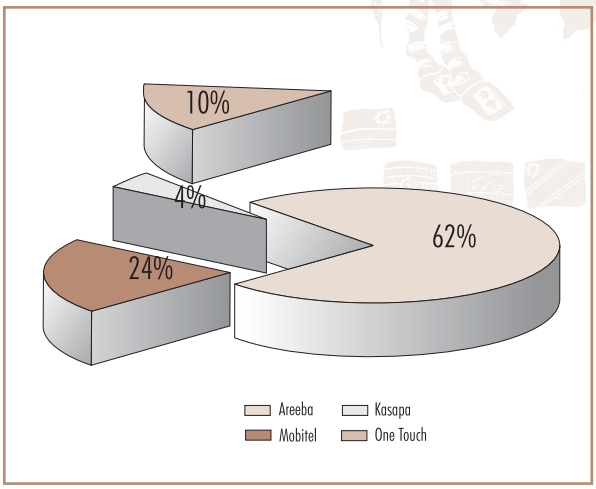


Figure 6.1: Trends in penetration of landline and mobile telephones

made by mobile telephony in Ghana, there is still a huge demand for landlines, with more than 180,000 people on the waiting list at the end of 2002.

The sector's performance could have been even more remarkable if the two national network operators had achieved their licence obligations of rolling out a total of 275,000 landlines by 2002. They were hampered by internal management problems, poor access to capital and regulatory inadequacies (Frempong 2004). Other factors which have hindered the rapid deployment of landlines, especially after the liberalisation of the industry, include political interference, a weak regulatory regime, associated problems of interconnection and trade wars between the operators (Haggarty et al, 2003).

Figure 6.2: Market Shares of Mobile Telephone Operators (2004)



Echoing global and continental trends, the mobile telephone market performed better than the fixed line sector. By 2002, mobile telephony had outpaced landlines, and by the end of 2004, the total number of mobile subscribers was more than three times that of landline subscribers (see figure 6.3). The total number of landlines in 2004 was 363,103, compared to 1,382,000 mobile connections.

Though the performance of mobile seems impressive, it cannot compare favourably with other African countries such as Uganda, Senegal and Cameroon. Cameroon, with two mobile companies – Mobile Telephone Network and Orange (formerly Mobilis) – raised the country's mobile subscription levels from 2,000 in 1999 to one million in the early 2000s (Nzepa 2004).

Problems of interconnection and cartelism, especially before the year 2000, contributed to the sluggish growth of mobile. The improved performance of the mobile sector in the 2000s was fuelled by the launch of a mobile service by the incumbent (GT), as there was a perceived fear by the other operators that GT would use its extensive infrastructure to support the new mobile telephone operator (Frempong 2004). The existing operators adopted new marketing strategies, including reducing prices of starter packs and call charges and introducing rewards and incentive packages.

In terms of coverage, two mobile telephone operators have covered the 10 regions of the country, and their services are available in more than 100 towns. Areeba has covered 111 towns (www.spacecon.com),

while One Touch is available in 117 towns (www.onetouch.com). Gradually, mobile telephones are becoming household technology, especially in the urban areas of the country.

INTERNET. While Internet penetration in Ghana seems very low according to ITU Basic ICT Statistics (2005), the number of Internet users per 10,000 inhabitants increased to 172 in 2004, which is higher than the African average of 123.21. By way of comparison, in 2003 South Africa had more than 3.1 million Internet users and Egypt 1.9 million users, while Ghana had 170,000 (ITU 2003). Most users in Ghana have access through shared Internet connections – offices, cyber cafés, friends, and to a lesser extent, homes (Ahiabenu II 2003).

Internet cafés are the most important source of Internet access in Ghana. In early 2003, there were more than 750 Internet cafés in Ghana, mostly using dial-up. About 90% of these are located in Accra, with the rest in other cities such as Kumasi and Takoradi (Ahiabenu II 2003). The largest cyber café is Busy Internet in the central part of Accra, with over 100 computers. The key Internet players are Network Computer System, Africa Online, Internet Ghana and Integrated Digital Network.

BROADBAND. There is an emerging market for broadband services in the country. Digital subscriber line technology (DSL) was first introduced in 2001 by Internet Ghana and in August 2004, GT introduced Broadband 4U in Accra. The service, according to Gruen Associates (2005), will be made available to the other parts of the country from 2005, and may achieve full coverage in 2017. The availability of SAT3 fibre loop, and effective utilisation of the network belonging to the Volta River Authority (VRA), may lower broadband costs and accelerate broadband's expansion into the other parts of the country. The VRA is Ghana's electricity generation and transmission entity that has established a fibre network to link its key installations across the country. The network has excess capacity which, if effectively commercialised, will positively impact on broadband access in the country.

The relatively competitive price (which some analysts describe as predatory) of GT's service is increasing subscriptions for broadband. Though no data on the level of subscriptions has emerged, there are good prospects for the service, especially in the major cities and towns.

PRICING AND AFFORDABILITY. Access to services lies not only in physical availability, but also in affordability – the ability of customers to pay for the service. In Ghana, accessibility and affordability are critical issues confronting increasing access to ICT services.

Telecoms pricing has seen some changes in the country, especially within the mobile market segment. Since October 2003, mobile operators have reduced call charges, which is increasing affordability. Areeba reduced its call charges from eight to six units per minute for peak periods and six to four units per minute for off-peak, and Mobitel, Kasapa and One Touch followed suit. They have also introduced per-second billing, allowing users to pay for the actual time used. However, inter-network call charges have not been affected. It is relatively expensive to make inter-network calls, defeating the purpose of price reductions.

Furthermore, the increase in interconnection charges between cellular and fixed line networks – from US$0.06 to US$0.2 per minute – in October 2003 had serious financial implications for accessibility to telephone services, especially for rural dwellers. Previously, callers to cellular networks from communication centres paid US$0.1 per minute; with the new tariffs, they pay US$0.3 per minute (Frempong

and Braimah 2005). Most people in rural areas rely on communications centres for access to telecoms services, but the popularisation of mobile telephone kiosks in the country may reduce this.

Interestingly, GT, under the guise of tariff rebalancing, has reduced its tariffs. Call charges from its network to the mobile networks have been reduced from US$0.2 to US$0.16 per minute. Before October 2003, GT complained about imbalances in exchange of traffic between it and the mobile networks and called for the revision of interconnection charges.

DEMAND-SIDE ANALYSIS. The analysis of this section is based on a national survey conducted in Ghana in 2004. The survey was based on household and individual usage of mobile, landline and public telephones, and Internet services, among others.

Figure 6.3.: Demographics

Age	%	Income Range	%
0-9	16%	0 to 99,999	17%
10-14	12%	100,000 to 149,999	8%
15-19	12%	150,000 to 199,999	4%
20-24	11%	200,000 to 299,999	7%
25-29	10%	300,000 to 399,999	12%
30-34	8%	400,000 to 599,999	23%
35-39	6%	600,000 to 799,999	9%
40-44	5%	800,000 to 999,999	9%
45-49	5%	1,000,000 to 1,299,999	4%
50-54	4%	1,300,000 to 1,599,999	2%
55-59	2%	1,600,000 to 1,899,999	1%
60-64	2%	1,900,000 to 2,199,999	0%
65->	5%	2,200,000 to 2,499,999	0%
Total	100%	2,500,000 to 2,799,999	0%
		3,800,000 to 4,199,999	0%
		4,200,000 to 4,499,999	1%
		4,500,000 to 4,799,999	0%
		5,200,000 to 6,999,999	1%
		Total	100%

Location	%	Gender	%
Major Towns	42%	Male	51
Other Urban	33%	Female	49
Rural	24%	Total	100
Total	100%		

DEMOGRAPHICS. The survey was conducted in three main locations in the country – major towns, other towns and rural areas. The sample size consisted of 1,301 respondents, of which 42% were from the major towns, 37% from other urban areas and the remainder (24%) from the rural areas

The gender and age distributions were taken into consideration. The composition of the sample on a gender basis was 51% male to 49% female. The age distribution of the sample showed 16% between ages of 0–9 years. Each of the teenage groups (10–14 and 15–19) constituted 12% (see figure 6.3). The age distribution of the sample conformed to the age structure of Ghana's population. The national population statistics showed that the age group under 25 constituted almost 61% of the country's population (Statistical Service 2004).

In terms of income classification, the majority of the respondents fell within the income bracket of less than ¢100,000 and ¢600,000 (US$11–US$67) per month. About 17% of them earned salaries less than ¢100,000 (US$11), while a significant number (23%) were earning between ¢400,000 and ¢600,000 (US$45–US$67) per month. Further, 18% earned between ¢600,000 and ¢1,000,000 (US$67–US$112) per month, while 7% had income within the range of ¢1 million and ¢1.9 million (US$112–US$213) per month. In all, only 2% had income over ¢2 million (US$224) per month. Generally, the bulk of the respondents came from the lower-income group, i.e. 58% of the sample earned salaries between ¢1,000 and ¢1,000,000 (US$0.11–US$112) per month.

The low income structure may be related to the youthful nature of the sample, but the general income status of the respondents raises questions about the patronage of ICT services in the country, as the level of salaries may be linked to ownership and effective usage of ICT services.

PENETRATION. In this section, we look at how the various ICT services such as mobile telephones, landlines, the Internet, and other services have been taken up.

MOBILE TELEPHONES. Mobile telephony has made an impressive entry into the telecoms market. This versatile technology outstripped landlines within 10 years of its inception and is now triple that of fixed.

Figure 6.3 provides information on the mobile subscribers interviewed as part of the survey. The majority (about 83%) were from the major towns in the country, 16% from other urban areas and an insignificant 0.4% from rural areas. The trend cannot be disputed because most of the operators have concentrated their services in the major cities and towns, where there is a huge market for their services. This also confirmed by the urban-based pattern of telecoms development in Ghana and other developing countries.

The proliferation of mobile telephony in Africa can facilitate the drive to achieving universal access to telecoms services on the continent. For example, most rural communities along major highways can easily pick up the signals of most mobile telephone networks. Potentially, this can be utilised to increase access to telecoms services, as considerable number of communities are dotted along major highways. However, the absence of electricity in most of these communities may be a handicap.

In view of this, the poor access in rural areas raises the issue of non–utilisation of the available signal along the major highways, and also raises the need to develop infrastructure that can support the use of mobile telephones in rural areas. There is a need to identify and test quality of the telephone signal in such areas and encourage people to use the service.

In terms of ownership, mobile telephones seem to be popular among the youth and young adults. This is illustrated in Figure 6.4, where almost 40% of respondents who own mobile telephones fall between the ages of 20–29. Mobile is less popular with those over 50, who formed only 15.3% of the sample.

Location	Major towns	83.2
	Other urban	16.4
	Rural	0.4
Gender	Male	58.2
	Female	41.8
Age	0- 9	0.5
	10-14	1.5
	15-19	3.6
	20-24	12.9
	25-29	19.0
	30-34	15.4
	35-39	11.8
	40-44	8.0
	45-49	12.1
	50-54	6.4
	55-59	3.1
	60-64	1.6
	65->	4.2
Income	1-100,000 (US$ 0.1-US$ 11.2)	4.5
	101,000-200,000 (US$ 11.3 - US$ 22)	6.2
	201,000-300,000 (US$ 23 - US$ 34)	5.4
	301,000-400,000 (US$ 34 - US$ 45)	7.9
	401,000-500,000 (US$ 45 - US$ 56)	9.2
	501,000-1,000,000 (US$ 56 - US$ 112)	20.3
	1,001,000-1,500,000 (US$ 112 - US$ 168)	47.6

Figure 6.4: Breakdown of mobile sample according to age, income, location and gender (%)

About 20.3% of mobile users fall within the income bracket of ¢501,000 and ¢1,000,000 (US$56–US$112), a

Figure 6.5: Duration of ownership, in months

Period	%
0- 6	21.7
7-12	19.2
13-24	27.8
25-36	15.3
37-48	8.3
Above 49	7.8

Source: Survey Data, 2004

bracket in which many young adult users fall. The income range of ¢1,001,000 to ¢1,500,000 (US$112–US$168) had the highest subscription rate of 47.6%.

The period in which the majority of the people acquired mobile telephones corresponded with the era of competition in the industry, that is, after 2002. The majority (68.7%) of users subscribed to the service within 1–24 months. Therefore, it can be deduced that most of them subscribed to the service in 2003 and the early part of 2004, the time when most operators launched aggressive marketing strategies to improve their subscriber bases. These strategies included reduced prices of starter packs, lower call charges and various incentive packages.

The price reductions were initiated by Mobitel, which reduced its tariffs by 34% in the early part of 2003 and later in the year embarked on promotional sales, where starter packs were sold at ¢149,000 (US$16.39) (Frempong 2004). Kasapa also introduced a pre-paid system and charged ¢800 (US$0.088) per minute for own-network calls and ¢1,200 (US$0.132) for calls to other networks[1]. Areeba, for its part, reduced call charges on its pre-paid service from eight to six units per minute for peak periods and six to four units per minute for off-peak in November 2003. Prior to this, it had organised promotions, with a new car as first prize. It is likely that these competitive activities attracted most of the respondents and are also linked to the 258% increase in mobile subscriptions in 2003.

PRE-PAID MOBILE SERVICES. One of the underlying factors influencing the popularity of mobile telephones in Ghana and other developing countries is the introduction of the pre-paid system. This provides easy access for the majority of subscribers, who might have found the post–paid system expensive.

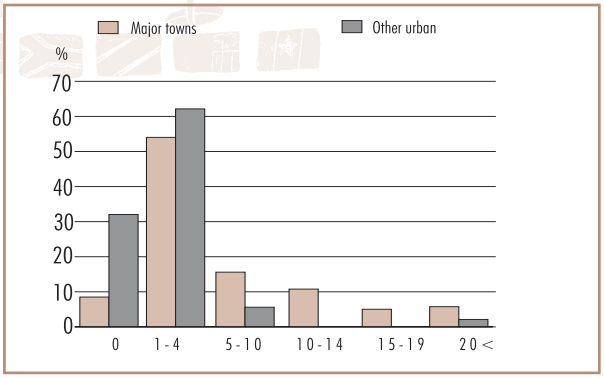
About 22.4% of pre-paid mobile telephone subscribers in major towns spent between ¢1,000 and ¢5,000 (US$0.11-US$ 0.55) per month on mobile services, compared to 39.1% in other urban areas. The low consumption pattern of this class of subscribers may be related to their monthly income. However, a significant number of subscribers (42.6%) in major towns and other urban areas (26.1%) spent between ¢50,001-¢100,000 (US$5.5-US$11) on mobile communications. In all, 63.1% of the sampled subscribers in major towns spent more than ¢50,000 (US$5.5) monthly on mobile telephones, compared to 41.3% in other urban areas. This emphasises the variations in expenditure patterns on mobile telephones between users in major towns and other urban areas, and also provides some economic justification for the concentration of ICT services in the key cities of the country.

Cedi	US$	Major Towns	Other Urban
1-5,00	US$0-0.55	22.4	39.1
5,00.1-10,000	US$0.56-1.01	0.8	2.2
10,001-15,000	US$1.02-1.65	0.4	0
15,001-20,000	US$1.66-2.02	2.1	2.2
20,001-30,000	US$2.03-3.03	3	2.2
30,001-50,000	US$3.04-5.05	8	13
50,001-100,000	US$5.06-11	42.6	26.1
100,000->	US$11->	20.7	15.2

Figure 6.6: Expenditure of pre-paid subscribers

EXTENT OF SMS USAGE. Unlike some developed countries such as the Netherlands, where there is a limit to the number of SMS that can be sent per month by a

Figure 6.7: Number of SMSs sent per week



subscriber, there is no limit on the number of SMS a subscriber can send in Ghana.

The majority of subscribers in major towns and other urban areas send a relatively small number of SMSs per week. In major towns, almost 54% sent between 1-4 SMSs per week, with 62% in other urban areas. About 11% sent between 10-14 SMSs per week in the major towns.

In other urban areas, 30% did not send SMSs at all. The low usage of SMS in this survey confirms an earlier study conducted in 2003, where it was found that only 3% of the sample had used SMS within a three-month period (McKemey et al 2003). The low usage of the SMS facility may be due to high illiteracy levels (31%).

INTERNET ACCESS. The level of access to the Internet in the sampled towns and rural areas shows a low level of access in the country. Residents in major towns mainly access the Internet through Internet cafés, followed by access at work or school. Access to Internet at home in major towns and other urban areas accounts for only 1.9% and 2.2% respectively. This confirms the assertion by Ahiabenu II (2003), that most of those using the Internet gain access at collective access points such as work, school or cyber cafés.

On the whole, Internet access is rising. It increased from 78.43 users per 10,000 people in 2003 to 172.15 in 2004. However, this level of penetration is lower than Senegal, for instance, where there were 469.16 users per 10,000 people in 2004.

One of the critical factors limiting household access to the Internet is the investment involved. Although it is possible to purchase a second-hand "Internet-ready" computer for between US$200-US$300, it is still expensive for the majority of Ghanaians. According to Southwood (2004), a typical web user has to pay a monthly subscription fee averaging US$30 for unlimited access and one email account, plus a telephone usage rate of ¢200 (US$0.03) per minute.

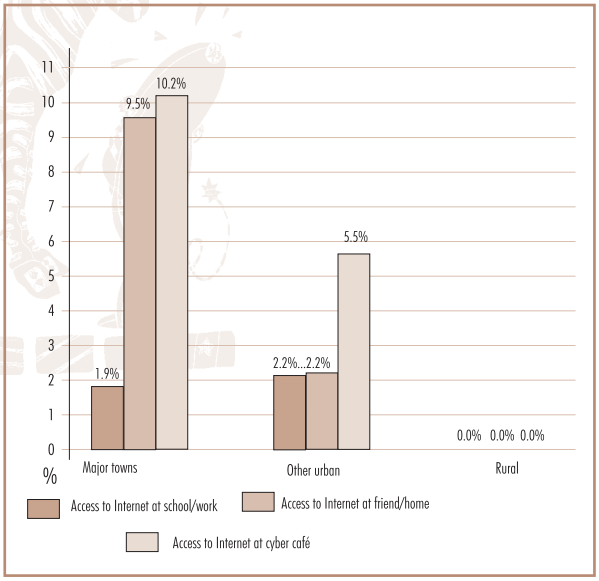


Figure 6.8: Access to Internet and others

Internet usage is negligible in rural areas, which is concerning, since the bulk of Ghana's population that generates the greater part of the country's income, live there. Therefore, providing Internet access and other ICT facilities is not only an issue of equity, but has great economic consequences for the whole country. This is due to the inherent positive contributions ICTs can make to improve efficiencies, productivity and the well-being of rural people.

To reduce this gap, the government has drawn up a programme to establish community ICT centres throughout the country. At these centres, rural people will be trained and have access to a number of ICT services, including the Internet. Under the programme, ICT centres are to be established in 230 communities. The first phase consists of establishing 62 community ICT centres, of which 60 have been completed and awaiting commissioning[2].

In comparing household ICT facilities such as working PC, Internet connection and telephone, it is evident that household telephones are prevalent mostly

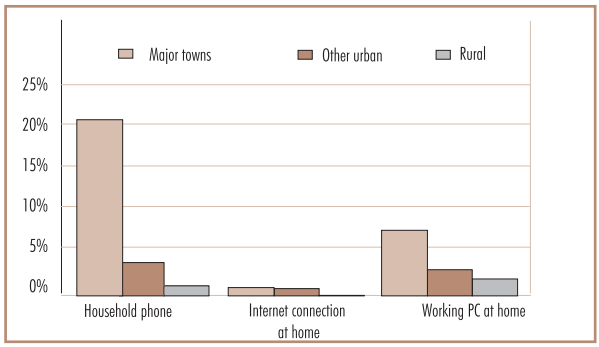


Figure 6.9: Computer, Internet and fixed line penetration at home

in the major towns. Availability of residential telephones and working PCs is also encouraging in other urban areas (see figure 10.9).

Nationally, residential access to telephones is on the rise, especially since 2000. A significant increase was recorded in 2000, when the number of residential landlines grew by 115.8% over the previous period. The continuous increases in the numbers of residential lines, especially in the 2000s, were helped by government's policy of using fixed line telephones to reach under-served urban and rural areas.

RESIDENTIAL USAGE OF ICT FACILITIES. The data depicted in figure 10 shows the penetration of residential telephones and the level of expenditure. The uptake of residential telephones by the sample is low. Only 21% of the households in major towns had telephones, 3.8% in other urban areas and below 1% in rural areas.

Apart from the financial implications, one factor which has restricted the uptake of residential telephones relates to the type of residential accommodation most Ghanaians occupy. A large number of Ghanaians, especially the lower-income group, live in rented compound houses, and relocation of landline subscriptions when moving between rented premises is difficult. Because of this, many people have not availed themselves of the service, even where available.

However, the situation is changing, especially in the case of middle-income earners who are acquiring properties in housing estates across the country. The concentration of houses in these estates has made it easier for telecoms companies, especially Ghana Telecom, to target and deploy their services there. Therefore, the gradual increases in residential telephones can partly be linked to this trend.

There is a common characteristic in household expenditure on telephones. In major towns and other urban areas, most households spent between ¢1,000-¢100,000 (US$0.1-US$11). About 44.4% of households in major towns were in that range, as were 77% of households in other urban areas. Only 10% of households in major towns spent between ¢401,000-¢500,000 (US$45-US$56) on telephones.

In comparing household telephones to other ICTs, it is evident that radio, and to some extent television, are the most popular ICT facilities in the country. About 90%

Figure 6.10: Household telephone and expenditure

	Cedi	US$	Major towns	Other urban	Rural
Household Phone			21.0%	3.8%	0.4%
Household Expenditure (Median)			160,000	42,500	0
Household Expenditure (range)	1-100,000	US$0-11	44.4%	76.9%	0.0%
	101,000-200,000	US$11.1-22	28.8%	7.7%	0.0%
	201,001-300,000	US$22.1-33	11.1%	0.0%	0.0%
	301,001-400,000	US$33.1-44	5.6%	0.0%	0.0%
	400,001- 500,000	US$44.1-55	10.0%	0.0%	0.0%

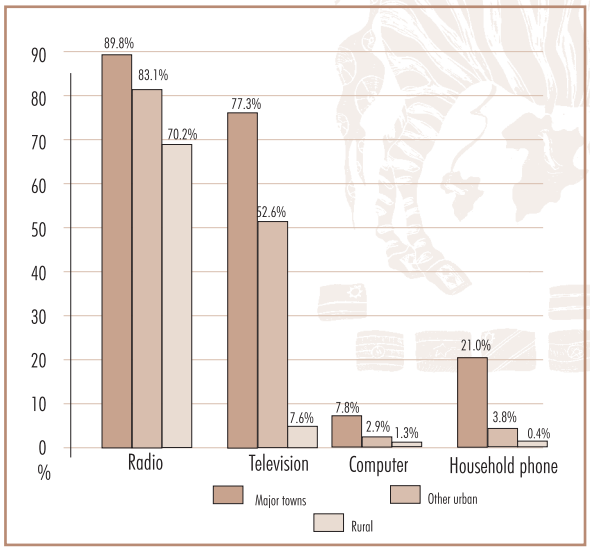


Figure 6.11: Household ICT Appliances

of households in major towns have radio, 83.1% in other urban areas and 70.2% in rural areas. This is due to the low cost of owning a radio and the proliferation of radio (FM) stations in the country after the liberalisation of the airwaves. By the end of 2004, the NCA had allocated frequency to 140 companies to operate FM radio stations in the country, of which 84 had commenced business.

Ownership of television is equally high. About 77.3% of households in major towns have television, 52.6% in other urban areas and 2.6% in rural areas. The relatively high level of ownership of television sets by households is also linked to the liberalisation of the airwaves, which has led to the licensing of four companies to provide free-to-air services and another four on a subscription basis. The second factor, a recent phenomenon, is the burgeoning trade in used TV sets, imported mainly from Europe. These used TVs are reasonably priced and therefore accessible to many.

PC ownership is lowest, at 7.8% in major towns, about 3% in other urban areas and 1.3% in rural areas. The generally low household ownership of computers, coupled with low levels of residential telephone services, have a negative implication on household subscriptions to Internet services. Ownership of computers and availability of telephone service are prerequisites for an Internet connection.

PUBLIC ACCESS. Access to public-based telephone facilities is fairly distributed, though still low in rural areas. From the data, 54.5% of respondents have access to payphones in major towns and 46.5% in other urban towns, while rural access was 9.6% (see figure 12).

In the case of telecentres or communications centres, the major towns had access of 30.6%, other urban towns 31.8% and 10.7% in the rural areas. Interestingly, private telephone kiosks have a relatively higher presence in the rural areas. They registered 44.8%, while the major towns and other urban areas had 77.8% and 63.8% respectively.

The data depicts the agility of the private sector as an important partner in increasing access to ICTs in urban and rural areas of Ghana. Therefore, support

Figure 6.12: Access to public telephone facilities

	Cedi	US$	Major towns	Other urban	Rural
Public payphones penetration			54.5%	46.8%	9.6%
Telecentre/community penetration			0.0%	0.0%	0.0%
Public access penetration			30.6%	31.8%	10.7%
Private telephone kiosks penetration			77.8%	63.8%	44.8%
Payphone spend	0- 5,000	US$0-0.55	18.9%	31.3%	24%
	5,001-10,000	US$0.56-1.01	0.5%	4.7%	7.5%
	10,001-15,000	US$1.02-1.65	8.1%	10.6%	5.5%
	15,001-20,000	US$1.66-2.02	10%	17.5%	13%
	20,001-25,000	US$2.03-2.75	8.1%	4.7%	11%
	25,001- >	US$2.76- >	50%	31%	39 %

should be provided to such entrepreneurs to establish ICT businesses to facilitate access to such services. Though the national ICT4AD and the Telecoms Policy of Ghana recognise the important role the private sector can play, one wonders why the government should give the ownership and running of the community ICT centres to the District Assemblies. Such facilities could be franchised to the private sector, while the government provides technical support to keep the centres running. The private sector, without government support, has demonstrated dexterity in managing such centres in rural areas, and government needs to revisit its decision.

The growing importance of communication centres, private telephone kiosks and other public facilities is bolstered by the level of expenditure on communications by rural people. Though still low, an improvement in the rural economy will definitely support the burgeoning trade in communications services. For example, 39% of respondents spent over ¢25,000 (US$2.75) per month on communications, higher than in other urban areas. What's more, looking at the poverty situation in the rural areas, spending ¢25,000 (US$2.75) per month on telephones, though a small amount, is a significant portion of household income.

Figure 6.13: Time spent accessing public telephone services

	Time (mins)	Major towns	Other urban	Rural
Time to public phone	0-15	69.5	51.6	18.2
	16-30	18.1	30.2	0.0
	31-45	8.2	9.3	9.1
	46-60	2.5	7.7	4.5
	61->	1.6	1.1	68.2
Time to telecentre	0-15	78.8	71.3	88.9
	16-30	11.8	24.1	5.6
	31-45	8.2	3.7	0.0
	46-60	1.2	0.9	0.0
	61->	0.0	0.0	5.6
Time to private kiosk	0-15	95.8	85.4	10.4
	16-30	2.7	9.7	2.1
	31-45	1.5	2.7	4.2
	46-60	0.0	1.8	4.2
	61->	0.0	0.4	79.2

The policy implication is that although the cost of extending telephone services to the rural areas might be high, evidence shows a real demand for services that could make such services profitable in the long run. The data reveals the importance rural people place on electronic communication, and they might increase their expenditures as their standard of living increases.

The length of time used to reach a communications facility is linked to the number of facilities in the area. Most individuals in major towns and other urban areas spend less time accessing public phones, telecentres and private telephone kiosks (see figure 6.13).

For example, 69.5% of individuals in major towns took between 0-15 minutes to reach a public phone, as opposed to 51.6% in other urban areas and only 18.2% in rural areas. Most rural people walk for more than 60 minutes to access payphones and private telephone kiosks.

The length of time the majority of rural people walk illustrates the point that the government's old policy of using payphones to achieve universal access was not very successful. The objective was to provide at least one payphone for every rural community of 500 people. To buttress this point, the strategy to boost the rapid deployment of payphones was never implemented. As part of the strategy, a new business entity was to be created to manage GT's payphones, and new public payphone operators were to be licensed for every region (Atubra et al 2000).

ACCESS TO THE POST OFFICE. The experience of people in rural areas in spending a longer time reaching public communications facilities is repeated in the case

	Major towns	Other urban	Rural
0-15	32.3	32.5	14.9
16-30	31.0	31.8	10.3
31-45	12.3	18.5	0.5
46-60	11.5	12.3	6.2
61->	13.1	5.0	68.2

Figure 6.14: Time to post office by foot

of access to post offices. The majority (68.2%) of rural people walk for more than one hour to post or receive letters from post offices. Only 13.1% of respondents in major towns and 5% of those in other urban areas have to walk for over an hour to reach a post office.

CONCLUSION. The discussion has looked at the policy and regulatory issues affecting ICT development and uptake in Ghana. Demand-side analysis has enabled a better understanding of the supply-side issue.

The analysis has confirmed the availability and usage of ICT services in the country. Most of the ICT infrastructure and services is urban-based, mostly in Accra (the national capital) and the other regional capitals. However, there is considerable evidence that people in rural areas value communication as much as urban dwellers, and are willing to pay proportionately large portions of their incomes to use them.

Contrary to the opinions of many analysts, there is an evolving market for communication services in the rural areas. This has been demonstrated by the increasing level of expenditure on telephone services in these areas. There is a conviction, demonstrated in this study, that improvements in the rural economy will exert a great impact on the telecoms market in the rural areas. As a result, the view of rural areas as not being economically viable may not be entirely correct.

Finally, the survey has shown that the few telecoms services in the rural areas have been driven by the private sector. This trend conforms to the rationale behind the telecoms liberalisation policy. Financial and technical support should be given to the private sector as a partner in achieving universal access to ICT services. ❑

ENDNOTES

1 The call charges of Kasapa were revised in line with the new interconnection charges approved for the sector by the NCA during the last quarter of 2003. Kasapa now charges ¢900 per minute for intra network calls and ¢1,750 for inter-network calls.

2 Of this number, five community ICT centres were opened in the northern part of the country this year.

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Chapter 7: Namibia

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National Indicators	
Country	**Namibia**
Population	1.8
Poverty (% of population below $1 a day)	n/a
Adult literacy rate (% ages 15 and over)	83.3
Urban population (% of total population)	31.9
GDP per capita (US$)	1,523
Surface area (000 km²)	824

INTRODUCTION. Recent data from the International Telecommunications Union (ITU) shows that the much-discussed digital divide between the information haves and have-nots is narrowing. Low and middle-income countries are providing an increasing share of users of the world's mobile phones, fixed lines and Internet connections, steadily catching up with higher income countries.

Yet, the latest study done by George Sciadas (2005) suggests that the gap between African countries in particular and the international average of a set of accepted ICT indicators, is growing. About 40% of the world's population lives in low-income countries, yet they accounted for only 7.7% of all main telephone lines, 5.7% of all mobile phones, 8.1% of all Internet users and 3.5% of all PCs in the world in 2003. There is clearly still a long way to go.

Perhaps more important than the actual figures – which have been challenged by the countries themselves – is an understanding of the factors at work in countries where the gap is clearly closing. The World Telecommunication Development Report of 1998 noted, "technology that theoretically provides telecommunication access from any place on the surface of the earth is already available.

Universal access is now not so much an engineering or supply-side problem, but rather a regulatory and policy challenge." Have more effective regulators and more effective policies contributed to this trend? While other factors, such as GDP per capita and time of entry into markets, might be greater determinants of ICT sector performance, policy and regulatory frameworks certainly contribute to the differential outcomes between countries.

Figure 7.1: Middle-income countries are catching up (ITU, 2004)

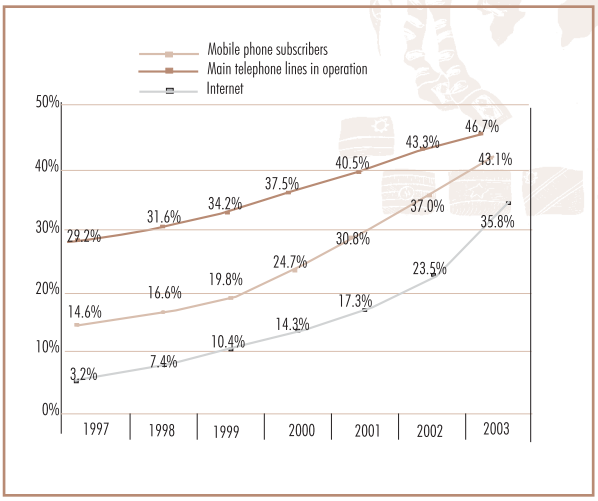
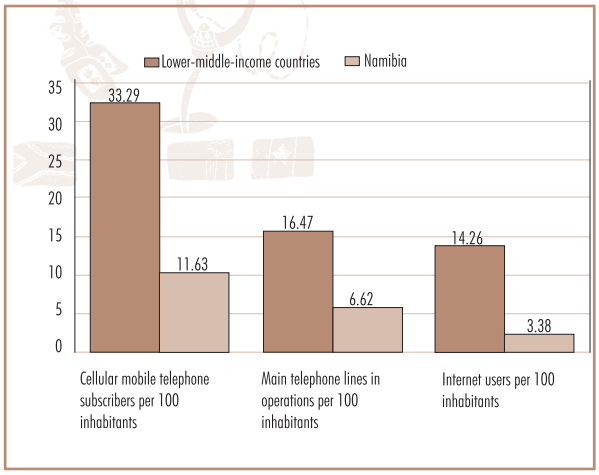


Figure 7.2: Namibia compared (ITU, 2004)



The last couple of years have seen a process of far-reaching liberalisation of telecommunications in many countries. First, mobile telephony challenged fixed-line telephony. This was typically followed by the introduction of competition in the mobile telephony space, and then competition in the fixed-line market. Evidence from around the world suggests that competition combined with effective regulation leads to lower prices and better services for consumers. In the absence of effective regulation and an enabling policy environment, a very real danger exists that the gap in access actually starts to widen.

According to UN categorisations, Namibia belongs to the group of lower-middle-income countries. Compared to the average for these countries, Namibia is lagging behind in terms of mobile and fixed line subscribers, as well as in Internet users per 100 inhabitants. It might not be an entirely fair comparison, since income is not the only factor affecting the digital divide between countries. Other factors include a country's general development, its existing infrastructure, the regulatory environment, the skills level of the workforce, the size of the domestic market and its location relative to trading partners. It should also be remembered that the digital divide exists not only between developed and developing countries, but also within countries. The digital divide within countries spans income groups as well as other characteristics such as age, socio-economic status, ethnic origin, language, education levels and whether someone lives in a rural or urban area. However, the comparison is still valuable as a benchmark.

The E-Index aims at establishing a further benchmark, measuring the digital divide both between and within countries and accounting for the "soft" factors such as skills levels, gender, personal and household income, age, socio-economic status, ethnic origin, language and education levels. The intra-country analysis and comparison between countries will help understand the spread of information and communication technologies (ICTs), their use and obstacles to further deployment.

METHODOLOGY. The survey was carried out by surveying households and individuals in urban and rural areas, using random sampling techniques and comprehensive questionnaires. The data was collected in such a way that gender, urban, income and other significant factors could be disaggregated and analysed to determine relations between penetration and usage patterns and policy and regulatory environments.

Probability sampling was used to ensure that all individuals in the target population had a known chance of being selected into the sample. For the sampling, a three-stage process was used.

- Primary sampling units (PSU): In the first stage, the primary sampling units were defined as major urban, other urban and rural areas. Walvis Bay, Swakopmund and Windhoek were defined as major urban areas, and all other towns were classified as other urban. Three towns were randomly selected as other urban areas using probability proportionate to size (PPS) methodology. The rural areas were sampled from the regions of the randomly selected towns.
- Secondary sampling units (SSUs): Enumerator areas (EAs), as defined by the 2001 census, were used as secondary sampling units. The 2001 census was used as the sample frame and EAs were selected using PPS methodology. 12 EAs were randomly selected for major urban, three EAs for each of the selected other urban towns and three rural EAs from the selected towns.

Total households in generic settlement in Namibia				Households interviewed	
	Share of sample	Share of population		Weights	
Major Urban	34,801	354	41.45%	10.05%	0.242467
Other Urban	102,066	249	29.16%	29.48%	1.010988
Rural	209,386	251	29.39%	60.47%	2.057492
Total	346,253	854	100%	100%	

Figure 7.3: Weights

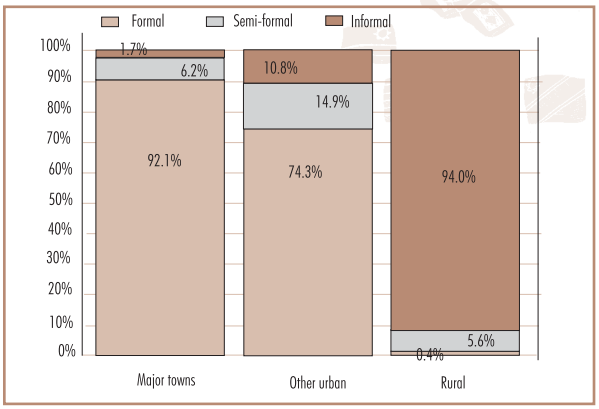
- Tertiary sampling units (TSUs): The tertiary sampling units were defined as households. Households were randomly selected within the selected EAs during the fieldwork using sampling intervals. The sampling intervals for each EA were determined by dividing the number of households present in an EA by the target sample of 27 households per EA.[1]

WEIGHTS. In total, 12 EAs in major urban, nine EAs in other urban and nine EAs in rural areas were randomly selected for the survey. This resulted in an over-sampling of households in major urban and an under-sampling of households in rural areas.

Weighting of the data was applied for the data analysis on national level to account for the over-sampling.

Figure 7.4 displays the shares of households classified in terms of living conditions for the entire sample and separately for survey location.

Figure 7.4: Household classification in terms of living conditions by survey location



HOUSEHOLD E-USAGE

This section is dedicated to the analysis of the survey data at a household level. The household data collected is nationally representative.

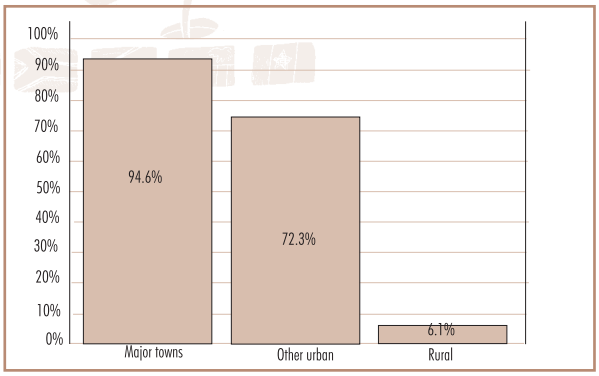
ELECTRICITY. According to this survey, about 34% of Namibian households are connected to the electricity grid. Electrification varies considerably throughout Namibia. In major urban areas, 94.6% of the households are connected to the electricity grid, in other urban areas 72.3% and in rural areas only 6.1%.

More than 90% of households connected to the electricity grid have mains exclusively for their households, with the majority using pre-paid electricity. Pre-paid electricity is particularly popular in rural and other urban areas. This might lead one to assume that lower-income households prefer pre-paid electricity and higher-income households account electricity. However, this is not the case, as even high-income households make extensive use of pre-paid facilities.

CONSUMER ELECTRONICS. The survey provided information on consumer electronics items in households. Around 77% of households in Namibia have a working radio at home, and 43.3% a cassette player.

Analysing the survey results by household income shows that with the exception of radios, the availability of all other consumer electronic items varies considerably with the level of household income. As

Figure 7.5: Connection to the electricity grid by survey location



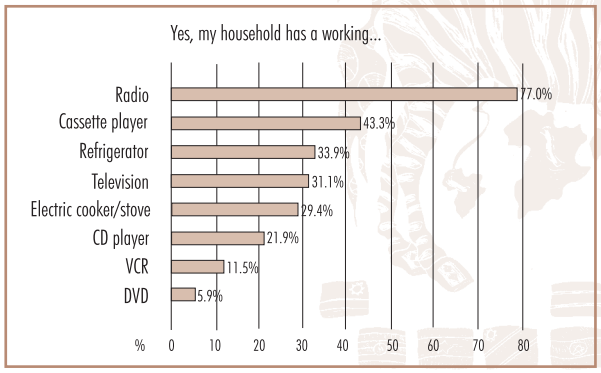


Figure 7.6: Households with various consumer electronic devices

Figure 7.7: Households with various consumer electronic devices by survey location

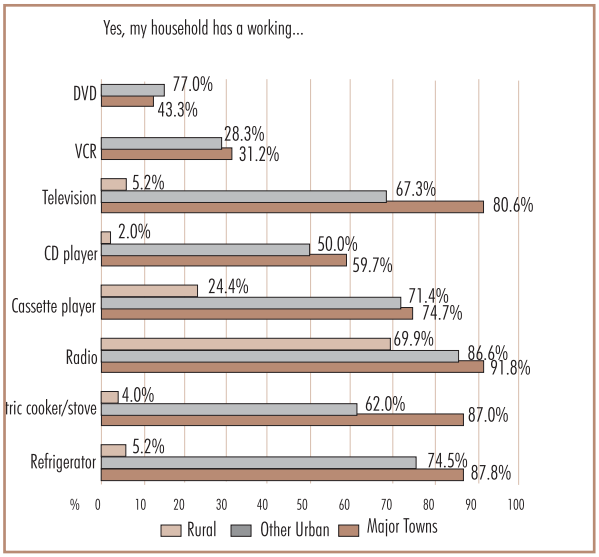
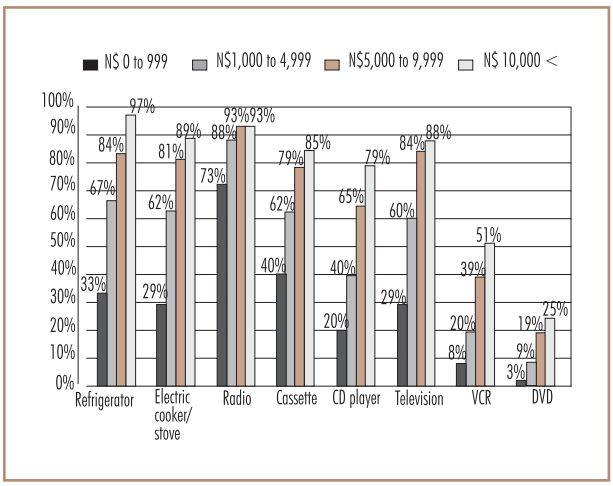


Figure 7.8: Consumer Electronics Exposure Index by survey location



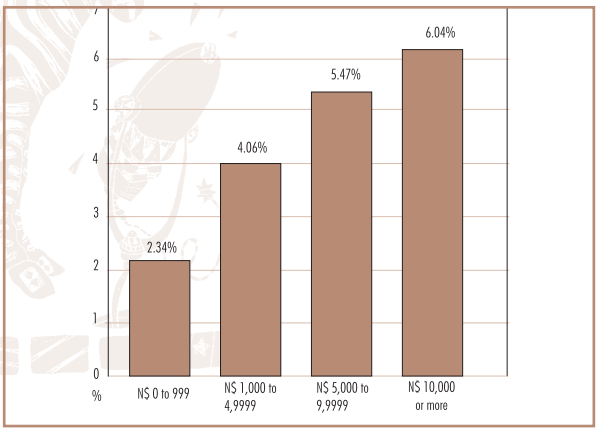
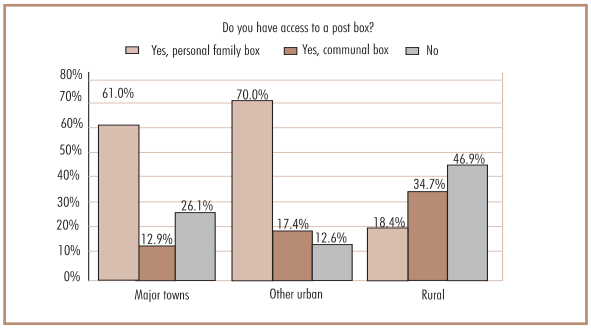


Figure 7.9: Consumer Electronics Exposure Index by household income

anticipated, the Consumer Electronics Exposure Index (CEEI) is higher for major urban areas than for other urban areas and rural areas. Also, higher-income households are more exposed to consumer electronics than lower-income households. Only 4.6% of households in Namibia have a working computer or laptop, and only 1.66% of households have a working Internet connection at home, all in urban areas. In major urban areas, 5.93% of households have a working Internet connection and 3.61% in other urban areas.

POSTAL USAGE. In all, 65.6% of Namibian households have access to a post box, 38.3% to a personal or family post box and 27.3% to a communal post box. In rural areas, far fewer people have access to post boxes as compared to urban areas, and communal post boxes are dominant.

Figure 7.10: Access to a post box



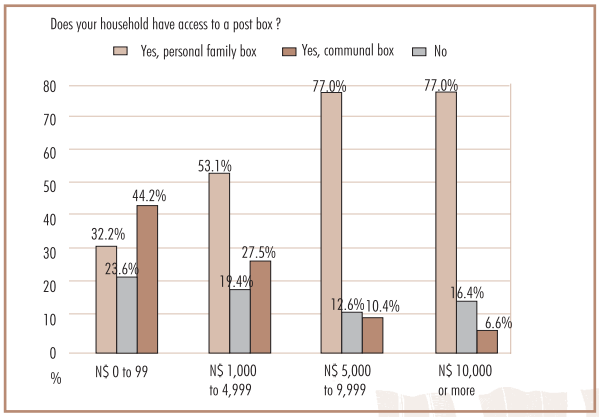
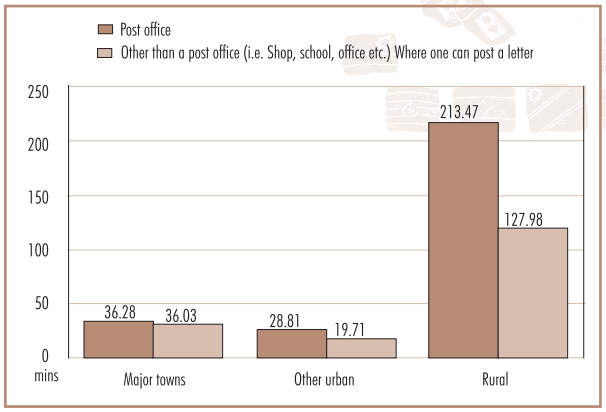


Figure 7.11: Postal access by household income

The higher the income of a household, the higher the probability that the household has access to a personal or family post box. A small post box in Namibia costs N$137 (US$46 PPP), a medium box N$226 (US$76 PPP) and a private post bag N$390 (US$132 PPP) per year, which is not much, given Namibia's GDP per capita of roughly N$17,000 (US$5734 PPP). However, postal services appear less affordable when considering the unequal income distribution in Namibia. For example, the monthly pension is only N$300 (US$101 PPP), which for many households is the sole source of income. Additional indirect costs accrue from the transport or opportunity costs of checking and picking up mail.

HOUSEHOLD PHONE. In major towns, 37% of respondents have a household phone, or a mobile phone

Figure 7.12: Average distance in minutes it takes to reach postal services



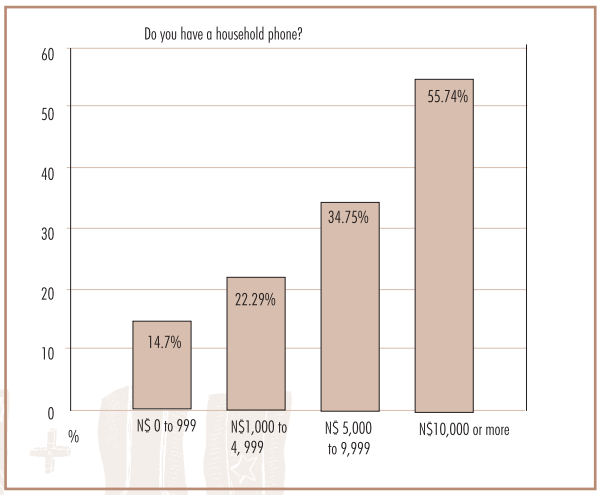
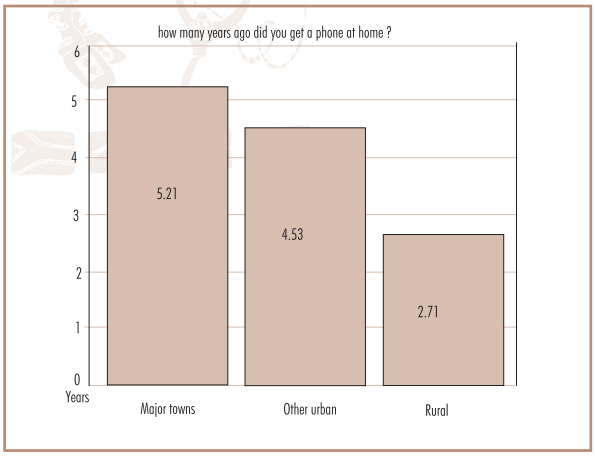


Figure 7.13: Percentage of households with household phones

on the premises. This falls to 29% in other urban areas and 1.6% in rural areas.

In Namibia as a whole, 13.2% of households have a household phone, 95.6% of which are fixed lines and 4.4% mobile phones. Rural areas clearly lag in acquiring household phones. Having a household phone is also clearly linked to the total household income, as Figure 7.13 shows. Households waited on average three and a half months between applying and actually getting a household phone installed. It needs to be kept in mind that this is not a measure for current service delivery,

Figure 7.14: First installation of household phone



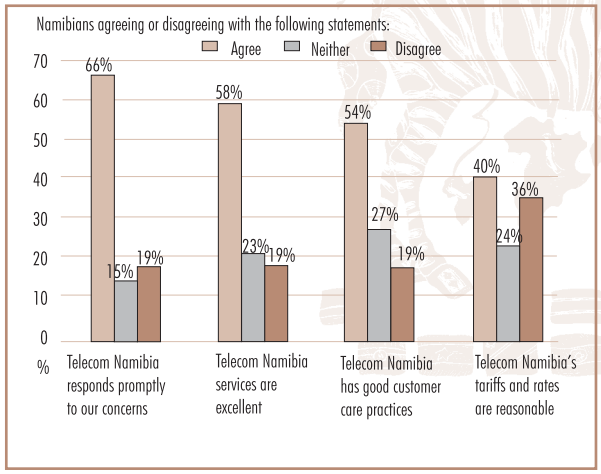


Figure 7.15: Rating Telecom Namibia

since it is an average for all households and for a long time period. Of those households that did not have a household phone, about 60% would be considering getting one if call prices, line rental and handsets were cheaper.

Generally, Namibians are positive about Telecom Namibia, with more than 66% believing that it responds positively to their concerns, and more than half indicating that they find services excellent and customer care good. However, far more are dissatisfied with the tariffs, with only 40% indicating that they find rates reasonable.

MOBILE PHONE USAGE. Recent years have seen phenomenal growth in the number of mobile phone subscribers. Today, mobile phones vastly outnumber fixed line phones in most countries around the world. This trend is a little puzzling, since mobile phone calls are more expensive and less reliable than fixed line calls.

Part of the explanation is that mobile phones are more flexible and offer a range of extra features – including phone books and diaries and the ability to play music, send text messages and even take digital pictures. Furthermore, mobile phones have become fashion objects in their own right, allowing people to call an individual rather than just a place. It is not uncommon to see people from all walks of life showing each other their latest mobile phones while sitting in cafés, restaurants or bars.

Apart from having turned into a lifestyle product, it is notable that the real breakthrough of mobile telephony has been the introduction of pre-paid services, such as the Tango card in Namibia. The latest ITU report (African Telecommunication Indicators 2004) states that 91.2% of all mobile phone users in sub-Saharan Africa are pre-paid subscribers. The success of pre-paid subscriptions in sub-Saharan Africa can be attributed to their appeal to people with lower or irregular incomes, since their use does not require a bank account, a physical address, a postal address or a minimum fixed monthly subscription or rental fee. Pre-paids allow users more control over their expenses – charging the phone as money becomes available and not spending if it does not.

Of all respondents that own a cellphone, about 15% live in a household without a working refrigerator. Surprisingly, more than half of those do not live in rural areas. This can be explained by the fact that 83% of the households without a refrigerator are not connected to the electricity grid. However, it also gives an indication of the importance of cellphones in peoples' lives.

Most respondents (62.8%) have owned only one handset since they got first connected, indicating that cellphones are, for the majority, more important for communication purposes than as fashion objects.

Figure 7.16

Mobile ttelephone usage	
Respondents that own a cellphone but live in a household without a refrigerator	15%
Respondents that have had only one handset since they got first connected	62.80%
Respondents that currently only have one handset	93.72%
Respondents that have only one active local mobile phone number (SIM card)	94.46%
Respondents that have no inactive local mobile phone number (SIM card)	75.32%
Respondents that only receive phone calls and do not make any	1.79%

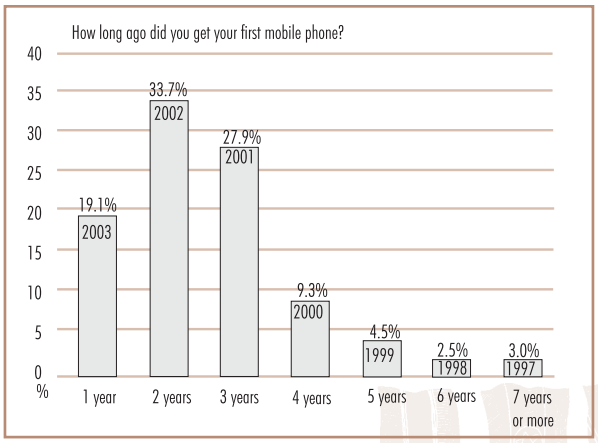


Figure 7.17: Mobile telephony adoption

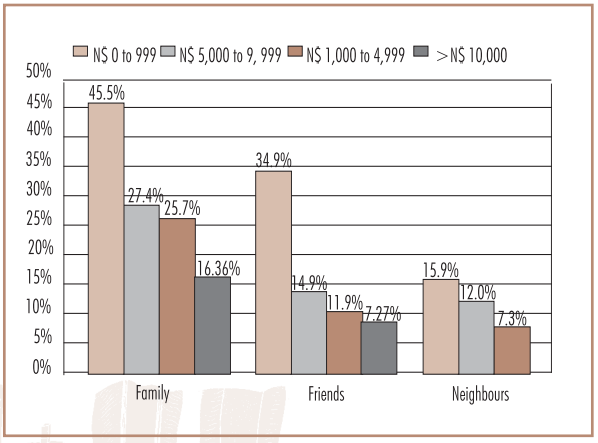


Figure 7.19: Mobile phone sharing by household income

The vast majority of respondents currently only have one handset (93.7%) and also own only one SIM card (94.5%). There is little incentive in Namibia to own more than one SIM card, given that MTC is currently the only mobile telephony provider. Despite relatively low average revenues per user (ARPU), a low 2% of respondents use their mobiles to receive calls only.

Around 60% of respondents acquired their first mobiles during the past three years; however, it is interesting that fewer people got their first mobile in 2004 (19.1%) than in 2003 (33.7%). This will be an interesting trend to track.

Respondents tend to share their mobiles with family first, friends second and neighbours third. Nearly 30% of respondents regularly share their mobiles with other family members, compared to about 16% with friends.

The percentage of respondents that shares their mobiles with family, friends or neighbours is distinguished by household income. One can clearly observe a trend of higher income households tending to share their mobiles less, which can also be attributed to more mobiles being owned per household. Figure 7.20 shows the sharing behaviour separately for survey locations. It can be observed that respondents living in rural areas are more willing to share their mobiles with others than respondents in major urban or other urban areas.

Living in rural areas is linked to lower household incomes. Households in major urban or other urban

Figure 7.18: Mobile phone sharing

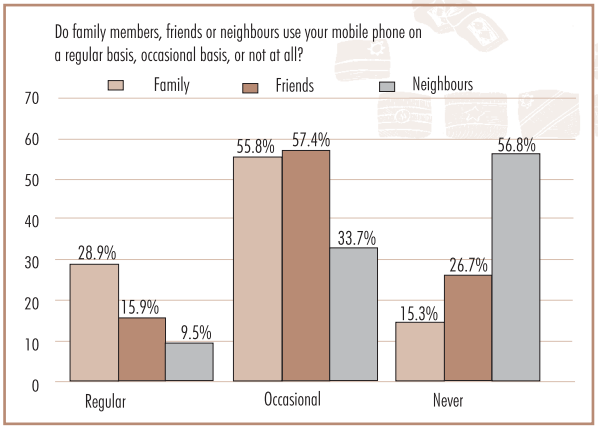
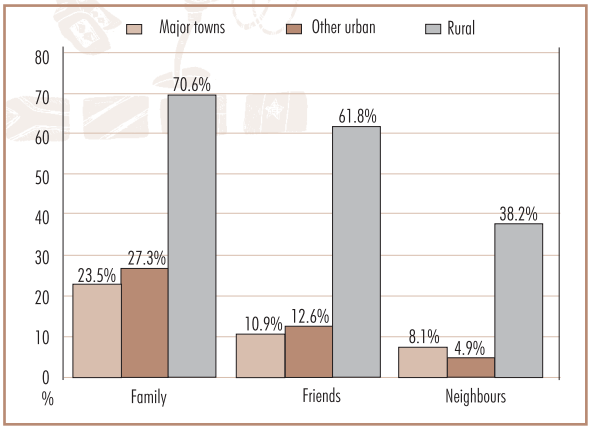


Figure 7.20: Mobile phone sharing by survey location



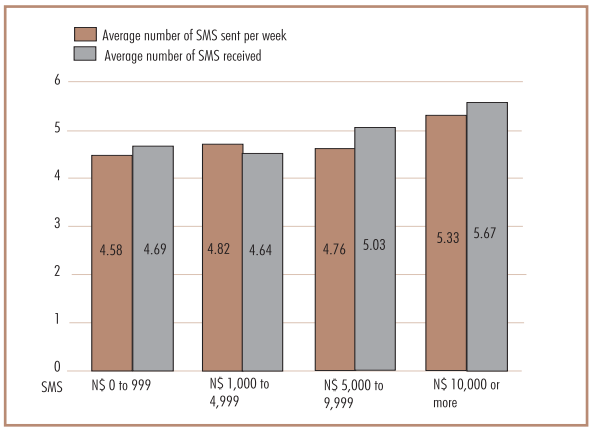
On average, how many text messages do you send weekly?		
No of SMS	Send	Receive
0	15.65%	12.97%
1-5	62.61%	67.15%
6-10	17.39%	13.83%
11 or more	4.35%	6.05%

Figure 7.21: Text messages weekly

areas earn, on average, about N$4,670 (US$1,575 PPP) per month. For rural areas, the average household income is N$1,640 (US$553 PPP) per month. The questionnaire did not contain any psychographics to infer family attitudes of respondents. However, it is safe to assume that people living in rural areas are more family-minded than people living in urban areas. From this derives a greater economic and social necessity to share resources such as communication devices (mobiles). Interestingly, only 2.77% of respondents that share their mobile phones charge friends, family or neighbours a fee for the use of their cellphones.

More than 80% of respondents send or receive short text messages (SMS), with some 60% sending between one and five SMSs per week. No significant difference could be observed between male and female users. The difference between respondents from high-income households compared to low-income ones is also surprisingly small.

Figure 7.22: SMS usage by income



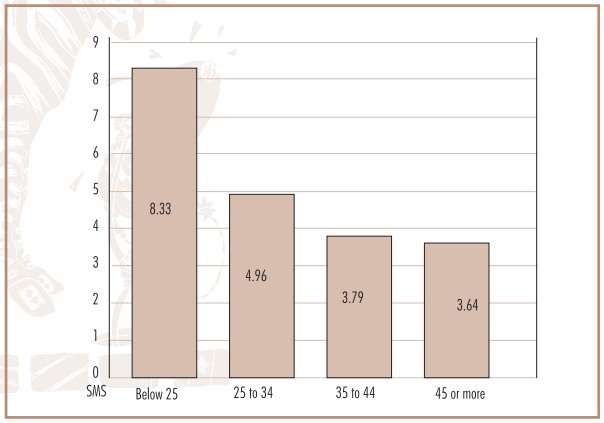


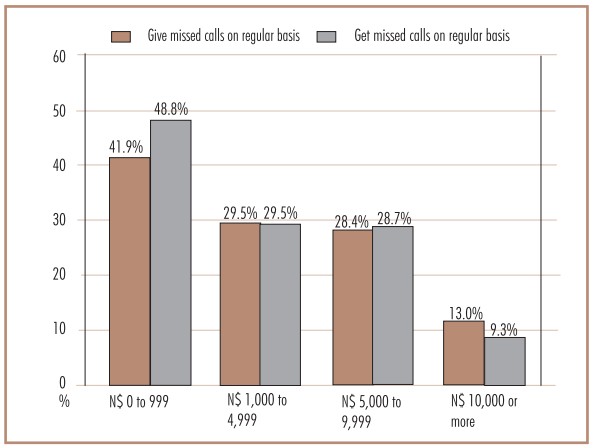
Figure 7.23: SMS usage by age

SMS USAGE BY GENDER AND INCOME. This might be attributed to two mechanisms that work in opposite directions. On the one hand, an SMS is a cheaper alternative to communication, compared to a call. On the other hand, respondents from higher-income households are more likely to have more disposable income to spend on SMSs.

Significant, however, is the difference in SMS usage when comparing age groups. The under 25-year-olds send more than twice as many SMSs as those aged 35 or older.

Looking at missed calls, respondents with lower personal incomes are making far more missed calls than respondents with higher personal incomes. At the same time, more lower-income respondents are getting missed

Figure 7.24: Giving or getting missed calls on regular basis by personal income



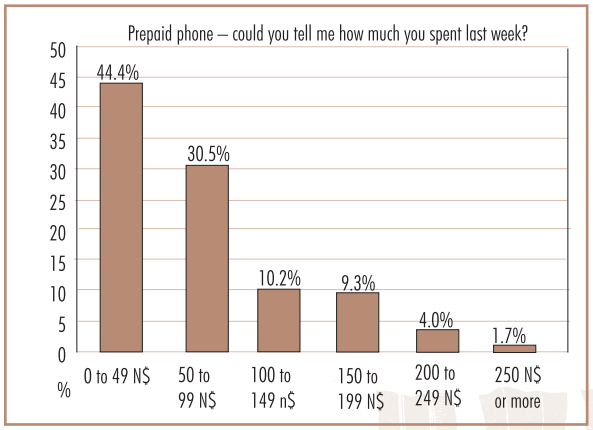


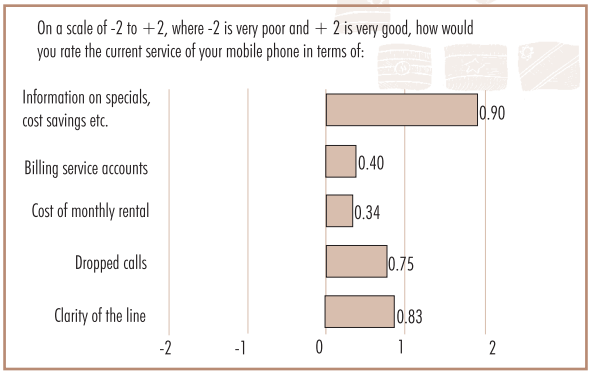
Figure 7.25: Average weekly expenditure of pre-paid users

calls than giving missed calls. Of respondents earning less than N$1,000 (US$337 PPP) a month, 41.9% were giving and 48.8% were receiving missed calls regularly.

The missed call culture seems to be more prevalent among rural residents than their urban counterparts. However, personal income is a better predictor for missed call use.

When asked who pays the mobile phone bills, most respondents said they pay for it themselves (89%). More than half of contract holders spend more than N$200 (US$67 PPP) per month. Pre-paid users were asked how much they had spent in the last week: 44.5% spent less than N$50 (US$17 PPP), while 30.5% spent between N$50 (US$17 PPP)and N$100 (US$34 PPP).

Figure 7.26: Satisfaction ratings



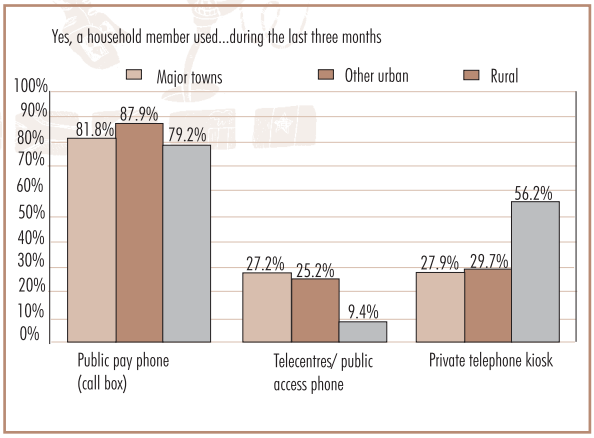
Asked what prevents them from making more phone calls from their mobiles, 80.5% cited the cost of calls. This indicates that mobile phone usage can be expanded considerably through lowering prices. A more comprehensive study on this issue would be required to determine demand elasticities.

Contract users are, on average, more satisfied than dissatisfied with monthly subscription costs and the monthly billing system. Overall, few respondents rated the services provided by MTC in terms of clarity of line or dropped calls as poor or very poor. On average, 55.5% of the respondents were happy, 8.6% unhappy and 35.9% neither happy nor unhappy with MTC.

PUBLIC PHONE / WORK PHONE USAGE. Most respondents made use of public payphones, with 82.96% of households having a household member that used a public payphone during the past three months. Telecentres/community public access phones and private telephone kiosks are used to a lesser extent, with 23% and 34% respectively.

Comparing public phone usage across survey locations shows that private telephone kiosks are more popular in rural areas than in urban areas. Telecentres and community phones seem to play less of a role in rural areas.

Figure 7.27: Usage of public phones during the last three months



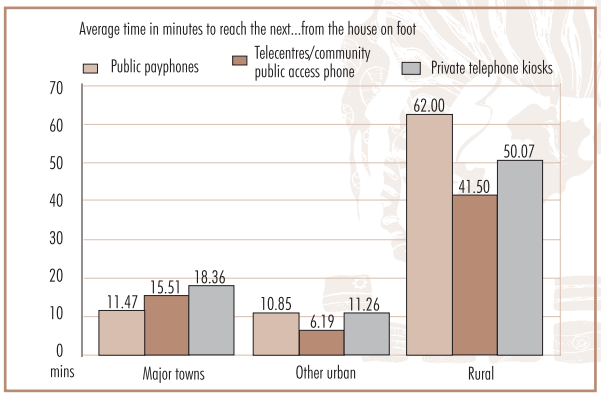
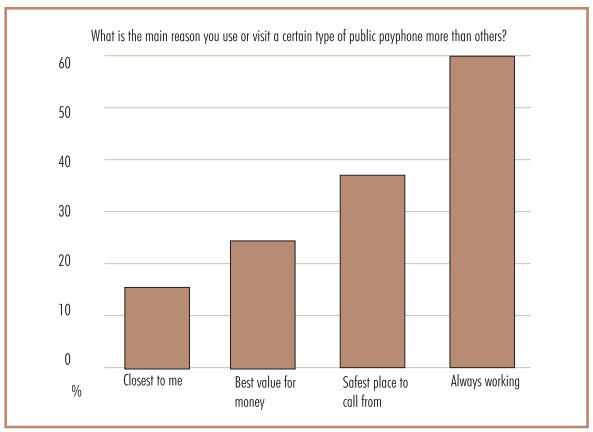


Figure 7.28: Distance in minutes to public phones

In rural areas it takes, on average, three to six times longer to reach a public phone compared to urban areas. A total of 91.74% of respondents walk, or take a horse or a donkey, to reach the nearest working public phones. Most respondents cited distance as the main reason for using a particular type of public phone, followed by value for money.

Interestingly, a third of public phone users also own a mobile phone, indicating that the cost of communication plays a major role. Respondents from households with household phones also make use of public phones. Public phones seem to serve to complement private telecommunications, either as a cheaper alternative or through convenient access.

Figure 7.29: Reasons for choice of type of public phone



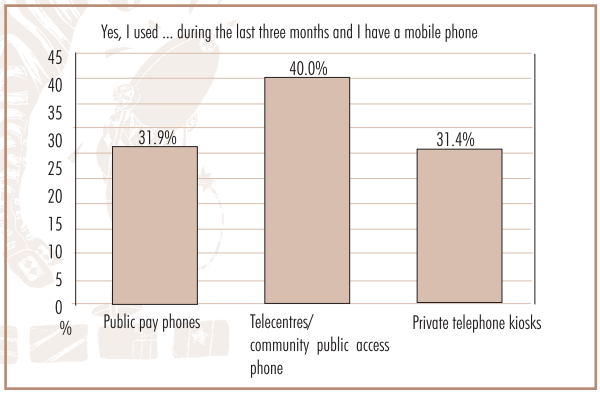


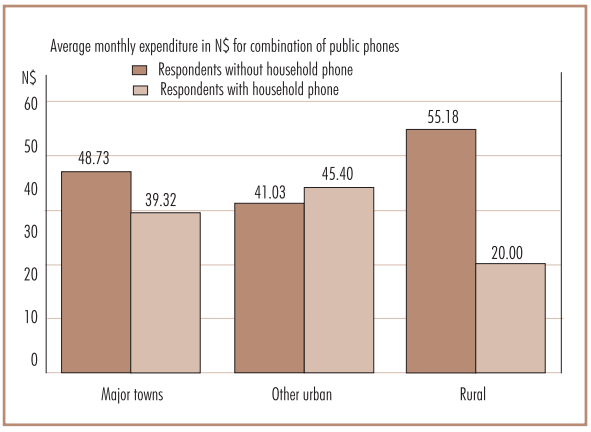
Figure 7.30: Public phone usage of respondents with household phones

The average number of days a public phone was last used was around 10 days for major urban and other urban areas, while it was 35 days in rural areas.

The most recent average monthly expenditure on a combination of all types of public phones remained constant during the past six months for 50.6% of the respondents. It increased for 32.8% and decreased for 16.6%.

In all, 41.6% of respondents have access to a telephone at work on which they can receive calls. Of those, 71.23% can also make private calls, and 44.44% can even call mobile phones. Of those that have access to telephones at work, 48.45% hold their personal calls so they can make them from their work phone.

Figure 7.31: Monthly expenditure



On average, respondents make 4.74 personal calls per week from their work telephone. Respondents employed in the private sector make less calls on average per week (4.28) compared to government employees or respondents working for parastatals (6.89).

INTERNET AND CYBER CAFÉ USAGE. Only 51 out of 854 households responded to questions on the Internet and cyber café usage, implying that most households surveyed do not have a household member that uses the Internet. Information was collected for 4,163 household members from 854 households. Of these, only 3.9% (162 household members) have an email address. Of the 51 households that had at least one household member that uses the Internet, 72.5% lived in major urban, 27.5% in other urban and none in rural areas. Of the respondents that use the Internet, 71.4% have access to the Internet at school or work. Only 20.4% use Internet cafés.

Surprisingly, 35.3% of respondents were male and 64.7% female. However, the low response rate impairs further conclusions on this matter. 58.8% of responding Internet users are in full-time employment and 19.6% are pupils or students. 25.6% of respondents earn more than N$5,000 a month.

Interestingly, only 66.7% say they have an email account, while others just use the Internet for browsing. About 46% use email more than browsing and 21% use both equally. The average usage of the Internet per week is 4.5 hours. 31.4% of respondents say their Internet use has increased during the last six months, and for 51% it has remained the same.

The average score in the consumer electronics exposure index was 7.88 for respondents that used the Internet, which is close to the maximum of 8.

The conclusions that can be drawn from the survey for Internet usage are limited due to the low response rate. Alternative approaches are required to understand Internet usage better in Namibia. What is clear, however, is that the Internet is most used where provided by work or schools. Exposure to consumer electronics, income and living in an urban area is also linked to Internet usage.

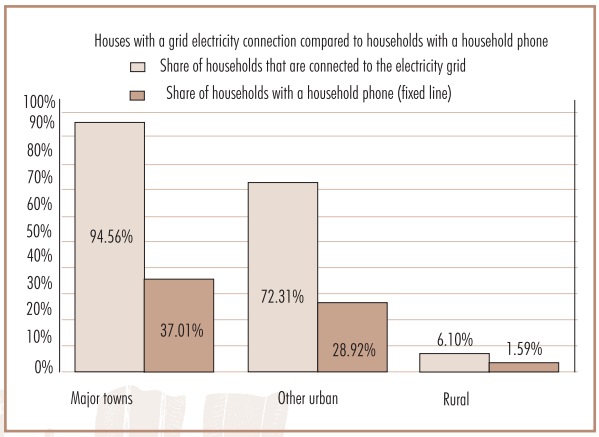


Figure 7.32: Access to electricity and fixed line telephony compared

The main obstacle regarding Internet usage in rural areas is access to electricity and fixed line telephony, both of which are required for conventional Internet use. Only 6.1% of surveyed households in rural areas are connected to the electricity grid. Technological solutions that allow wireless broadband Internet access, even to locations without connection to the electricity grid, are available in Namibia, but these are currently only provided to schools by Schoolnet and/or Xnet.

In urban areas, the main private Internet access barrier is income and access to fixed line telephony.

Electricity is available to most households in urban areas, but few have a fixed line telephone. More than 90% of households in Windhoek, Swakopmund and Walvis Bay are connected to the power grid, but only 37% have a fixed line phone. In other urban areas, more than twice as many households have electricity in their homes compared to fixed line phones.

CONCLUSION

The survey revealed several mechanisms and patterns of ICT diffusion in Namibia.

- Expenditure for communication has increased disproportionately compared to the rise in disposable income in Namibia. Poor people have shifted their expenditure to be included in the information society, to be able to stay in contact with family and friends. Owning a mobile is more important to some people than owning a refrigerator. However, owning a mobile is only one step towards becoming part of the information society.
- Direct and indirect costs are the main obstacles to bridging the digital divide. The choice between a public payphone and a private telephone kiosk is, for example, a choice based on direct costs (call charges) and indirect costs (costs on getting there or opportunity costs).
- Communication devices that require financial commitment are less successful with poor people and hence less suitable to bridge the digital divide. The success of pre-paid regimes, whether for mobiles, electricity or fixed line telephony, shows that the mechanism of controlling costs and avoiding commitment is preferred over the cheapest form of communication.

The main challenges faced in Namibia are to make ICTs cheaper and more accessible. Technologies to deliver always-on Internet access and telephony to even rural communities without connection to the electricity grid are readily available – Schoolnet operates such systems in rural Namibia, for example. What is lacking is an enabling policy environment that allows private initiatives to flourish and entrepreneurs to deliver ICT services to suit communities. Evidence from around the world suggests that competition combined with effective regulation leads to lower prices and better services for consumers. In the absence of effective regulation and an enabling policy environment, a very real danger exists that the gap in access will actually widen.

Undoubtedly, the ICT sector in Namibia faces serious challenges owing to the size of the country, its relatively small population (under two million) and the consequently low population density. Only effective regulations and an enabling policy environment can ensure that these challenges are effectively met, and the proposed Telecommunications Bill is a big step forward.

Namibia is still in regulatory limbo, with two different ministries responsible for the regulation of the industry. The Ministry of Information and Broadcasting is responsible for the supervision of MTC via the Namibian Communications Commission (NCC), while the Ministry of Works, Transport and Communication is responsible for the supervision of Telecom Namibia. The new Telecommunications Bill will address this issue and create a single authority responsible for the entire sector, but the Bill has been stalled for a couple of years. Namibia urgently needs a single regulatory body for the supervision of the ICT sector, especially since the arrival of a second mobile operator is imminent. The new regulatory institution will need more authority and also more skilled manpower. Namibia's NCC currently has only seven employees, compared to the 67 at Botswana's Telecommunication Authority and 321 at the Independent Communications Authority of South Africa. Much more can be done to deliver effective regulation and an enabling policy environment for the ICT sector.

A further important step is to start the liberalisation of the telecommunications market. Namibia's lack of openness in the telecommunications market is hampering huge potential growth in the sector, despite it being one of the leading countries in Africa in terms of

access to, and use of, telecommunications services. Namibia is not doing well when compared to other lower-middle-income countries. There is a vast body of literature and empirical evidence linking competition in the telecommunications sector with growth in the number of telecommunications users, employment and in GDP. Universal service obligations can no longer be used as an excuse for maintaining monopolies.

Mobile teledensity in Africa today vastly exceeds that of fixed lines. This has consequences for how we should think about the issue of universal service. Mobile telephony is clearly more attractive – not to mention more accessible – to the African consumer than fixed line telephony. Namibia's telecommunications regulator (currently still the Namibia Communications Commission) could impose a universal service levy on the turnover of any service provider. The returns of this levy could then be used innovatively to bring telephony to areas not attractive to commercial service providers. Successful examples of this approach can be found across the world.

Liberalising Namibia's telecommunications sector, establishing a single competent regulator for the converging telecommunications, broadcasting and IT sectors and actively managing the radio spectrum will open up new business opportunities and generate growth and employment. Access to information today is seen as a human right by many. The clear link between effective regulation and competition, on the one hand, and access to information, economic growth and employment on the other, makes it imperative to act sooner rather than later. ❑

ACKNOWLEDGEMENTS. NEPRU would like to express our sincere gratitude to Telecom Namibia who contributed to the International Development Research Centre (IDRC) support of this research. We would also like to thank the Namibian Central Bureau of Statistics for their help with maps and census data.

ENDNOTES

The 2001 census data and up-to-date maps of the selected EAs were provided by the Central Bureau of Statistics.

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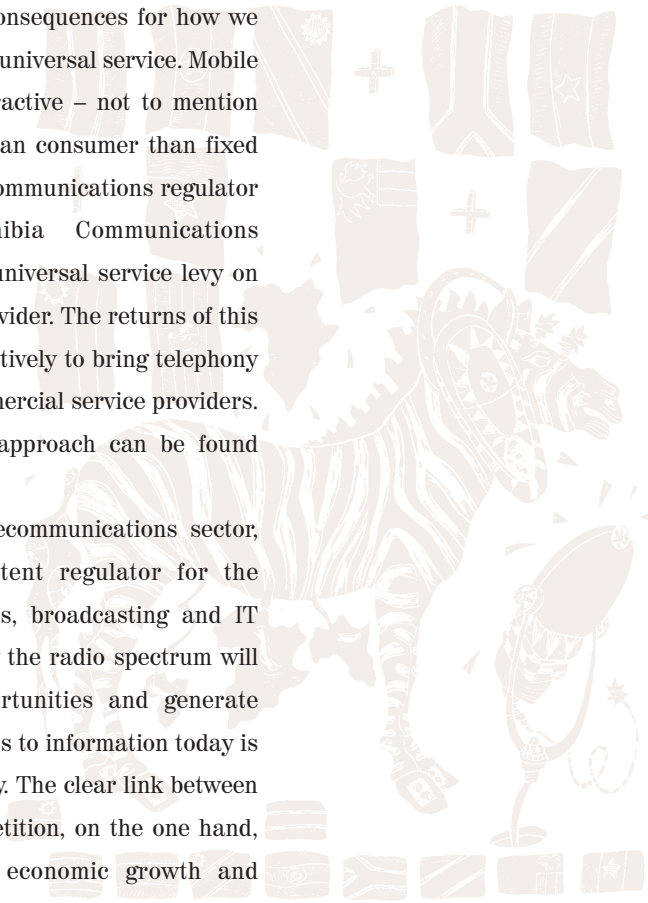

Chapter 8: Rwanda

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Christoph Stork, Namibian Economic Policy and Research Unit

National Indicators	
Country	**Rwanda**
Population	8.2 million
Literacy	69%
Urbanisation	6.4 %
GDP per capita	US$210
Land surface (000 km²)	26

Source: Development Data Group, World Bank

BACKGROUND. The Rwanda national household and individual ICT user survey confirmed two major constraints to ICT development in Rwanda: low levels of telecommunications penetration, especially in remote areas, and the high prices of services, especially mobile. Though the findings of the Rwanda study are currently tentative due to data errors that have emerged, there is sufficient evidence that despite these constraints, there is considerable demand for communications services that could be turned into an opportunity, given an enabling policy and regulatory environments that will encourage investment in network extension and enhanced services.

There is enough political will from the highest authorities to support the development and integration of ICT in all levels of society, mainly by promoting the social and economic development of the country through the adoption of ICTs. This has been translated into different actions, including the ICT Policy Framework and the adoption of the NICI (National Information and Communication Infrastructure) Plan, but this has yet to be realised in terms of delivering affordable services to a significant number of the citizenry.

The major challenges preventing the development of ICTs in Rwanda include the lack of human resources, both on the technical and policy sides. This impacts on fundamental inputs for telecommunications, such as the shortage of electricity, which continue to hamper the country's development.

The current levels of access and penetration of ICT services in Rwanda is one of the lowest in the world for fixed telephony, the Internet and mobile. This is related to low income levels, especially in the rural areas. This, in turn, reflects and is compounded by the lack of basic infrastructure, including electricity and telecommunications.

DEMOGRAPHICS. Rwanda is a small, densely populated country in the east and central part of Africa, inhabited by about 8.9 million people with an area size of 26,338 sq km. The mountainous relief of Rwanda, and the human pressure exerted on its soil leads to erosion across the whole territory, especially in the western part of the country, which is very hilly and receives up to 1,800mm of rainfall per year. The arable area is 13,850 sq. km, which means that there are 643 people per sq km of arable land, making Rwanda the most densely populated country in Africa. The country's demography shows a rapid population growth of 2.9% per annum, which could bring the population to 16 million by the year 2020. The population is composed of very young people: the average age is 21, and about 63% of the population lives below the poverty line of US$1 per day (MINECOFIN, Socio-demographic survey, Department of Statistic, 1996 Projections).

REGULATORY STATUS. The government of Rwanda has created a multi-sectoral regulatory agency that covers the major sectors of the economy, including energy, telecommunications and transport. The Rwanda Utilities Regulatory Agency (RURA) started at the beginning of 2003 with very limited human resources and to date is not yet fully functional. The process of

building its capacity to be able to provide services in the various sectors will take some time. The major challenge to the Agency is its lack of capacity to regulate the telecommunications sector, as this is where the market is growing rapidly and competition has shown itself to have a great impact on the quality of service and prices, especially the Internet. The efficient operation of the Agency will definitely provide direction in terms of addressing telecommunications access and penetration issues by assessing ways of approaching universal access, interconnection pricing and practices, frequency spectrum allocation and management as the fundamental elements to enable fair access and affordability to ICT services.

Telecommunications Sector. There has been a significant extension of mobile services, fixed services and the Internet in Rwanda in the past three years. The network coverage of MTN-Rwandacell network is estimated at 70%, while the annual growth rate has been 25% since 2000. The new satellite telephone provider, Artel, is implementing rural telephony using solar and VSAT technology, but the performance and penetration rate is still low. Again off a very low base, Internet access resulting from this has nevertheless been promising. The major city, Kigali, and other urban areas are connected through leased lines, frame relay, ISDN or dial-up technologies, while the rural areas are still lagging behind with little access.

Major improvements are expected with the advent of the new telecommunications company, Terracom, which is a licensed ISP with an international gateway, and is implementing a fibre optic network backbone with wireless local loop access to reach out to potential users in the remote areas. It has already deployed fibre optic inside Kigali and is extending this backbone from Kigali to other major urban areas. In October 2005 the company won the privatisation bid for Rwandatel, the incumbent and owner of all the major telecommunications infrastructure in the country.

Internet Development. Internet access and penetration is increasing rapidly, especially in the capital city of Kigali and the other major urban areas. This is the only service where competition has played a key role in terms of lowering the cost of access and usage, increasing access, especially through cyber cafés, as many Rwandans cannot afford computers and the Internet in their households. A number of Internet access technologies with higher bandwidth, including ISDN, frame relay, VSAT and wireless options, are available for corporate and educational institutions.

The major change is expected to come from the education sector as the Ministry of Education is planning to acquire a significant number of computers, including 4,000 assembled computers for secondary and primary schools with an average of 10 computers per school and Internet access for each school with an average of 128 kbps bandwidth.

Market structure. The Rwandan market structure is in the process of moving from a mix of monopoly and competitive segments to more competition. The major change to take place in the first quarter of 2005 was the announcement on the end of monopoly status in fixed, mobile and the Internet. The two major companies that will now compete in both mobile and fixed telephony are Terracom and MTN-Rwandacell. Other existing companies such as Mediapost (an Internet service provider) and Artel (a satellite telephone company addressing rural access for fixed lines and the Internet) have not yet shown any signs of performance in terms of increasing their network coverage and penetration.

Looking at the development of the major telecommunications services available in Rwanda, mobile telephony has shown great success in the past four years. MTN-Rwandacell was able to cover 67% of the

country within that period with an annual growth rate of 15%. A second mobile licence has been issued to Rwandatel within the context of the ongoing privatisation process.

As for Internet services, this is most likely where competition will start to flourish through a number of new players on the ground and the variety of technologies available. The various price structures, depending on the technology, will make an impact on both penetration and usage.

ICT Market. Although in its infancy, the ICT sector in Rwanda is growing fast. ICT services are expanding in a wide range of areas, including training, networking, systems development, communications, user support and systems administration. Local and foreign business ventures are developing or distributing ICT services and products. There are already local assemblies of computers and software development.

The sector was estimated at US$30 million in 2001 with a growth rate in excess of 10%. As the table below shows, central government reports the highest levels of ICT engagement, while large businesses are concentrated (83%) in the lowest two levels. SMEs are the most evenly distributed across the spectrum, reflecting the varied conditions under which they operate. Although much of the initial domestic stimulus for ICT service industries continues to come from government and public sector expenditure, the government is sending a clear message, in the process setting a course for the private sector as well.

Insufficient infrastructure still remains the biggest impediment to ICT development. Overall teledensity remains very low in comparison to global figures, particularly in the rural areas. However, there is steady growth, fuelled mainly by the introduction of new technologies (especially cellular and wireless communications). Currently, the privatisation of Rwandatel is expected to further stimulate the rollout of services.

An optic fibre backbone has been laid in Kigali and will soon be extended to the provinces. The combination of fibre and wireless local loop will facilitate ongoing rural telecommunications projects. Connectivity in government has improved as part of the e-government flagship. Most ministries have local-area networks (LANs), some spanning entire buildings and others connected to wide-area networks (WANs). The next step is to improve government services through the use of ICTs, and that's where e-government comes in.

- Rwanda Internet Exchange Point (RINEX): The Rwanda Internet Exchange Point was established in June 2004 and officially inaugurated by the Prime Minister in July 2004. RINEX now allows ISPs in Rwanda to exchange domestic Internet traffic without having to send data across multiple international hops.
- Computers for schools: RITA also entered into partnership with ComputerAid International, which saw the delivery of 450 refurbished PCs and 18 printers for distribution to schools. Microsoft donated the software for these computers under the Partnership-In-Learning (PIL) Memorandum signed by the Minister for Education earlier in 2004.
- Rwanda (.RW) country code domain: The technical administration of the Rwandan country code (.RW) top level domain continues to be delegated to a resident of Switzerland. RITA has initiated the re-delegation process through the Internet Corporation for Assigned Names and Numbers (ICANN). Budget for a server, software as well as training to establish a local internet registry has been obtained from UNDP.

RITA is collaborating with stakeholders to build the required technical capacity to enable local management of the country domain as soon as possible.

POLICY REVIEW. An ICT Policy document was adopted by the Cabinet in the year 2000 after two years of consultations with various stakeholders, including government and educational institutions, the private sector and international organisations. The ICT Policy states the visions and strategies for transforming Rwanda's predominantly agricultural economy into a knowledge-based economy through the adoption and development of ICT and its applications.

The principal policy instrument for the transformation is the National Information and Communication Infrastructure (NICI). NICI is supplemented by a comprehensive blueprint with a series of specific initiatives for achieving the policy objectives. The blueprint serves as a strategic vehicle for the transformation, in line with Rwanda's Vision 2020. The first quarter of the blueprint covers the period 2001-2005 and is anchored on eight pillars, namely human resources, ICT infrastructure, e-government, community access, ICT in education, legal and regulatory provisions, private sector facilitation and foreign direct investment, all which aim at promoting ICT.

At this stage, Rwanda is currently moving towards the end of the first NICI Plan and there is a need to review the NICI process and make sure that the current ICT development activities are in line with the first NICI Plan. The first and second NICI Plans have a special focus on human resources development and infrastructure provision, while the third and fourth NICI Plans will focus on the absorption of ICT into the various social economic sectors. Looking at ICT development, there are a number of ongoing ICT activities that fall into the NICI Plan, especially the training of ICT users at all levels and the provision of infrastructure mainly for educational institutions (primary, secondary and tertiary) and government institutions as well. The major gaps at this point include the low level of coordination amongst the various institutions, which results in a low level of partnership amongst ICT stakeholders, and a situation in which the private sector players have not yet started taking the initiative, despite incentives that the government has put in place to encourage private investment in all the development sectors and in ICT in particular. These incentives include the government deciding to exempt ICT equipment (including electrical equipment) from import taxes and the creation of the Rwanda Investment and Export Promotion Agency (RIEPA), a very aggressive agency promoting local and foreign investment by ensuring that the potential investors get accurate information and benefits from the various government incentives.

RITA will continuously review the operating environment to identify obstacles to the development of ICT and to propose necessary changes. While RITA is confronted with numerous challenges, it will need to strengthen its internal capacity, especially its skills mix, operational modalities and strategies.

Insufficient human resources have been identified as a weak link in the NICI Plan implementation chain. Hence there is a dire need to focus on training and retention of core professionals with technical capabilities to provide and maintain ICT infrastructure and services. Changes in personnel practices, including compensation, are necessary to support the recruitment and retention of ICT professionals. These changes include providing flexible career and compensation options. Infrastructure development, particularly connectivity, is a prerequisite to the success of the NICI plan. It is essential to increase support for infrastructure development, perhaps by redirecting available resources to crucial under-funded areas.

HOUSEHOLD AND INDIVIDUAL USER SURVEY

The survey in Rwanda started in June 2004 through a

pilot conducted during the training of local supervisors. The final survey took place between October and November 2004 and involved 930 households around the country with three major geographical areas: the main city of Kigali, major urban areas and the rural areas. The individuals represented within the households reflected the Rwandan population in terms of gender, with 51.5% of those living in the sample being female, and the remaining 48.5% male. The age profile of the individuals similarly matched the general population, with the highest percentage (11.6%) falling between the ages of 15 and 19 years of age, followed by those between 20 and 24 (9.1%), 15 and 29 (32.4%) and 30 and 34 years (10%).

Around 18% of those represented in the sample were recorded as household heads, with over one-tenth (12.1%) reportedly spouses or partners of the head. Almost half (46.5%) were children of the head, while 2.3% were grandchildren.

The results presented in the chapter are only representative of the respondents and cannot be extrapolated nationally due to a sampling bias that could not be rectified through weighting; however, the findings are shared as they nevertheless provide some insights into the access and usage patterns of Rwandans.

Overall access to ICT services in Rwanda remains very low. The current total number of main fixed lines is 23,000 in a population of nearly around eight and half million people. Mobile subscribers exceed fixed by some distance, at 240,000, while the number of Internet users in terms of email address owners is estimated at 30,000.

PUBLIC PHONE USAGE. Public access can be divided in three categories: the public phone kiosks that are operated by major telecom operators such as Rwandatel, Artel and MTN-Rwandacell; the private phone businesses that are managed by individuals either using Rwandatel fixed lines, Artel or MTN-Rwandacell cellphones known as "Tuvugane", meaning "Let's talk"; and lastly, telecentres that offer Internet and public phone access through any of the above operators.

In terms of penetration, telecentres or community access centres are almost non-existent in the remote areas, while the private phone business, especially Tuvugane, has grown rapidly since its launch. There have been some attempts to establish community-based telecentres around the country, but there have been major issues around their financial and technical sustainability. VoIP services are not regulated, but have not yet been widely implemented. There are a few cyber cafés, mainly in Kigali, offering VoIP, but it is still very limited. Interestingly, the Terracom consortium is currently testing VoIP through its Internet network and is planning to offer a package of voice and data services to its Internet customers. The hope is that in those remote areas where it has been difficult to deploy telephone access, VoIP will ultimately be deployed using a wireless technology such as WiMax.

Figure 8.1 confirms the lack of community public access or telecentres, especially in the rural areas, while Figure 8.2 shows a high penetration of private telephone kiosks in metro, urban and rural locations, with a lower penetration for rural areas that can be attributed to limited network coverage .

A significant 44.5% of public phone users possessed a mobile phone, and of all mobile phone users interviewed, 78% used public phones as well. This indicates that public phone usage is less an access and more a cost issue. The public phone service on offer in Rwanda is cheaper to use than mobile, and people use them when they do not have the money to recharge their airtime. It is worth noting that public phone usage in Rwanda is high regardless of whether or not people have access to another phone, even at work. Among those that do not have access to a phone at work, 80.74%

used public phones, while 76.2% of those with access to a phone at work use public phones.

Cost and convenience are the main factors that influence the choice of public phone. The private telephone kiosks are very popular in the whole country, due mainly to the various options available and the flexibility of payment. This includes being able to pay in cash, where telephone cards are required for public phones, but are frequently unavailable.

MOBILE PHONE USAGE. Mobile services have grown rapidly since their launch in 1998. The service is still provided by only one operator, MTN-Rwandacell, but competition is expected through the new mobile service to be launched in the near future by Terracom-Rwandatel. The introduction of mobile has been hugely successful in the country, as fixed telephone services have failed to meet the market demand, even though the cost of mobile usage is still high for most people. The hope is that competition will drive down costs, thereby increasing the number of users. The lower-cost mobile service, Tuguvane, has made a big impact in terms of providing access to lower-income people who cannot afford to own a mobile handset. The lower unit price of this new service gives more people the opportunity to make calls, especially from remote areas to their friends and relatives living in the major urban areas.

The majority of respondents got their first mobile phone during the last three years, when services really began to take off in Rwanda after a slow start in 1998. More than 90% of respondents only own one handset, while 42.7% have only ever owned one handset.

In terms of others using respondents' cellphones, in only 10% of cases did they share their mobile regularly with family members, and only 2.7% with their friends.

SMS USAGE. Female respondents send and receive marginally more SMSs weekly than male respondents. SMS usage is also clearly related to personal income of respondents, with more affluent users using SMS the most. This may also correlate with literacy and education. In line with international trends, the age group of 19 to 35 uses SMSs most.

BEEPING About 37% of respondents with a high personal income (above 75,000 cedes) regularly receive missed calls but only 9.3% give them. Respondents with lower personal incomes are more likely to give missed calls.

As can be seen in figure 8.6, the rate of mobile usage in terms of receiving and making calls from the respondents is very high, despite the high costs of use. The cost of calls remains a major issue that prevents

Figure 8.1: Public phone usage

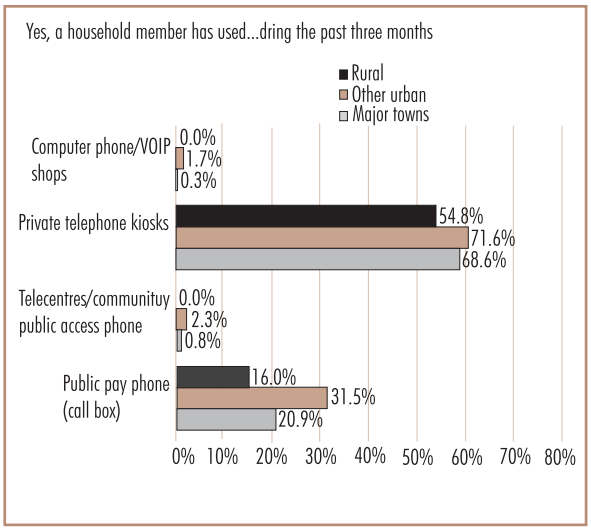
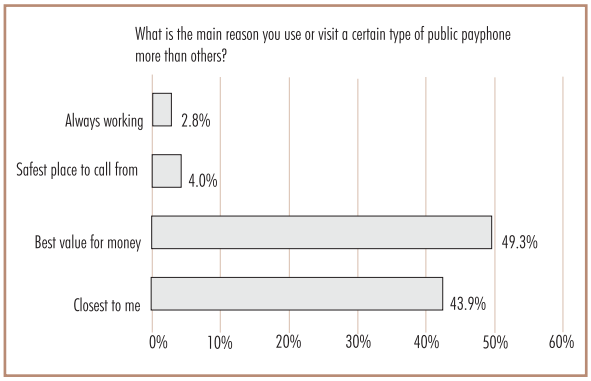


Figure 8.2: Reason for usage of one form of public access over another.



users from making even more calls. MTN-Rwandacell has been enjoying a monopoly for the past six years and very little change in terms of lower prices has occurred during that period. Most people interviewed said they were ready to change their service provider if a new one came onto the scene because of the high costs of mobile usage. MTN argues that there have been some improvements through the offering of various lower entry pricing schemes, but it also raises the issue of electricity shortages that impact on usage. This is clearly a strategy to prepare for imminent competition.

The majority of mobile users are either unhappy or only sometimes happy. Four years ago, MTN's network was very unstable, with minimal network coverage, which was frustrating and prompted users to call for a new mobile service provider to compete with MTN. In the past three years, MTN has dramatically improved its services, both in terms of network coverage and value-added services. MTN is currently the sponsor of a series of major events taking place in Rwanda and provides a number of prizes during various competitions, so the image of the company has improved, which is reflected in the responses received. In terms of responding to user' needs, MTN has launched a number of franchised business centres around the country that are managed by private owners. These centres offer a variety of services including mobile spares, mobile repair and the sale of airtime vouchers.

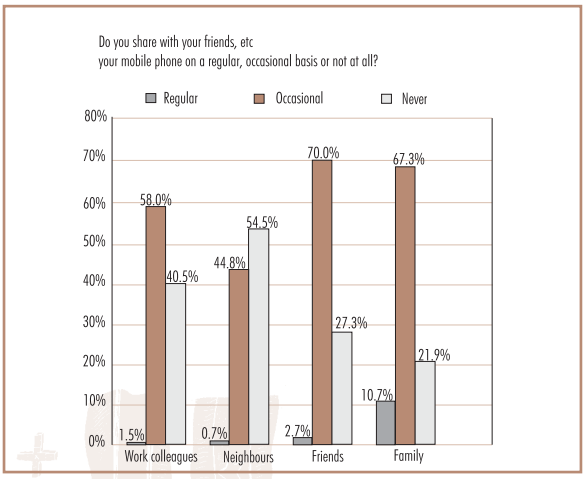


Figure 8.4: Shared usage of phones

INTERNET USAGE. The number of respondents using the Internet is miniscule, despite the prioritisation of it in national development strategies. Predictably, the limited nature of the national backbone, together with the unmet demand even in areas to which the network extends, impacts negatively on Internet penetration.

The major Internet access points are cyber or Internet cafés that are very competitive in terms of price and quality of service. There has been an increase in the number of cyber cafés around the country, especially in

Figure 8.3: Mobile phone uptake

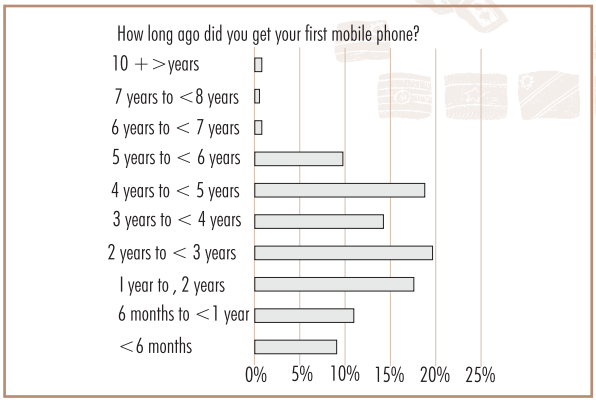


Figure 8.5: Relation of gender and income to cellphone usage

		Average number of SMS or text messages sent weekly	Average number of SMS or text messages received weekly
Gender	Male	4.9	5.6
	Female	5.6	7.9
Personal Income	Income below US$9.1	1.4	1.4
	between US$9.2-US$45.3	3.2	4.6
	between US$45.4-US$136	5.4	7.9
	Income US$137 or more	6.8	8.4
Age	18 years or below	2.7	3.4
	between 19 and 35	6.1	8.6
	between 36 and 55	4.9	5.4
	56 and older	3.1	3.8

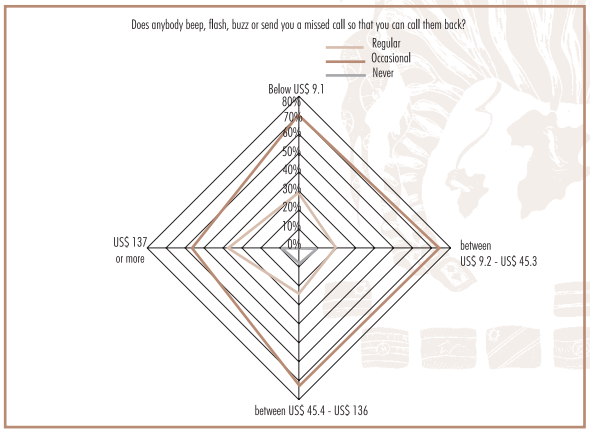


Figure 8.6(a): Incoming beeping in relation to income

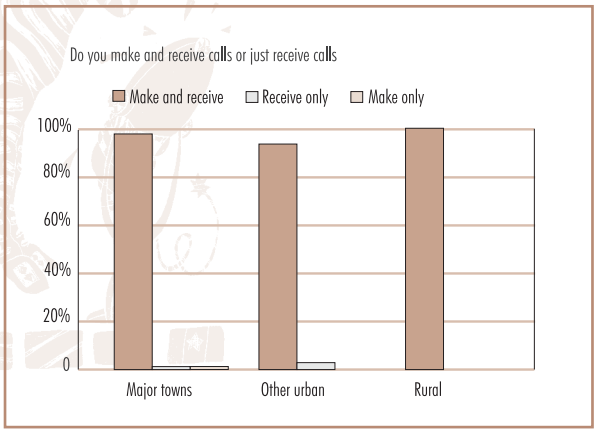
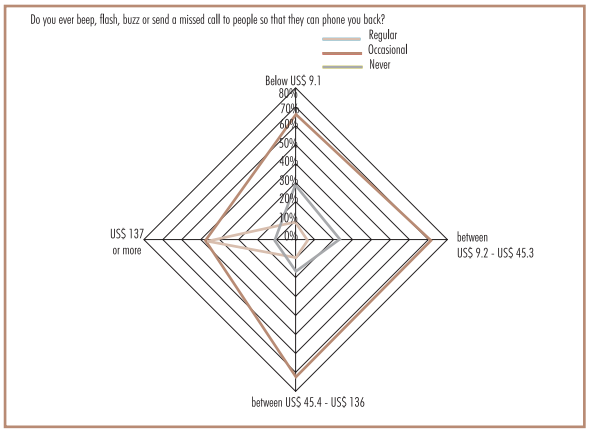


Figure 8.7: Sending and receiving calls

the major city of Kigali and other urban areas. Despite the shortage of electricity, the number of cyber cafés continues to grow and prices have been continuously decreasing due to competition and the availability of connectivity options, such as wireless local loop, that the major service provider Terracom is offering.

Of all respondents that used the Internet, only 14.2% use it at their own home or at the home of a friend or colleague. More than 50% used cyber cafés and 30% used computers at school or work. Unlike mobile and fixed telephony, Internet usage requires a level of literacy, which is why most Internet users are between the age of 16 and 35 and live in urban areas.

Figure 8.6(b): Outgoing beeping in relation to income

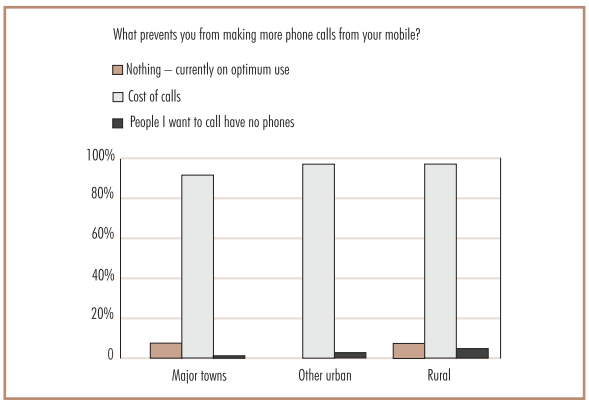


Conclusions

While overall ICT access and usage is still very low in Rwanda, the growth rate of access and usage to the emerging ICT services is rapidly increasing despite the shortage of electricity, the high cost of usage (especially for mobile) and the lack of connectivity in remote areas that prevent ICT access from taking root.

With Rwandatel's recent privatisation, there is great hope that the two major operators, MTN and Terracom, will start competing in the mobile arena and that this will lead to the reduction of costs and increased access. As for the Internet, Terracom is now leading the market, and the fear is that the market will not grow unless a new big provider comes into play.

Figure 8.8: Reasons for not making more use of mobile services



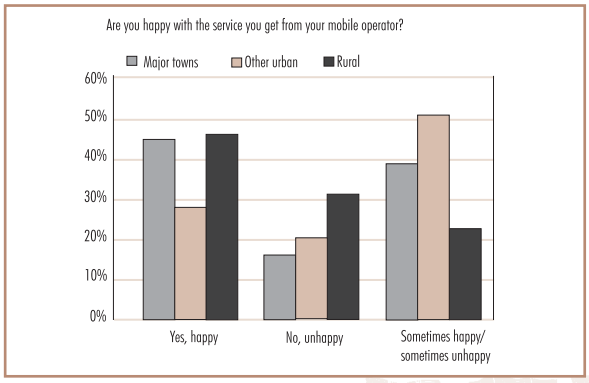


Figure 8.9: Quality of service of mobile operator

Fixed telephony is unlikely to grow for the time being, as there is no sign of competition. If VoIP succeeds, one may expect that public payphones, kiosks and corporates will be the major beneficiaries of this new service.

The political will to boost ICT access and usage is playing a key role in terms of creating an enabling environment for ICT to take off. A number of projects and programs that are supported by the government and international donors are in place, and are mainly aimed at deploying ICTs in the various segments of society. However, for Rwanda to attract the potential private investors that are needed to extend the backbone and provide the "last mile" in terms of access and usage, there are some critical issues that need to be addressed. These include basics such as increasing access to electricity and the development of human resources critical to building a network economy.

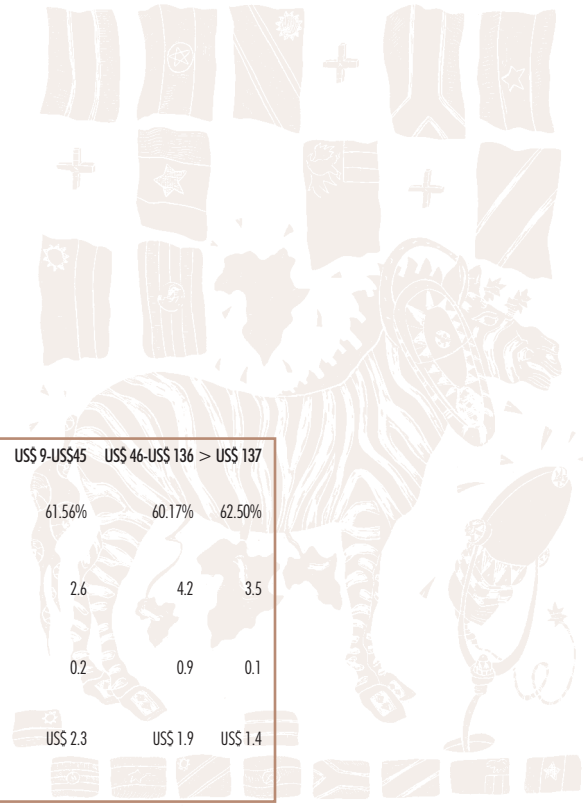
This is a particular challenge for the regulator, which despite its progressive outlook, is severely constrained in its ability to regulate the sector competitively.

Within this context the main lessons from the study include:

- There is a tremendous gap between the capital city, Kigali, and the rest of the country in terms of access and penetration of ICT services, particularly for fixed and mobile telephony. Some of the reasons include low levels of income and a lack of basic infrastructure, such as electricity and connectivity, that is needed for the deployment of ICT services.
- Despite the high cost of mobile services, respondents value the access and flexibility they provide and are willing to pay to own or use them.
- Due to the high cost of mobile services and the relatively low ownership levels outside the urban centres, residents remain highly dependent on alternative communications methods, although these remain limited due to the continued absence of a backbone outside of the major centres.
- Due to high costs associated with mobile, those with access to mobile phones use multiple modes of communication even when they have credit on their phones, most predominantly public access phones. Of these, private phone kiosks are most popular due to their relative pervasiveness and convenience, but also because of the flexibility of their payment schemes, and particularly the acceptance of cash. The cards required for RwandaTel pay phones are frequently not available.
- The deployment of Internet services through cyber cafés and the development of public payphones or kiosks around the country has had some impact in

Figure 8.10: Usage of Internet services in relation to age

	18 or younger	between 19 and 35	36 and older
On average, what percentage of time spent online at an Internet café or cyber café is spent for emailing as opposed to browsing?	65.19%	66.35%	56.51%
On average, how many times a week do you use an Internet cafe or cyber café for emailing or browsing?	3.39	2.60	3.27
On average, how many times a week do you use an Internet café or cyber café for playing computer games?	2.22	0.27	0.47
On average, how much money do you spend per week when using an Internet café or cyber café for the purposes of emailing or browsing?	US$ 1.3	US$ 1.7	US$ 1.4



Personal income	< US$ 9.1	US$ 9-US$45	US$ 46-US$ 136	> US$ 137
On average, what percentage of time spent online at an Internet café or cyber café is spent for emailing as opposed to browsing?	64.67%	61.56%	60.17%	62.50%
On average, how many times a week do you use an Internet café or cyber café for emailing or browsing?	2.5	2.6	4.2	3.5
On average, how many times a week do you use an Internet café or cyber café for playing computer games?	2.5	0.2	0.9	0.1
On average, how much money do you spend per week when using an Internet café or cyber café for the purposes of emailing or browsing?	US$ 1.5	US$ 2.3	US$ 1.9	US$ 1.4

Figure 8.11: Usage of Internet services in relation to income.

terms of providing access to the general public but current the numbers of users remains very small. It is anticipated that with the introduction of the new operator, its intention to deploy low-cost wireless based VoIP services access through cyber cafés will improve and provide an important alternative to other types of voice services such as fixed and mobile. ❑

Chapter 9: South Africa

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National Indicators	
Country	South Africa
Population	43.6
Poverty (% of population below $1 a day)	n/a
Adult literacy rate (% ages 15 and over)	86
Urban population (% of total population)	58.4
GDP per capita (US$)	2,293
Surface area (000 km^2)	1,221

POLICY AND LEGAL FRAMEWORK. South Africa's well-developed communication sector, relative to the other countries reviewed, is often assumed to reflect positively on policy and regulatory reform over the last decade. It is far more likely, however, to reflect the country's considerably higher GDP per capita of US$4,668 in 2004 (World Bank 2004) – generally associated with more developed economies and a higher level of skills – rather than the success of its communications policies. In fact, despite the progress evident in South Africa's ICT indicators between 1996 and 1998 – following the historic regime change in South Africa in 1994 and the introduction of mobile services into the sector – the gap between South Africa and the global average on a range of ICT indicators has grown since then (Sciadas 2005).

During the past decade, the South African telecommunications sector has been in a process of "managed liberalisation". The passing of the Telecommunications Act in 1996 established a sector regulator and allowed for further mobile network competition and the partial liberalisation of value added network services (VANS) and private telecommunication networks (PTNs). In 1997, the incumbent fixed line operator, Telkom, was partially privatised. This was secured through the extension of its monopoly for a further five years.

In preparation for the second phase of reform, the Telecommunications Amendment Act was passed in 2001 to legalise a second fixed network operator, further mobile competition and create a new category of under-serviced area licences to salvage the unsuccessful roll-out of services into economically marginal areas during the exclusivity period. The Act further granted a multimedia licence to the incumbent broadcasting signal distributor, together with an international gateway licence. The Amendment Act also sought to introduce a number of competitive measures such as carrier selection and number portability.

In the absence of an effective competitive framework, due to licensing delays in both the second network operator and the under-serviced area licences, the Ministry of Communications in September 2004 announced a set of policy directives that were to have ameliorated the situation through further liberalisation of the services market. The directives, which have been hailed by industry, allow mobile, VANS and PTN operators to re-sell their excess bandwidth, optimising available capacity and hopefully resulting in reduced prices and increased choice for users and consumers. The regulator and the industry also interpreted the directives to permit VANS to self-provide facilities, although the Ministry provided a dissenting interpretation in a press release issued the day before the measures were to come into effect on 1 February 2005.

The policy directives also further deregulate public payphone provision and introduce a 50% "e-rate" discount for Internet connectivity to all public schools. The new policy directives, welcome as they are in terms of opening up the sector to greater competition, have

severe implications for recent entrants to the market and those still awaiting licences.

Once the liberalisation of self-provisioning and resale of bandwidth is enabled on both the demand and supply side, greater choice and cheaper prices for VANS and ISP services should result, but this is likely to be primarily in urban areas, since rural areas continue to be perceived as uneconomic, especially in the light of the diminishing business case for under-serviced areas licensees (USALs).

METHODOLOGY. This is the policy and regulatory context in which the research described below was conducted. It was based on a triangulation of three methodological approaches that included a background desktop study, a quantitative survey and qualitative survey conducted over an 18-month period.

The desktop research resulted in the South Africa ICT Sector Performance Review (2004) and entailed the compilation and analysis of all ICT sector-published data, enabling a supply-side analysis of the ICT sector in South Africa. However, although this has historically been the case, no analysis of ICT can be based on supply-side factors alone, and therefore research and analysis into the demand side was undertaken. A national household and individual user survey was undertaken in 2004, allowing for a demand-side analysis of the same ICT sector. However, this study, based on a quantitative survey administered to 1,743 households and 6,586 people, was largely a close-ended modularised questionnaire and was limited in terms of its findings. Specifically, it did not allow the researcher to probe for and gain a better understanding as to why certain processes occur, namely the reasons (and dynamics) influencing decision-making for those issues that impact on adoption and changes of telecommunications and how usage patterns of different telecommunications develop and change over time. In addition, the quantitative survey produced certain findings that were difficult to interpret, so it was decided to test the findings of the quantitative survey by undertaking a qualitative survey to be administered against a similar sample of ICT users as the quantitative survey.

A total of 159 ICT users participated in 19 focus groups administered around the country to ensure a requisite spatial spread of urban and rural areas, which kept as close as possible to the EAs selected for the quantitative survey. For each focus group, a list of possible candidates meeting the required criteria was drawn up, from which a sample of 10 was selected and invited to participate. On average, 8.4 participants attended the focus groups. Two teams, each led by a researcher involved in the 2004 quantitative survey, undertook the research during a one-month period in mid-2005.

The telecommunications sector in South Africa continues to be characterised by relatively high retail prices, super profits, job losses, licensing delays and deadlocks with minimal new foreign investment in the sector. So significant a growth sector is the communications sector that despite the drag inefficiencies the telecommunications sector may be placing on the overall economy, the South African telecommunications market has continued to grow way above the national economic growth rate – at an estimated rate of 14% between 2003 and 2004, with estimated total revenues of R78 billion for the year ending 2004 (only for operations within South Africa). This contributed around 5.1% to GDP in 2002, which represents a marginal decrease on the previous year's 5.4% (ITU 2004 and Annual Reports). While this is not a poor contribution to GDP by lower-middle-income country standards, the fact that the contribution of this globally expanding sector is not increasing suggests that the sector may not be operating optimally.

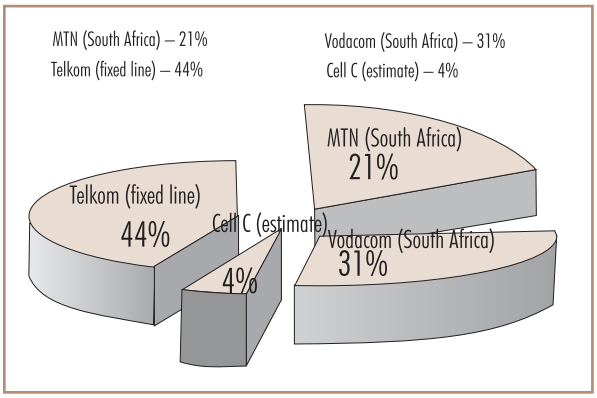
South Africa

South Africa

Mobile is the fastest-growing segment of the telecommunications market. Total revenues for the mobile sector in 2003 grew at a rate of well over 20%, with Vodacom and MTN declaring significant profits (EBIDTA) of R7,536 million and R4,522 million respectively in their local operations (Vodacom and MTN Annual Reports 2004). A new trend, however, in this low ARPU market is the emergence of declining margins. In the second quarter of 2004, Vodacom announced further subscriber growth but declining ARPUs from an average of R177 to R164 per month (ITWeb, 28 July 2004). The new entrant to the mobile cellular market in 2002, Cell C, continues to make gains, but with only just over two million subscribers, it is unable to compete head-on with the incumbents.

While shareholders have seen significant value-add over the past few years, consumers are the ones that have paid for the largesse of the listed telecom companies. For the national economy, the high prices of both mobile and fixed line have retarded economic growth and, arguably, added to the inflationary environment of the last few years The success of mobile appears to have come at the cost of the development of a "data divide" between those with access to the Internet and the benefits it provides and those without access. (See Figure 9.1)

Figure 9.1: Telecommunication sector market share by network operator



ACCESS. While the incumbent operator, Telkom, announced super profits of R4,592 million and dividends for shareholders[1] in 2004, total fixed teledensity continued to decline, though at a slower rate than the previous year. Retaining the current 4,821 million subscribers (2004) followed efforts by the incumbent to allay political anxiety after a loss of a further 80,000 subscribers in 2003. This drop came after a spike in prices in 2002, officially the last year of Telkom's exclusive provisioning of voice services and facilities. This was on top of a net reduction of 672,000 connections since 2000, when prices first began to increase dramatically.

The latest 2001 census figures indicate more conservative penetration rates, with 1.1 million households having only a phone in the dwelling, while nearly 1.6 million have both a phone in their dwelling and a mobile phone and just over two million households have cellphones only. About 4.3 million households are near to a public payphone while more than 670,000 continue to have no access to telephony (Stats SA 2001). On average, 46.9% of households in South Africa have access to telecommunications, both fixed and mobile (Stats SA, 2003). This figure is lower than the average for other lower-middle-income countries, which average household penetrations of 49.4% (ITU 2003:189).

What is clear, nevertheless, is that poor fixed line access was compensated for by continued mobile growth, with the total number of subscribers in 2004 estimated to be over 19 million despite relatively high prices. Pre-paid services, prompted by the threat of competition to the incumbent duopoly in 2001, have been a key driver. According to market research firm BMI-TechKnowledge (2003), the pre-paid market in South Africa today makes up more than 75% of cellular subscribers, and more than 90% of new connections are pre-paid. Indeed, third mobile entrant Cell C estimates

that 98% of its subscribers are pre-paid users. These figures are in line with the experience throughout Africa, where BMI-T estimates that between 90% and 95% of cellular customers are pre-paid.

VANS. Despite being dominated by Telkom, the VANS market in South Africa is both large and varied, with a market value of an estimated R3.3 billion (Gillwald and Esselaar 2004), not including Telkom. Telkom's 2004 Annual Report states that its data business revenues were R4.1 billion, putting the total value of the data services market at R7.4 billion – equal to the size of the total market in 1992, when the process of liberalisation began. While Telkom's data business line item in its Annual Report may not correlate exactly with its VANS activities, a 58% share of the revenues generated in the data services market would indicate that its value-added services market share is significant and increasing by more than the independent VANS operators.

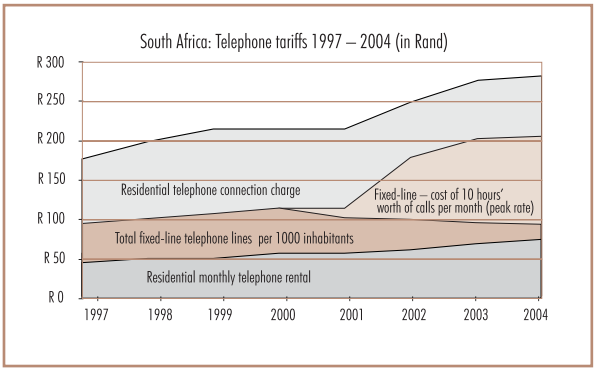
While this segment of the market is critical to the development of a knowledge economy and generally the area of innovation, it is highly dependent on affordable bandwidth to flourish. It generally requires high-level skills though value-added applications, for example, in call centres, which could create significant job opportunities if other critical factors are in place.

INTERNET. Internet penetration in 2004 (compared to 2003) continues to plateau, with penetration only increasing by 6% to an estimated 1.1 million dial-up subscribers (Goldstuck 2004). While South Africa's Internet penetration has followed the standard path of technological adoption – which is weak initially until a critical mass is achieved, followed by subsequent explosion in growth, which then reduces as the market gets saturated – the tapering off coincides precisely with the dramatic increase in tariffs in 2000. Nielsen NetRatings (2001) attributed the fairly short time spent online relative to countries with similar penetrations to the relatively high Internet access charges, even before the more dramatic Telkom increases in 2002 and 2003. Of the total basket of costs that a consumer pays for Internet access, around 78% of the costs go directly to Telkom in the form of dial-up access call charges. This figure increases to 84% when line rental is included (Gillwald and Esselaar 2004). The effective doubling of the local-call price by Telkom since privatisation has had a huge impact on the cost of Internet services, and evidence suggests that as long as dial-up costs remain this high, Internet penetration will be stunted.

BROADBAND. In comparison to other lower-middle-income countries, South Africa does not have a broadband market. Only 25,000 ADSL subscribers have signed up since the introduction of the service in 2002. The costs of ADSL remain high and Telkom has been marketing its ISDN services aggressively. ADSL lines are only likely to increase with the introduction of competition (and thus the introduction of the SNO), as has been the experience in Europe, where there has been a strong increase in broadband access as a result of the threat of competition.

COLLECTIVE ACCESS POINTS. There are currently 981 collective access points such as cyber cafés, MPCCs, post offices, digital villages and telecentres now

Figure 9.2: Relation between fixed-line telephone charges, churn and mobile growth



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available with variable usage (Thomas 2004). With fixed line prices so high, cyber cafés have not penetrated throughout the country, with two of South Africa's nine provinces without any commercial access points. The high price of fixed line access translates into an average cost per hour in commercial cyber cafés of around R27 (Thomas 2004).

PRICING AND AFFORDABILITY. The failure to bring on line the second national fixed line operator and the de facto continuation of Telkom's monopoly, both in retail fixed services and in wholesale facilities provisioning, is cause for concern. Local call prices have nearly doubled since the privatisation of Telkom, despite significant efficiency gains within the privatised incumbent, resulting in it nearly halving its labour force to 32,934 since 1997 (Telkom Annual Reports).

Concern that telecommunications, amongst other input costs, was contributing negatively to the high cost of business in the country prompted the Treasury to commission a comprehensive report on administered and regulated prices, which concluded that there might be excessive prices in sectors such as telecommunications[2]. An independent international comparison of prices commission, as part of a study on Telkom by its unions, found that telecommunication prices were excessively high, particularly after adjustment for purchasing power parity, and as such, were a major obstacle to economic growth, wealth creation and creation of employment opportunities (Efficient Research 2004: iii). A further report commissioned by the South African Foundation found that there was clear indications that "Telkom's pricing structure is excessive and that some sort of intervention in the market may therefore be appropriate" (SA Foundation 2005: 15).

INVESTMENT. While the level of telecommunications investment per capita can fluctuate significantly from year to year as major capital projects are begun or completed, the figures provide an idea of the commitment of countries to expanding their networks and joining the information society. Foreign investment in the telecommunications sector, however, continues to be static due to the interregnum in the regulatory and licensing environment. Continued investment in network extension and upgrading has been largely domestic, with the mobile sector providing a combined estimated investment of R3,700 billion, compared to a total capital investment by Telkom of R3,862 billion.

With investment reflecting the dynamism of the sector and providing an indication of progress towards creating the infostructure needed to service a modern economy, at US$15.7, South Africa's telecommunications investment per capita is relatively low when measured against other middle-income countries such as Argentina (US$24), Mexico (US$31) and Poland (US$35)

It should be noted, however, that with the exception of Mexico and Morocco, South Africa has significantly fewer total telephone subscribers per capita than the other middle-income comparison countries, and one would therefore expect to see higher investment rates if this gap were to be narrowed. The extent, quality and price of the backbone infrastructure is a significant consideration for investors wishing to offer services exploiting the backbone facilities, and, indeed, for investors in other sectors requiring high-volume, low-cost, guaranteed services (Gillwald 2004).

EMPLOYMENT. As indicated in the SA Standard Industry Database, after rising from about 85,000 in the early 80s to peak at about 110,000 around 1990, employment in the communications sector (postal and telecommunications) has steadily declined to below 80,000 in 2003. The rate of employment in the telecommunications sector plateaued in the early to mid-1990s, but fell sharply between 1997 and 1999 (Quantec SIC 75). Although this reflects job losses in the

entire industry, it does coincide with the privatisation of Telkom and the cutting of over 23,000 jobs between 1998 and 2004 (Gillwald and Esselaar 2004).

The decline in employment numbers more or less echoes that of the economy more generally, which rose to 8.2 million in 1990, but then declined sharply to only 7.4 million in 2003 (Quantec SIC 75). While the decline in numbers in the telecommunications sector, from 99,945 in 1994 to 77,347 in 2003 is more dramatic, it in fact diverges slightly between 1999 and 2002, buoyed no doubt by the pre-paid growth of the mobile industry prior to the introduction of further mobile competition with the licensing of Cell C in 2001. The continued sharp decline from the modest rise between 1998 and 2002 reflects the continued efficiencies in the sector and the absence of the anticipated new entrants. The number of fixed lines per employee went from 83 in 1998 to 149 in 2004. Efficiencies inherent in mobile technology mean that mobile networks are far less labour-intensive than fixed networks, and operated on average with 2,200 lines per employee in 2003.

Demand-Side Analysis

The following section of the report is based upon a national survey conducted during 2004. The survey plots household (and individual) usage of mobile, fixed line and public telephony and Internet usage. An average of three persons was interviewed in each of 1,743 households, making for more than 6,700 interviewees. Combined with household income, the communication indicators collected enable a serious analysis of the state of communications access in the country. The survey was further enhanced by a series of focus groups that provide a much greater understanding of the decision-making processes of the South African ICT consumer. This was undertaken via the administration of 19 focus groups administered around the country to ensure a requisite spatial spread of metropolitan, urban and rural areas, which kept as close as possible to the EAs selected for the quantitative survey. Once a list of possible candidates was chosen, a sample of 10 were selected and invited to participate. On average, 8.4 participants attended the 19 focus groups. The research was undertaken during a one month period in mid-2005 and the findings incorporated into the previous demand-side analysis.

In assessing the demand for ICT in South Africa, it is impossible to ignore the structural imbalances inherited by apartheid and therefore any analysis needs to ensure that these dynamics are accounted for. As such, it is imperative that race is still used when measuring demand, as would be the rural: urban divide. In addition, disparities are also found in terms of economic, technological, regulatory, informational and market factors, which impact differentially on diverse generic categories of user, namely age, wealth, vocation, education, distance from nodal point, etc.

This demand survey investigated household and individual access and usage of fixed phone, mobile, computer, home Internet usage and email address ownership penetration rate. In addition to the survey, focus groups were used to investigate how various telephone and email address ownerships came about, and details various aspects of usage, including cost, frequency and type of usage. Also, perceptions of subscribers, records of churn, ownership of handsets and SIM cards, as well as SMS texting and calling patterns were probed. The survey also investigated usage of public telephony and Internet outlets, probing for specifics of these including the type of outlets used, type of usage, expenditure and frequency. Finally, the process of decision-making, influential issues and future perceptions of change were also recorded.

Demographics. The quantitative survey sampled a total of 6,701 individuals living in 1,743 households in

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72 areas around the country, whilst the qualitative survey sampled 159 individuals in 14 different parts of South Africa. Both samples were distributed across major towns, including metropolitan areas (54%), other urban areas (24.5%) and rural areas (21.4%). Metropolitan areas and major towns include cities such as Bloemfontein, Cape Town, Durban, East London, Johannesburg, Pietermaritzburg, Port Elizabeth, Pretoria and Vaal Triangle. Other urban areas include George, Grahamstown, Kimberley, Klerksdorp, Newcastle, Polokwane, Port St Johns, Potchefstroom, Rustenburg, Sol Plaatje and Tzaneen. Rural areas include villages and rural areas such as Aurora, Bamshelle, Bushbuckridge, Emalahleni, Emfuleni, Flagstaff, Langeberg, Maluti a Phofung, Maphumulo, Matjhabeng, Mbombela, Nongoma, Orange Farm, Seme, Siyancuma, Thabazimbi, Thulamela, Tsolo, Umjindi, Umtshezi and Westonaria.

The individuals represented in both quantitative and qualitative surveys reflected the South African population in terms of gender, with 52% of those in the sample being female. The age profile of the individuals in the quantitative survey similarly matched the general population, with the highest percentage (11.3%) falling between the ages of 15 and 19, followed by those between 20 and 24 years (10.5%). This was followed by those between 25 and 29 and 30 and 34 (9.8% and 9.1% respectively). The qualitative survey had a slightly higher proportion of youth than would be recorded in terms of national proportions. This age profile is significant as mobile phone usage is increasingly taken up through pay-as-you-go options in these younger age cohorts.

A quarter of those represented in the sample were recorded as household heads, with over one-tenth (14.5%) reportedly spouses or partners of the head. Almost two-fifths (39.9%) were children of the head, while a little over another tenth (11.2%) were grandchildren.

The marital status of individuals can play an important role in the household economics and distribution of resources, including access to telephony. A little under half (48.2%) of all individuals in the sample were married at the time of the survey.

Of the 20 to 24 age cohort, 58.8% had completed secondary school, as opposed to 45.7% and 14.2% in the 25 to 49 and 50 plus age groups. A total of 6.9% of 20 to 24 year olds had completed tertiary education, compared to 4.3% over the age of 24. The opposite is reflected in terms of no education, with 21.6% and 14.5% of over 50s who had either never been to school or not completed primary education, as opposed to 2.5% and 3.3% under the age of 50.

One-fifth (20.2%) of the individuals had been engaged in full-time employment outside of the wider family, while only fractionally fewer (19.9%) were reportedly unemployed. This is again significant in influencing spending patterns and household financial allocation towards telephony and ICT expenditure. Indeed, the

Figure 9.3: Demographics

Age	%
<10	
10 – 14	9.7
20 – 24	10.5
25 – 29	9.8
30 – 34	9.1
35 – 39	8.3
40 – 44	7.1
45 – 49	5.7
50 – 54	3.5
55 – 59	2.5
65 – 69	1.6
70 – 74	1.5
75 – 79	.8
>79	.6
Total	100.0

Income	%
<R500	68.2
R501 – R1,000	11.2
R2,001 – R3,000	4.9
R3,001 – R4,000	2.0
R4,001 – R5,000	1.5
R5,001 – R7,500	1.4
R7,501 – R7,500	1.4
R10,001 – R12,500	.4
R12,501 – R15,000	.5
R15,001 – R20,000	.3
>R25,001	.1
Total	100.0

Location	%
Major town	54.0
Other urban	24.5
Rural	21.4
Total	100.0

Gender	%
Male	48
Female	52
Total	100

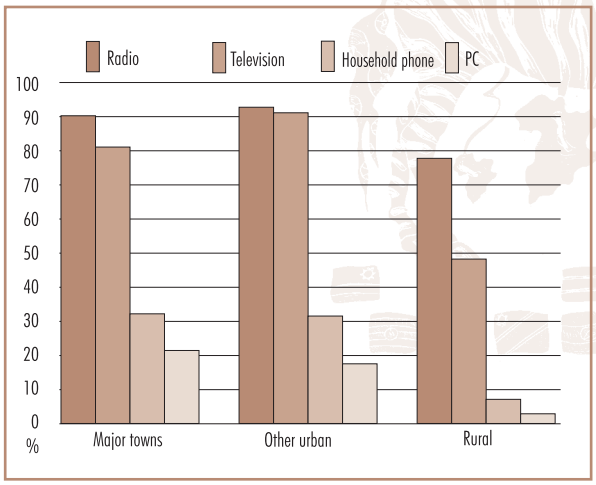


Figure 9.4: Penetration of various forms of communications

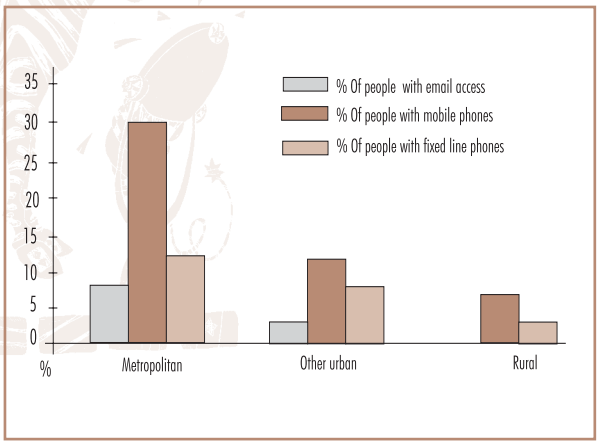


Figure 9.5: ICT access according to geographic location

employment profile of the individuals correlates strongly with the income patterns reflected by survey respondents. More than two-thirds (68.2%) of the individuals reportedly earned less than R500 per month, while more than another tenth (11.2%) earned between R501 and R1,000 per month. In total, more than nine out of ten (92.2%) individuals earned less than R3,000 per month. Even accounting for the students and scholars, who are by and large unlikely to earn an income, this reflects the exceedingly low incomes on which the majority of households have to depend. The median income per individual was just R1,500 per month.

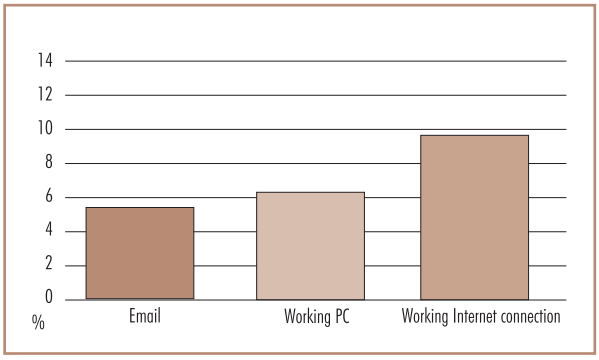
PENETRATION. In line with the latest 2001 national census figures of 24.4% of households having a fixed line telephone, the survey indicated that 22.1% of South African households have a telephone in the house. As anticipated, ownership is skewed to urban areas[3]. This includes any phone that is permanently in the home and includes mobile phones that are left in the home for general usage. Had this included only fixed lines, it can be anticipated that the figures would have been significantly lower, considering the reduction in fixed lines between 2001 and 2004 – particularly residential lines.

Nearly 55% of respondents in metropolitan areas have a phone in the house, while other urban areas have only 33%. This is considerably more than rural areas, where a little over 11% of respondents have a fixed telephone in the house. Mobile phones make up 11% of household phones in metropolitan areas, despite fixed services being widely available in these areas, while mobile phones were used as a household phone by 89% of respondents who had a household phone.

Only 4% of households have an Internet connection at home, or one that they can use at someone else's home. Overall, only 5.7% of all respondents have an email address.

If one compares this data and the ITU's percentage of Internet subscribers from 2002, South Africa's figure

Figure 9.6: Household member has an email address, working PC or Internet connection



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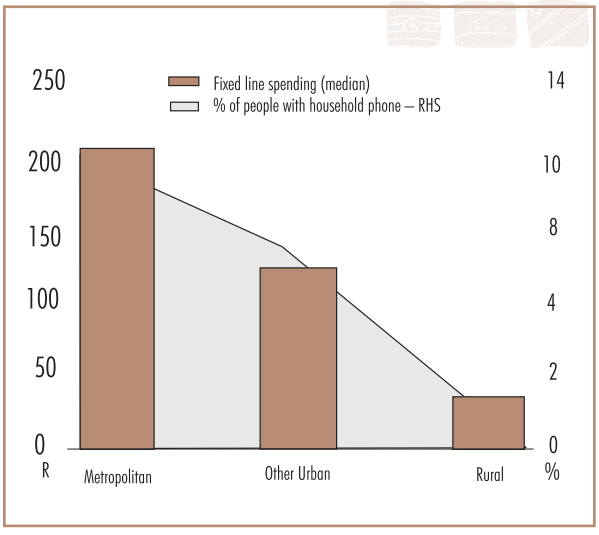
is very low compared to other lower-middle-income countries such as Argentina (11.2%), Turkey (7.28%) and Poland (9.84%) (ITU 2003).

FIXED TELECOMMUNICATIONS. With the exception of international telephony, the overwhelming majority of respondents in the focus group survey felt that the overall usage of fixed line telephony was in decline. Of those that still use fixed services, usage is highest amongst women and teenagers. In most historically black townships, use of a private home telephone was not freely available to family members and was kept locked for most of the time. This is in sharp contrast to white and Asian families, where it was indicated it is not locked, primarily for safety reasons. In rural communities where the inhabitants are of coloured descent, the home telephone cannot be used by people outside of the family except in the case of emergencies.

Expenditure on fixed services in metropolitan and rural areas differs greatly, with metropolitan areas spending on average R200 a month while the median spend in rural areas is only R35 a month. The median amount spent by households in South Africa on fixed line telecommunications is R171 per month.

Figure 9.7: Fixed line spending compared to fixed line access



In metropolitan areas, however, over 28% spend between R251 and R500 per month, with more respondents in this category than any of the lower categories of fixed line expenditure. The majority of expenditure ranges in the categories from R51 to R500, with a remarkable 16% of respondents spending over R551 per month in urban areas. This is in stark contrast to rural fixed telephony expenditure, where 47.5% of households spend R50 or less a month, with another 22.5% spending less than R100 a month. This means that nearly three-quarters of rural households spend less than R100 a month, compared to the less than a quarter of metropolitan households that spend below R100 on fixed line communications a month. Of those with a phone in other urban areas, most households (25.4%) spent R51 to R100 a month, but this was closely followed by nearly 24% who spend between R251 and R500 a month on fixed telecommunications.

The use of Internet at home is limited and it was felt by focus group respondents that this might increase should computer ownership increase and access become cheaper. This would impact on overall expenditure, but at this stage it is difficult to ascertain actual monthly spend on Internet through dial-up. Many respondents felt that the main purpose of a fixed home telephone is to dial other fixed phones, and there appeared to be a correlation between home fixed line telephone ownership and the proportion of fixed numbers called as a percentage of all calls made. In other words, the more friends and family that had a fixed phone and were contactable by fixed phone, the greater the likelihood that a respondent would have a home fixed phone. This, however, is a trend that still needs to be empirically tested, but corresponds to the generally accepted notion of network effects by which the addition of subscribers to the network adds value to its users.

From a quality of service point of view, most respondents indicated satisfaction with their service and over 95% of the respondents with fixed phones indicated that their phones were working. In urban areas, the waiting period for a phone was less than a month and in rural areas two months. Despite 58% of respondents indicating that they thought the cost of their local service was reasonable, 80% indicated that they deliberately planned calls during off-peak times or avoided phoning mobile phones because of the price, and those that no longer had a fixed phone gave lack of affordability as the primary reason. Further, a number of respondents in the focus groups expressed a desire to move away from monthly billing to pre-paid fixed phone telephony. As discussions became more involved, there would seem to have been "convert" respondents suggesting that if the possibility of such a migration from monthly billing to pre-paid were better articulated, there would be a possibility of increasing the subscriber base of the latter.

Office Phones. Just one-third (30.3%) of the sample worked in an office where there was a telephone, but just a fraction over half (51.5%, or 15.6% of the total sample) could use the phone to make and receive calls to another fixed phone and 39.6% (or 12.0% of the total sample) to make calls to either fixed or mobile calls. In most cases those who have access to an office phone never had to negotiate usage, but rather it was informal and based on a "non-abuse" understanding. Of those with access to an office phone, just 6.3% consciously planned to limit their calls from other telephones and saved them for usage via an office phone. The major reasons for using an office phone to make private calls were conveying information to family about them having safely arrived and when they would depart from the office, to ask for information on domestic purchases, for phone/Internet banking and to assist children in school research projects.

Public payphones. Despite the penetration of mobile phones, nearly 70% of all respondents in metropolitan areas continue to use payphones, while 36% of other urban and rural households rely on them. All households spend a median of R20 per month on payphones of any kind and payphone users in all areas indicate that it takes around 10 minutes to reach a payphone. This means that nearly a quarter of the population continues to utilise public payphones; however, this statistic masks the fact that this occurs almost entirely amongst the black population, with very few members of the other race groups using public phones. The reasons for usage were primarily not having any other alternatives; running out of pre-purchased credit for either a fixed line home telephone or a mobile phone; when a home telephone is barred to certain household members or for certain types of calls (for example, to fixed line numbers); or when the only available credit for telephony is limited and only public telephones can be used to access telephony.

However, regardless of financial limitations (that is, when credit is available for mobile telephones and access unhindered to fixed telephones), consumers still use public phones as part of a strategic combination of maximising their tele-expenditure and tele-usage. Depending on where the call is destined for (mobile or fixed line), whether a local or long distance is being made and on the time of day (peak versus non-peak hours), consumers will mix and match the most cost-effective option available to them. It is not uncommon for respondents to make three telephone calls within a limited time period using a combination of a public telephone, mobile telephone and fixed line telephone. There are also other reasons for mixing tele-usage patterns – the need for privacy, to combine other tasks such as shopping with telephone, etc. There is a very real rational process

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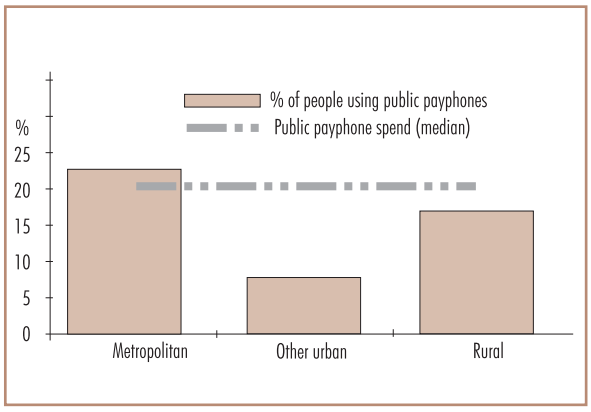
which tele-users traverse in mapping out which type of telephone is used. Indeed, given the vast array of public telephones in South Africa – Telkom-operated card and coin, mobile-operated telecentres and private tele-kiosks, where a choice of a combination of these is within a tele-travel threshold – usage could vary depending on which maximises their financial and time usage.

Those who do not use public telephony tend to be financially more secure, fear for their personal security and do not trust the hardware to deliver the end result, particularly where coin-operated booths fail to return monies where there is a problem or the call is not connected. With regards to security, almost all of the respondents felt that public telephones in retail outlets and in containers were more secure and safe than free-standing public telephones. Those coin-operated booths favoured by all respondents, both high and low-income users, were those found within retail outlets where complaints can be instantaneously dealt with. Finally, it is important to note that amongst all public telephone users, the fact that card-operated public telephony enables metering, and thus monitoring of usage by cost, meant that this option was most preferred, though the minimum amount of money required to purchase a card (R20) often meant that people were forced to use a coin-operated phone instead.

Figure 9.8: Fixed line spending compared to fixed line access



The amount of money spent on public phones is considerably more than telecentres, which only 18% of rural households utilise although they take the same time to reach. In metropolitan areas, telecentre usage drops to 14.6%, with only slightly greater usage in other areas. At 14.6%, this is considerably less than payphone usage. Private telephone kiosks are most widely used in rural areas, with as many as 43.5% of households indicating that they took 10 minutes to reach. This is more than in metropolitan areas, where private telephone kiosks take half the time to reach but where only 35% of households use them. This was similar to other urban areas.

About 66% of households gain public access to telecommunications through their place of work or school. This was followed by just over 47% using public payphones, 38% private kiosks and less than 17% other community access points such as telecentres and MPCCs. The median spend across these different public access points is R60 a month. The major reason for using a particular public access point is its proximity (54%) followed by it being perceived to be the best value for money (38%).

MOBILE. Given the low income profile of the sample, it is perhaps remarkable that almost one-third (32.7%) of respondents owned a mobile telephone. These were most likely to be pre-paid phones (81.2%), while more than one-tenth (13.6%) were contract, and just 1.3% were work-related, and thus likely to be supplied by the company or business the individual worked for.

Around half of those interviewed had acquired their first phone in the last four years, which coincides with the introduction of pre-paid mobile in 2000 by the mobile incumbents MTN and Vodacom prior to the anticipated introduction of a third mobile operator. Of this group,

more than 15% had owned their first phone for one to two years, and just less than 15% had got their first mobile phone in the last two to three years. This may reflect the take off of pre-paid services introduced with the threat of competition in the early 2000s and the low-cost price packaging of services by the third operator Cell C, which finally became operational in 2001, and the consequent availability of cheaper phones.

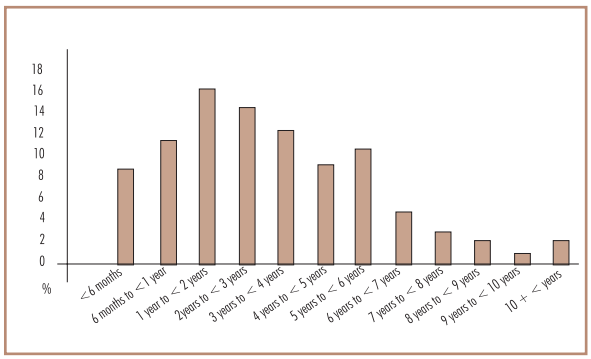
Cell C's late entry into the mobile market has been further marred by perceptions that its network is not reliable and/or its network coverage is considerably smaller than MTN and Vodacom. Most consumers who were already on a mobile network also indicated a strong preference for their existing network, with most saying that change was difficult. Even when offered a hypothetical situation where Cell C call charges were lower than either of the other networks and a free SIM card was offered if a consumer would change networks, 99% of the time the response was in the negative. This is indicative of the massive advantage that MTN and Vodacom managed to acquire during the licensing debacle and the continued impact this has on Cell C's subscriber base.

In terms of the length of time that respondents had a phone number, most respondents in the combined urban areas had their phone number for 36 months. Rural areas lagged by a year, with most respondents indicating they have had their phone number for 24 months. Handset churn was fairly specific to income levels, with those in lower-income categories keeping a single phone up to six or seven years. Amongst income levels where handsets changed hands fairly often, there was a further distinction between generations, with the younger generation often changing phones because of better technology and fashion or image. Amongst all the focus groups, old phones were often recycled to others in a family. In the pre-paid market, the amount of time taken to save for a handset varied between one and three months, though there were indications that people were increasingly willing to acquire more debt (including credit card debt) in order to fund new phone purchases.

Mobile phone ownership is highest amongst those living in major towns (55.6), followed by those in other urban areas (41%), and finally, those in rural areas (27.7%) as indicated in the table. The fact that over one-quarter of those living in rural areas own mobile phones indicates the viability of these as an alternative to fixed line phones where access is likely to be difficult and the national operator is disinclined to roll out its network.

There is little difference in ownership between males and females, with ownership just 5% higher amongst males throughout South Africa. An analysis of ownership by age places ownership highest amongst those between the ages of 30 and 34 (52.5%), followed by those between 25 and 29 years (51.3%) and 35 and 39 years (50.2%). The table reflects the relatively high ownership amongst young people, significantly higher than amongst those over the ages of 60 years. From the ages of 45 to 49, ownership of mobile phones decreases dramatically to just 7.4%. Those owning mobile phones in the younger age cohorts are almost exclusively on a pay-as-you-go system, while contract ownership of phones is more common amongst those older than

Figure 9.9: How long ago (months) did you get your first mobile phone?



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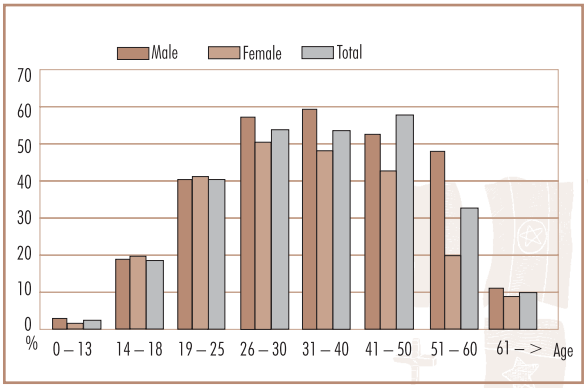

Figure 9.10: Does a household member have a mobile phone?

Percentage of individuals who own a mobile phone by...

Location	Major town	55.6
	Other urban	41.0
	Rural	27.7
Gender	Male	35.6
	Female	30.0
Age	> 10	0.6
	10 – 14	4.3
	15 – 19	21.4
	20 – 24	40.5
	25 – 29	51.3
	30 – 34	52.5
	35 – 39	50.2
	40 – 44	43.7
	45 – 49	48.3
	50 – 54	39.1
	55 – 59	29.0
	60 – 64	13.8
	65 – 69	8.3
	70 – 74	7.4
	Older than 75	17.7
Income	<R500	20.6
	R501 – R1,000	22.1
	R1,001 – R2,000	55.5
	R2,001 – R3,000	69.8
	R3,001 – R4,000	91.2
	R4,001 – R5,000	97.0
	R5,001 – R7,500	91.4
	R7,501 – R10,000	93.4
	R10,001 – R12,500	100.0
	R12,501 – R15,000	97.1
	R15,001 – R20,000	100.0
	R20,001 – R25,000	100.0
	> R25,001	100.0

Figure 9.11: Mobile phone ownership

30. Statistical tests run on the data suggest that location, gender, age and income are all significant predictors of mobile phone ownership throughout South Africa.

Contrary to popular perceptions that cellphones are widely shared, less than 5% of respondents regularly allow friends to use their phones, over 45% occasionally did but more than 50% never did. In the focus groups, the most common form of sharing was for friends without phones to send a "please call me" to another friend and then wait for the return call. However, since a "please call me" can only be personalised a limited number of times in the case of the MTN network, and none in the case of both Cell C and Vodacom, there might not be a return call, since the called friend might not know who was calling and would be reluctant to spend airtime on someone they might not know.

Even with regard to family usage, for only 23% was it regularly used by family members, for over half of the respondents this happened occasionally and for about 24% family members never used their mobile phones.

Of note is the fact that over one-fifth of individuals earning less than R500 a month, and a fraction more of those earning between R500 and R1,000 a month, own mobile phones. These are all on pay-as-you-go rather than contract, and suggest the high value placed by even low-earning or unemployed individuals on communications. Ownership increases steadily as income rises, with 100% of those earning between R10,000 and R12,500, and all those earning over R15,000 owning mobile phones.

In metropolitan areas, more than 65% of the sample has a mobile phone, compared to less than 22% in other urban areas and only 13% in rural areas. The median pre-paid expenditure on mobile telephony in all areas was R30 a month, though the variation amongst respondents was much greater in metropolitan and other urban areas with means of R48 and R52 respectively. The variance between the mean and the

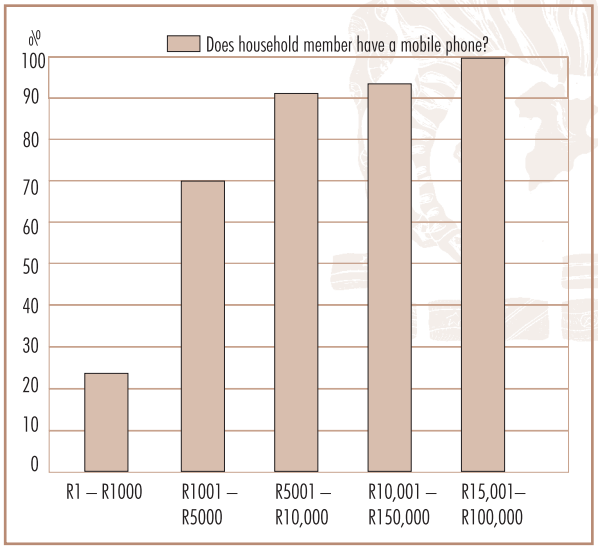

Figure 9.12: Mobile ownership vs income bracket

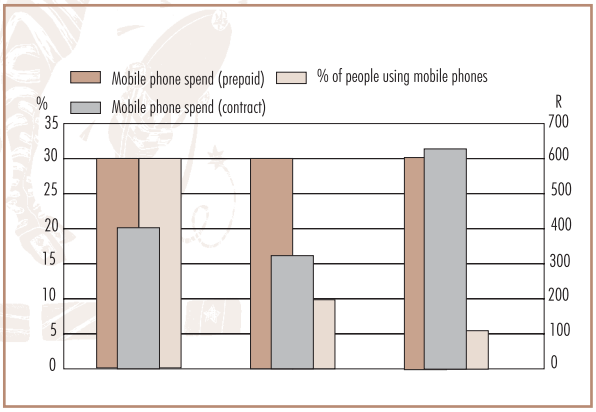

Figure 9.13: Mobile phone spend compared to access

median once again emphasises the discrepancy of access between rural and urban areas. The number of rural households with members on contract that provided expenditure data in rural areas was less than 3%, with a massive R600 (median) monthly expenditure. As the number of respondents on this question was so small, this figure cannot be used to generalise for all rural contract users, but it does suggest that only the affluent few in rural areas are on contract.

One of the aims of the focus groups was to gain an understanding of the decision-making processes in choosing a particular network, in particular what role cost played. The research found that cost does not play a major role when deciding what network to choose, but coverage does. Factors such the choice of network being influenced by family members or friends being on the same network, and thus reducing call costs, were non-existent. For those families where the parents were choosing phones (and networks) for their children, the fact that the child might be on Vodacom and the parent on MTN was not a factor in the decision. The perception that Cell C did not offer adequate network coverage meant that there was a reluctance to go onto the network, despite the lower calling charges.

In rural areas, 97% of those with a mobile phone are pre-paid, compared to a combined urban percentage of between 71% and 74%. While the total number of people with contracts is 13.6%, interestingly nearly 28% of respondents in urban areas have contract phones, compared to less than 16% within metropolitan areas and nearly 17% within rural areas. Nearly three - quarters of phones in metropolitan areas are pre-paid, as are nearly all mobile phones in rural areas.

Nearly half of those interviewed using pre-paid services spent between R20 and R40 a week and another 25% spent R40 or R60 a week. However, it is important to note that when expenditure spend was probed during the focus groups, this figure doubled amongst lower-income cohorts and trebled amongst higher-income cohorts. Around 18% spent nothing the previous week, suggesting that expenditure was very variable and dependent on available income and that at least sometimes people were only receiving calls. In the focus groups it was noticeable that monthly expenditure on telephony is nearly exclusively dependent upon personality type – that is, personalities that generally save would plan their expenditure, while

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those that do not, would spend money as soon as it is available. This cuts across income categories, with the only difference being that wealthier respondents had more money to spend.

Contrary to expectations, focus group respondents indicated that the cost of calls is not a factor when purchasing a phone or SIM card. The choice of a particular network was based several factors, none of which are related to the cost of calls but rather relate to:

- the price of the handset (including pre-paid);
- on contract phones, the availability of money upfront (for example, a R2000 "signing on bonus");
- the price of the starter pack; and
- any other specials that might be running – for example, if there were discounts on airtime (like those offered by petrol stations and supermarkets).

While an argument might be made that all of these influence the price of calls, it is interesting to note that at no point did any respondent compare actual call prices on any package that they might be about to purchase. In lower-income households, the ability to buy smaller airtime packages (for example, Vodacom's offer of R12 airtime) is a factor, though this is not a factor when looking at Cell C – mainly because the other perceived disadvantages outweigh positives such as R5 airtime vouchers.

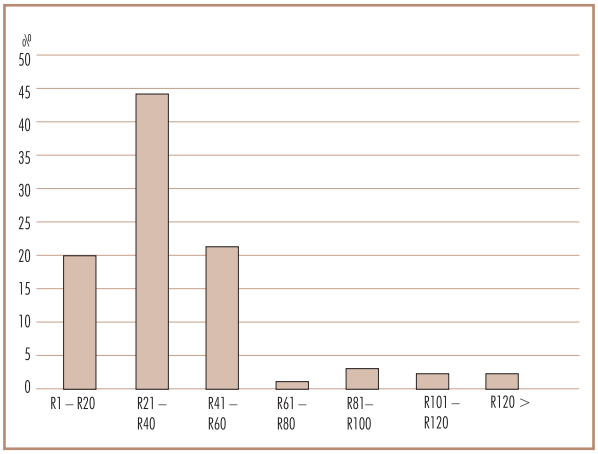
The lack of attention to call prices means that advertising based on the brand of the network, its community consciousness and its dedication to black economic empowerment take on an added importance. For example, the value of Yellow (MTN's advertising slogan and colour) in choosing a network is vital, with many respondents in the focus groups saying that they would not change networks because they "love yellow". In general, the most common source of information on mobile phones is by word of mouth, brochures and catalogues. In lower-income areas (particularly townships), catalogues are regularly perused for the specials that they might contain.

The lack of overt pricing information (in the sense of call prices) on the part of the networks is seen as a key obstacle to migration. Also, many respondents are very reluctant to change numbers because of the associated costs – sending out SMSs to all contacts informing them of the change of number, the possibility that others do not read the SMS and that the person will subsequently become unavailable to a range of friends and family. Respondents were more open to the idea of migration if number portability were allowed, though there was still considerable reluctance based on the person's perception of the brand value of that particular network.

It is interesting to note that the highest amount of money spent on pre-paid phone cards was in the R21 to R40 category, which incorporates the R29 airtime phone card. This analysis was supported by the focus groups, where R29 was by far the most popular form of top-up.

Based on the E-Index, in 78% of cases mobile expenses were paid by the owner of the phone. In less than 15% of cases it was paid by a partner, and less than 10% by a parent. The focus groups brought out the fact

Figure 9.14: Pre-paid spend

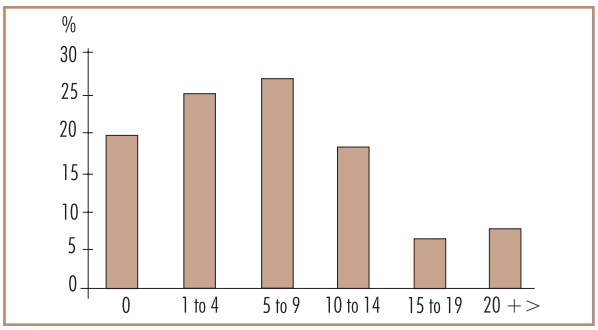


that airtime is often given as a gift for special occasions, but only between family members rather than between friends. When asked what people were prepared to sacrifice to get airtime, the answer was that mobile phones are a key to survival and that anything can really be sacrificed to ensure that the mobile phone has some credit (even it is a few cents). Therefore there is some income substitution away from other areas of expenditure such as CDs, clothes, accessories and sometimes even food. For example, faced with a choice between eating lunch or buying airtime, many people chose airtime. Lending money to friends and family for airtime (mobile and public payphone) is common, though this does not extend to Internet usage and handset purchases.

As will be seen with the Internet, the extraordinarily high expenditure on rural contracts in the data reflects the very small number of high-end users and is consequently not a reliable data set.

Most of the respondents (25%) sent between five and nine SMSs a week, followed closely by those who sent only between one and two SMSs a week. Close to 20% sent none. Only 8.5% of respondents send more than 20 SMSs per week. In the focus groups, it was clear that SMS played a particular role in communication. If the message was not important or "heartfelt", then an SMS was adequate (particularly amongst the youth). For example, sending a SMS in the morning to say hello would be a common usage. A requirement for all using SMS was the need for it to be instantaneous, mainly to ensure that the other person responded at the time that it was sent. SMS is also a favoured method to keep in contact with friends and family internationally. Finally, SMSs are used to establish that family or friends have arrived safely in a cost-effective way.

Figure 9.15: How many SMSs sent weekly



Given SMS's greater versatility, it is not surprising that it is used for so many reasons. A slimmed down version of the SMS is "please call me" and buzzing (missed calls), where an entirely new language is developing. Because it is free, it is used to communicate in a variety of different ways depending upon the context. For example, many use a "please call me" when a family member or friend has arrived at their destination. The equivalent response of another "please call me" means that the person has arrived safely. Another use is to confirm arrival in a specific place that has been arranged beforehand (such as the mall). Sending a pre-arranged "please call me" can mean that a person is on their way, has arrived at the specified location or is running late. Outside of these contexts, a "please call me" literally means "please call me" and the response to that message is based on the relationship with the person it was sent to. For example, if it is a good friend and calls are made equally between them, then a return call might result (depending on airtime). However, if it is not a good friend, then it is ignored.

The further development of this as a language is probably limited, because in response to such widespread usage, mobile networks have placed a limit on "please call me" calls of between three and seven per day.

The high cost of various forms of telephony means that nearly all groups of respondents use multiple types

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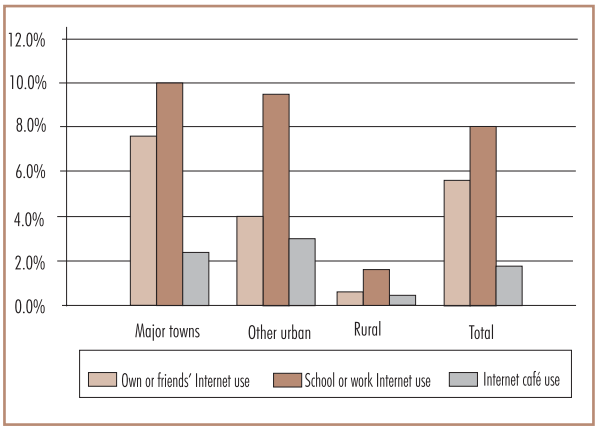
of phones (the only exception being white and upper income users of all races). Public telephony has a key role to play in South Africa, since it is used when there is too little money to buy airtime. All respondents are aware of price-saving strategies, such as phoning fixed line phones only from other fixed lines such as public phones or from work. Container phones (or private phone kiosks) play much the same role for the mobile sector – when there is not enough money to buy airtime, then container phones are used to make calls that cannot wait. When allied with what seems to be a general attitude of using phones on an *ad hoc* basis (as opposed to saving up for calls), then multiple points of contact become paramount.

The emergent role of email as a medium of communication has been replaced by mobile phones. Because few people have access to the Internet or email, and because of the delay in accessing it (that is, most people have to be at work to get their email), mobile phones are preferred to communicate with people. An added factor is that SMS (and by extension, email) are perceived by the older generation as not heartfelt or genuine and that the only way to communicate (even to confirm something which would seem to lend itself towards SMS) is by voice. Amongst wealthier respondents, voice is seen as more convenient (though this is more amongst the older generation), mainly because it is instant, versus the possibility that an SMS is ignored or not received.

INTERNET. Uptake of the Internet is much more limited than mobile and reflects the generally poor access that many South Africans have to ICTs other than basic voice telephony. Just 5.7% of all individuals have an email address. This email address is most likely to be a combination of a work and personal account (38.5%), with over one-quarter (26.6%) purely work-related. A little over one-fifth (22.2%) have a personal free account, such as those offered by web-based services such as Yahoo and Hotmail, while just over one-tenth (12.8%) have a personal subscription-based email address. The focus groups highlighted the fact that the Internet is used sparingly because it is an expensive form of access (in comparison to SMS). An added expense is that it is not usually available close by, which requires travel and therefore taxi fare. Apart from a few specific needs, mobile phones are perceived as a more than adequate replacement.

While access is difficult even in urban areas, the digital divide is even greater between the metropolitan areas and the rest of the country. Of the respondents who have Internet connections at home, over 80% are in metropolitan areas, 20% in other urban areas and none in rural areas. In terms of cyber café usage, the total number of respondents is so low (reflecting the absence of the cyber café culture found in other countries on the continent) that no significant conclusions can be drawn. A common reason given by focus group respondents was that where there are cyber cafés, they are expensive and have poor hardware, making it a lengthy process to use. There is also the uncertainty that the person receiving the message will be able to access the message timeously.

Figure 9.16: Internet Penetration



As with telephony, the greatest access to the Internet is provided by schools or work, with a median of five hours of access provided. Users go online at cyber cafés on average only for only two hours a week, and users are online at home or someone else's home for only three hours a week. Home Internet access and cyber café access is roughly comparable, as home users spend around R134 per month, compared to R160 per month for individuals using cyber cafés. The major use of cyber cafés or community access points is to email and browse (a median of twice a week) compared to phoning and faxing (once a week), printing, computer games and just hanging out (not at all).

There is a common consensus that the Internet (and computers) is important to know for work and career purposes. Personal usage of the Internet is limited to Internet banking, research (for example, school projects), job sourcing and applications. The Internet is not used regularly for getting information on sports or news – the major medium for this is the TV, radio or newspapers. (Interestingly, a number of focus groups said the private free-to-air television station eTV is used for news and not the public broadcaster, the SABC).

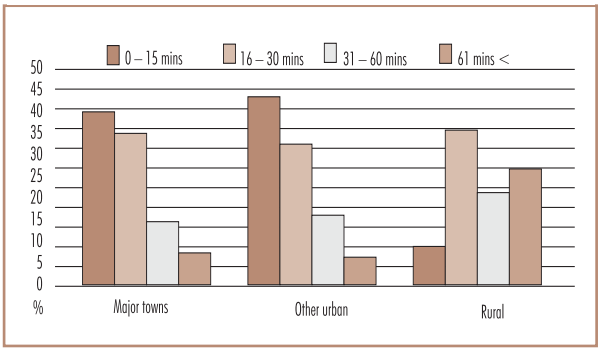
The most common users of the Internet are the youth (particularly for music), whites and professionals. In one focus group, which consisted of international as well as South African respondents, South Africans' lack of interest in the Internet for news-gathering purposes was seen as symptomatic of their ignorance of international affairs and their inward focus. However, the same group noted that South Africans have a greater variety of access to international and national news through the newspapers, magazines and television, as opposed to people in their countries.

Internet Usage		
Time spent last week on Internet at home or friends' home	hours	2.7
Change in Internet usage at home or friends' home over past six months	Increased	29.4
	Same	39.2
	Decreased	31.4
	Total	**100.0**
Time spent last week on Internet at school/work	hours	4.4
Change in Internet usage at school/work over past six months	Increased	41.6
	Same	42.9
	Decreased	115.6
	Total	**100.0**
Time spent last week on Internet at Internet cafés	hours	1.1
Change in Internet usage at Internet cafés over past six months	Increased	1.1
	Stagnant	47.6
	Decreased	26.2
	Total	**100.0**
Internet Café usage	Only one	73.0
	Multiple use	27.0
	Affordability	25.2
Main reason for not spending more time on the Internet	Time	52.4
	Access	11.7
	Quality	2.6
	Hardware	8.2
	Total	**100.0**

Figure 9.17: Internet usage

POST OFFICE. Over 38% of those interviewed continue to use the post office to access a postal box (over 50%, if one includes communal postal boxes). One of the major reasons for not using the post office is the time it takes to reach a post office. The urban-rural divide in this regard is reflected in the chart below, where just under 40% of the urban respondents were able to reach a post office in less than 15 minutes. For most rural

Figure 9.18: How long does it take you to reach the nearest post office, by foot?



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respondents this took between 15 and 30 minutes, and for a significant 30% it took over an hour, while this was the case for only 9% of urban respondents.

Conclusions

The household survey confirmed broadly-accepted statistics around the relatively low household penetration rates for communication services in South Africa, with household fixed-line ownership at only 22%. Significantly, of the 32% of the population with mobile phones, 14% also have access to a fixed phone, suggesting that while mobile telephony offers convenience and additional utility, it has only extended access to a further 18% of the population. While this is significant, more than 68% of the population continue not to own phones. In this regard South Africa compares poorly with other lower-middle-income countries. Household penetration of fixed and mobile services in Poland (31 and 45% respectively) and Turkey (36 and 39% respectively) are well above South Africa (22 and 32% respectively) (ITU 2004).

And while the survey indicates that South Africans value communications services and are willing to pay an extraordinarily high price for them, pricing clearly remains an inhibiting factor, both with regard to ownership and usage. Although respondents generally indicated that the pricing of services was acceptable, responses to other questions suggest that this may reflect a lack of consumer awareness rather than satisfaction. For example, 36% of respondents who no longer had a fixed phone indicated that the reason they no longer had it was because they could not afford it.

Although respondents said the price of mobile services was reasonable, the primary reason they gave for not using mobile services more was the price of services. So, while there is a general awareness of the cost of calls, the fact is that this is not a major factor when choosing a network. People do not choose their network based on the number of friends or family that share the network. The handset deal, the image of the network operator and the discount offered on airtime packages are all more important factors. Part of the explanation for this might be the lack of any comparative advertising between mobile operators on call prices. The conclusion that this is typical behaviour of oligopolists cannot be far off.

With the high rate of "churn" (subscribers moving off the network or being disconnected) from the Telkom network, it would seem there is some substitutability of voice services between mobile and fixed services. Given the high mobile call tariffs in comparison to fixed line rates, the apparent rise of mobile at the expense of fixed services may initially seem contradictory — all the more so when one considers that it was with the introduction of expensive premium-rated, pre-paid airtime services that mobile growth rates increased exponentially. Despite the high cost of these services, the convenience and flexibility of pre-paid mobile services (lack of credit checks, and a pay-as-you-go system) have clearly spurred their adoption on a massive scale.

Yet the high adoption of pre-paid must be seen within a context of a "multiple communication strategy" for consumers: that is, people use whatever form of communication is convenient within their income at a particular point in time.

There are three parts to this. Firstly, communication must be convenient or accessible. The closest container phone to a particular community is often the most used (though if there were several available from different operators, then Cell C is most often used because it is perceived as newer and cheaper). Secondly, people's income varies across a month and week. The use of mobile telephony is higher when there is money to buy airtime. When R30 (or R12, depending on the network)

is not available, then R2 will be used in a container phone or call box. Thirdly, calls on a personal mobile phone are often made in off-peak hours. By contrast, calls from containers or call boxes are often made throughout the day because of the low denomination of the call (though, of course, the length of the call will vary substantially based upon the time of the call).

The continued usage of these commercially-driven access points stands in stark contrast to telecentre usage, which while less widely available, is used by less than a fifth of respondents, while private telephone kiosks are used by nearly half of respondents. The greatest place of access to both basic and advanced services is the respondents' place of work or school, which is also indicative of the bias towards business over residential lines in the country. Residential phones make up only 51% of all phones, compared to an average in Europe of 79%. (ITU 2004) Despite the huge impact made by mobile cellular telephony, the number of fixed lines will continue to be an important developmental measure – because fixed line connections offer more affordable capacity. This is especially true for access to the Internet, because the relatively high cost of GSM means that it is not currently viable for full Internet connectivity. Without this policy perspective, it is possible that a new digital divide will develop, between those with access to data services and those without.

The national household and individual user survey established that South Africans (and Africans in general) utilise a multitude of communications mechanisms. It established that the Internet in South Africa is not a popular medium amongst lower-income households. Expenditure on communications as a percentage of income is high compared to the developed world. But the quantitative survey did not establish why South Africans continue to use a combination of public, mobile and fixed line phones, nor if there was a pattern to this usage. It did not establish the reasons for individuals' choices of network service providers, or what features were considered important on a mobile phone. It did not provide an explanation for why the Internet is so under-utilised in South Africa. These are the questions that the focus group research set out to answer.

In doing so, the research finds that South Africans make use of a basket of communications technologies because of the flexibility it provides. South Africans choose the type of communication technology they are going to use based upon their ability to afford it at a particular point in time. Thus, if there is no money for airtime, then a container phone would be used for a mobile call, while a payphone would be used for a fixed line call. A whole new language is developing using buzzing and "please call me's" on mobile phones, because it is free. The limitation placed on "please call me's" by the networks is seen as a blessing by parents. The number of "please call me's" allowed by a network service provider is seen as a real reason to choose a particular network by the youth.

The low Internet usage statistics in South Africa are borne out by the perception that the Internet is an inefficient and costly communications mechanism. One cannot be sure that a message will be read in time because of the lack of facilities to access that message, such as cyber cafés. The inability to articulate, amongst focus group participants, the benefits of the Internet is seen as indicative of the challenges faced by Internet service providers and fixed line operators, who are faced with a declining fixed line voice market, and who must be looking for alternative sources of revenue.

POLICY IMPLICATIONS. There is now considerable local evidence to suggest that protectionist policies emerging from the privatisation of Telkom have not served the sector well, and while they allowed for the

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maximisation of state assets, this occurred at the expense of the ICT sector and, indeed, the national economy. In recent scenario modelling commissioned by the communications union Solidarity, it is suggested that if Telkom prices had increased their prices at the average of a set of 11 developed and developing countries since 1997 as a result of greater liberalisation of the market, inflation would have been about 1% lower than the actual 12.4% reported for December 2002, as would interest rates (Efficient Research 2004: 50).

The failure to expand fixed line services has several knock-on effects. Declining subscriber figures means lower Internet take-up, particularly broadband – increasingly seen as a measure of a country's competitiveness – and a stagnating VANS and ISP sector. A recent report by the South Africa Foundation (2005) highlights the discrepancy between South Africa and other comparable countries in terms of telecommunications costs. For example, the cost of ADSL in South Africa is 139% more expensive than the average price out of the 15 countries surveyed. Local call costs (peak) are 199% more expensive than the average price of all the countries surveyed. The supply of fixed line telephony is skewed towards the business sector and the wealthy residential sector. In the last two years, the number of fixed lines has remained fairly constant.

The stalling of the second national fixed line operator and the de facto continuation of Telkom's monopoly is cause for concern. Local call prices have nearly doubled since the privatisation of Telkom despite significant efficiency gains.

Telkom's monopoly has negatively impacted on the provision of the Internet, with a stagnant number of subscribers and limited take-up of new technologies such as broadband. While a competitive VANS sector exists, it is increasingly dominated by Telkom, thereby limiting the skills available to the independent sector and stifling innovation. Access to the Internet through collective access points such as cyber cafés and telecentres is equally poor due to high costs and the limited number of access points.

The real contribution to the accessibility of telecommunications has come from the mobile sector. The introduction of pre-paid has seen a huge increase in the number of subscribers. South Africa is one of the few African countries with near-universal mobile coverage, and mobile phones are available in all parts of the country. The licensing delay in bringing the third mobile operator, Cell C, online has given a boost to the incumbent mobile operators, Vodacom and MTN. The dominance of these two operators has had some bearing on the high prices of mobile calls, but the point remains that the failure of the fixed line sector has been more than made up by the rise of the mobile sector.

Household Internet penetration is concerningly low at 3.5% of the respondents, with most Internet users acquiring access at work or school. With the low levels of household PC ownership (12%) and with the high cost of the fixed line infrastructure, there is the danger that the Internet market will rapidly reach saturation. It is not likely to drive uptake of residential broadband services and until there is widespread connectivity at the household level with access to enhanced services, citizens will not be able to participate optimally in the information economy or society.

Getting backbone and services to under-serviced areas remains a major challenge for government, as low access to both private and collective communication service areas in rural areas indicates. The privatisation strategy to double the network clearly failed, with two million disconnections during the last three years of the exclusivity period. The USAL

strategy to encourage market entry into under-serviced areas has now been overtaken by events, and failure to provide a supportive regulatory environment is making entry into this market increasingly less attractive and at best very marginal.

Currently proposed strategies to overcome access and affordability problems in the 2001 Amendment Act, and Ministerial policy directives aimed at further liberalisation of the sector, may have unintended negative consequences. The proposed 50% discount on Internet connectivity for all public educational institutions will require skilful management if it is not to become counterproductive. It has the potential to interfere in the market mechanism which establishes prices, and can in turn lead to distortions in the market. There is also no clarity on how this will relate to the proposed PTN for educational institutions included in the Amendment Act, which in itself is highly problematic for USALs, as it would cut out a serious part of their potential market, which targets municipal and provincial institutions.

Such social interventions will require efficient monitoring and evaluation to ensure their objectives of providing affordable access are being met and that they do not result in negative, unintended outcomes or distort the gains arising from potential market efficiencies that are likely to arise from the latest reforms.

These developments, together with the proposed convergence legislation, have the potential to create an environment more conducive to investment and effective competitive. Together with proposed changes to the licensing and regulatory regime, this should allow market forces to drive down prices, with positive effects on the price of communication services and, indeed, the cost of business in South Africa.

For the benefits of these reforms to be realised, a fair playing field will be required to facilitate the entry of new entrants to compete in these dynamic markets, driving a more efficient allocation of resources and ultimately lower prices and greater choice. The key to this will be an effective regulator, well-resourced and highly skilled.

It will be important in the next phase of convergence regulation, and indeed of policy formulation, for the ICT sector to consider where the real bottlenecks on essential facilities in the incumbent networks are, and to innovatively to devise ways of ensuring access to these facilities. Network duplication appears simply not to be financially viable, in which case a fair access regime to the primary network needs to be ensured. At the policy level this may require a serious examination of the current structure of the market and ways in which restructuring it would be conducive to fair competition and affordable delivery.

An integrated ICT vision is required if high-end (and currently expensive) services are not only to be utilised by a relatively privileged few. Although the centrality of ICT to economic growth and poverty alleviation has been widely articulated, various departments have initiated several ICT policy visions, and presidential commissions and national strategies have been established over the last few years, currently no integrated ICT policy framework exists for the country. Until this is created, ICT policy will be uncoordinated, ad hoc and often contradictory and reflected in the relatively poor indicators for the country. ❑

Endnotes

1 Telkom announced net profits of R4,5 billion and paid 90c a share in dividends (Telkom Annual Report 2004)

2 Statement on Cabinet meeting issued by the Government Communication and Information Services, 6 October 2004. "It was agreed that a system would need to be put in place to address these issues, including:

* strengthening of regulatory capacity, where applicable, with better analytical expertise and reliable and timely information;

* price-setting should take into account inflation targets for the period ahead, as

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well as efficiency, equity objectives, long-term demand and supply and other policy considerations.

3 This section draws on the conclusions of Gillwald and Esselaar (2004), *South African ICT Sector Performance Review 2004.*

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Chapter 10: Tanzania

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Beda Mutagahywa, University of Dar es Salaam

National Indicators	
Country	**Tanzania**
Population	35.2
Poverty (% of population below US$1 a day)	No data
Adult literacy rate (% ages 15 and over)	77.1
Urban population (% of total population)	34.2
GDP per capita (US$)	282
Diplomatic Missions	945

BACKGROUND. The United Republic of Tanzania is the largest country in East Africa, covering 940,000 km², of which 60,000 km² is inland water. Tanzania lies south of the Equator and borders eight countries: Kenya and Uganda to the north; Rwanda, Burundi, the Democratic Republic of Congo and Zambia to the west; and Malawi and Mozambique to the south. Administratively, the mainland of Tanzania is divided into 21 regions and the island of Zanzibar into five regions. Each region is subdivided into districts (129 in total) and each district into wards (2,787). Each ward was further divided into enumeration areas (EAs) before the 2002 population and housing census (55,217). This study used these EAs as its primary sampling units (PSU).

According to the 2002 census, the population has increased to 34.4 million - from 12.3 million in the first post-independence census in 1967 and 23.1 million in 1988 – but Tanzania is still sparsely populated, with 39 persons per km². Although the population is still predominantly rural, the proportion of urban residents has been increasing steadily, from 6% in 1967 to about 23% in 2002.

This report presents its data in urban and rural categories, hence the need to clearly define these terms in a Tanzanian context. All regional and district headquarters are, by definition, urban areas. Other areas are also categorised as urban, provided there is a concentration of houses and there are institutions like police stations, post offices, health centres and streets in these areas.

ICT PERFORMANCE IN TANZANIA. The reform and the restructuring of the communications sector in Tanzania started in 1993 and involved two processes: the dissolution of Tanzania Posts & Telecommunications Corporation (TP&TC), and the establishment of three separate institutions, namely the Tanzania Communications Commission (TCC) as an independent Regulator, the Tanzania Posts Corporation (TPC) and the Tanzania Telecommunication Company (TTCL) as service operator.

In 1994, TTCL was granted a licence by the regulator allowing it to provide telecommunications services for 25 years, with the provision that it could not be revoked in the first 15 years. In the same year, the regulator granted an operating concession to Mobitel, a mobile service operator jointly owned by TP&TC and Millicom International. In 1995, this concession was converted to a formal licence and another mobile license was awarded to TRITEL (now defunct) through an open tender process. The ensuing competition in the market led to a decline of about 60% in mobile charges.

In 2003, the Tanzania Communications Regulatory Authority (TCRA) Act of 2003 was passed by Parliament, establishing a single regulator for the telecommunications and broadcasting sectors. TCRA inherited the functions of the former Tanzania Communications Commission and the Tanzania Broadcasting Commission. Its objectives include:

- Promotion of effective competition and economic efficiency;

- protecting the interests of the consumer;
- promoting the availability of regulated services;
- licensing and enforcing licence conditions of broadcasting, postal services and telecommunication operators;
- establishing standards for regulated goods and services;
- regulating rates and charges (tariffs);
- managing the radio frequency spectrum;
- monitoring the performance of the regulated sectors;
- monitoring the implementation of ICT applications; and
- management of numbering resources.

By July 2004 the regulator had issued the following licences:

- Telecommunication services
  - o One basic telephone service provider
  - o Four land cellular mobile telephone operators
  - o One global mobile personal communication service (GMPCS)
  - o 11 public data communication companies
  - o Nine private (dedicated) data services companies
  - o 23 Public Internet service providers (ISPs)
- Postal services
  - o One public postal operator
  - o Five international couriers
  - o Nine domestic couriers
- Broadcasting licences
  - o 17 cable television licences
  - o 23 radio stations
  - o 17 terrestrial televisions
  - o 12 television booster stations
  - o Three pay television licences
  - o 16 community television operators

The telephone market share of the incumbent has fallen from 100% before mobile service operators entered the market in the 1990s to a mere 8.5% by October 2004, with Zantel taking 4.3% of the market, Mobitel 16.6%, Vodacom 49.0% and Celtel 21.1%.

Household and individual user survey

The focus of the study was to establish access and usage patterns for fixed, mobile and Internet services at household and individual level. A national household survey based on the same questionnaire used in studies across the continent was used to determine the access and usage patterns of users and consumers of communication technologies and was aimed at creating a baseline data set upon which future developments in Tanzania can be evaluated and trends measured.

Household characteristics. Information regarding housing facilities is essential for the interpretation of survey findings and to verify this data against earlier household surveys. This section therefore provides a short description of some demographic and socio-economic characteristics of the population in the sampled households, including age, gender, residence, educational level and household assets. For the purposes of this survey, a household is defined as a person or a group of persons living together and sharing a common cooking pot. This group of people could be occupying part of, or an entire building, or not necessarily live in the same building. To capture all the necessary information about household and individuals, one type of questionnaires was administered to all selected households.

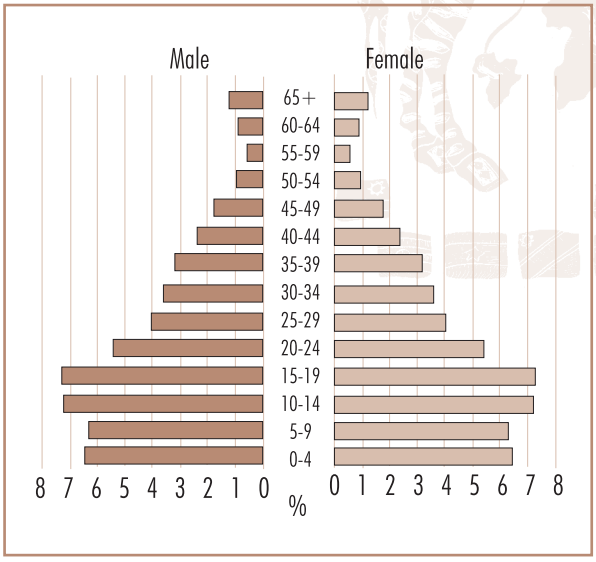
Respondents were asked about ownership of particular assets and access to services, including connectivity to electricity and ownership of a generator and motor vehicle, radio and television. The availability of items like a computer and Internet services indicates access to electricity in the household, while the presence of a motor vehicle

shows that a means of transport is available to the household, which may make possible accessibility to a distant Internet café or post office.

AGE STRUCTURE OF THE STUDY POPULATION. Population pyramids show the total picture of a studied population by age and gender, and are a useful way of illustrating the age structure of any population. Figure 10.1 below shows the population pyramid of the studied population. The broad base indicates high birth and death rates, and in general, the study population is characterised as having a youthful age structure. This shape is representative of the age/gender presentations of many other African countries, including Tanzania, according to the 2002 census. In line with the census, there are more men aged between 5-24 years in both urban and rural areas of the study population in Tanzania, but the trend changes gradually as they grow older. This pattern is similar to the one observed in the survey.

EDUCATION LEVELS. A key determinant of an individual's lifestyle and status is education. It affects many aspects of human life, including access to ICTs. It

Figure 10.1: Population Pyramid Tanzania 2004



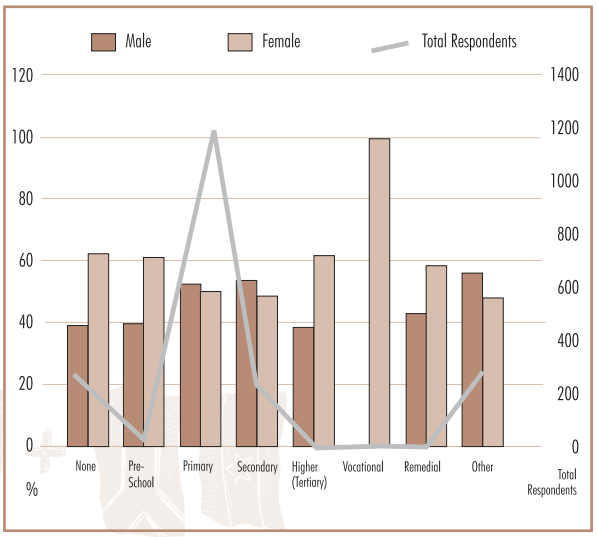
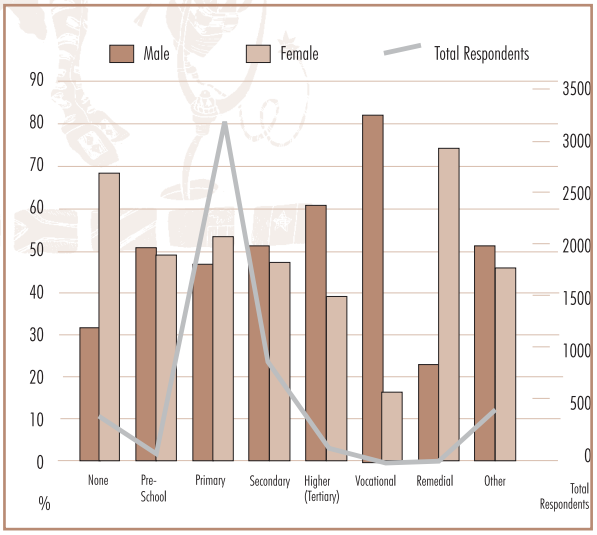


Figure 10.2: Highest level of school completed by gender in rural areas

was important to examine the level of education within the study population, since it provided some insight on the access of mobile phones, Internet and other modes of communication.

There is a marked difference in education between the sexes, especially at higher levels, both in rural and urban areas (see figures 10.2 and 10.3). As regards the "no education" category, the survey results reveal

Figure 10.3: Highest level of school completed by gender in urban areas



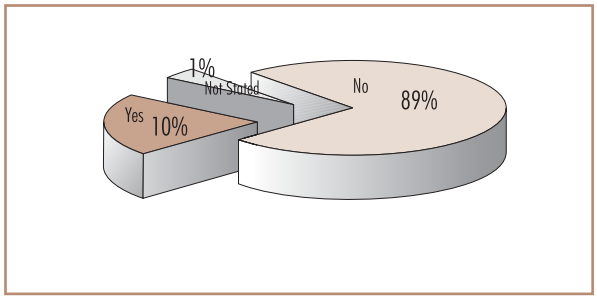
a higher percentage of females (over 60%, nearly double the number of men), but for those women who do enter the educational system, nearly double more women than men complete their higher education.

Figures 10.3 and 10.6 indicate a correlation between education and access to ICTs. With so many women excluded from education, one would expect more males to have access to technologies like mobile phones and Internet facilities. Figure 10.2 shows that in rural areas, 51% of males have completed primary education and 49% of females. This type of bivariate analysis will highlight the relationship between access to ICTs and education.

ACCESS TO MOBILE PHONES. A major objective of the 2004 E-Index Baseline Survey was to estimate access to, and usage of, mobile telephones. Information was collected from each member of the surveyed household on whether they had a mobile phone and whether the mobile phone was a contract or pre-paid mobile phone. The usage information was asked of only one member of the household that currently either owned or used a mobile phone, and the information collected reflected their individual situation only.

Figure 10.4 indicates that access to mobile phones is still low, with only 10% of those interviewed found to own mobile phones. Despite this low figure, figure 10.5 shows that 48% of people living in Dar es Salaam

Figure 10.4: Access to mobile phones



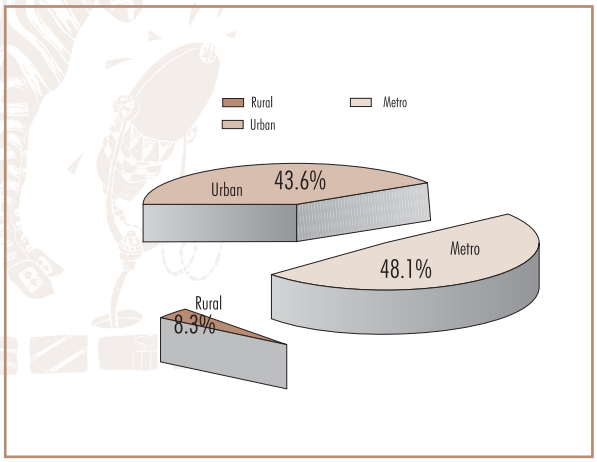
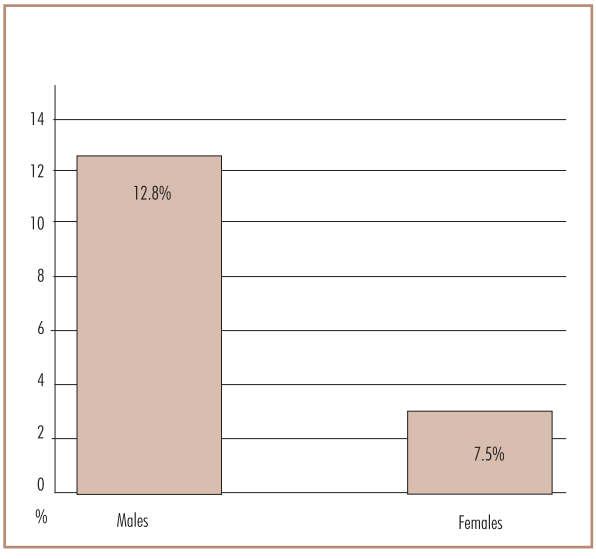


Figure 10.5: Access to mobile phones by place of residence in Tanzania

(metro) and about 44% of people in other urban areas, have access to mobile telephony. In rural areas, only 8% of people have access to mobile phones, in spite of 77% of the population living there.

ACCESS TO MOBILE PHONES, BY GENDER. According to the 2002 census, females account for 51% of Tanzania's population. As figure 10.6 indicates, only 8% of females interviewed have access to mobile phones, while 13% of male respondents were

Figure 10.6: Access to mobile phones by gender



Type of mobile phone						
Location	Contract	Pre-paid	Work- related	Combination	Total	Persons
Rural	0.0	100.0	0.0	0.0	100.0	63
Metro	0.5	99.0	0.5	0.0	100.0	384
Other urban	0.0	99.4	0.6	0.0	100.0	337
Total	0.3	99.2	0.5	0.0	100.0	784

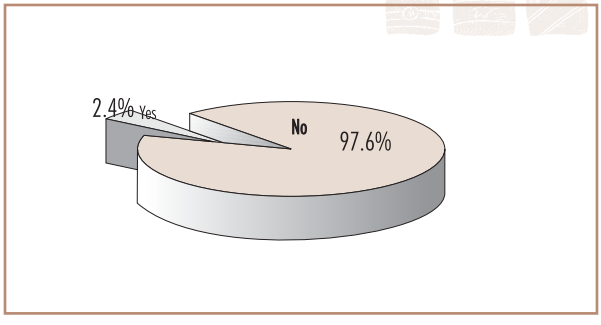
Figure 10.7 Distribution of household members by type of mobile phone and residence

found to own mobile phones. Of the subset who do own mobile phones, females make up 38% compared to 62% for males. It is clear that there are correlations between education and income, and access to communication services.

As figure 10.7 shows, almost all members of households owning mobile phones own pre-paid phones (99%). While less than 1% were contract phones, only 0.5% were work-related, and thus likely to be supplied by companies to their workers. In rural areas, 100% of mobile phones are pre-paid, compared to 99% in urban areas. Even in Dar es Salaam, there are very few contract subscribers.

ACCESS TO EMAIL. Assessing access to the Internet and computers was another major objective of this study. Only 2% of people in Tanzania have email addresses (figure 10.8). Most of those live in Dar es Salaam. This does not appear to be significant in comparison with less than 1% in the rural areas. Looking at gender, figure 10.9 shows little difference

Figure 10.8: Access to email addresses



Email addresses					
Gender	Personal subscription	Personal free account	Work-related subscription	Combination	Total
Male	14.0	79.3	6.6	0.0	100
Female	17.9	74.6	1.5	6.0	100
Total	15.4	77.7	4.8	2.1	100

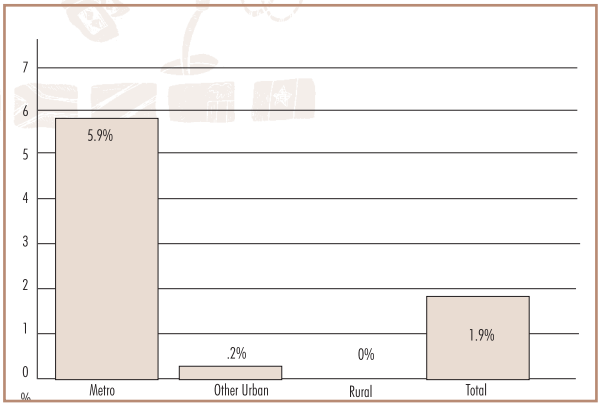
Figure 10.9: Percentage distribution of household members with at least one email address, type of email and gender

between males and females on email ownership (3% for males and 2% for females).

Of those who own email addresses in Tanzania, more than three-quarters (78%) have free public accounts, for example, Yahoo or Hotmail. Only 15% of email owners have personal subscription email accounts, and just 5% use work-related accounts. Of those who have an email address, close to 7% of males have work-related email, compared to only 2% of females. This is likely to be associated with the fact that more males are employed than females.

ACCESS TO COMPUTERS AND THE INTERNET. Only 2% of all households in Tanzania have at least one working computer – all of them in urban areas (figure 10.10). Only 6% of households in Dar es Salaam have computers, of which almost half have printers, according to the study findings. Only 15% of households with a computer have scanners. With

Figure 10.10: Availability of working computers, by place of residence



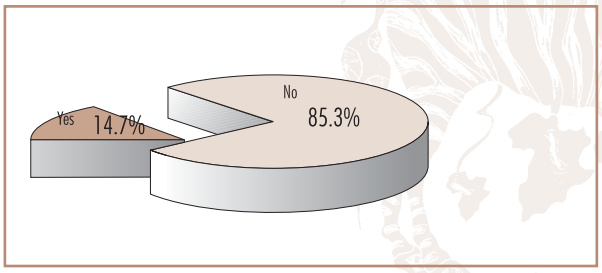


Figure 10.11: Does anybody in the household have a working Internet connection?

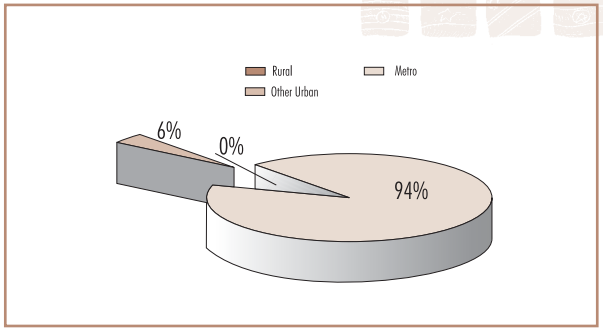
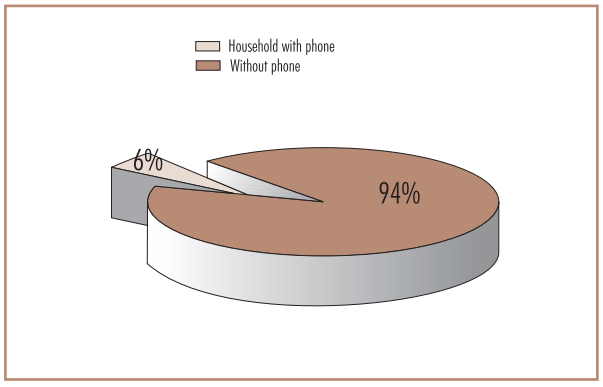


Figure 10.12: Breakdown by place of residence of those with access to a working Internet connection

power distribution concentrated in the major urban centres, these findings are not surprising.

Only those households with at least one computer were asked if they are connected to the Internet. The survey found that only 15% of all households with working computers are connected to the Internet – almost all of them (94%) in Dar es Salaam (figure 10.12). It is evident that a negligible number of households in Tanzania have Internet connections.

Figure 10.13: Households with telephones



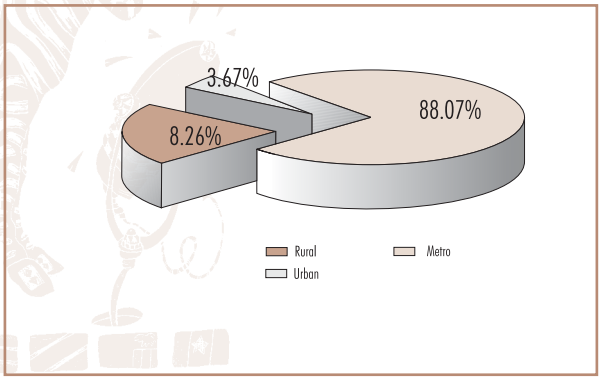


Figure 10.14: Households with a phone at home, by place of residence

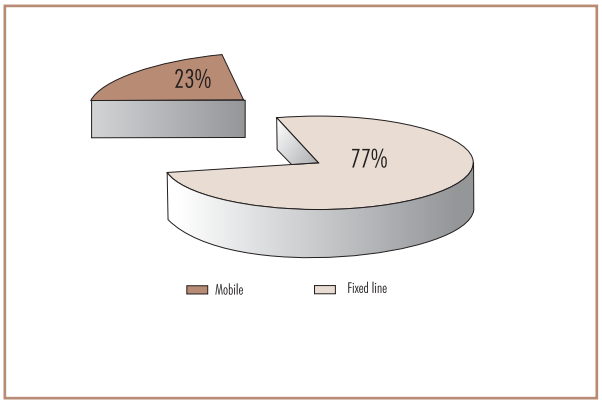


Figure 10.15: Households with either a mobile or fixed line phone

ACCESS TO HOUSEHOLD, PUBLIC AND OFFICE TELEPHONES

HOUSEHOLD TELEPHONES. Figures 10.13, 10.14 and 10.15 show that only 6% of all households have phones at home. Of these, 88% are in major towns, 4% from other urban and 8% from rural.

Of those who have household phones, 77% have fixed lines and the remaining 23% have cellphones. 76% of respondents with phones said their household phones were currently working. About 72% of household phones are pre-paid system.

USE OF PUBLIC AND OFFICE PHONES. Figure 10.16 shows that 8% of respondents used payphones during the past three months, 64% of these being from Dar es Salaam, 27% from other urban and 9% from

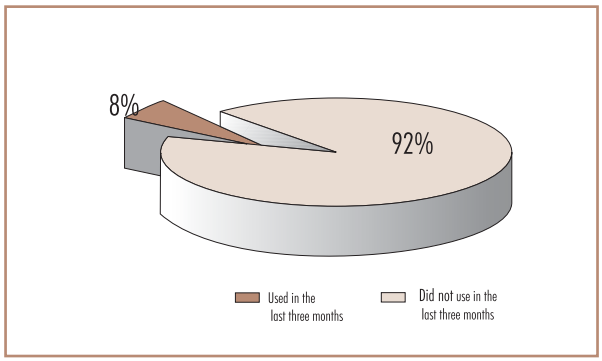
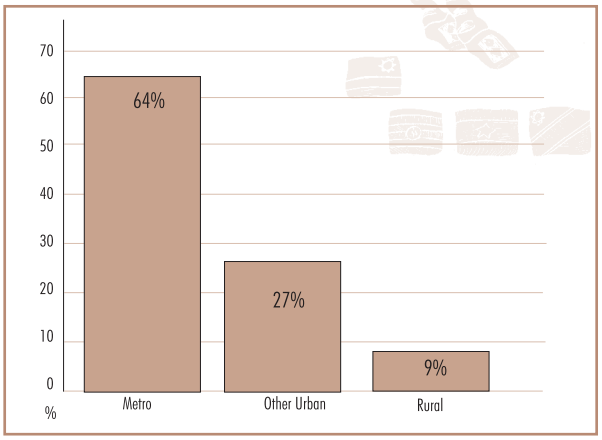


Figure 10.16: Payphone usage

rural areas. The relatively low usage in the last three months in rural areas of public access telephones reflect their limited presence outside of Dar es Salaam. Of those respondents who had reported use of private telephone kiosks, 78% of them were from major towns. Less than 1% of the respondents reported to have used computer phone/VoIP shops. This is due to the fact that VoIP is illegal in Tanzania.

CONCLUSION. The E-Africa Index baseline survey provides a useful tool to analyse the demand patterns of users and consumers of communication technologies, and has created a baseline data set upon which future developments can be evaluated and trends measured in Tanzania and 11 other African countries. This data should provide a worthwhile benchmarking, monitoring and evaluation tool for the regulator, TCRA and the Ministry.

Figure 10.17: Payphone usage



Only 6% of households in Tanzania have access to phones, of which almost 90% are in Dar es Salaam. About three-quarters of household phones are fixed lines, while the rest are mobile phones dedicated for household usage. Although recently introduced, the pre-paid system in Tanzania is predominant, with 72% of households using pre-paid phones.

The study found that mobile most effectively services the country, with 10% of all Tanzanians owning mobile phones. Most mobile phone owners, however, are found in urban areas, with 17% of the population in Dar es Salaam owning mobile phones, 10% in other urban areas and only 4% of the rural population, despite the vast majority of Tanzanians living in rural areas. It is noteworthy that almost all mobile phone owners use pre-paid accounts (99%).

Payphone usage is surprisingly low, considering the poor access to both fixed and mobile phones. However, there are very few payphones outside the major urban areas, and where they do exist, they seldom work.

Access to the Internet and computers is extremely limited. Only 2% of people in Tanzania have email addresses, and most of those live in Dar es Salaam. More than three-quarters of those who have an email address use free public accounts.

Only 2% of all households in Tanzania have a computer – all in urban areas. Even then, a mere 15% of the few households with working computers are connected to Internet, and they almost exclusively live in Dar es Salaam. In general, there is negligible Internet penetration in Tanzania. ❑

Chapter 11: Uganda

FF Tusubira, Makarere University; Irene Kaggwa, Uganda Communication Commission; and Jonathan Ongora.

National Indicators	
Country	**Uganda**
Population	23.4
Poverty (% of population below $1 a day)	26.8
Adult literacy rate (% ages 15 and over)	68.9
Urban population (% of total population)	14.9
GDP per capita (US$)	243
Surface area (000 km²)	241
Uganda Shilling / US$1	1,725.5

INTRODUCTION

An ICT demand-side survey is a critical component of any telecommunication sector review, as the success of communications development interventions cannot be realistically assessed until access, cost, and utility are analysed for the target population. Furthermore, the long-term impact and success of rural communications development interventions require baselining. Unfortunately, all studies and analyses to date have taken only a supply-side approach to sector statistics, where issues relating to equity of access (rural, gender, youth) get lost in aggregations. This survey of ICT access and usage enables both the disaggregation and the establishment of a baseline for future time-series studies that will allow for a better determination of trends within the sector.

In this paper, the Uganda telecommunications sector is discussed and analysed up to the end of 2004 , both from the macro perspective using standard indicators, and from the user perspective based on a national household and individual user survey. The study also incorporates the proposed new sector policy, scheduled to come into effect during 2005 at the end of the duopoly.

BACKGROUND.

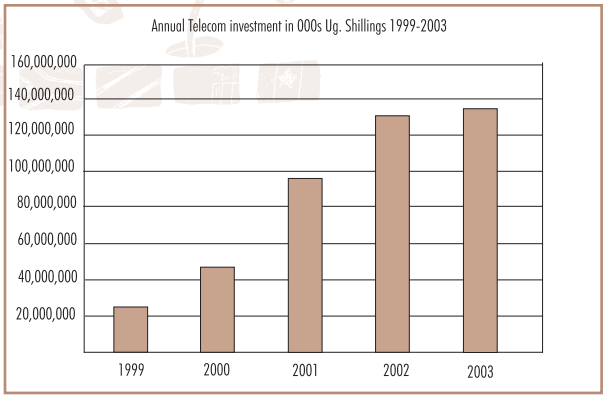
The first tentative departures from monopoly provision started 10 years ago. Today, Uganda's relatively liberalised telecommunications sector has a number of positive attributes. These include good regulation; a fairly competitive and vibrant market; declining prices, dominated by the mobile platform; and a potentially successful rural communications development programme, which has recently been launched. The sector still faces a number of key challenges, including limited access and competition, relatively high prices (despite the downward trend), and hardly any Internet penetration.

An ongoing policy review, included in this discussion, aims to build on the successes and address the shortcomings of the period 1995-2004.

SECTOR GROWTH AND VALUE[1]

INVESTMENT. There was a fairly steady growth in investment until the year 2002, when it started flattening out (figure 11.1), with only Shs[2] 133.5 billion invested in 2003. While ISPs have increased their investment, this has been at a much lower rate than the rest of the sector and does not have a significant impact on the figures. It should be noted that many ISPs get their capacity from the two national operators, MTN and UTL, both of whose figures are not disaggregated.

Figure 11.1: Sector investment



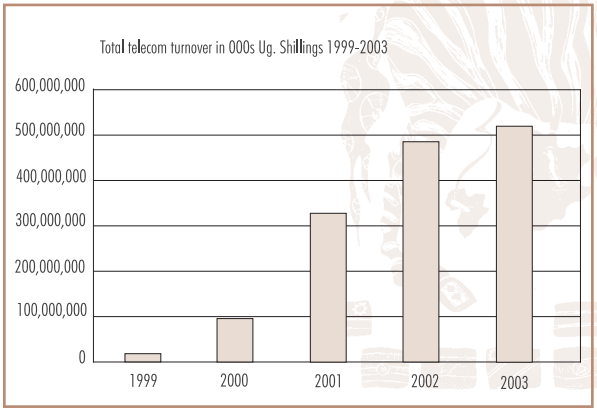


Figure 11.2: Sector revenue

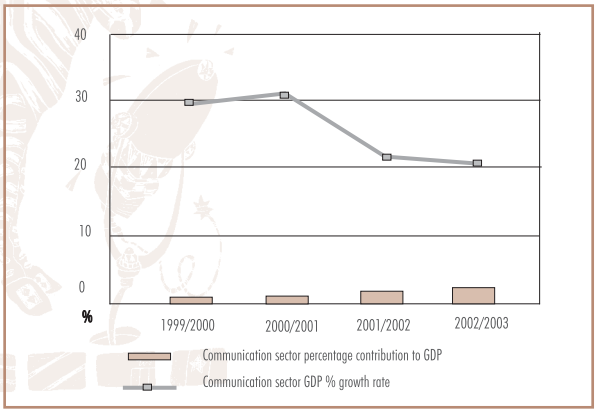


Figure 11.4: Communication sector growth and contribution to GDP

REVENUE. Total sector revenues (figure 11.2) have a similar trend to investment, with the revenue split between the major licensees and ISPs approximately 60:40. (This revenue does not include cyber cafés and telekiosks).

CONTRIBUTION TO GDP. Figure 11.3 shows the sector GDP and its contribution to the overall GDP from 1999 to 2003. While the growth rate is much higher than the overall GDP growth rate, its contribution to the national GDP remains low, being only 1.4% in 2003. The high sector growth rate underscores its continuing potential to attract investment. The downward trend in growth would appear to be an investment disincentive, but it appears to be flattening out at about 20% rather than being a continuing decline.

Figure 11.3: Contribution of the telecommunications sector to GDP

Total GDP (million Shs)	7,828,950	8,274,376	8,772,644	9,199,814
% Increase	5.9	5.7	6.0	4.9
Per capita GDP (Shs)	346,362	354,155	362,980	367,951
Exchange rate	1,454.83	1,664.5	1,755.56	1,797
Communication Sector GDP (million Shs)*	67,713	89,601	109,385	131,788
Communication Sector GDP % growth rate*	29.7	32.3	22.1	20.5
Communication sector contribution/Percentage contribution to total GDP*	0.9	1.1	1.2	1.4

** This includes communications, multimedia industry and postal*

JOB CREATION. While there has been only a small gradual increase in the number of directly employed staff, there has been high growth in the actual number of jobs in the sector. This is a result of the overall expansion of the sector combined with the outsourcing policies of the operators (MTN, for example, currently outsources to more than 3,000 people); the liberalisation of the provision of access services through Internet cafés and telephone kiosks; the growth of support services for the sector; and a growth in user equipment assembly, sales, installation and maintenance. The training sector has also generated a large number of jobs to develop the skills needed to service the sector at all levels. Figure 11.5 shows the trend of jobs in direct and indirect sector employment (indirect employment is estimated).

ACCESS

COVERAGE. The strategy adopted by all the major service providers (Celtel, MTN, UTL) has relied on the rapid rollout of mobile services. The national telecoms operators (MTN and UTL) have at the same time continued to invest and participate in projects to improve fixed line infrastructure availability countrywide, especially as the demand for broadband data infrastructure increases. More optical fibre has been introduced into the underlying telephony

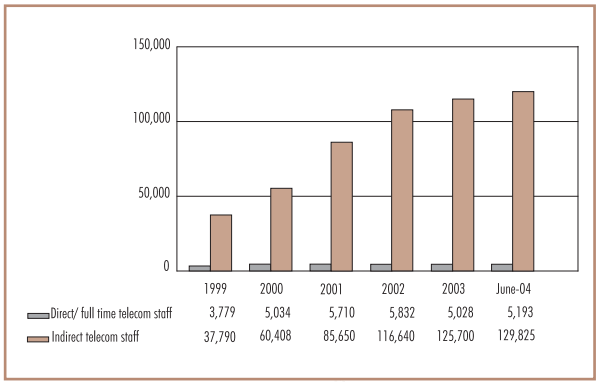


Figure 11.5: Telecommunications sector direct and indirect employment

infrastructure, especially within the capital, Kampala, and in interconnecting the major urban centres of Kampala, Entebbe, Jinja and Masaka. In a few areas where terrain or security does not allow easy access, VSAT has been deployed.

In the process of targeting the major cities and towns, the three cellular service providers have created coverage over most of the heavily populated areas of the country. The GSM network now covers all 56 districts[3] of Uganda, although it is mainly concentrated in the major urban centres and along the highways.

CUSTOMER GROWTH. Figure 11.6 shows mobile (GSM cellular) and fixed line customers. The mobile market is the biggest and has proved to be the fastest-growing market in Uganda during the past six years. There are currently 1,040,127 mobile customers against 71,056 fixed customers (Uganda Communications Commission, November 2004). The growth of the mobile industry is attributed to a number of factors:

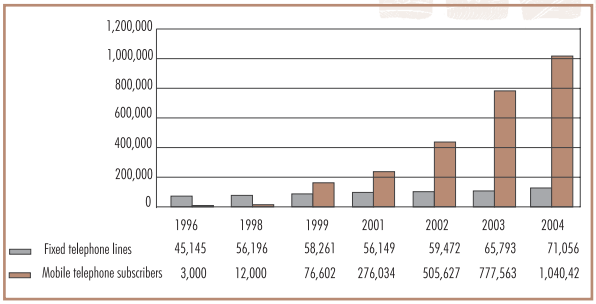
- The provision of fixed line telephony services was for many years associated with inefficiency, unreliability, and poor customer service.
- Use of the pre-paid model that provides the freedom to make calls (and spend money) according to need. (UTL, based on the same marketing approach, has also introduced a pre-paid package for its fixed line customers).
- The ease of getting a telephone connection, and the resulting mobility. The big informal business sector in Uganda has particularly benefited from cellular services and has been a significant driver in user growth.

UTL remains the main provider of fixed services (fixed and wireless technology), with MTN also becoming a significant player in the provision of fixed services (wireless technology).

TARIFFS. The three-way competition in telephone services has led to a continuing decrease in tariffs, thereby increasing affordability. International tariffs have, on the whole, also reduced as operators continue to set more realistic termination rates and enter into fairer pricing arrangements with international carriers and operators. While there was a price cap mechanism during the exclusivity period, competitive pressure on tariffs has been such that it has never been applied – prices have been consistently under the price cap limit over this period.

Figure 11.7b illustrates the tariff movement of both fixed and mobile services from the period 1995 to 2004. Despite the downward trend in prices, affordability has remained a key issue for all service categories during the current policy regime. To date, the average revenue per user (ARPU) is estimated at US$20, and with a per capita income of US$200, the

Figure 11.6: Number of telephone customers



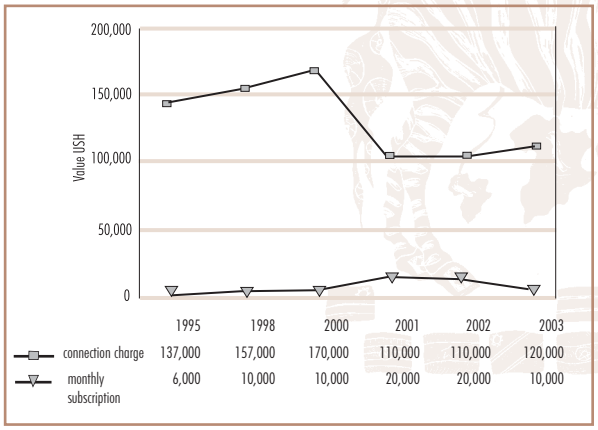
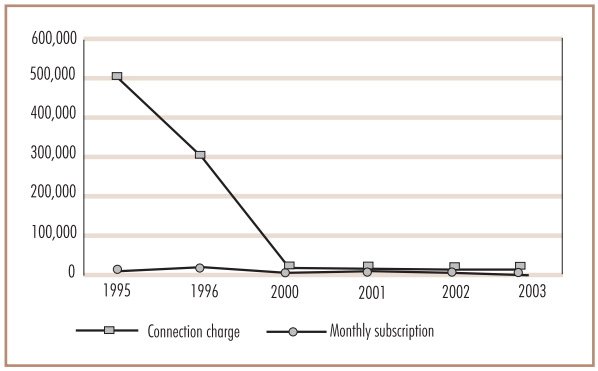


Figure 11.7a: Connection and monthly fees, 1993-2003

number of people who can reasonably spend US$20 on telecommunications services is minimal. This emphasises the need to create pricing and other incentives to address affordability concerns.

To assess the performance of Uganda's fixed line tariffs within the East African region, a benchmark study was undertaken in December 2003. The findings (figure 11.8) indicate that Uganda's rates are comparable to the other countries, but international rates are nearly two times lower than Kenya and Tanzania, mainly due to more competition in this market (eight international data gateway (IDG) licenses, whereas IDG is exclusive to the national operators in Kenya and Tanzania). A similar

Figure 11.7b: Movement of mobile connection and subscription rates, 1995 to 2003, pre-paid



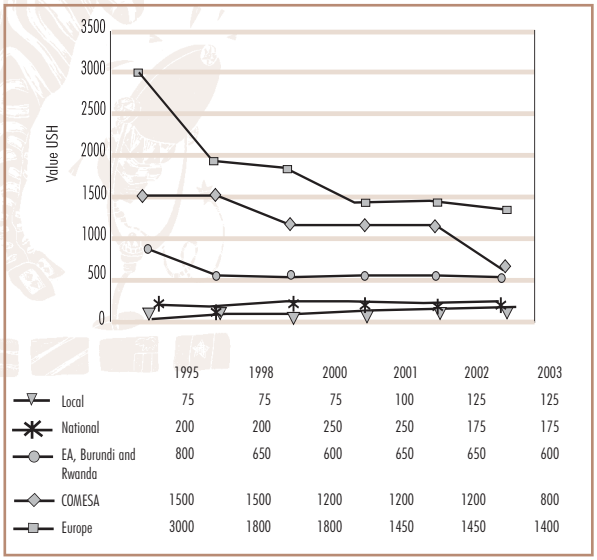
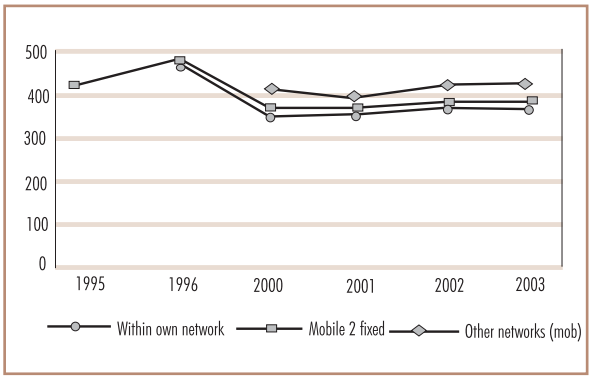


Figure 11.7c: Tariff for classic landline, 1995-2003

benchmarking was carried out for the mobile market, and the findings (figure 11.9) indicate that Uganda's mobile tariff rates are the lowest for all tariff categories. This analysis not only shows that operators in Uganda may be mindful of affordability concerns (thus lowering rates), but also that competition in the market has brought prices down.

INTERNET AND DATA MARKET. Considering the liberal regulatory environment, the growth of the Internet and data market has remained below expectation. However, a dramatic fall in prices (from about $8,000 per Mbps

Figure 11.7d: Movement of local mobile rates (on network, off network and M2F), pre-paid.



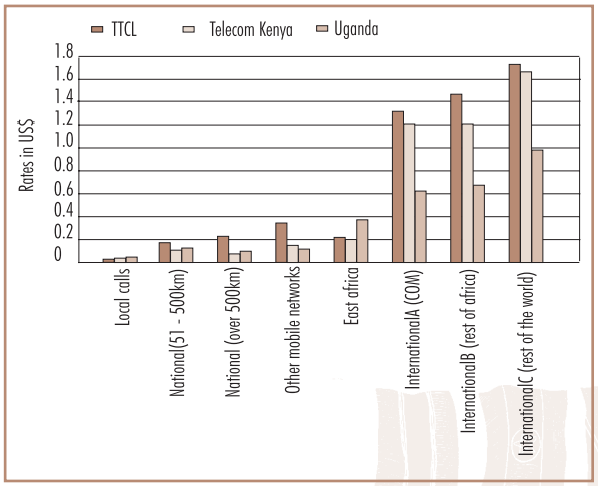
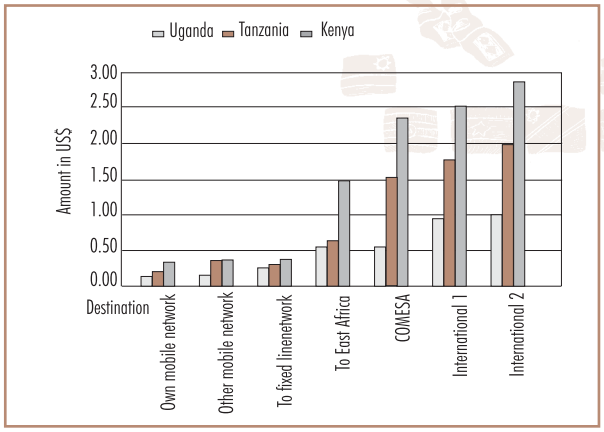


Figure 11.8: Fixed telephone service tariffs in East Africa – 2003

per month to typically $3,000) towards the end of 2004, the deregulation of the ISM band for wireless Internet access and the waiver of licensing requirements for ISPs that do not own IDGs are expected to spur growth.

Figure 11.10 illustrates international bandwidth and the cost/time series. Cost figures are based on large consumer costs (Makerere University case study). The continuing drop in prices is ascribed to a combination of competitive pressure as well as increased volumes resulting from increased awareness and spread. The low level of utilisation to date is largely attributed to a lack of awareness combined with high costs, limited

Figure 11.9: Mobile telephone service tariffs in East Africa – 2003



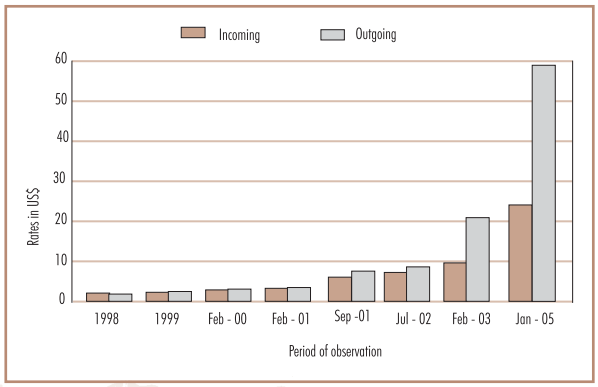
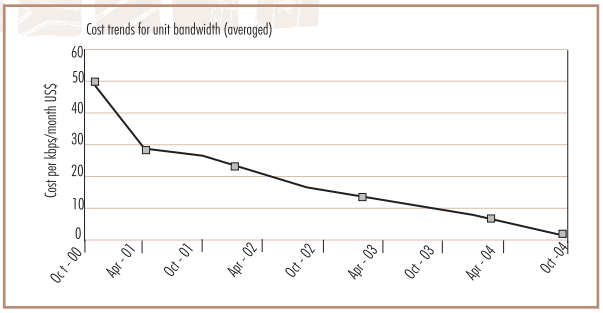


Figure 11.10: National incoming and outgoing bandwidth, time series

points of access, lack of content relevant to the needs of the majority of the citizens and the high rate of illiteracy.

Uganda is currently disadvantaged by the fact that its only available means of international connection is via satellite, which is very expensive compared to optical fibre cable. Local loop access costs remain high for dial-up customers (tariffs are still time-based), and this is compounded by continuing slow speeds (typically less than 5kbps for dial-up): it currently costs at least $3 (telephone tariff only) to download a 1Mb file via a dial-up connection. Leased lines for larger clients are available but still expensive due to limited competition. The Uganda Communications Commission (UCC) has recently taken a decision to deregulate the ISM band (subject only to emission level limits) to encourage the use of broadband wireless access.

Figure 11.11: Bandwidth cost, time series (Makerere University)



SYNERGIES WITH RADIO, AND SOCIAL BENEFITS. The spread of mobile phones has created a synergy with the spread of private FM radio stations, with more than 100 operational stations in Uganda providing near total national coverage in local languages. Where radio used to be a passive tool for development information dissemination, it has become an interactive public tool and discussion forum through the popular phone-in programmes. Daily programmes range from political debates and other topical issues to health issues, agriculture, education, gender issues and the environment.

RURAL COMMUNICATIONS DEVELOPMENT[4]. When telecommunications sector reform started in Uganda, there was an explicit recognition right from the start that the kind of liberalised market envisaged by the government policy framework would lead to marginalisation of the poorer sections of society. It was recognised that the varying interpretation of "rural" across the world meant that imported solutions were not likely to succeed. The arising policy and strategy consequently departed from the common purely infrastructure interventions to include related needs. The UCC identified the challenges of accessibility, affordability and utility (dictated by ICT literacy and awareness of opportunities):

> The Rural Communications Development Fund (RCDF) shall be used to establish basic communication access, through smart subsidies, to develop rural communications. That is, the RCDF shall be used to encourage commercial suppliers to enter the market but not to create unending dependency on subsidy.

To date, it is estimated that $1,500,000 from the RCDF has leveraged a further investment of about $1,000,000 from the private sector. The leverage ratio is low because a lot of the initial disbursements were in the category of outright grants to small start-ups. Procurement procedures under the World Bank have unfortunately delayed the implementation of the key components of the RCD programme over the last two years. When these are implemented during 2005, it is expected the private sector will invest $3 for each $1 from the RCDF. Through subsidies from the fund to various companies, the following projects have so far been implemented:

- 20 Internet PoPs were established in various districts (there are 56 districts altogether);
- 26 district websites were established (www.dip.co.ug);
- Four Internet cafés were established;
- Three ICT training centres were established; and
- 66 public payphones were provided.

NEW POLICY DIRECTIONS[5]

BACKGROUND AND ISSUES. Uganda has come to the end of the duopoly period that defined the key elements of the market over the last seven years. This, combined with the need for periodic review, motivated a sector policy review (led by the UCC at the request of the Minister responsible for communications) that started in the last quarter of 2004, and was concluded during January 2005. The document is posted at www.ucc.co.ug for public comment.

The national ICT policy framework defines the entry points for ICTs into the national development process by supporting the development targets and processes in other sectors, and being an economic sector in its own right. The national telecommunications policy and the infrastructure targets similarly respond to the national ICT policy framework. Proposed infrastructure needs and the rate of rollout have, therefore, been dictated by the planned rate of progress in sectors like education, health, agriculture and governance. Human development impact is

expected to be the defining measure of success, with the extent of infrastructure only being an indicative measure. The holistic approach that has been used especially focuses on the majority of often-marginalised citizens, consisting of rural communities, women, the physically disadvantaged, and youth.

Within a broader context of competitive reform and regulation, the poor Internet diffusion in the country was highlighted. Uganda is e-landlocked, without direct access to the international fibre backbone. Until this is addressed, Ugandans will generally be locked out of the global knowledge society. This is a national strategic priority, as is the creation of relevant and accessible content, promoting regional peering within East Africa and the continent, and the need for government to become a user and number one advocate of the Internet in Uganda.

In addition:

- Government recognises that a purely commercial approach would marginalise the majority of the citizens, and has therefore made universal access, supported by appropriate PPPs, a key objective.
- Government will work towards the convergence of all ICT sectors under single political leadership to ensure maximum synergy and harmonised policy, laws, and regulation.
- Access to the international Internet backbone, via optical fibre and the establishment of a national data backbone, are key national strategic priorities to be achieved by the end of 2006.

The resulting mission is to establish, by the year 2010, a fully liberalised telecommunications sector as an engine of growth that is driven by the human development needs of Uganda.

SPECIFIC OBJECTIVES. The specific objectives are defined within the context of providing an infrastructure that provides, by the year 2010, accessibility and availability throughout the country to a minimum of a voice and data network points, as detailed.

Part 1: Targets to support the universal access objectives aimed at enabling the human development plans of various government service delivery sectors. These will be supported through the RCDF and PPPs.

Part 2: Targets that address sectors of the population that can afford services. These will be achieved largely through market liberalisation, fair competition and regulation that assures fair pricing. PPPs will have a limited role during the policy period to 2010.

Part 3: Strategy objectives, in terms of establishing the market through licensing and regulation.

The proposed key components in defining the market structure are the following:

- Reducing license categories to only two: infrastructure and services.
- Addressing affordability and avoiding abuse of market power through price regulation aimed at service providers who achieve significant market share in infrastructure or services.
- Automatically permitting self-provision of infrastructure for service providers whose infrastructure needs cannot be met within a timeframe responsive to the service provider's needs.
- Requiring holders of converged licences (ie, permitted to roll out and operate any infrastructure or service) to have a clear business separation between the infrastructure and the services side of operations; and between wholesale and retail operations.[6]

HOUSEHOLD AND INDIVIDUAL USER SURVEY

The survey was planned to cover 60 enumeration areas with 1,800 questionnaires. However, one such area was not accessible because of the long time required for security clearance, leaving 59 enumeration areas and 1,770 households. Of these, 1,623 interviews (91.7%)

were successfully completed. This still gives assurance of sufficiency of the returns as a basis for countrywide interpretation.

56 institutional questionnaires covering NGOs, schools, health units, and factories and businesses were also developed to capture the insight needed by the UCC. These questions were aimed at assessing the availability, usage, satisfaction and demand for communications services at institutional level. These were administered in the same enumeration areas, but their analysis is not part of this discussion.

DEMOGRAPHICS. Uganda is characterised by three major settlement types: the capital city, Kampala, that has a unique character and challenges; the major urban areas, consisting of other large urban centres; and the minor urban/rural areas, combining both small townships and the rural areas that radiate outwards around them. Figure 11.12 summarises the age and income distribution as well as the male/female and the rural urban ratios as established through the survey. Uganda's population remains largely rural (90%).

In terms of interventions that support rural communications development, a key question to answer is: where do the poor people live, and what are their typical incomes? The characteristics of the various classifications of settlements occur not just in landscape and level of development, but also in income levels. The majority of Ugandans are not employed in the conventional sense – a result of the interpretation by most of the rural population that their farming style of life is not employment as such. In this, they are often not absolutely wrong, since the majority of their efforts are subsistence farming, with no conscious effort to produce more goods for marketing. The lack of any price guarantees hampers those who try to go into small-scale commercial production, compounding the low incomes that characterise most of the rural population in Uganda. The lowest income bracket in Uganda has been taken as those earning less than Shs 100,000 (about $55) per month. Figure 11.13 shows the locations of people in the lowest income bracket in terms of urban and rural.

About 83% of the rural population lie in the lowest income group, identifying rural areas as the key focus of supported intervention for communications development. A major part of the urban population (just over 50%) also falls in the lowest income bracket, pointing to the need for intervention in urban areas as well. 90% of the household heads earn less than $100 per month: this must, especially in the rural cases, where the head is the dominant income earner, be spread to the rest of the family. This percentage, however, needs to be qualified: in the rural areas, subsistence agriculture supports most of the food needs of the family, and this is not reflected in the income figures.

There is a slightly higher proportion of females to males in the country (about 53% female). Although this has long been considered a challenge, it is gradually becoming recognised more as an opportunity through initiatives such as Unophone and MTN Village phone, in which women provide community telephony services as a source of income. In the rural areas, however, a challenge still exists due to the cultural lifestyle that keeps females occupied in domestic work, limiting the availability of time for using any ICT other than voice telephony.

Most of the population (about 54%) is below 15 years of age, while 90% of the population is below 45 and only 3.1% above 60. The high percentage of youth poses an opportunity for ICT utilisation. The increasing success of universal primary education in addressing the literacy challenge – that is also a challenge to ICT uptake – is reflected in the fact that 44% of the household members are attending school. This still leaves some children who have either not been to school or have dropped out at an early level, but it also means

that Uganda will very soon achieve more than 80% literacy, fostering the uptake of ICT services.

GENERAL PENETRATION OF SERVICES. The use of telephone services in urban and rural areas is illustrated in figure 11.14.

The current and overwhelming conclusion from the survey is that mobile voice telephony is the exclusive means of communication for the typical Uganda citizen, and that there are hardly any fixed line services in peoples' homes. This is expected even from the macro-picture, in that there are 1,040,000 mobile phones countrywide, and only about 70,000 fixed phones (UCC figures). Most fixed phones are either in offices or high-income residential areas in urban centres.

Public and private payphones are the principal means of communication for the majority of citizens. In rural areas, only about 25% of the population utilise these services on a fairly regular basis. Regular usage in urban areas is just over 60%, most likely based on a combination of higher income, greater ease of access, and greater awareness.

There is also no access using VoIP in rural areas, and it is still very limited in urban areas. This is partly a result of the grey area that has surrounded the legality of unrestricted utilisation of VoIP that the regulator has never addressed, a lack of awareness and the absence of Internet in rural areas.

In terms of the overall population, as shown in figures 11.15, there is almost no access to and

Figure 11.12: Some demographic indicators

Age	%	Gender	%	Income	%	Location	%
<10	39.0	Male	47.4	<100	90.6	Capital	4.3
10 - 14	14.8	Female	52.6	101 - 200	7.0	Urban	5.0
15 - 19	10.3			201 - 300	1.5	Rural	90.7
20 - 24	7.4			301 - 400	0.4		
25 - 29	8.4			>400	0.5		
30 - 34	5.2						

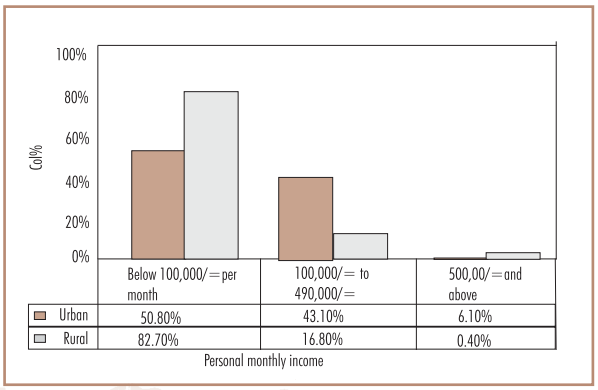
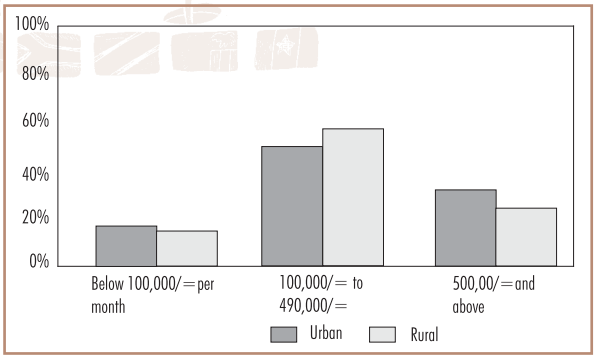


Figure 11.13: Household income by location

utilisation of computers and the Internet, especially outside the major urban centres. This is again a result of a combination of factors: the inherent low bandwidth and the unsuitability and high cost of the main (mobile) access platform; the limited penetration of fixed lines that would provide the Internet access last-mile connection; the still high cost of international bandwidth (the sharp fall in prices towards the end of 2004 has not yet filtered through to the small users); very low ICT literacy; and the lack of relevant content.

Shortage of computers, while real (only 5.5% of the households have a household computer; and Internet cafés, whose number is growing, are still very rare in rural areas) is not cited as a key cause of limited penetration: if demand is demonstrated and recurrent

Figure 11.13b: Household income by location



costs are affordable, there would be private sector investment in public access points.

PUBLIC PAYPHONE FACILITIES. Figure 11.16 illustrates the usage of telefacilities by gender. It is interesting to note that there is no significant gender divide in the utilisation of telefacilities. The number of females using computer-based telefacilities is marginally higher than males, most likely a result of the continuing tendency for secretaries (where the gender-based outcome is that they are mostly female) are always the first to use computers in most organisations.

Looking at the usage of telefacilities by the different income brackets (figure 11.17), it is interesting to note that although payphone usage is greater in the urban areas, the usage of these facilities increases with income, especially in the rural areas.

ACCESS TO ELECTRICITY. A key factor in access to telecommunications services, and especially Internet use, is access to electricity for re-charging phones and powering computers. Uganda has a fairly extensive transmission grid reaching most of its 56 districts. Access is, however, limited by the cost of stepping down from the transmission to the distribution voltage, carrying out internal house wiring and paying for the connection. As a consequence, 97.7% of rural and 59.9% of urban households have no access to electricity.

Urban populations have an advantage in that they can always find a place to charge a phone or access the Internet within a fairly short time. Rural populations end up completely cut off or having to make long journeys (up to one hour) to charge phones or get access to the Internet. The government's Energy for Rural Transformation programme is trying to address this challenge, but progress is agonisingly slow. The current target is to connect at least 20,000 households to the grid each year for the next five years. The

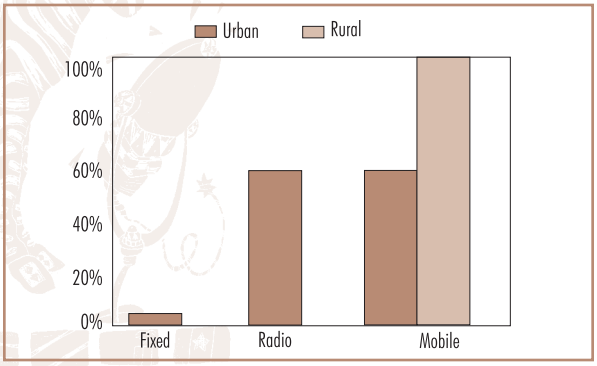


Fig 11.13(c): Type of household phone by location

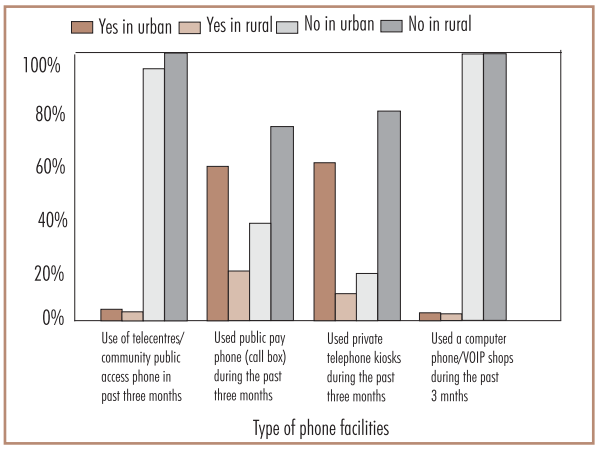


Figure 11.14: Use of telephone services by location

achievement of this target is not helped by the even bigger challenge of a large energy deficit in Uganda that has taken precedence over rural electrification.

MOBILE

While mobile is effectively the only means of access, penetration is still very low. Ownership of mobile phones is 2% and 16.6% among rural and urban populations respectively, with an overall penetration of about 3%. It is noteworthy that, without exception, all the enumeration areas had access to at least one mobile network, albeit poor in some of the cases.

There is significant usage among the lowest income group (earning less than Shs 100,000 per month) as has been noted, but mobile phone ownership levels start becoming significant only

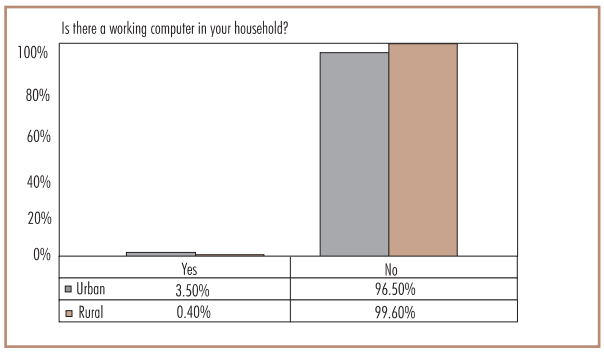
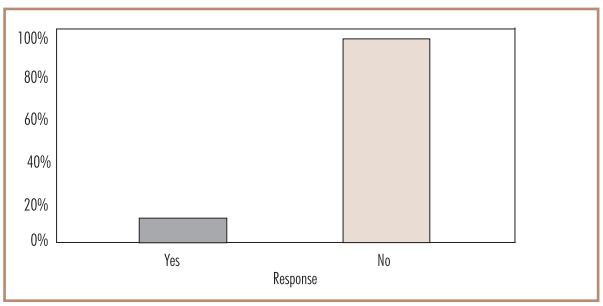


Figure 11.15a: Computer distribution by location

above this group (0.9% in the lowest income group, 6.2% and 15.9% in the middle and high income groups). This underscores the fact that the actual cost of the mobile handset is one of the key inhibitors to ownership, pointing to an area of intervention in promoting increased access. There is, however, some ownership in the lowest income group, and this is attributed to two factors: the informal sector, where it has become a vital tool for competitiveness and business survival (customers want to ring their mechanic, their favourite hawker, the fresh produce vendor in the market, the plumber); and among students, where the cost of phone and the recurrent cost is met by the parent (this is very common in the middle- to high-income groups).

Almost all mobile phones (99.7%) are pre-paid, which is a user preference because it eliminates any paperwork and permits expenditure according to income pattern.

Figure 11.15b: Household Internet connections



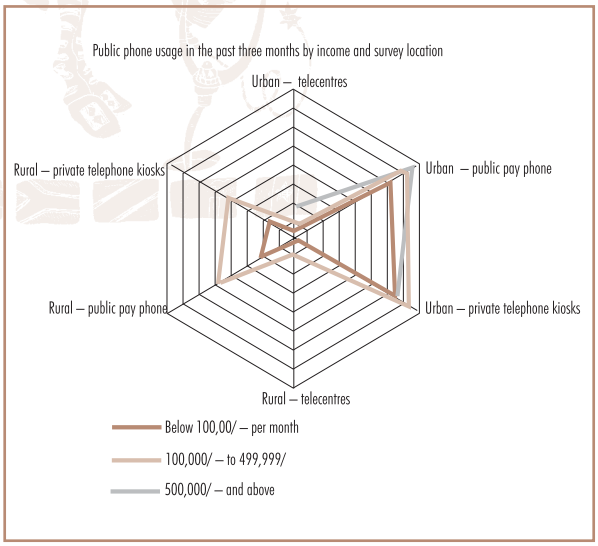
There is a significant gender divide in ownership of mobile phones at the household head level: 8.1% of the male heads have phones, compared to 5.2% of the female heads. This is most likely due to higher incomes of male-headed households.

In the lowest income groups, both urban and rural, public payphones and single phone private tele-kiosks are the principal means of telecommunication. Individual public phone expenditure in the rural areas is typically Shs 1,500 per month, and in urban areas 2,500. People in the lowest income group typically make one to two calls per month using a payphone, while those in the middle-income group will typically make three or four such calls. As observed under general access, female usage across all categories is marginally, but not significantly, lower.

Strategic intervention to increase basic access has to address the problem of affordability of mobile handsets, possibly through the RCDF and in partnership with the service providers. This would also promote the sale of services by single phone tele-kiosks in rural areas.

INTERNET. The statistics from the survey paint a grim picture of Internet use in Uganda. Ownership of

Figure 11.16: Usage of telefacilities by gender



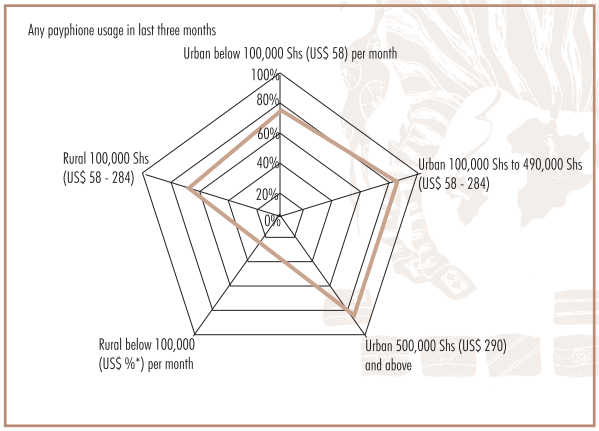


Figure 11.17: Usage of telefacilities by income

computers is still very limited, with only 3.5% of the urban population having access to computers in their homes. The corresponding figure for the rural areas (where the majority of the population lives) is 0.4%, with overall national penetration 0.7%. Based on these figures, there are only an estimated 182,000 computers for the 26 million people in Uganda. For those who own computers in their homes, only about 10% have a working Internet connection, meaning that computers are not yet used as an aid to communication and information access. Among those who have Internet connections in their homes, the typical monthly bill is about Shs 85,000. Even if it was not for the other challenges, such a cost puts possession of an Internet connection to the home out of the reach of more than 90% of the population. It is interesting to note, in possibly the only positive aspect, that households with female heads are twice as likely to have an Internet connection as households with male heads.

Only 4.2% and 0.1% of the urban and rural populations respectively have email addresses, about 60% of which are free subscriptions and the rest paid subscriptions or office access. The national penetration is 0.4%, or about 104,000 people out of a population of 26 million.

Uganda is de facto not using the Internet, and this poses the greatest challenge to strategy in the new sector policy: it is economic suicide to permit this situation to continue in the global knowledge society.

Qualitative survey using focus groups

Objective and methodology. The quantitative part of the national survey brought to light patterns of access and utilisation of telecommunication services from the user perspective. To validate and explain such findings and observed patterns, it became necessary to supplement the quantitative survey with qualitative information. The focus group methodology was used to carry out the qualitative survey.

Specifically, the aim of the qualitative research was to collect information that would assist better understanding of:

- The reasons (and dynamics) influencing decision-making for those issues that impact on adoption and changes of communications technology (namely, the adoption and adaptation of different ICTs, and the frequency of use and reasons thereof).
- How usage patterns of different communications technologies develop and then change over time (how technology impacts on other aspects of their lives, both from a social and economic perspective).

A total of eight focus groups, involving 59 respondents, were conducted. Six of the groups were held in Kampala (capturing both urban and rural) and two in Lira District. The locations were identified through a random selection from the enumeration areas that were used in the quantitative survey. Different groups were then identified by demographic and usage criteria: youth, adults, men, women, Internet and non-Internet users. The selection of participants was based on a purposive sampling procedure: local facilitators were given a list of general categories, including age, sex and communication technology-usage patterns, to

guide the selection of participants. The detailed methodology and other details (composition, identification, records of discussions) are contained in a separate report.[7]

Findings

Ownership of fixed line phones. Only three out of the 59 respondents had fixed line phones in their homes. These were, however, also used as informal tele-kiosks to generate income for the owners. This limited number of fixed lines was attributed to either fixed lines not being affordable or to the absence of infrastructure. The fixed wireless phone has begun to replace fixed wire line phones due to its pre-paid billing system. The public kiosk operators are also prefer the pre-paid model due to avoidance of billing and the ability to calculate available spend before or after a call.

Access and usage behaviour. Almost all participants said they had access to either a call box, a tele-kiosk (mobile or fixed wireless) or to a mobile phone that either belongs to them or their neighbours. It is also common practice for phone owners to let neighbours, friends or family members use their phones, more to receive than to make calls. Using other peoples' phones to make calls (without paying) is usually allowed only for matters of extreme urgency and importance. This, however, is on the decline, due to the fact that more and more people are saving up to acquire cellphones and, especially in the urban areas, there is normally at least one person in the family who owns a mobile phone.

A common point of access to services is the office phone in the government, NGO and private sector. In the public sector, access to office phones seems to be limited to top government and civil servants, who use them for all sorts of personal reasons. The use of office phones to make or receive calls on behalf of friends and relatives is also common.

Payphones. Regardless of the type of connection used, it is a combination of distance and affordability that dictates the choice of where people make calls. In the capital city, the Simu 4U kiosk has become very popular, since users can pay for a 15-second call to any network at Shs 100, compared to a typical minimum of Shs 200 per minute. Public phone booths are generally located at small trading centres (along main roads), and near or within public institutions that are more secure. However, these tend to be some distance from residential areas. Housewives and teenagers making calls in the evening tend to use phone booths or informal tele-kiosks that are closer. Privacy introduces another dynamic: most of the respondents (especially women) say they walk to public phones that are further away from where they live so that they may not be easily identified. One woman said that in their small trading centre, other people tended to listen to the callers' conversations.

The phrases "now you are talking" or "connected", once used by two of the cellular providers, have become slang terms to refer to a new mobile phone owner, especially among the youth. The entry into the mobile phone culture is determined by a number of factors: inconvenience experienced in using another person's phone to receive or send messages, the lack of privacy, and unreliability when the owner of the phone forgets to deliver a message. This has driven many users to buy handsets, even if they use them as receivers most of the time.

Peer pressure is a major factor in phone ownership among the youth. The source is often a donation. Most of the participants (youth) who own mobile phones said that friends or relatives, either in Uganda or abroad, bought the phones for them. Buying phones for children is now a common practice among rich families. A phone is also a common gift to girlfriends. Respondents who

didn't own personal mobile phones revealed that mobile phone ownerships depended a lot on income or allowances offered by employers or parents in the form of a specified amount of airtime per month.

The age at which most people join the "now you are talking" culture is not clear-cut. It was, however, agreed that it was determined more by income than age. Where income is not sufficient, many youths are now simply buying SIM cards, providing them with a line and a number that they can use to send or receive messages. SIM cards cost about $10, and come with airtime and a connection fee for a period of time. By inserting a SIM card in a friend's phone whenever they want to send or download their messages, youth are able to creatively communicate and also maintain their status and privacy.

Most women and youth said they typically buy airtime of between Shs 2,000 and 5,000 (US$1-$3), which also comes with an access period. Typical monthly expenditure was claimed to be Shs 10,000. However some respondents, especially businessmen, said they always have airtime.

Most respondents said that telephony is a necessity. It is not uncommon for users to make calls or get airtime on credit at tele-kiosks in their neighbourhoods. Many of them consider the use of mobile phones a luxury only if usage is not related to work or business.

EXPENDITURE. In the few houses where pre-paid fixed phones (wired or wireless) are installed, the parents keep the access codes to themselves, thus deterring children and neighbours from making calls. The fixed home telephone owners also said they use their phone mostly to receive calls, preferring public payphones to make calls according to immediate need. There were instances where home phones had been disconnected due to failure to pay: users claimed their bills were exaggerated or manipulated, with suspicion of tapping by unscrupulous neighbours or phone company employees.[8]

Government offices and other employers have started allocating a specific amount of airtime to each phone. NGOs tend to give airtime freely, while other institutions require their staff to pay for private calls from the office (except in emergencies).

Beeping – calling a party and ringing off before they answer – is a common creative means of communication. Beeps carry messages like "this is my number, please call me" or "Hi!" or "I'm on my way." There is a pattern in relationship between those who use beeping, and this relationship also determines if whoever is beeped would respond, and how they respond. People often beep friends or family members (particularly to those who are financially better off), and to persons with whom there is an understanding that the person who is beeped has a stake in the matter to be communicated.

SMS is widely used across all networks. It is used a lot by young adults and professionals to send meeting announcements and greetings to friends and families. SMS is preferred to calling because it is cheaper. It is also used to communicate private and personal matters under circumstances where it is not convenient to do so using voice calls in public places. All the mobile phone companies offer some sort of value-added SMS services such as job vacancy notifications, weather updates and currency exchange rates.

Finally, there is high awareness of the off peak periods, when reduced rates apply: late at night and over weekends, when most respondents said they prefer to communicate to minimise costs.

INTERNET. Most respondents are aware of the existence of Internet-based applications like email, but very few have ever used it. Reasons for non-use include a lack of knowledge on how to use the computer, and the fact that Internet cafés are mostly located in large towns and trading centres. The major usage of the

Internet is for email, followed by browsing. Most of those use the Internet also claim to have email addresses, which they use for contacting friends and relatives living abroad. They generally learnt to use the Internet through a friend, and their main point of access is cafés.

Internet expenses are minimised by asking friends who are better skilled to give a hand. This minimises usage time, which is billed on a minute basis. Café staff are also asked to help type or to write long messages off-line. Users tend to frequent cafés that offer special rates or offer promotional programs. All respondents who use the Internet say they consider it a necessity.

Conclusion

This is a first-pass analysis of e-usage in Uganda, and has focused on voice telephony and Internet access. Analysis is still continuing to extract other factors and correlations in a manner that will further inform policy and strategy in creating greater and economically beneficial access to ICTs.

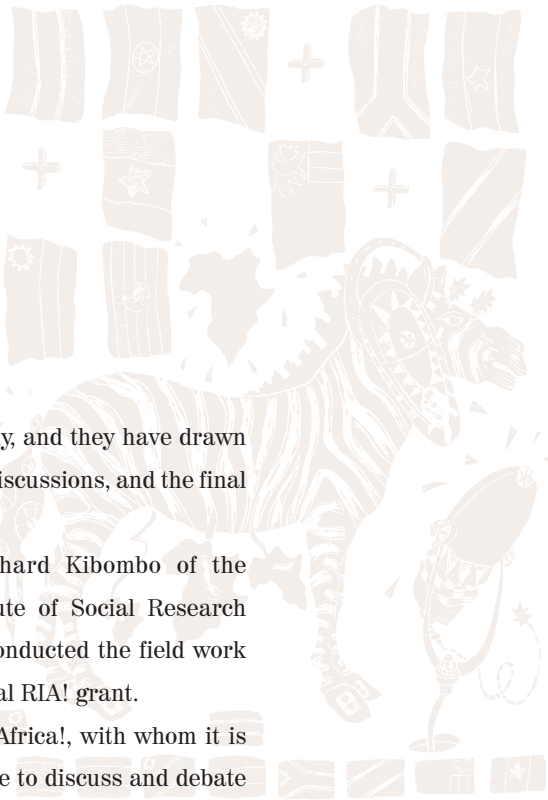
This analysis underscores the following:

- Access to basic telephony services in rural areas is still unacceptably low. Mobile has the potential for the rapid achievement of nationwide access if the key barriers, mainly the initial cost of the phones and the absence of a convenient means of re-charging, are addressed through PPPs supported by the RCDF. Government also needs to recognise the mobile pre-paid platform as the basic means of communication and lower tariffs by removing the excise duty currently imposed on pre-paid airtime.
- Access to the Internet across the entire country is far below what would be expected with the often-praised policy and regulatory environment in Uganda. The key issues of supporting the generation and dissemination of relevant content; the national data backbone; the connection of Uganda via optical fibre to the global Internet backbone; encouraging local assembly of computers to bring down costs; and the greater integration of ICT skills training at all levels of education, must be addressed by both government and the regulator.
- The higher percentage of females in the country, and having a majority of citizens below 15 years of age, provides strategic opportunities for growing ICT skills and utilisation in the country.
- The focus group research not only confirms the statistical inferences made from e-usage, but give insight into user behaviour patterns that provide a good platform for formulating policy interventions for increasing access and use.

This discussion has provided the macro and micro view (derived from the e-usage survey) of the Ugandan telecommunications sector. The key emphasis, however, is on the micro view that, for the first time in Uganda, gives policy-makers and regulators a clear picture of what is happening at the user level as a result of the macro policies. The micro view has emphasised some of the challenges Uganda still faces in achieving equitable universal access. The survey has yielded immediate results in that it has gone a long way in informing the proposed new telecommunications sector policy in Uganda where (again for the first time), human development targets have been recognised as the driver for infrastructure and other targets. ❑

Acknowledgements

1. To the Uganda Communications Commission, who recognised the importance and relevance of this study, and funded 75% of the survey work, and the IDRC for their initial grant. We thank particularly the task force set up by the UCC to prepare recommendations, using a holistic approach, for the new telecommunications sector policy in Uganda. Both the core authors have been chair and member



of this task force respectively, and they have drawn liberally from the analysis, discussions, and the final report.

2. Samuel Kayabwe and Richard Kibombo of the Makerere University Institute of Social Research (MISR), who planned and conducted the field work and to the IDRC for the initial RIA! grant.
3. Colleagues in Research ICT Africa!, with whom it is always a learning experience to discuss and debate issues.
4. The Directorate for ICT Support, Makerere, that has become a key player in creating high-level knowledge capacity to link ICT to development in Uganda.

Endnotes

1 Some figures used only go up to 2002/3 because there is no authoritative compilation yet for 2004.

2 The exchange rate over the last four years has held fairly stable at about $1=Shs 1,800, with swings up to 10% on the high side and 5% on the low side (1,700-2,000).

3 Uganda uses a system of decentralised government, with the district as a semi-autonomous political (with a directly-elected political head) and administrative unit. There are currently 56 districts in Uganda. Each district has three to four counties, and each county has three to four sub-counties.

4 FF Tusubira (2005), *Approach To Universal Access In Uganda*, prepared for the Services Experts Meeting organised by OECD, Paris.

5 Uganda Communications Commission, Proposed Review of the Telecommunications Sector Policy Recommendations to the Minister of Works, Housing and Communications, 28th January 2005; link from www.ucc.co.ug main page.

6 The current estimated public funding to achieve the policy objectives by the target date of 2010 is $110 million, with $25-$35 million coming from the levy on service operators, and the rest being from corresponding private sector investment (typically $3 from the private sector for $1 from public funds in the PPPs).

7 To be posted at http://www.researchictafrica.net.

8 There is a real history of this in Uganda, with phone company employees and other users taken to court. While this has been mostly stamped out after privatisation, the very strong perception still remains.

Chapter 12: Zambia

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BACKGROUND

ICT Policy and Regulatory Environment.

In the past few years, most African countries have undertaken various regulatory and institutional measures aimed at improving the provision of ICT services. These include the liberalisation of the ICT sector, establishment of ICT regulatory bodies and development of ICT policies. In 1991, the ICT sector in Zambia was liberalised. A regulatory authority, referred to as the Communications Authority of Zambia (CAZ), was subsequently established in 1994 in accordance with the Telecommunications Act. The Authority falls under the Ministry of Transport and Communications and has jurisdiction over the telecommunications industry. It also regulates the licensing and use of the radio frequency spectrum in the broadcasting industry for both radio and television transmission. The Independent Broadcasting Authority was established in 2003, with jurisdiction to regulate operations in the broadcasting industry.

National Indicators

Country	Zambia
Surface Area	752,617 sq km
Population density	13.00 per sq km
Total Population	10,757,192
Male Population	5,280,267
Female Population	5,476,925
Growth rate (Between 1990 - 2000)	2.4
Percentage aged 0-4:	15.2
Percentage aged 5-14:	30.6
Percentage aged 15-24:	21.4
Percentage aged 25-60:	28.6
Percentage aged 60-over:	4.2
Literacy rate	72.8%
GDP at current prices (ZMK billion)	16,260.4 (2002)
Per capita GDP at current prices (ZMK '000)	1, 505 (2002)
Average Exchange rate	4780 (2004)
Currency	Zambian Kwacha (ZMK)

Source: Central Statistics November 2004: Living Conditions Monitoring and Survey Report 2002-2003

Public switched telecommunications network (PSTN).

Zamtel, the state-owned telecommunications company, is the only licensed operator allowed to provide PSTN services. The coverage includes all districts except Kaputa and Sesheke, in the northern and western parts of the country, which are not connected to the network. The network uses a domestic satellite system. The country has a 24-core 520km optical fibre backbone on the Copperbelt covering all mining towns, and a 45km optical fibre cable between Lusaka and Kafue. By the time of the survey (2004), there were more than 96,000 main lines in operation and the telephone density was just under 1%.

Mobile communications.

There are three operators in the cellular market using GSM technology. Celtel is a subsidiary of MSI international. Telecel Zambia is a subsidiary of Telecel International Ltd, a US-based cellular telecommunication group. Zamtel, the incumbent national telecommunications company, owns Cell Z.

Services provided include standard voice and value-added services, such as SMS and voicemail. Currently, the network coverage includes all nine provinces. However, not all operators cover all the provinces, and coverage is mainly along the railway line (from Livingstone to the Congolese border in the Copperbelt) and in provincial capitals. In most rural areas, network coverage for mobile phones is very poor, and is completely non-existent in some areas. There is little sharing of capacity, as individual operators mostly have their own infrastructure, including international satellite connections.

There has been a dramatic increase in the use of mobile phones in the country. According to the latest (2004) central statistics report, there are around 420,000 cellular subscribers in Zambia, as opposed to 270,000 subscribers in 2002. This can be attributed

partly to the emergence of Cell Z in 2003. About 99% of mobile phone users are pre-paid.

Internet service providers (ISPs). There are six ISPs in the country. The first, Zamnet, was established in 1994. The others are Zamtel Online, Coppernet, UUnet, Microlink and Celtel. Combined, they have almost 12,000 subscribers. Although there are no legal restrictions on new ISPs, licensing fees are prohibitive, and the regulator has limited foreign shareholdings in ISPs and similar value-added licenses. For most Zambians, inadequate financing for such ventures has negated the benefits of the shareholding requirement (Computer Society of Zambia (CSZ), 2004).

The Internet market in Zambia is still developing, with around 45,000 Internet users. However, the potential for rapid growth is undermined by inadequate telecommunications infrastructure, poor telephone accessibility and high access costs.

Internet cafés and business bureaus offer telephone and Internet access in major urban centres and a few rural towns. In 2004, there were about 400 licensed telecentres across the country. Most of these are along the main railway line, due to the relatively good telecommunications infrastructure, low operation costs and high number of potential users. The limited coverage and usage of such business services is an indication of low ICT penetration levels in the country. However, due to insufficient data, it is difficult to estimate Internet usage revenues in relation to other services such as telephone and fax.

Utilisation of VoIP is currently very limited, with very few companies currently using it on their intranets. There is no legislation pertaining to VoIP in Zambia.

Pricing. At the wholesale and retail level, telecommunications prices in Zambia remain high. There is little sharing of capacity, and interconnection fees are exorbitant: US$0.60 per minute, according to the ICT Survey undertaken in November 2002. The cost of accessing the Internet for an hour is around ZMK9,000 (US$2). This certainly has a big impact on the utilisation of ICT services, considering low household incomes.

Policy developments. Current policy developments in the ICT sector include the preparation of the Cyber Bill, which was approved by Cabinet in 2004 but has not been promulgated. The bill addresses matters pertaining to issues like Internet security, privacy, data protection, digital frauds and hacking controls. The final draft of the national ICT policy has since been produced, spearheaded by the Ministry of Communications and Transport. The draft policy underwent an extensive consultative process and efforts to enact legislation to accommodate the new policy are already under way.

ACCESS AND USAGE STUDY

Sector Performance Review. In 2003, a review of the sector conducted by RIA! indicated that while some efforts to improve the supply side had been successful at the national level, such as mobile and Internet provisioning in the urban areas, the lack of a reliable backbone across the country and even in Lusaka, together with the high price of telecommunications, were inhibiting the achievement of national goals of universal access (RIA! 2003). To ascertain the impact of the above developments, a baseline study to determine demand for ICT services was undertaken in October 2004 as part of a wider continental demand survey.

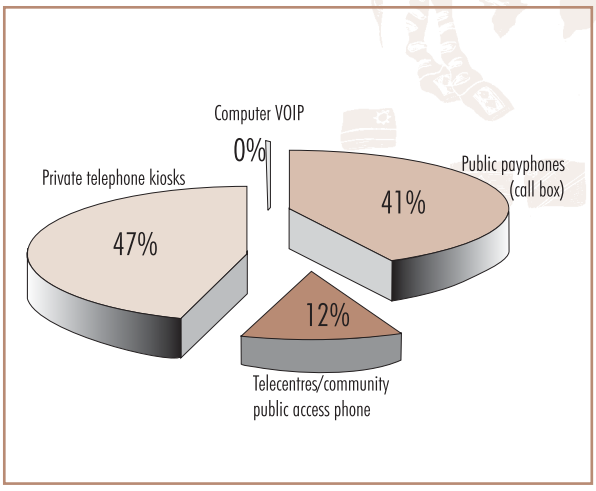
National household survey. The study took the form of a national household and individual user survey, and focused on fixed lines, mobile phones, payphones and Internet services. It aimed to analyse the access and usage patterns of services delivered by operators in response to policy and regulatory

frameworks assessed in the sector performance review. The survey was conducted in 45 enumeration areas located in six of the nine provinces: Lusaka, Central, Southern, Eastern, Copperbelt and Northern provinces. To reflect the diversity of access and usage, these areas were further categorised into major urban or metropolitan, other urban and rural areas.

FOCUS GROUPS. For the qualitative analysis, a series of focused interviews was undertaken amongst a selected group of persons from different spatial areas across the country. The survey targeted a population of eight focus groups drawn from three provinces, namely Lusaka, Copperbelt and Central provinces. The sample of respondents selected was drawn from a sample of enumerator areas (EAs) that were previously used for the 2004 quantitative survey. The groups were identified by demographic and usage criteria and had representation from the youth, men and women and Internet and non-Internet users.

The combined results of these studies began to explain the reasons (and dynamics) influencing decision-making behind the adoption of ICTs and how usage patterns of different communications technologies develop and change over time. This allows a broader assessment of how technology impacts on other aspects of peoples' lives, both from a social and economic perspective.

Figure 12.1: Access to public phones



PUBLIC ACCESS PHONES. Zambia has public payphones that are owned by the incumbent, Zamtel, and use tokens. There are also community payphones (Celtel) and mobile phones in private kiosks, Internet cafés and business centres. These are all referred to as public payphones, as they can be accessed and used by anybody at a fee.

The most widely available type of public payphone is the private telephone kiosk, which accounts for 47% of public phone usage. The public telephones provided by Zamtel account for 41% of usage, whilst telecentres account for the remaining 12%.

The high usage of private telephone kiosks is due mainly to proximity and the fact that phones in private telephone kiosks are always working, unlike public payphones and community public access phones, which are frequently out of order. Most private kiosks also have access to all three mobile operators, giving the customer the option of using the most cost-effective service by avoiding cross-networking.

ACCESSIBILITY. In rural areas, people have to walk long distances – between 21 and 40 minutes by foot – to reach a payphone. This inhibits accessibility, and means that in most cases persons only make the trip to phones when there is an urgent need. The situation in major urban and other urban areas is different, as the majority of people take no more than 20 minutes to reach the nearest payphone.

EXPENDITURE. On average, people spend ZMK 15,746.80 (US$3.26; US$ PPP 7.20) per month on public phones. This shows a relatively low expenditure on payphones. This can be attributed to low incomes amongst those using payphones, since most people in high-income brackets can afford their own mobile phones

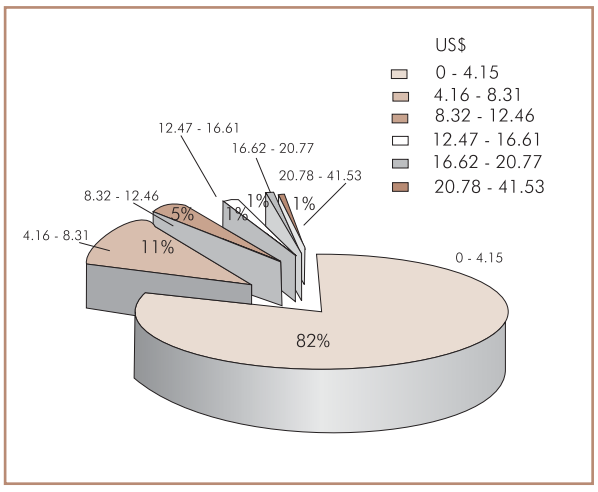
Minutes	Survey Location: Major towns	Other urban	Rural	TOTAL
0- 20	65.0%	70.4%	47.2%	64.4%
21- 40	24.9%	19.7%	50.0%	26.1%
41- 60	8.4%	5.6%	2.8%	7.5%
61- 80	0.3%	1.4%		0.5%
81-100	0.3%	1.4%		0.5%
101-200	0.9%			0.7%
201-300	0.3%	1.4%		0.5%
	100.0%	100.0%	100.0%	100.0%

Figure 12.2: Time taken to reach nearest public payphones (in minutes)

and landlines and therefore only need payphones under exceptional circumstances.

What emerged from the focus groups was that people use public phones when they have little or no talk time on their phones, when they want to ring another network, or if they do not have access to any phone at the office or at home. Focus groups outside the metropolitan areas complained of telephone booths being too far and few. The choice between public phones (Zamtel payphones) and mobile payphones is influenced by distance and the network to be called, when a home phone is not functioning or when anonymity is important.

Figure 12.3: Expenditure per month on public phones (Kwacha)



Some rural areas have infrastructure which is not working. Like many other rural areas, Nampundwe has no Zamtel public payphone. Celtel recently introduced three GSM community payphones to the area. They are cheaper than other mobile payphones, but two are located in a noisy place.

This type of payphone has spread almost to every corner of Lusaka, and most of the private kiosks are shifting from the use of ordinary cellphones to the community payphones. The kiosk operators say the new payphone has a number of advantages in that the rates are lower, it is portable and easy to install, and a client cannot run away with a handset.

Most professionals and workers only use payphones occasionally, despite them being relatively cheap. One respondent said he pays as little as K1,500 (US$0.32) to make a call. The reason for not using payphones regularly is that they either have mobile phones, access to office phones or both.

In Kawama, people do not use Zamtel payphones, which were all vandalised, but they use the private public kiosks in the neighbourhood, where they pay about K2,500 (US$0.53) per minute. Fixed public phones are not available in Kawama, and the citizens depend on Cell Z cellphones at the private kiosks. If one wants to use a public payphone, which is a landline, they have to travel to Ndola town, about 15km away. This is not economical unless one has other business in town.

Munali has a number of public phones, both fixed and mobile. Public fixed phones are relatively cheap (costing about K1,500 per token) and are used even by those with mobile phones when funds are low. The community payphones are now widely used in the area, mainly because they are cheap.

In all enumerator areas in which focus groups were conducted, the amount paid (charge), the

proximity and location of the phone, and the network one would use were prominent factors regarding the choice of payphones.

PRIVACY. Many youthful respondents cited a lack of privacy as an inhibitor to using public phone booths. There are generally a number of people standing in close proximity, and public cellphone operators stand nearby to prevent users from running off with their handsets.

SAFETY. Security at most public payphones is seen to be a problem at night. Despite being safer during the day, people say they need to hide their valuables. Security is not seen as an issue in rural areas.

HOUSEHOLD PHONES. The survey confirmed that home phones are predominantly fixed lines, with 98.4% of home phones being PSTN lines and 1.6% either radio or mobile phones. Of these, a relatively high 78.3% are in working order.

The waiting time for fixed lines is around two months. The rate of acquisition of fixed telephone lines has decreased, and this is attributed to the increased usage of mobile phones and very small aperture terminal (VSAT) technology for Internet purposes. The substitution of fixed phones by mobile phones in 1.2% of households is a new phenomenon that will be interesting to track in future. This could be because some mobile phone providers, in particular Celtel, have relaxed credit periods (calling/receiving windows), making cellphones more feasible as household phones.

AVAILABILITY. The fixed line network does not cover some of the rural areas. However, even if lines were available and affordable, few rural households would consider applying for a line. This could partly be due to the fact that they have done without for so many years that they do not see the need. However, if lines were made available, people made aware of the benefits of such services, and they were affordable, it is highly likely that phone usage would increase.

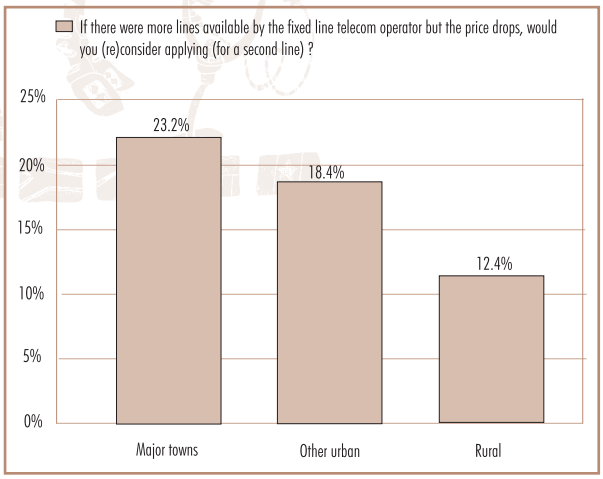
Amounts	Survey location		
US $	Major towns	Other Urban	Rural
0.1-51.9	36.7	46.3	64.7
51.9-103.8	22.3	23.3	14.3
103.9-155.8	9.4	16.3	7.1
155.9-207.7	12.8	9.1	8.5
207.8-259.6	2.4	1.4	0.4
259.7-311.5	1.8	0.0	0.0
311.6-363.4	2.9	1.2	1.8
363.5-415.4	11.7	2.4	3.1
Total	1742	458	272

Figure 12.4: Monthly earnings per household member

AFFORDABILITY. The average income for a household in rural areas is ZMK291,484.70 (US$60.39; US$ PPP 133.21) per annum, whilst the average cost of a fixed line is ZMK58,290.16 (US$12.11). Taking into account the fact that there are other essential requirements such as health and education, it may be noted that this cost, though seemingly low, may be prohibitive.

QUALITY OF NETWORK. Respondents generally seem satisfied with the quality of their service. Just

Figure 12.5: Affordability



over 36% of those interviewed said line clarity was very good, whilst 1.9% indicated that they had very poor service in terms of line clarity. Some 1.4% indicated that the current service in terms of dropped calls was very poor, whilst 29.1% said they had no problems with dropped calls.

BILLING. Most of the fixed phones are on monthly billing systems. However, Zamtel is in the process of implementing a pre-paid system. In terms of expenditure, an average of K58,290.16 (US$12.08; US$ PPP 26.64) is spent on household phones per month. On average, 32.9% indicated that the billing services for the phones were accurate.

The households whose phones were disconnected say this is due to very high bills, and suggest that these bills are mostly incorrect. They say they know how to reduce costs on household phones by calling during off-peak hours and avoiding calling mobile phones from a landline. Furthermore, as a cost-saving initiative, most landlines are mostly used for receiving calls. This is particularly prevalent in urban areas, where people have mobile phones that they can use to make calls.

BRIBERY/CORRUPTION. Nobody admitted to having bribed anybody to obtain a fixed line or any other services. It is probable that this happens, but people not likely to admit to it. This is reinforced by the fact that most respondents acknowledged that they had problems in obtaining fixed lines (some had to wait for as long as five years), which certainly creates the conditions under which bribery becomes one way of securing scarce resources.

USAGE. Neighbours' fixed phones are only used when there is a pressing need. It is the elderly who normally ask the neighbours to make or receive a call. Children are not allowed to do this unless there is an emergency and there are no adults home. Many professionals indicated that the Zambian culture does not warrant charging the neighbours for the use of their phone. However, some respondents said they would sometimes be given a bill from the neighbour on calls they had made, mostly when the bill became too high.

Generally, people in urban areas do not use the neighbours' home phones much, due to the social set-up of urban areas. The situation is different in rural and high-density areas, which are associated with low income levels. At the few homes that do have fixed phones, neighbours use them mostly for receiving calls or making important calls, which are normally for no charge.

The owners seem to be the primary users of fixed phones in homes. One youth said parents normally use fixed phones when calling other landlines or making trunk calls, because it is cheaper than using mobile phones. Other focus groups said home phones are mostly used by the children at home, since the parents have mobile phones. Two areas indicated that home phones are mostly used by women, because "they have more friends than men" and "by nature they are more talkative". Girls and women seem to use the phone most, because they receive more calls from male partners; they say it is the duty of the men to call them.

Since the advent of mobile telephony, the use of fixed lines has waned. However, more people are being connected to fixed lines for the purpose of connecting to the Internet, and it is likely that the advent of cheaper radio links and VSAT technologies could reverse this trend. Still, demand based on the need for Internet connections is quite limited, considering that only a small section of the population is in a position to procure computers and eventually connect to the Internet.

OFFICE PHONES. About 59.6% of respondents are able to receive personal calls at work. 64% are allowed to make personal calls from the office, but only to landlines and not to mobile phones, long-distance or international destinations.

Response	Survey location: Major towns	Other urban	Rural
Yes	22.0%	6.8%	6.2%
No	78.0%	93.2%	93.8%
Total	100.0%	100.0%	100.0%

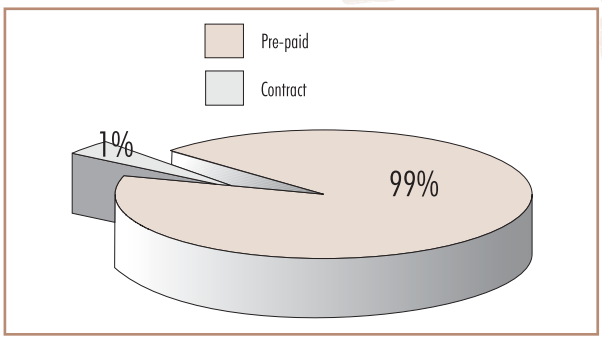
Figure 12.6: Mobile phone penetration, per location

Some focus groups indicated that the use of office phones to make private calls is not as common as receiving calls; however, some people do so to save their airtime. One focus group admitted to using office phones secretly to make private international calls. Three groups indicated that when using these phones for private purposes, one had to sign a logbook to trace the users in case the bills became too high. Some private companies and civil service sectors allow Cell Z mobile phones to be called, as the calls are the same cost as fixed line calls.

Some workers in the private sector are given some airtime for their mobile phones (ranging between US$2.5 to 10) per month, removing the need to save units by using the office fixed phone. At other companies, the office phones are blocked for calls to mobile phones. Friends and relatives do not usually use office phones.

MOBILE. As anticipated, the majority of mobile phones are located in the major metropolitan areas (22%), but surprisingly there is not a significant difference between other urban and rural areas. Of those who have

Figure 12.7: Mobile phones on pre-paid and contract



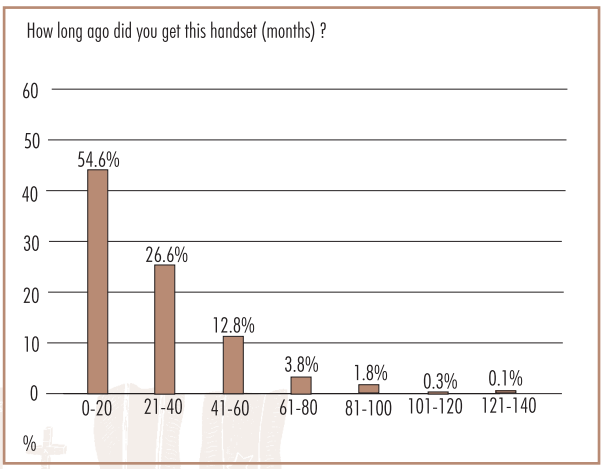


Figure 12.8: Start of ownership of mobile phones

mobile phones, the vast majority are pre-paid.

From the bar chart above, it can be seen that a number of people got their first mobile phones up to five years ago, though the majority (53%) got their first mobile in the past two years. This can be attributed to the arrival of a new service provider, Cell Z, which is cheaper than the other two operators. This has forced the other two to improve their services and reduce tariffs, driving down the costs of mobile handsets and phone accessories as privately-owned mobile phone shops and vendors have mushroomed.

Nearly 20% of mobile respondents have more than one SIM card, due to the high costs of interconnection between the various networks and the fact that some mobile phone operators do not have network coverage in some parts of the country. Subscribers therefore change SIM cards depending on the location. This is most common among people who travel extensively.

Only 0.3% of the respondents have work-related mobile phones. All of them live in the major towns.

EXPENDITURE. On average, people spend about K25,000 per week (US$5.18; US$ PPP 11.42) on mobile phones. About 80.4% pay their own bills. Possession of a mobile phone is not confined to people in higher income

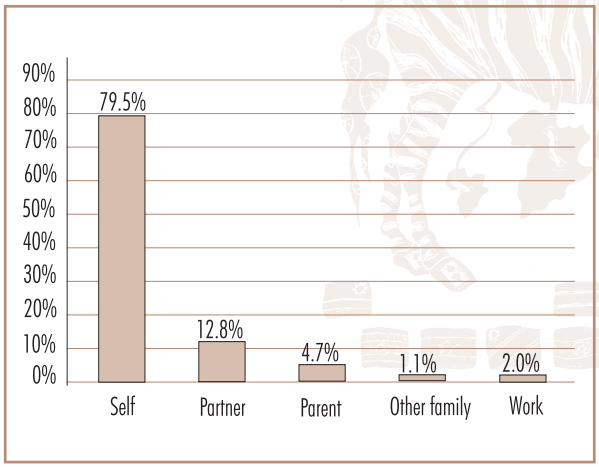


Figure 12.9: Payment of mobile expenses/bills

brackets. Airtime can be bought from service providers and agents all over the country. Most respondents said they do not budget for airtime.

The graph above indicates that the majority of the people pay their own bills, followed by those whose bills are paid by their partners. Those who acquire mobile phones generally have the means to pay the bills.

The focus groups revealed that users acquire airtime from a range of sources, including their own resources (salary/business) and gifts from spouses, friends, relatives and employers. They even go so far as to borrow money to buy airtime in an emergency. Men are often a source of airtime for women. "My husband buys for me, and he is responsible for my airtime of about K50,000 (US$10) per week," said one woman. Another young woman said: "My dad buys me credit twice a week and I also receive credit from good friends (the so-called landlords, or boyfriends)."

Some students in colleges or universities forgo part of their meal allowances for airtime, which they said was not a luxury, but a necessity.

AFFORDABILITY OF HANDSETS. The majority of respondents said they could afford handsets, especially the employed – both workers and those from the business fraternity. Though less than 15% of respondents have had more than one phone, they claim they are able to change handsets as technology changes or their phones are stolen.

With the reduction of duty on phones and high competition levels, the prices of handsets have become affordable even to some low-income earners. Some respondents will save for several months to acquire a mobile phone. Others indicate that they can afford a handset and a SIM pack, but the ongoing expenses scare them off at this stage.

IMAGE AND STYLE. The type of mobile phone one uses is often directly related to one's status in society. Mobile handsets with cameras, Internet connectivity and polyphonic ringtones are very expensive, and are mostly limited to the affluent. Low-income earners usually own older, bigger handsets with fewer features. Some of these big handsets are referred or nicknamed as "brick", "gun", "weapon" or "Roger Roger", in reference to two-way radios.

None of the participants in the survey had a third generation (3G) phone, but most of the elite were well-informed about the features and abilities of these phones. High costs and poor availability are a major hurdle, but it is expected that 3G phones will eventually become commonplace.

QUALITY OF SERVICE. A total of 62.9% of respondents in major towns indicated that they were happy with the quality of service they were getting from the mobile operators. Some 29.7% said they were sometimes happy,

Figure 12.10: Quality of service of mobile operators

	Survey location			
Response	Major towns	Other urban	Rural	Total
Yes, happy	62.9%	47.7%	74.1%	61.7%
No, unhappy	7.5%	3.1%		6.6%
Sometimes	29.7%	49.2%	25.9%	31.7%
Total	100.0%	100.0%	100.0%	100.0%

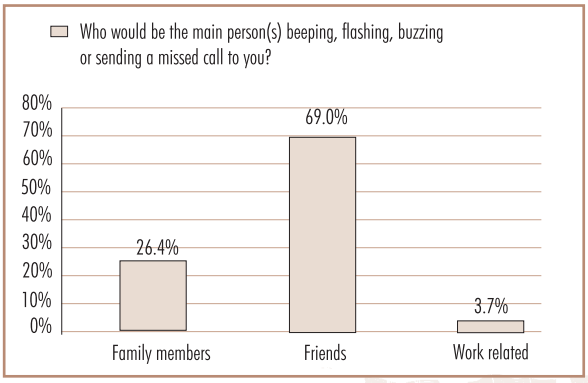


Figure 12.11: Beeping, flashing and buzzing

mentioning problems with congestion and high noise levels. In rural and peri-urban areas, people complained of many dropped calls, due to poor network coverage outside the major centres. Nevertheless, considerably more people indicated that they were satisfied with the quality of service than those that were not.

TEXT MESSAGING. There is a high utilisation of text messages (SMS), mainly due to the low cost of text message services. This has been further boosted by the interconnection of the three mobile operators.

PAGING (FLASHING/BEEPING/BUZZING). Around 66% of respondents say they "page" (missed call) occasionally, and are paged regularly. Most of those paged are friends or family members. In terms of making and receiving calls, 99.7% of respondents both make and receive calls, whilst 0.3% only receive calls. However, these figures should be contextualised against a backdrop of people being reluctant to acknowledging an inability to pay for calls.

BRIBERY. None of the respondents acknowledged having bribed anybody to obtain mobile services. This could be due to the fact that mobile services are relatively easy to obtain.

INTERNET. The Internet market in Zambia is still developing, with around 45,000 Internet users. However, the potential for rapid growth is being undermined by the inadequate telecommunications infrastructure, poor telephony accessibility and high access costs. There is an increase in shared Internet access centres (Internet cafés) in major towns.

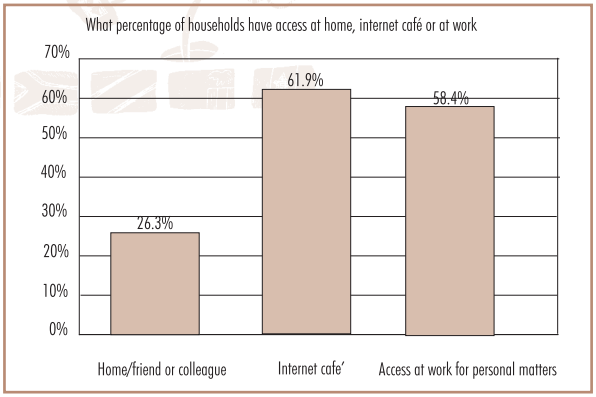
The Internet is mostly used along the railway line or in urban areas, and by people who are more enlightened. For people to access the Internet, they use their workplaces, universities, colleges, libraries, homes and cyber cafés. There are more cyber cafés in Lusaka than Copperbelt.

Most people who use the Internet do so for the following reasons:

- exchanging messages (email);
- searching for news;
- finding social or marriage partners;
- searching for lost friends;
- shopping (e-commerce);
- studying; and
- curiosity, and downloading games and music.

The majority those using the Internet are the youth and workers. Few people in rural areas have access to the Internet, and those with the inclination must travel to towns and cities to access Internet services. Apart from Internet cafés, offices and learning institutions, a few homes have Internet access. Respondents say inadequate knowledge of the Internet, and prohibitive

Figure 12.12: Access to the Internet



	Time	Survey location	
		Major towns	Other urban
How long does each trip	0-10	29.6%	36.4%
(one-way) take to the	11-20	43.2%	36.4%
Internet café you use	21-30	19.8%	27.3%
most often (by usual	41-50	6.2%	
transport)	51-60	1.2%	

Figure 12.13: Time taken to reach Internet café by survey location

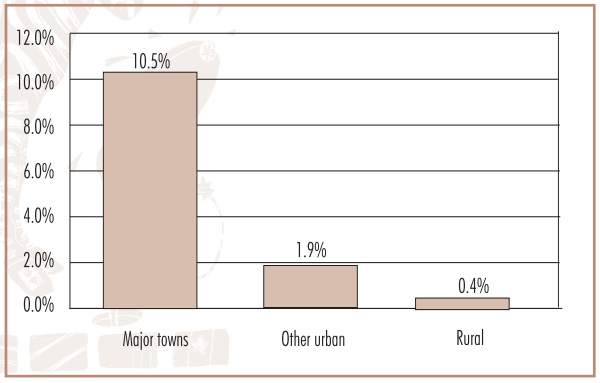


Figure 12.14: Ownership of e-mail address by location

costs, are among the factors that dissuade some people from using it. Other factors are distance to Internet cafés, access speed and overcrowding in the cafés.

There is no direct correlation between one's income level and having an email address. The major factor is the level of awareness of the Internet and its availability.

Just less than 30% of respondents indicated that they have access to the Internet, either at home or a friend's home, whilst 71% have no access to the Internet. Persons between 21-40 years of age are the major users of the Internet in the country. Only 29% have access at home, compared to 83.9% who have access at work or school. 64.9% of people use Internet cafés. The survey shows that there is very low penetration of the Internet in rural areas.

For nearly half the respondents, it takes between 11 and 20 minutes to reach the nearest location with an Internet facility.

EMAIL. Only 0.4% of people in rural areas have an email address, compared to 10.5% and 1.9% in major towns and other urban areas, respectively. This could be due to lower literacy levels and availability of Internet facilities. It is not surprising that most Internet investors concentrate on the urban areas, where they are likely to recoup their investments quicker.

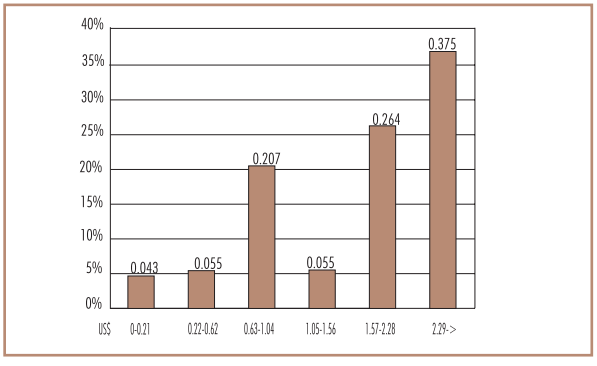
Almost all the youth and workers/professionals in the focus groups had email addresses, with most youths and some workers being on public accounts (like Yahoo).

Email is normally used for communication with business partners, friends and relatives, both abroad and domestically. Email has become more popular than posting letters. Most users found it difficult to quantify how mail they received or sent per month. One respondent said she can receive more than 10 mails per day, and responds to at least half of them.

INTERNET CAFÉS. In Lusaka, Internet cafés charge an average of K1,500 (US$0.31; US$ PPP 0.69) for 15 minutes of Internet services. In the Copperbelt, it is more prohibitive, with Internet cafés charging an average of about K18,000 (US$3.74) per hour. This can be attributed to the law of supply and demand; there are fewer cafés in the Copperbelt.

According to respondents, factors that influence the choice of Internet café include:

Figure 12.15: Average amount spent per week at Internet café



- the costs and billing systems;
- the quality of connection;
- safety and security of the premises;
- privacy;
- the attitude of café managers;
- ambience; and
- the type of equipment used, e.g. the condition of the computers.

Because of security reasons, most women users like going to cafés close by. Some youths go to specific cafés where they meet friends, or have an arrangement to pay discounted rates.

AGE. Most respondents said everyone with the interest and ability to use the Internet should do so, regardless of age. However, they said younger children should be supervised. Some participants said only those 18 years and older should use the Internet, while very few elderly people use the Internet.

SOURCES OF INFORMATION. Radio, television, the telephone and the print media are the most common sources of information for most respondents, with the Internet being cited as a preferred source by some youths, workers and professionals due to its versatility.

EXPENDITURE. The ISPs charge a fixed monthly rate, ranging from $23 to $30 per month. An average of ZMK14,678.36 (US$3.04; US$ PPP 6.71) per week is spent on Internet cafés. It was clear from the focus groups that people do not usually budget for Internet and telephone usage. Some youth in colleges and universities will go so far as to spend their allowances, meant for books or meals, on the telephone and the Internet. However, borrowing money for telephone and Internet usage is not common, unless in emergencies. Most respondents, especially the youth, workers and professionals, consider expenditure on telephone and Internet as essential, while many women consider telephone expenditure a luxury.

CONCLUSION. The baseline household and individual survey, together with the qualitative follow-up focus group survey, brought to the fore a number of issues pertaining to accessibility and usage of ICTs in Zambia. The study confirmed the low penetration of ICT services in rural areas, compared to urban areas – a natural consequence of the pattern of network coverage, which tends to be more concentrated in the urban areas. Despite the reduction in the waiting time for fixed phones, there is still unmet demand. Increasing numbers of people are putting in lines for Internet purposes, mostly in urban areas.

The survey also confirmed the increase in the overall penetration rate, particularly in the past five years. This can be clearly attributed to the liberalisation of the sector, particularly the introduction of mobile phone services. However, the restricted nature of the liberalisation means that consumers have not yet seen the real benefits of competition. The demand for mobile phones is high and more needs to be done in Zambia, especially in the rural areas.

The study highlighted the high cost of ICTs in the country, particularly as most people in the country are in lower-income brackets. This impacts negatively on the utilisation of services. There is a need to extend the provision of ICT services to other parts of the country, particularly rural areas. To attain this, telephone operators and ISPs should continuously explore new lower-cost technologies that may be appropriate in rural areas. A prime example is the community mobile phone service being provided by Celtel, which is cheaper and has the potential to penetrate rural areas.

The liberalisation of the international gateway will also drastically reduce the cost of mobile phone calls. At the moment, all mobile service providers have to use Zamtel's facilities. There is also a need to come up

with a policy on VoIP. Although there seems to be an unwritten law restricting the use of VoIP, it has the potential to reduce the cost of ICTs in the country.

The mission statement for Zambia's ICT policy is "to enhance and accelerate sustainable economic growth and social development through the provision of affordable and universally accessible ICTs". The mobile service providers have spread to all districts of Zambia, and reduced prices on handsets, airtime and other value-added services have increased the uptake of services. The provision of VSAT also has potential to extend the provision of ICT services to rural areas, but the cost of this technology and services are still currently prohibitive for most Zambians.

The cornerstone of development in the 21st century is information. It is this information that largely contributes to the positive performance of a nation in terms of effectiveness and efficiency of the public sector, private sector and civil society.

Zambia's major resource is its people. They are the targets of the vision of the ICT Policy, which reflects the national vision for social and economic development. Therefore, the vision and mission statements of the country are based on the need to create knowledge in various sectors of the economy. Most Zambians have realised that they cannot do without information and communication to develop. For many, the adoption of ICTs in everyday life is the basis for wealth creation and development. This will largely depend on whether ICT will:

- be made affordable and cost-effective enough to become an "enabler" resource in people's livelihoods ; and
- be made available where and when it is required by consumers.

The country has a high demand for ICTs, particularly amongst the youth. However, the potential of ICT in the country has not been fully exploited. This can be attributed to inadequate telecommunications infrastructure, poor telephone accessibility and high access costs. It can also be further attributed to the lack of a deliberate policy environment that can provide the necessary impetus for the use of ICTs in the country. Currently, the country has no ICT policy, although efforts to develop one are under way. Once enacted, it is hoped that this will provide a necessary framework for the growth of the ICT sector. ❑

Appendix: Methodology

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OVERVIEW. The Africa E-Index seeks to determine the size and nature of access and usage in the ICT sector in several African countries. The research was based on a triangulation of three methodological approaches, which included a background supply-side desktop analysis of the performance of the sector in all countries, a quantitative national household and individual survey in 11 countries, though Mozambique was not written up in time for this report, and a more in-depth qualitative survey in five of these countries. All data collection and analysis was conducted over an 18-month period ending in mid-2005.

The desktop research entailed the compilation and analysis of all ICT sector published data, enabling a supply-side analysis of the ICT sector – particularly the performance of the sector against stated policy objectives of affordable access across the continent[1]. While in many countries these have provided the first systematic assessment of performance and analysis of the outcomes in terms of policy and regulation, they still tell very little about the consumers, users and those marginalised from communications on the continent.

The demand-side study, on the other hand, views ICT sector developments from the perspective of users, consumers and those unable to access services, and to analyse access, demand and usage patterns of the services delivered by operators within the policy and regulatory frameworks in each country examined. In other words, the supply side of the equation must be allied with an adequate understanding of the demand side. Once data has been collected on the demand side of the economy, the focus must fall on understanding the data. In particular, what are the decision-making processes that consumers go through that result in a demand for a basket of various ICT technologies?

The quantitative national surveys, administered to 14,635 households and 70,504 individuals, collected an enormous amount of data, allowing for a detailed demand-side analysis of the ICT sector. However, collection was based on a largely close-ended modularised questionnaire and was therefore limited in terms of gaining a better understanding as to why certain processes occur. In particular, what was lacking was an insight into the reasons and dynamics influencing decision-making for those issues that impact on adoption and changes of telecommunications, and how usage patterns of different telecommunications develop and change over time. In addition, the quantitative survey produced certain findings that were difficult to interpret, so the findings of the quantitative survey were tested by undertaking a qualitative survey that was administered against a similar sample of ICT users as the quantitative survey.

SURVEY METHODOLOGY. Both the quantitative and qualitative studies were undertaken targeting various strata of ICT users – collectively within households, as individual users of public telephones, individual owners and users of mobile telephony and Internet users. From the outset, it was imperative that the data collected from both studies be extrapolated to the entire country and as such, probability sampling needed to be applied. A number of methodologies were available to the project; however, the one chosen for the quantitative survey has its origins in the World Health Organization's Expanded Programme on Immunisation (EPI), which was developed as a methodology that could readily and easily be used in developing countries.

The methodology evolved around cluster surveying and has proved so successful that it is now used, amongst other purposes, to measure the impacts of national immunisation programs in most developing countries. This type of program monitoring capability, if provided through the conduct of periodic cluster surveys, is especially important in developing country settings where administrative records are often incomplete. In view of its relative simplicity and low cost, it is also used to measure the impacts of many developmental and service-orientated programs in developing countries. Furthermore, such a methodology is particularly effective if there are different and often multiple measurement objectives within individual studies; for example, the measurement of e-index usage patterns and trends, as well as evaluating the success of ICT service delivery programs. The respondents selected for the qualitative survey were drawn from the areas selected for the quantitative sample.

Quantitative Survey Methodology. In designing the quantitative probability sample in each country, it was necessary to use recent census data to select a nationally representative sample, to draw a sample whose size was sufficient to achieve reliability requirements and to create a logistics framework to enable a field implementation process that would be faithful to the sample design. A second required feature of sample design was that the sample had to be segmented into three uniquely spatially-defined strata: metropolitan or capital city (henceforth referred to as metropolitan), other urban settlements and rural areas. This was considered necessary because national records and prior research has shown there to be distinguishable differences in tele-ownership and e-usage patterns through such spatial characteristics[2]. The most obvious difference is the impact that the availability of infrastructure has on users, but cost, need and tele-dependence are different across the metropolitan-urban-rural divide, influencing usage.

The sample itself was based on a three-stage, stratified, countrywide representative sample of households and individuals. Firstly, all enumerator areas (EAs) in each country were segmented into metropolitan, other urban and rural strata. Secondly, from within each of these strata, systematic random sampling was used to select between 30 and 75 EAs in which the research would be undertaken. The total number of EAs selected in each country was determined by the degree of social diversity of the population. Once each EA was selected, a team was dispatched to map and produce a real-time record of all domestic and non-domestic dwellings, from which the surveyed households were selected. The third stage of sampling required the systematic random selection of 30 households to be surveyed from within each EA. Within each household, one or more individuals was asked to complete either the entire interview schedule or specific modules within it. The selection of these respondents was not random, with the household head or their spouse being asked to complete those sections of the interview schedule relating to household demographics, postal services and fixed telephony. The ownership of a mobile or an Internet address, and their availability during three separate visits to each household, determined which of the other respondents were selected to answer the relevant modules.

From the outset, it was essential that the sampling frame was clearly defined if the results from a survey of this type were to be used to project to each strata of the overall population. However, results are only truly projectable to the sampling frame from which the sample was selected; therefore, if the sampling frame was missing elements of the target population, the results then cannot be a true reflection of the target population,

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because certain elements of that population had no chance to be in the survey. Crucial, therefore, was the construct of the sampling frame to ensure it contained all elements of the target population. It was also important that each element of the target population appeared only once in the sampling frame. Multiple occurrences of the same element in the sampling frame would have reduced the efficiency of the sampling design by reducing the precision of estimates from the sample.

The sample design was then drawn. Although adhering to the maxim that it should be a probability sample in all stages of selection and countrywide in coverage, it was designed in as simple a way as possible, so that its field implementation could have easily and faithfully been carried out with minimum opportunity for deviation from the design. In keeping with the aim of simplicity, both stratification and the number of stages of selection were minimised. The prime purpose of the stratification was to increase the precision of the survey estimates, plus to allow over-sampling for selected areas when those areas were of particular interest. Implicit stratification is simple to implement and highly efficient when selected area level estimates are the main focus.

The sample design for the EPI cluster survey is generally a two-stage design involving the selection of pre-determined primary sampling units, or "clusters" (defined by identified spatial areas or units), from which the desired number of subjects within a specific target group (defined by identified demographic variables) are chosen. It can, however, be more than a two-stage design. In the standard design, clusters are chosen from a list of primary sampling units (e.g. villages, urban communities, census enumeration areas, etc.) through systematic random sampling with probability proportional to estimated size. The latest estimates of cluster population sizes, which are as viewed to be proportional to the number of subjects in the target group (pre-determined) in each cluster, are typically used as measures of size. The pre-determined clusters chosen are then visited by survey enumerators, who carry out the second stage of sample selection and conduct the household interviews.

The EPI design called for sample subjects to be chosen randomly from a list of all eligible subjects in each sample cluster. However, because the creation of lists of households and subjects tends to be time-consuming, costly and unfeasible in most developing country settings, this procedure is impractical. Instead, it is preferable to utilise one of several simplified second-stage sampling procedures. The research in each country was completed within six weeks of being initiated, and across all the countries over a 12-month period.

HOUSEHOLD SAMPLE DOMAIN. The baseline survey conducted in each country targeted different populations – households, individual users of public telephones, individual owners and users of mobile telephony and Internet users. There were a number of options available to each country in the design of the probability sample, and each was dependent on the ready availability and quality of recent census data. However, there are certain basic features necessary to meet the requirements of a scientific probability sample that were observed by all countries:

- Use accepted probability sampling methods at every stage of sample selection;
- Select a nationally representative sample;
- Ensure that the field implementation was faithful to the sample design;
- Ensure that the sample size was sufficient to achieve reliability requirements; and
- Use the most recent population census as the sampling frame.

A second required feature of the sample design was that the sample was segmented into three unique spatially-defined strata: metropolitan areas and/or the capital city, other urban areas and rural areas. To ensure that the probability sampling methodology devised was effective, the field implementation of the sample selection plan, including the interviewing procedures, had to be faithful to the design. The strict implementation of sample selection procedures is not always easy when working in a developing environment, and the overall design had to take cognisance of these realities and adapt accordingly. The best way to control sampling bias is to insist on strict probability sampling, and this was rigorously applied in each country.

There were other biases which were non-sampling in origin, and included non-response, erroneous response and interviewer errors. Appropriate steps had to be taken to control these non-sampling biases as well, including such measures as pre-testing concepts to take into account the nuances of each country, careful interviewer training and quality control of fieldwork. Nevertheless, some biases did occur in varying degrees in the different countries.

HOUSEHOLD SAMPLING FRAME. The surveys in each of the countries were based upon the sampling frame provided by the list of census enumeration areas (EAs), with population and household information from each of the latest population and housing censuses. In all the countries, except for the Cameroon and South Africa, these were all undertaken within the previous three years and were made readily available to the study. In the Cameroon, the census was over 20 years old and not available electronically, and the sample was drawn from a complete set of dot-matrix printed records that were located and made available to the study. Ironically, in South Africa, where it was expected that cooperation with the national statistics office would be easiest, Stats SA refused to make data available at an EA level, citing privacy and national security issues. As the use of the EA data could neither be used to invade the privacy of anyone nor threaten national security, the only reasons for its obdurate position is the standard of the data collected during the last census, which has come under scrutiny in the media, together with the capacity of the Stats SA to effectively fulfil its mandate.

In some of the countries, subsequent to the most recent census, a range of changes had been made to the administrative layout of certain towns (eg. Addis Ababa) and further information was required, as the census sampling framework could not be used in its original form. The prime use of the census for the surveys was to provide a complete list of EAs with measures of size, such as population or household counts, for selection of the first-stage sampling units. Maps were sometimes available as part of the census of population in most of the countries, and proved a useful resource when in field.

HOUSEHOLD SAMPLE SELECTION. As noted earlier, the sample for the survey in each country was based on a three-stage, stratified, countrywide representative sample of households and individuals. Following the stratification of each country into the three settlement bands, it was necessary to decide on a total number of sampling points, or clusters, for each of the countries. Each cluster was represented by a census EA. The final selection of clusters varied across the different countries, with the two variables influencing this being the size of the population and the variety of settlements in each country. The following table shows the allocation of clusters per country and the total number completed at the end of each study.

As can be seen from the table, it was hoped that 675 clusters be surveyed in the 14 countries that were selected and that a total of 20,250 household interviews

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Country	Population	Diversity	Overall Sample		Quantitative Survey			Qualitative Survey		
			Clusters		Households			Focus Groups		
			Target	Done	Target	Done	Individuals	Target	Done	Respondents
Botswana	1,601,913	Low	30	30	900	811	3,552	X	X	X
Cameroon	16,024,854	Medium	45	45	1,350	1,136	6,176	8	8	
Ethiopia	67,872,710	Medium	75	61	2,250	1,795	8,441	8	8	
Ghana	20,913,268	High	45	45	1,350	1,309	5,946	X	X	X
Mozambique	18,945,114	Low	45	21	1,350	1,465	7,999	X	X	X
Namibia	1,971,274	High	30	30	900	800	4,031	X	X	X
Rwanda	7,938,017	Low	30	31	900	916	5,619	6 (pilot)	6	
South Africa	43,313,670	High	75	67	2,250	1,743	6,699	20	18	
Tanzania	36,838,286	Low	60	60	1,800	1,800	8,031	X	X	X
Uganda	26,166,407	Medium	60	60	1,800	1,766	7,532	8	8	
Zambia	10,430,092	Low	45	45	1,350	1,675	9,170	8	8	

* '000km²

Figure Appendix 1

Source: ITU World Telecommunication Indicators 2003, World Bank World Development Indicators

be undertaken. However, 14,635 household interviews were eventually undertaken in total.

The following summarises the sample selection process. At the first stage of sampling, all the EAs in each country were stratified into metropolitan, urban and rural segments and clusters drawn from there. Therefore, it meant segmenting the country into three strata from which, respectively, a selection of metropolitan, other urban and the rural areas was made. The primary sampling units (PSUs) were, therefore, the spatial stratified groups of EAs in each country. The second-stage stratification resulted in the selection of EAs from each of the strata. EAs were selected using systematic sampling with probability proportional to size. The secondary sampling units (SSUs) are, therefore, the EAs. Given a lack of ICT infrastructure in most rural areas in the survey countries, the sample was biased in favour of metropolitan and other urban areas.

This was then followed by a complete household listing operation, which was carried out in all the selected EAs to provide a sampling frame for the third-stage selection of households. The tertiary sampling units (TSUs) are, therefore, the households in each EA. Census or sketch maps were composed to ascertain the relative position of all infrastructure, including all habitable dwellings (or household units) within an EA to ensure that the enumerators could correctly identify each of the selected households during the fieldwork. These maps were also used during this third-stage of sampling, where systematic random sampling was used to select 30 households in each EA. This was done by calculating the sample interval across all households in each EA, then following the random selection of a starting point, which ranged from one to the highest being one number below the sample interval, systematic sampling was used to select each household.

The survey was designed to eventually obtain completed interviews from at least one respondent in a minimum of 30 households in each of the clusters in each country. Initially, 27 households per cluster were deemed necessary to meet sampling requirements however, to take non-response into account, this was increased to 30 households. No substitutions were allowed, and if the enumerator could not solicit an interview after three field visits, that sampling point was abandoned. It also happened that the enumerator was able to locate one or more respondents to answer

specific modules of the questionnaire, but not for others. So long as the first five modules, including the household demographics, were answered, then the interview could proceed, although some modules would have been left unanswered.

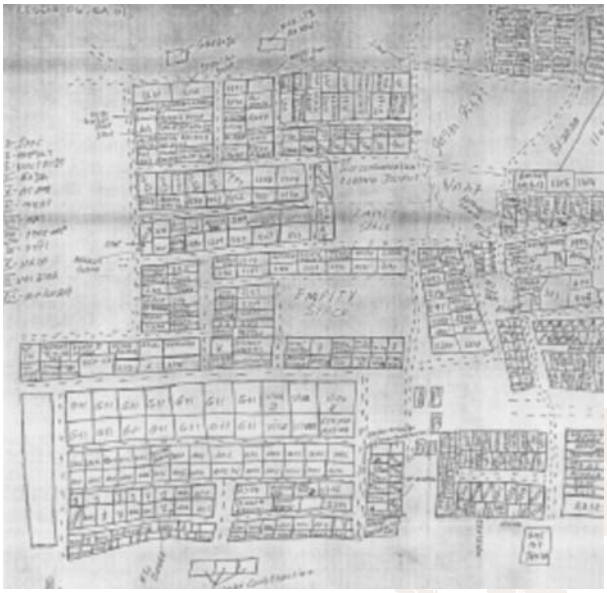
HOUSEHOLD MAPPING. Once all the EAs in each country were selected, wherever possible maps were secured from the Central Statistical Authority or Office (CSA/O) in that country. In many instances these maps had two attachments containing descriptive information on each of the EAs, where it was located within a greater spatial entity, administrative details and a diagram of the boundaries with all the buildings within and some external to these boundaries. Where CSA/O EA maps were good, identifying the boundaries of each was relatively simple; where they were poor, and the diagrammatic information was difficult to follow, a combination of the locally-hired facilitator's knowledge and the narrative description of each map's boundaries contained in the CSA/O document was used to complete the task.

In those countries where maps were not available, teams of "mappers" were engaged, who then located EAs and physically drafted maps to include all residential units within each EA. Once the mapping team had identified the peripheral boundaries of each EA, all roads and commercial and public buildings, religious places and graveyards were sketched on the map to serve as a reference for the entry of residential dwellings. The final task was the systematic listing of all domestic structures and, wherever possible, the family name of the principal family or household ID within that structure. On the maps, households were often represented using a box with the household ID in it. Vacant houses were also listed, but not included in the listing from which the sample was drawn. With the exception of two EAs, it took the mapping teams an average of two days to map and list each EA. On completion of each of the mapping and listing exercises, team supervisors would revisit the area and randomly check on the location and/or household information of a number of dwellings. Once this process was completed, the team supervisors would submit the maps to the country team leader, who selected the sample interval, randomly selected the starting point and then generated a list of households to be surveyed. As a means of illustrating the previous description of the mapping and sampling process, three maps representing generically different areas in Addis Ababa are presented.

This EA, which is a mixed settlement, is located within the inner city and is characterised primarily by single-family dwellings with no or limited passage between structures. The primary land use categories in the area include formal housing, informal housing, commercial, and recreational. The roads are made of tarmac, but not maintained.

A suburban EA is a formal settlement, located in the periphery of the city. Multi-family dwellings, with tarmac roads that are well maintained and where vehicles pass easily, characterise the neighbourhood.

Example of Inner City EA and Map – Addis Ketema, Kebele 21, EA 04



Example of a Suburban Formal EA and Map – Kolfe Keranio, Kebele 06, EA 01

The principal land use categories in the area are formal housing, with some informal housing.

A rural EA is a traditional settlement located in a rural area. The neighbourhood is characterised primarily by single-family dwellings with limited passage between structures. The primary land use categories in the area are traditional, characterised by green fields and agriculture. The roads are natural track or path, with no vehicular access..

HOUSEHOLD FIELDWORK. Once the enumerators were assigned to a field team and the field teams to the field managers, each team was allocated a number of EAs to survey. Each field team was comprised of a supervisor and four enumerators. In addition, on the first day of fieldwork in each new EA, the field supervisor and one member of the mapping team accompanied each field team and individually identified each house to be interviewed, often informing the respondents that their household had been chosen, and, if possible, arranging an interview date. A total of three visits was required to ensure that an interview was arranged, and failing this, the interview was abandoned. In reality, however, in many countries, most field workers undertook more than three visits before reporting to the field supervisor that no respondent was available.

Example of Rural EA and Map – Nefas Silk-Laftom, Kebele 20, EA 01

The field supervisor was then obliged to check every instance of unavailability. Likewise, field supervisors had to confirm the validity of each refusal to be interviewed and ascertain why an eligible respondent was not available. On average, across all the countries, it took a field team on average two days to complete interviews in one EA. Either one or two teams worked in an individual EA, with the number of teams per EA determined by the size and proximity of the EA to the urban locations. The further away the EA, the larger the deployment of enumerators for that EA. The team supervisors checked all questionnaires prior to being submitted to the data coders for checking and coding. Data checkers also alerted field supervisors to questionnaires that were perceived to have contained irregularities.

HOUSEHOLD INTERVIEW SCHEDULE. The interview tool used was a largely close-ended questionnaire that was modularised to solicit information both at a household and individual level. The questionnaire was divided into eight modules, of which Module 1 recorded sampling details and information on the number of visits

and whom in the household was interviewed. Modules 2/3/4 documented demographics, vocation, income and mobile and Internet address information for every member of the household being surveyed. The information was requested from one person, usually the household head, their spouse or a responsible and knowledgeable member of the household. However the information was collected for each household member. Modules 5 and 6 registered information on some household attributes, water, sanitation, waste disposal and postal infrastructure and services used by the household, as well as information on various appliances, including household computers. This information was collected from the same person to whom the previous modules were administered and pertained generally to the household.

Module 7 collected information on private non-mobile household phones and was administered only if these were found in the surveyed household. This module was directed at the household member responsible for the private telephone household account, or who had good knowledge of it. This person may have been the same as the one being asked the previous modules. Once again, information was collected to represent the household and not the individual.

Module 8 dealt with public and office telephones and directed at the same person who answered the previous module. Obviously if that person was unemployed, then they did not complete the second part of this module relating to the use of office telephones. In practice, however, many enumerators switched this module to the household member who was formally employed and who would have had access to a telephone at work. It should be noted that access to this telephone did not necessarily mean that they could use it for private purposes, and such information was only requested after the questions on this module had been initiated.

Module 9 was directed at one household member who, at the time of the survey, either owned or used a mobile phone and the information collected reflects their own personal situation only. Information on who in the household had a mobile telephone was readily available from Module 4 of the questionnaire. Enumerators were asked to ensure a representative quota by gender and age and vocation; however, this was not built into the sampling, for logistics and budgetary constraints limited the number of visits to each household to a maximum of three. Where possible, enumerators did use a Hirsch chart to select household members, but this was limited.

Module 10 recorded information on cyber cafés and Internet usage and was directed only to one household member that had Internet access and used the Internet, so the information collected reflected personal patterns only. Household members to whom Modules 8 and 9 were administered may have been the same persons to whom the earlier modules were asked, but not necessarily so. On average, five persons were interviewed in each household, ranging from mostly a single respondent to as many as 15 respondents from 16,000 households across the continent.

HOUSEHOLD DATA COMPUTATION. The computation of the data was undertaken individually in some countries – Cameroon, Ethiopia, Ghana, Rwanda, Uganda and Tanzania – and centralised in South Africa for all the rest. Slight variances in approaches occurred, but generally, a coding team, a checking team and a data entry team were set up. The task of the coding team was primarily to create codes for answers that had not been provided as an option on the questionnaire. However, the coding team also checked questionnaires for errors that may not have been picked up by the team supervisors, or in the case of those questionnaires centralised in South Africa,

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referred back to country managers. For this reason it was important that the coders worked together so that they could discuss the errors made and how they intended rectifying them. The coding team was therefore involved in daily sessions with team supervisors, data managers and country managers, identifying any problems with the way questionnaires were completed and enabling these problems to be dealt with almost immediately by the team leaders. The coding was completed over a one-week period for each country. Data capture teams usually completed each country set in one week, entering an average of 50 questionnaires per day. Individual SPSS data files were checked daily. On average, 0.92% of the sample in each country had to be destroyed during the final validation.

QUALITATIVE SURVEY METHODOLOGY. The qualitative survey was administered to a representative mix of various generic sub-samples of the population to mirror those in the quantitative sample. They included the youth, students, professionals, women, unemployed/employed – and in South Africa, foreigners – using qualitative techniques. This was undertaken via the administration of 42 focus groups administered in a sample of the same EAs as per the quantitative sample in each of five of the 11 countries. This mean that the requisite spatial spread of metropolitan, urban and rural areas was repeated. Once a list of possible candidates was chosen, a sample of 10 to 12 were selected and invited to participate. On average, between eight and 10 participants attended the 42 focus groups (a further eight focus groups are being completed in Zambia). The research was undertaken during a one-month period in mid-2005 and the findings incorporated into the previous demand-side analysis.

The research objectives were to build on the quantitative analysis to enable a better understanding of the ICT sector in terms of:

- user patterns as they develop for different communications technologies and change over time;
- reasons (and dynamics) influencing decision-making for those issues that impact on adoption and changes of communications technology;
- demand in terms of how telecoms operators and Internet service providers react to meet these; and
- protection in terms of Communications Policy.

TARGET POPULATION. The target population on which this study was based was all communication consumers in each country. In South Africa, to ensure that the diversity of the population was reflected, the number of focus groups was doubled. To improve the focus, groups were further subdivided to include specific targeting of women, students, youth, unemployed, professionals and foreign residents.

HOUSEHOLD INTERVIEW SCHEDULE. The interview schedule was divided into five modules, the first dealing with fixed line telephony and focusing on the use of private fixed phones, use of office phones and fixed phones at home. In addition, there were probes as to why decisions are made to use different types of telephones, what exogenous factors impact on these and the range of choices. The second module deals with public telephony and addresses issues concerned with the type of public phones used, issues of privacy, safety and socialisation and combining the use of public phone with other phones. Crucial to this module is a series of probes that investigates how a bundle of different types of public phones are used at certain times and the reasons why.

The third module deals with mobile telephony and probes ownership of mobile phones, entry and exit levels of ownership, affordability and churn of handsets, image and style, issues of credit and airtime, understanding the true nature of buzzing, SIM cards and issues around SMS and service providers. The

fourth module focuses on Internet access and usage, exploring the use of the Internet, cost factors affecting use of Internet, emailing on the Internet, Internet cafés, entry age onto the Internet and sources of information. Finally, the fifth module details an in-depth investigation on various aspects of communications expenditure, including budgeting, planning processes, transfers of expenditure, borrowing and lending, necessity or luxury.

RESEARCH LIMITATIONS. Despite the fact that efforts were made to reduce the limitations of this study, it must be recognised that there are various limitations caused by the relatively small research samples used in each country, as well as the restrictions in terms of resources and time. A number of limitations can be identified, some of these are common to research surveys of this kind.

Firstly, it must be recognised that the viewpoints and background of the researchers, who were involved in the larger research study, inevitably shaped the research process and final findings.

Secondly, although respondents were assured of confidentiality, it is nevertheless likely that some participants were reserved in both the manner they responded and in the content of their responses. Furthermore, discussing issues relating to financial expenditures always runs the risk of being under-reported or over-emphasised. Furthermore, many questions relied on the respondents having a fairly accurate memory recall, thus again possibly resulting in biases.

Thirdly, this research project, as with any research project that relies almost entirely on quantitative data, cannot be tested against any set of qualitative criteria. It is simply hoped that the opinions were honest and representative. Fourthly, for both the quantitative and qualitative research, the data collected by its own nature does little more than provide a snapshot of facts for a moment in time. Unless repeated, it does not allow the analyst to make any type of statement in terms of dynamic trends, and particularly how different influences lead consumers to make the types of choices they do. With IDRC support, the intention is for this to serve as a baseline household and individual user survey that will be repeated in three years' time. ❑

ENDNOTES

1 These studies draw on the methodology developed by LIRNE.NET to conduct their annual review of the ICT sector in Denmark. LIRNE.NET is a collaborative research and training network consisting of the Danish Technical University, the Technical University of Delft, the London School of Economics, the University of the Witwatersrand LINK Centre and LIRNEasia. See www.lirne.net .

2 Benjamin, P, Stavrou, A, Burton, P and McCarthy, C (2000), *Telecentre 2000,* Link Centre.