Ethiopia ICT Sector Performance Review 2009/2010

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Executive Summary

Despite recent massive investment the contribution of the communications sector to the Ethiopian economy remained very low

The Ethiopian Communications Sector has seen substantial growth off a very low base over the last five years as a result of a massive investment through a vendor financing loan agreement with China's Zhongxing Telecom Corporation (ZTE) worth US$1.9 billion. The increase in access network, completion of core network, introduction of fixed and mobile broadband access, rolling out of fibre backbone and establishment of links to about 10,000 rural villages was marked by a dramatic fall in the quality of service. Telecommunications revenue has grown only moderately in comparison to investment, at around 16% per annum. The contribution of the communications sector to the economy remained just under 2% – low in comparison to the regional average, which is around 4%.

There has been no positive movement towards competition over the last two decades. The market remains structured around a monopoly where a single operator provides fixed, mobile, and Internet services and maintains the international gateway service. The regulator, the Ethiopian Telecommunications Agency, remains weak in terms of its legitimacy in monitoring the behaviour of the monopoly operator and and its ability to deal with regulatory challenges such as licensing, frequency assignment and monitoring, setting and enforcing tariffs, dispute resolution, maintaining quality of service and promoting universal access. It is unable to attract and retain skilled employees with legal, regulatory, management and technical skills, due partly to low public sector remuneration and the absence of such skills.

The Annual Revenue Per User (ARPU) of the fixed, mobile and Internet segments plummeted over the last five years, resulting in an overall decline in revenue of the incumbent and government tax in comparison to investment. The public sector is the loser by holding on to the inefficient and vertically integrated monopoly market structure. ETC's revenue stands at around US$460 million in 2009. A fourfold increase in traffic would have brought the revenue to around US$2 billion a year, which could have generated about US$0.5 billion in public tax and related revenue a year, not to mention the productivity improvement of an enhanced ICT sector.

Pro-competitive policy intervention is important to deal with current poor service penetration, low quality of service and high cost of broadband access.

Ethiopia's ICT sector remains far behind the rest of the world. It sits at the bottom of the Information Development Index (IDI) of the International Telecommunications Union, scoring 0.97 and placing 154th out of 159 countries in 2010. Fixed-line teledensity stands at 1.14%, although the number of mobile subscribers doubled in 2009, when mobile tele-density jumped from 2.5% to 5.5%. This growth is paltry, however, when compared to the global average for mobile subscription of 67% in 2009.

The sector faces a significant skilled human-resource shortage for planning, implementation and management of a modern Next Generation Network and its regulation. The absence of technical, analytical, policy and regulatory capacity at all levels has been the major challenge in stirring the communication sector out of its low level development. Pro-competitive policy intervention is important to deal with current poor service penetration, low quality of service and high cost of broadband access.

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Background

Social and Economic Overview

Ethiopia and Eritrea are the last countries in the world where the government owns the entire communications sector.

Ethiopia is located in the Horn of Africa, and it is bordered on the north and northeast by Eritrea, on the east by Djibouti and Somalia, on the south by Kenya, and on the west and southwest by Sudan. It sits in one of the most volatile regions in the African continent, neighbouring lawless Somalia and the Sudan, which is reeling from a long standing conflict in the south and in Darfur. Eritrea and Ethiopia were at war between May 1998 and June 2000. The volatility of the region is one of the major factors that have contributed to the governments' heavy handed regulation of the ICT sector. Ethiopia and Eritrea are the last countries in the world where government owns the entire communications sector.

Ethiopia's economy is mainly agrarian and subsistence. Agriculture accounts for nearly half the country's Gross Domestic Product (GDP), 60% of its exports and 80% of total employment. The major agricultural export crop is coffee. Other traditional major agricultural exports are leather, hides and skins, pulses, oilseeds, and "khat," a leafy shrub that has psychotropic qualities when chewed[1] . Khat is mainly exported to neighbouring countries – Djibouti, Yemen and Somalia. Sugar and gold production has also become important in recent years along with flowers. While the contribution of the service sector to the economy has been growing (comprising about 41%) the impact of its ICT sector remained relatively small – the ICT sector contributes less than 2% to the economy.[2]

The challenges facing Ethiopia are daunting. The dynamics of population growth, very low productivity, inadequate educational and work standards, structural bottlenecks, dependence on unreliable rainfall, and being land-locked combine to pose challenges almost incomparable with anywhere in the world. While the Ethiopian economy has been growing over the recent year, the quality of life has generally been declining, especially in the rural areas. Inflationary pressures are growing with an average rate of 36% (2008-2009). Coupled with the substantial devaluation of the Ethiopian Birr, which lost its value by over 50% within a year, the inflation of food prices has had a direct impact on a vast majority of the people, who could otherwise have spent part of their earnings on communications. Increasing food prices will have a substantial impact on the ability of the majority of Ethiopians to afford basic communications and will negatively impact Annual Revenue Per User (ARPU).

Table 1. Ethiopia Economic Data
Source: World Bank, Economics Intelligence Unit, UNDP Human Development Index

	Socio Economic Data
Gross Domestic Product	$26.6 billion (2007-2008)
GDP Per Capita (PPP)	$800 (2008)
Average inflation rate	36% (2008-2009)
Total Population	81,000,000 (2009)
Composition by sector	Agriculture: 45.9% Industry: 12.9% Services: 41.2% (2008 estimates)
Urbanisation	17.6%
Literacy rate 15 years and above	35.9% (2007)
Human Development Index	0.414 (2009)
Inflation rate	25.3% (2008) 36.4% (2009)

Rural Ethiopia, where 82% of the population lives, is exceptionally poor. Urban poverty is growing in pockets of cities and towns. Ethiopia ranked 171 out of 182 countries in 2009 with a Human Development Index of 0.414, one of the lowest in the world. About a third of the population (31

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[1] US State Department, Country Profile, Ethiopia, 2009, http://www.state.gov/r/pa/ei/bgn/2859.htm

[2] World Bank, Ethiopia at a Glance, http://devdata.worldbank.org/AAG/eth_aag.pdf

million people in 2006) live on less than half a dollar a day and between 6 and 13 million people are at risk of starvation each year.[3]

Notwithstanding inflation and the growing gap between rich and poor, the last five years have seen impressive economic growth rates, averaging above 10%. Ethiopia's GDP grew by 10.1 percent during 2009. The Economist predicts that Ethiopia will be the fifth fastest growing economy in 2010 after Qatar, China, Congo and Turkmenistan.[4] This is expected to increase the demand for communications and information technologies which in turn has the potential to create a virtuous cycle for further economic growth. However, Ethiopia's ICT sector development will continue to depend on government policy choices – whether to allow for further competition in the sector or to hold on to an inefficient monopoly incumbent.

Economic hardship, including inflation and devaluation of the local currency, had a substantial impact on the ARPU.

Political Overview

Ethiopia is a federal republic under its 1994 constitution. The executive branch includes a president, Council of State, and Council of Ministers. Executive power resides with the prime minister; therefore decisions with regards to the communications sector come from him.

Ethiopia promotes a policy of ethnic federalism, devolving significant powers to regional, ethnically based authorities. The country has nine ethnically-based semi-autonomous administrative regions and two special city administrations (Addis Ababa and Dire Dawa), which have the power to raise their own revenues. Considerable administrative power is devolved to the regions and down to the district level. The communication sector is regarded as a national strategic asset, therefore planning of the telecom sector has little input from these regions and districts.

A fourth election was held in May 2010 in which the Ethiopian People Democratic Front (EPRDF) won with a landslide victory. The new government has introduced a new five year Growth and Transformation Plan (GTP) that is expected to boost economic growth and attain around 15% growth on an annual basis. It is widely expected that the newly elected government will continue to liberalise the country's economy, attract Foreign Direct Investment (FDI), initiate privatisation programmes and encourage private sector's participation in the communications market to facilitate the implementation of the GTP.

The new five year Growth and Transformation Plan (GTP) is widely expected to boost economic growth and demand for communication services.

ICT Policies

ICT has become an integral part of Ethiopia's development programmes over the last decade, following initial indifference to the development of the sector. The country faces a substantial gap between interest in the ICTs and the policy and regulatory instruments available to enable its development. ICT is one of the major components of the Sustainable Development and Poverty Reduction Program (SDPRP) of the Ethiopian government. The most consolidated and recent policy framework is the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) that runs between 2005 and 2010. Five major initiatives were designed with regard to the ICT sector development in the PASDEP document:[5]

- promoting human resource development in the ICT field;
- mainstreaming the use of ICT in all sectors of the economy, in the administration of government, and in the education system;
- developing the necessary telecommunications infrastructure;
- promoting research and development through ICT; and
- creating enabling legal and regulatory framework.

The broad ICT sector policy of the Ethiopian government that derives from PASDEP, was developed in 2006 by the Ethiopian ICT Development Agency (EICTDA).[6] The policy aims to:

- develop ICT as a globally competitive industry, and as an engine of national growth;

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[3] United Nations Development Programme, Human Development Index, 2009

[4] http://media.economist.com/world/

[5] Government of Ethiopia, Plan for Accelerated and Sustainable Development to End Poverty, 2004

[6] Government of the Ethiopian Federal Democratic Republic, ICT Policy, http://www.eictda.gov.et/Downloads/ Policies/ICT_Policy_English.pdf

- create the necessary conditions for the rapid development of ICT within the economy and society to accelerate Ethiopia's socio-economic development process;
- promote and facilitate an extensive use of ICT in support of key sectors of the economy including agriculture, industry and the services sectors;
- transform Ethiopia into a knowledge and information-based society and economy; and
- promote the use of ICT for modernising the civil and public service to enhance its efficiency and effectiveness for service delivery, to promote good governance and reduce wastage of scarce resources.

To achieve the above objectives, the government has crafted various programmes that aim at:

- creating an enabling policy, regulatory and legal environment for the growth and utilisation of ICTs;
- developing the necessary ICT human resources, infrastructure, rural access, ICT standards, and local content;
- strengthening the capacity of public institutions to facilitate the mainstreaming of ICTs for socioeconomic development; and
- facilitating the use of appropriate technologies for development of applications and content for rural development, good governance, and service delivery in priority sectors.

While these policy objectives are laudable, a critical standpoint shows a conflict between government policy objectives for improving affordable access to ICTs to individuals, households, businesses and institutions and the regulatory and policy instruments available to enable it. Ethiopia is one of the few countries that has retained a government monopoly over its fixed, Internet and the mobile markets. The monopoly market structure is one of the major factors in the slow development of its ICT sector. Table 2 lists the prevailing policy in the communication sector.

Table 2. Level of Competition in the ICT Sector in Ethiopia

Telecommunication services	Market	Policy
Fixed-Line (Domestic and International)	Monopoly	ETC is the sole provider of international and domestic fixed-line services.
Mobile service	Monopoly	ETC is the sole provider of mobile service
International gateway	Monopoly	ETC controls the international gateway
Internet services	Monopoly	ETC is the sole provider of Internet service
Domain names	Monopoly	ETC is the manager of the domain name and responsible for web hosting under ".et" domain.
Content services	Monopoly	Web hosting under .et domain a monopoly of ETC
VSAT	Monopoly and case by case	Individuals and enterprises are not allowed to own VSATs and bypass the national gateway. International organisations are allowed to own VSAT with payment of traffic compensation or "landing right" fees on case-by-case basis.
Call centre, cyber café and messaging services	Competition	Downstream value-added services such as call centres, pay phones, cyber cafés and messaging services are allowed for competition.
Call back and use modern technologies (e.g. VOIP)	Barred	Call back or use of modern technology like VOIP are not allowed.
Telecommunications equipment	Competition	Sale of mobile and telephone handsets is allowed.

Source: ETC Strategy paper 2004-2006, Council of Ministers Regulation No. 10/1996, Proclamation No. 49/1996; Proclamation No. 116/1998 and Council of Ministers Regulation 47/1999

In summation, the sector is characterised by an incongruence between the broad policy objective of increasing access and the instruments the government uses to achieve that. Although the public monopoly is often regarded as an instrument for expanding the core network due to the capital

investments and economy of scale that makes a single provider more effective, analysis below shows that Ethiopia's adherence to a natural monopoly has been detrimental to the development of its ICT sector.

ICT Sector Regulation

The reform process in the telecommunication sector began in 1996 with the adoption of a proclamation that provides for the regulation of telecommunications services (49/1996)[7] (as amended), in which the government created the regulator, the Ethiopian Telecommunications Agency (ETA). The regulator was legally established in November 1996, but it was not operational until December 1997 when the General Manager was appointed by the Minister of Transport and Communications.[8] The establishment of the regulator as a viable institution with adequate and skilled staff took another two years. This was followed by a change in the ETA management in 2001, with two acting general managers over the period of a year until a general manager was formally appointed in 2002. The last general manager left the country in 2009 and no further formal appointment was made until March 2010.

Although public monopoly is often regarded as an instrument for expanding the core network, Ethiopia's adherence to the inefficient incumbent has been detrimental to sector growth.

Table 3. Legislation Relevant to the Communication Sector
Source: Ethiopian Telecommunications Agency, Ethiopian Broadcasting Agency

Year	Legislation/Regulation
2007	Proclamation No. 533/2007 – Broadcast Service Proclamation – http://www.eba.gov.et/wed/data/LawsRegs/main.html
2006	Council of Ministers Regulation No. 130/2006 - Information Network Security Agency Establishment Council of Ministers Regulation
2004	Council of Minister's Regulation No. 99/2004
2003	Proclamation No. 360/2003 – Ethiopian Information and Communication Technology Development Agency Establishment Proclamation
2003	Proclamation No. 375/2003, Investment (amendment) Proclamation)
2003	Council of Ministers Regulation No. 93/2003
2002	Proclamation No. 280/2002
2002	Proclamation No. 281/2002
1999	Proclamation No. 178/1999 – Ethiopian Broadcasting Agency Establishment Proclamation
1999	Broadcasting proclamation N°187 – http://www.telecom.net.et/~eta/Important_legs.htm
1998	Investment proclamation No 166/1998
1996	Ethiopian Telecommunications Agency Proclamation 49/1996 – http://www.telecom.net.et/~eta/Proc_No_49_1996.htm
1996	Proclamation for the establishment of Ethiopian Telecommunications Corporation 10/1996
1996	Regulation to provide for the regulation of telecommunication services

Besides its lack of a manager, the ETA has no independent board of directors or commissioners. The minister, who allocates its budget, appoints the general manager. Moreover, the Council of Ministers' regulation on Telecommunications Services that was issued in 1999 (proclamation 47/1999)[9] gives the Ministry of Transport and Communications the power to issue directives without recourse to the regulator or the public. Without distinction on whether the directives are of

[7] Federal Democratic Ethiopia, Proclamation 49/1966, http://www.eta.gov.et/Button/Scan/Telecom%20Proc%2049_1996%20NG1.pdf

[8] Mbendi, Ethiopia - Computers & Communications: Communications Industry Regulation, http://www.mbendi.com/indy/cotl/govc/af/et/p0005.htm

[9] Federal Democratic Republic of Ethiopia, Council of Ministers Telecommunications Service Regulation, http://www.eta.gov.et/Button/Scan/Telecom%20Regulation%2047_1999%20NG.pdf

policy or operational nature, the Ministry can direct the sector without involving the ETA if it deems that is necessary. Effectively, the ETA acts as a department within the ministry rather than as an independent regulator that guides the ICT sector in the country.

The regulations that established the Ethiopian Telecommunications Corporation and the Ethiopian Telecommunications Agency have not been updated in over a decade. No new regulations and guidelines were issued by the regulator over the last three years, an indication of the stalled communication sector regulatory process in Ethiopia. The major regulatory instruments that govern the ICT market in Ethiopia are listed in Table 3.

Institutional Arrangements

The overall communication sector governance framework in Ethiopia comprises a number of players that influence the regulatory environment in different ways, but the key power rests with the prime minister. The main actors include:

- The Prime Minister, head of the government and ultimately responsible for decisions on policy and regulatory matters.
- The Council of Ministers, which approves communications regulations and sets the budget of the ETA.
- The Ministry of Transport and Communications, which defines the policy framework, directs the regulator and oversees the activities of the incumbent operator. The Ministry appoints the General Manager of the ETA and the Chief Executive Officer of the ETC.
- The Ministry of Capacity Building, which defines ICT strategy for the public service, including education, health, agriculture and other sectors. The Ministry hosts the EICTDA, which is responsible for the development and implementation of the national ICT policy.
- The Government Communication Office, which deals with broadcasting sector and oversees the activities of the Ethiopian Broadcasting Agency, which has a parallel function to the Ethiopian Telecommunications Agency.
- An ETC Board of Directors, which supervises the Ethiopian Telecommunications Corporation. The Board develops the telecommunications strategy for the country and appoints senior managers to the ETC.

The three institutions that compete for the regulation of the ICT sector are the EICTDA, ETA and EBA. The ETA and EICTDA have areas of ICT regulation that often overlap, such as community access, content and legislations pertaining to online transactional content. The EBA and ETA overlap in the area of spectrum management and regulation of converged content.

The EICTDA was established to promote the use of ICTs in government agencies, education and in the private sector. It deals with five themes: ICT for government; legal and regulatory frameworks including standards; human resources development; ICT applications in sector; private sector development and promotion of community access. The EICTDA has also been charged with the review of a national ICT policy.

The EBA was established in 2000 following a proclamation for its establishment in 1999. It has not been effective for quite a long period due to a protracted debate over opening the broadcasting sector for private investment. The EBA works closely with the Ethiopian Telecommunications Agency and responsible for the management of the broadcast radio frequency spectrum.

Despite its collaboration with other agencies, the ETA remains the weakest institution compared to the EBA and EICTDA. The public monopoly of telecommunication services leaves the ETA with little to regulate. So far, the focus of the regulator has been confined to the collection of licensing fees from small scale service providers such as telephone service resellers, cyber cafés, and importers of communications equipment that were authorised under Proclamation No. 281/2002.[10]

Efforts to improve ETA's capacity began in 2008 through a Business Process Re-engineering (BPR) process, and new legislation was drafted in 2008 that permits it to cover the telecommunications and postal sectors. But the draft legislation did not go through the Parliament and the Council of Ministers, therefore undermining the legitimacy of the regulator.

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[10] Federal Democratic Republic of Ethiopia, Proclamation No. 281/2002. A Proclamation to Provide for the amendment of Telecommunications Proclamation, http://www.eta.gov.et/Button/Scan/Telecom%20Proc %20281_2002%20(amendment)%20NG.pdf

The legitimacy of the regulator is central to the development of the communications sector in Ethiopia. An effective and legitimate regulatory body cannot be attained without competition; and competition cannot be achieved without good regulatory institution. Having a legitimate and skilled regulator prior to opening up the sector could improve investor confidence, which will likely increase Foreign Direct investment and encourage better diffusion of the ICT services.

The telecoms sector regulator, the ETA, remains the weakest of all public institutions involved in the ICT regulatory space.

Licensing of the telecommunications sector

Licensing in telecommunications consists of the ETC receiving a monopoly licence from the regulator to provide fixed, mobile and Internet services on an exclusive basis in exchange for efficiency and quality of service requirements and infrastructure expansion targets. The network rollout targets are set by the ETC itself and approved by its Board of Directors, often with little input from the regulator.

In 2007, the ETC entered in a strategic agreement with China's Zhongxing Telecom Corporation (ZTE) through a vendor-financing soft-loan agreement amounting to US$1.9 billion to substantially expand its infrastructure. The vendor-financing scheme was subsequently used as the basis of the ETC's 2007–2010 targets. The targets pledge to achieve the following by 2010:

- roll out a 10,0000km optical fiber transmission network;
- increase the number of fixed lines in operation by 2010 to 4.4 million, thus raising tele-density to 6%;
- expand the mobile subscriber base to 10,000,000 with 85% national geographic coverage of mobile signal;
- attain 1,000,000 Internet subscribers, thus raising Internet subscribers density from 0.02% to 0.23%;
- expand 3G services to rural areas, in particular to major towns out of Addis Ababa;
- install wireless and VSAT connections to 15,000 villages including installation of CDMA Wireless Local Loop;
- expand the CDMA network with a capacity of 2.5 million subscribers,
- install 50,000 public telephones all over the country;
- establish a Network Operation Centre;
- establish a state-of-the art call centre; and
- establish a modern customer care and billing system.

It was also envisaged that all district towns would benefit from digital communications systems, and all major roads of the country, town centres, tourist centres, historical places and industrial villages will have mobile signals following the completion of the much awaited ZTE/ETC project.

Licensing of the telecommunication sector is effectively a monopoly license to the Ethiopian Telecommunications Corporation which sets its own network rollout targets.

Progress so far indicates that the core network is being completed and about two-thirds of the fibre network has been rolled out. Targets such as reaching 10,000,000 mobile subscribers and 15,000 villages are not likely to be met by 2010 as planned. Besides, the incumbent will not have the resources to continue building or maintaining its infrastructure to catch up with the growing demand for services in the rest of the world.

By the end of 2009 there were 4,051,703 mobile subscribers (less than half of what has been pledged in the strategic plan) and 915,058 fixed-line subscribers, giving a total subscriber base of 4,966,761 covering about 6% of the population. Mobile teledensity stands at around 5.5% – a low figure compared to penetration rates around the world. Some countries in Africa, such as Botswana and South Africa, have sold more SIM cards than their total population, and neighbouring countries like Kenya and Sudan have achieved rates as high as ten times that of Ethiopia.[11] Table 4 shows a comparison between stated targets for 2007–2010 and actual progress made by 2009, just a year before the target.

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[11] The use of mobile penetration for comparing countries should be approached with some caution. Mobile data in most countries is generally inflated by 20% to 50%. More SIM cards are sold than those actually in use at any given time. In Ethiopia, the figure of mobile subscribers is estimated to be accurate with about 5% inflation. This is largely due to limited supply compared to demand in Ethiopia as opposed to other countries.

Table 4. ETC Targets for 2010 and Performance by end of 2009
Source: Ethiopian Telecommunications Corporation – Statistical Bulletin 2008/2009

Targets	Target by June 2010	Achievement by end of 2009	Achievement in % by June 2009
Fixed network	3,000,000	1,150,622	38%
Mobile subscription	12,000,000	4,051,703	40.5%
Fibre network (km)	10,000	6,332	63.3%
Internet subscription	150,000	71,059	43.4%
Reach out to rural villages	15,000	9,892	67%

It is evident that the incumbent operator will not be able to meet the self-imposed targets, in particular in the area of mobile and Internet subscription, where it was about 60% off the target in 2009. Although two-thirds of the fibre network and rural village access had been accomplished by end of 2009, it is unlikely these will be fully attained by 2010. The major problems cited by the ETC include difficulties in securing the right of way, vandalism on its fibre network, inadequate supply of the electric power and difficulties with the civil works.

Market Structure

Ethiopia's public monopoly of the communication sector and a vertically integrated market structure determine access to and use of ICT in the country. The market is characterised by excessive pricing, especially in the broadband and international direct dialling segment, poor quality of service, inefficiency, lock-in, and the absence of choice that had a detrimental effect on the revenue of the incumbent and the productivity of public and private enterprises.

Despite pressures from international financial institutions, Ethiopia's telecommunications market structure has continued to be state-owned. Close observation also shows that it is unlikely that liberalisation will take place in the short term. Telecommunications is viewed as a strategic asset for the economy and national security in the horn of Africa. Another obvious reason why the government would like to hold on to the state-owned enterprise is its interest in recouping the massive investment it made in recent years and repay the US$1.5 billion loan. The government has sunk so much borrowed capital into the network that it is highly risk-averse and therefore likely to maintain the status quo.

Senior policy makers have been cautious when it comes to the introduction of competition to the communications sector or privatisation of the incumbent. The main line of argument so far has been that "liberalisation will not result in positive universal access to the poor people due to the profit motives of the multinational companies that are interested in the cream telecom market." The "cream skimming" or "cherry picking" argument was repeated several times by policy makers, who argued that the new entrant will focus on corporate customers and urban areas and take away business from the incumbent. The related argument, which held an appeal to most people, was that the monopoly incumbent is the only option for meeting universal service objectives in Ethiopia since access requires massive investment and cross-subsidies.

It was further argued that telecommunications infrastructure is a public good and that government is best placed to promote universal access[12]. ETC feels that it has the obligation to deploy the communication networks to rural areas as per the government decentralisation programme. Other factors, such as employment and labour disputes, are also taken into account. While the universal services arguments may have some merit – particularly with regard to the government's role in rolling out broadband infrastructure that underpins Ethiopia's future economic growth – the status quo has been detrimental to the growth of the ICT sector in Ethiopia.

Global progress in competition and privatisation of the communication sector shows that most of the arguments above offer a superficial and flawed appeal to public interest agendas and to those who do not have an understanding of the linkage between policy, regulation and sector performance. Monopoly undermines government revenues and the competitiveness of

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[12] See for example, a news and discussion forum on private sector participation on the future growth of telecommunication services in Ethiopia, http://www.ethionet.et/enews_march_27.html

enterprises. Estimates show that the ETC loses about 30% of its revenues to bad quality of service on an annual basis.

Comparative analysis of countries shows that the Ethiopian government, by holding on to a vertically integrated monopoly market structure, is actually the loser. Telecom sector development in countries that have liberalised the sector, like Kenya and Uganda, shows that the Ethiopian government loses tax revenues of at least US$0.5 billion per year by not opening its communication sector for investment – not to mention the impact that wider and more competitive access could have brought to the economy and competitiveness of enterprises. ETC revenue stands at around US$460 million in 2009. A four-fold increase in traffic would have brought the revenue to around US$2 billion a year, which would have generated about US$0.5 billion in public tax and related revenue a year, in addition to the impact that wider access would have on enterprises and individuals.

The stance on monopoly has also been delaying Ethiopia's global and regional integration. Ethiopia is poorly integrated into the regional and international economy and it has not been able to reap the benefits, despite being the host of African institutions such as the African Union Commission and the Economic Commission for Africa (ECA). For example, Ethiopia was able to use its strategic position to run one of the most successful airlines in Africa, but it was unable to develop a communications sector of a global standard. The lack of institutional capacity and the low level of awareness of the linkage between policy, regulation and operation of the communications sector, in particular the inability to understand the technological development in the sector, have been major obstacles to the integration process.

The government applied for membership of the World Trade Organisation (WTO) in 2003 and committed to preparing itself thoroughly for the accession negotiations. In order to accede to the WTO, it needs to participate in the General Agreement on Trade in Services (GATS) and negotiate a schedule of specific commitments on trade in services, including telecom and financial services, transport, tourism and others. As a part of its integration strategy, Ethiopia has prepared a Memorandum on the Foreign Trade Regime, which was the first prerequisite to negotiate accession in the WTO in 2007. The Working Party on the Accession of Ethiopia held its first meeting in May 2008 to examine Ethiopia's foreign trade regime. However, despite the original target accession date for 2009, Ethiopia was unable to accede to the WTO, mainly due to its fear of vulnerability to an account deficit when it opens up its market and its stance on delaying the liberalisation of the banking and the telecom sectors.

Nevertheless, policy makers are becoming wary of the inefficiency of the incumbent operator, especially the low revenue collection from subscribers. The government was unable to acknowledge that ETC's inefficiency is actually the result of its own policy on the communication sector. Instead it started to look for a solution elsewhere, by appointing a management firm that offers efficiency and effectiveness on a revenue-sharing basis.

The six-month search for a strategic partner in 2010 led to the selection of France Telecom to run the ETC on a revenue sharing basis. The other competing bidders were Videsh Sanchar Nigam Ltd (VNSL) and MTN Group.

This follows an attempt in 2002 to appoint a strategic investor that could generate fresh capital and transfer technical expertise, implementation experience and management skills. The possibility of selling part of the ETC shares to private partners was also explored in 2002 by engaging a consulting firm, Price Waterhouse Coopers, which undertook audits of ETC assets in the same year.

However, the selling-off of shares was shelved in 2003 due to various reasons including "lack of interest from investors"[13] uncertainties about strategic partnership, and the government's apprehension about the impact of telecommunications liberalisation on the economy, not least on the strategic importance of communications to power. Afterwards, the government resorted to overhauling the management of the ETC and adopted a "wait and see" mode rather than pursuing the originally planned strategic partnership route.

The main tool against the ineffectiveness of the ETC so far was to change the management and see if that could lead to an efficient state-owned enterprise. This "tool" faltered in 2006, resulting in three major management reshuffles in the incumbent. Critics argued that the change of senior management would not change the fundamental structural problem of the public monopoly – its inefficiency and ineffectiveness.

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[13] See Interview of the Russell Southwood with the former Chief Executive Officer of ETA, http://www.balancingact-africa.com/news/back/balancing-act_272.html

Estimates show that the ETC loses about 30% of its revenues to bad quality of service on an annual basis.

Policy makers are becoming increasingly wary of the inefficiency of the incumbent operator, especially the low revenue collection from subscribers.

While the government is still negotiating the terms of the management takeover by France Telecom in its second attempt to improve efficiency through change in management, critics argue that the inflated, unskilled and unproductive workforce and other structural challenges will make it difficult for the incumbent to become efficient. The structural challenges to Ethiopia's communications sector run far deeper than inefficient management. The major structural challenges are:

- a lack of adequate staff skilled in management of internetworking and Next Generation Networks;
- a low-level work attitude and entrepreneurship arising from entrenched civil service culture; and
- low quality service that has a direct impact on the revenue of the incumbent.

Other structural challenges include the absence of advanced and cutting-edge policy and managerial capacity at government decision-making levels, lack of state-of-the-art technical skills, inadequate corporate work attitude and quality of service, and above all a lack of financial muscle to sustain the building of the Next Generation Networks. Moreover, there are factors beyond the control of the incumbent, including systemic problems including red tape, absence of contracts for civil works and the level of cooperation from other public and private institutions. In sum, the main ingredients of a competitive firm are currently absent and they are unlikely to be built overnight, thereby stifling the attempts to improve productivity of the incumbent by engaging a foreign firm to manage it.

Despite some progress in rolling out fibre infrastructure and introducing a broadband mobile network, Ethiopia's ICT sector remains far behind the rest of the world. Ethiopia sits near the bottom of the ITU Information Development Index (IDI), scoring 0.97, placing it 154th out of 159 countries.[14] Until March 2010, when it signed an agreement with SEACOM to purchase 3 Gbps, Ethiopia was not able to capitalise on the momentum in the rest of Africa in achieving affordable broadband connectivity following the landing of submarine cables in its neighbouring countries. The slow pace of the development of the communication infrastructure has continued to deter social and economic progress and constrain the competitiveness of institutions, enterprises and individuals. A policy measure that introduces gradual competition with a long-term strategy that brings affordable broadband connectivity to institutions and enterprises is critical for Ethiopia to achieve its goal of becoming a middle-income country by 2020.

Universal Access

Ethiopia does not have a universal access fund to expand communications to rural areas. The major resources for rural connectivity come from cross-subsidies between international and domestic tariffs, and the incumbent's plan for expanding services to underserved areas. The ETC uses two instruments for achieving universal access:

- a Rural Communication Project (RCP); and
- rolling out ETC's service stations in underserved areas

The Rural Communication Project was aimed at rolling out services to over 18,000 Kebeles (rural sub-counties). Kebeles (sub-counties) are the lowest government administration hubs. A typical rural Kebele comprises of 500 to 800 households. The Rural Communications Project was originally planned to cover all the 18,000 Kebele associations in two phases – 3000 in 2005 and 15,000 in 2006 – using wireless local loop technology and VSAT. Each rural station was envisaged as having a PC, phone, fax and Internet access. It was estimated that each station would cost between $8,000 and $15,000 to set up. The ETC had also planned to hire 36,000 graduates of technical and vocational schools to operate village communication centres that provide all ranges of communication services to customers.[15] The number of Kebeles to be connected was revised downwards from 18,000 to 15,000 in 2007.

By 2009, about two thirds (9,892) of the targeted villages were connected. While connecting villages will undoubtedly improve equity and universal access to communications infrastructure, it is not clear whether the approach to connect each Kebele makes business sense or will be sustainable in the long term. There has been limited study of the impact of a model parachuting

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[14] ITU, Measuring the Information Society 2010

[15] ETC, Rural Communications Project, 2005

one link in the middle of a village without rolling out connectivity to residents or entrepreneurs that may seize the opportunity of the presence of the network and provide diverse services to community members.

The Rural Connectivity Project was based on the conviction that the same technology works for everyone and that rural people wish to access similar communication services to those accessed in urban areas. Affordable and easy access to a telephone is often the major preoccupation of rural people, although advanced services like the Internet are desired. The ability to provide access to basic communications to people in rural areas should be the underlying drive for the universal access.

The second instrument for expanding access was expanding ETC's own telephone stations in underserved areas (small remote towns) using VSAT and radio. There were 994 telephone stations in 2009, of which 565 were served using a digital automatic telephone exchange.

While the rolling out of ETC stations to rural towns and establishment of communication links to farmers' associations has made a significant improvement, the regulator lacks a well thought out and sustainable universal access plan driven by demand and based on technological and business innovations and quality of service. The Rural Connectivity Project did not take the potential of small players such as rural cooperatives, private sector and resellers (including women entrepreneurs) into account.

Given the experience with rural farmer associations, models that are built around cooperatives and those that involve women could be very attractive in providing access to communications in rural areas. Micro-lending has shown some success and could be adapted to the provision of communication services. Different models of shared access facilities, such as telecentres in schools, libraries and clinics etc. could also be explored by the regulator and policy makers in order to promote access and improve employment opportunities in rural areas.

Small towns provide a lifeline for the surrounding community. In addition to the availability of mobile coverage, a well functioning and cheap telephone system in small towns throughout the country could perhaps provide the best alternative to reach out to people in rural areas. The involvement of rural cooperatives and entrepreneurs in the delivery of rural communication would not only relieve the incumbent from managing last mile projects but also create opportunities for the regulator to play a key role in licensing and regulating small-scale service providers and in carrying out research on cost, infrastructure and technology options that stimulate further access.

Coupled with nationwide mobile coverage, a well-functioning and cheap telephone system in small towns throughout the country could provide the best alternative to reach out to people in rural areas.

Human Resources

Human capital in the computing and communications field in Ethiopia is very limited compared to demand, although the number of young people graduating with basic computer skills has been growing. There is a considerable shortage of experts that design and implement systems. A survey conducted by the Ethiopian Science and Technology Commission in 2005 shows out of 311 PhD holders in academic institutions only 22 (7%) specialise in engineering and information technology. In effect, the figure did not change much in 2010.

Ethiopia faces a considerable shortage of highly skilled and experienced ICT experts with PhDs necessary to drive the sector.

The introduction of computer science and IT degrees in seven public universities as of 2003 has improved student intake in the ICT sector in Ethiopia. The number of students enrolled in private colleges has also improved. There were 9454 students pursuing information technology in vocational public schools in 2006, of which 45% were male and 55% female. Students enrolled in ICT-related subjects represent around 13% of the total enrolment in 2006[16].

The Ministry of Education's Education Management Information Systems figures show a significant drop in the number of women registered for computer science and engineering at the university levels compared to those enrolled in vocational ICT education. The number of women in ICT-related fields at university level represents about 15% of the total students enrolled in those programmes in 2006. The pipe gets thinner as students move up in the higher education ladder. There were 353 students enrolled for graduate degrees in computer science and electrical engineering in 2006, of which only 8% were women.

The quality of IT education has been improving in recent years due to the establishment of three centres of excellence (Addis Ababa University, HILCOE College and Micro Link information Technology College) that provide education in advanced software engineering and systems development. However, the number of qualified and certified programmers and network managers

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[16] Ministry of Education, Education Statistical Abstract 2006-2007.

is insignificant in creating a meaningful domestic ICT industry. The absence and low level of attention to compliance with industry certification such as Microsoft, CISCO, Oracle etc. means that there are few individuals with the skills required to tap into the global ICT business.

There is a significant mismatch between graduate curricula in telecommunications and modern telecommunication network planning, implementation and management requirements in Ethiopia.

Addis Ababa University is the leading national university and one of the major sources of ICT human resources. ICT-related departments include the Department of Computer Science, the Department of Information Science (which grew out of a library science program) and the Department of Electrical Engineering. The introduction of post graduate studies in Computers Science and Electrical Engineering and the upgrading of the Ethiopian Telecommunications Training Institute to run graduate programmes were among the initiatives that improved research and development in the ICT sector in the country. These graduate programmers have yielded research in areas such as Natural Language Processing, information search and retrieval and large scale database management and mining that can be scaled up to meet the growing development challenges of the country. The budding research work in the areas of wireless networks and networking technologies at the Graduate School of Telecommunications and Information Technology is also promising, although this has been cut short due to administrative difficulties the school faced over the last two years.

A PhD programme in ICT was launched in 2008 by bringing together a consortium of departments drawn from the Addis Ababa University and the College of Telecommunications and Information Technology. The PhD programme focuses on areas that were regarded as priority – software engineering, information systems, information retrieval and language technology and wireless communication systems, IP networking and mobile Internet. The programme is expected to generate a critical mass of researchers, educators and managers that will support growth in teaching, learning, research and development.

The telecommunication field is one area where Ethiopia faces a critical shortage of human resources. The ETC does not have a well-developed human resource plan to deal with its increasingly intelligent network.

In an effort to improve the human resources base for the deployment of the new generation networks, the government upgraded its fifty-years old Ethiopian Telecom Training Institute to a graduate College of Telecommunications and Information Technology (CTIT) in 2004. The CTIT began postgraduate training in telecommunications engineering and telecommunication management and has graduated a few engineers between 2008 and 2009. In 2010, the CTIT ceased to accept new students, citing administrative challenges. While the fate of the college is unknown, industry analysis shows a mismatch between graduate curricula and modern telecommunication network planning, implementation and management requirements in Ethiopia. Modern telecommunications engineering and management requires education beyond graduate level. It needs exposure to new ideas and situations, hands on training and certifications, iteration and improvisation that cannot be achieved through graduate education alone.

Contribution of ICT Infrastructure and Services

Contribution to Economic Growth

The low level of ICT penetration in Ethiopia corresponds to a meagre contribution to national economic development. Ethiopia's Gross Domestic Product has improved significantly between 2000 and 2009 with an annual growth rate of around 10%, while the contribution of the telecommunications sector changed only slightly. Telecommunications revenue was 1.3% of the GDP in 1996, grew to about 2.3% in 2005, and fell again to 1.3% in 2009. In contrast, the investment in the telecommunications sector as a percentage of the GDP has jumped substantially since 2003.

The contribution of the communication sector to the GDP has declined over the last decade.

Although the revenue and contribution of the telecom sector was expected to improve following the high-profile investment that began in 2005, progress so far shows that the contribution of communication sector to the GDP has been declining. Table 5 presents the contribution of the telecommunications sector to the GDP, and investment over the last eight years.

Table 5. Contribution of Telecommunication Sector to the GDP

Source: World Bank, World Bank, World Development Indicators, ETC Annual Statistical Bulletin 2008/2009

	2002	2003	2004	2005	2006	2007	2008	2009
GDP at market price (billions)	7.79	8.17	10.1	12.3	15.2	19.4	26.5	34
Telecommunication revenue in US$ billion	.104	.123	.144	.211	.280	.367	.345	.453
Telecommunication Revenue as % of GDP in market price	1.6	1.8	1.75	2.3	2.0	2.0	1.4	1.35

It is evident from Figure 1 that although ETC's revenue has been growing over the last decade, it did not advance in par with real GDP growth. In effect, telecommunications revenue as a percentage of real GDP has declined since 2005.
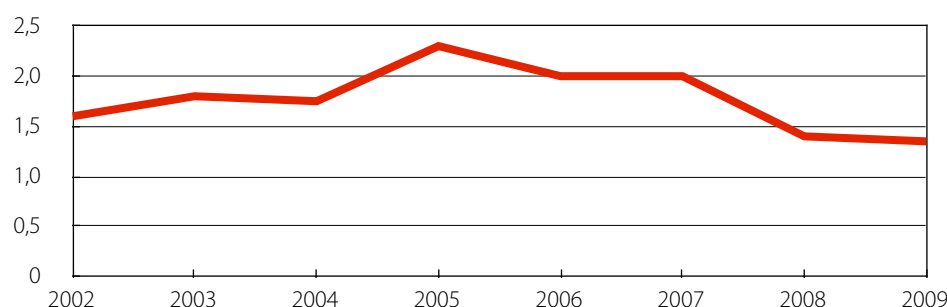
Figure 1. Telecommunications Revenue as a Percentage of GDP

Source: World Bank, World Bank, World Development Indicators, ETC Annual Statistical Bulletin 2008/2009

The decline of the revenue as a percentage of GDP can be attributed partly to the drop in the value of the Ethiopian Birr. The inability of the incumbent to improve the quality of service and develop innovative products that boost its Average Revenue Per User (ARPU) is mostly to blame for the plummeting revenue as percentage of GDP. The ETC incurs about 30% loss of revenue due to its low quality of service.

The inability of the incumbent to improve the quality of service and develop innovative products that boost its Average Revenue Per User (ARPU) is mostly to blame for the plummeting revenue as a percentage of GDP.

Contribution of the Telecommunications Sector to Employment

The ETC is one of the largest employers of the civil service with 12,384 employees in 2009. Its work force represents about 2.8% of close to 450,000 civil servants. The proportion of male to female employees remained the same, hovering around 70:30 for almost a decade, and started to decline since 2007. This implies that the ETC was unable to improve the gender gap as shown in Table 6 below.
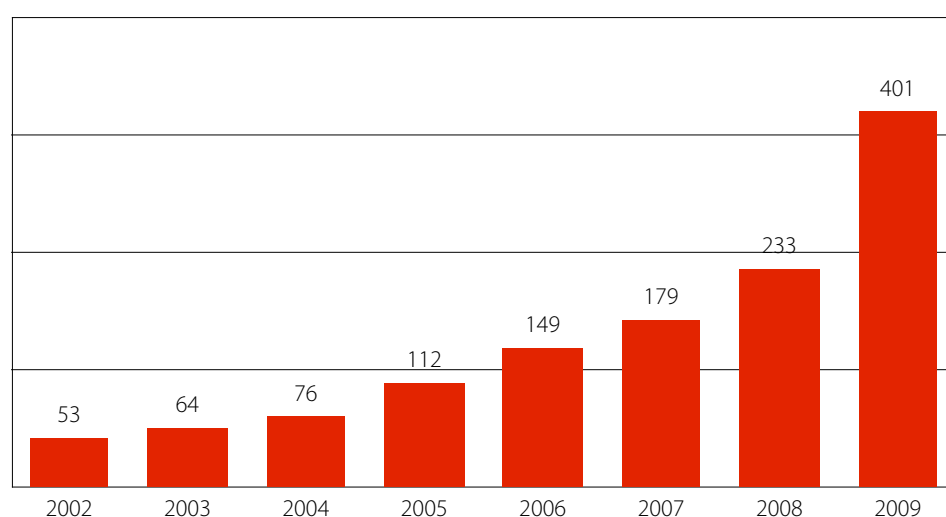
Table 6. Employment in the Telecommunications Sector

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

Year	2003	2004	2005	2006	2007	2008	2009
Male	5416	5897	6290	7764	8087	8712	8913
Female	2497	2632	2803	3470	3557	3548	3471
Total	7913	8529	9093	11234	11644	12260	12384
% of women	32	31	31	31	31	29	28
Fixed lines	404790	494,008	610,347	725,046	888088	897,287	915,058
Mobile lines	100000	155,534	410,630	866,709	1,208,498	1,954,527	4,051,703
Total phones	504,790	649,542	1,020,977	1,606,959	2,088,586	2,851,814	4,966,761
Total Phones/ employees	64	76	112	149	179	233	401

The proportion of telephone lines to the number of ETC employees has been growing over the last ten years, as is shown in Figure 2. The rapid growth in the telephone/employee ratio was mainly due to the fast growth in mobile subscription.

Figure 2. Proportion of Telephone to Employees

Source: Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2000

It is important to note that the ETC does not have disaggregated data on who is responsible for its fixed, mobile and Internet services; therefore it is difficult to gauge whether the corporation is actually efficient simply by looking at those figures. Mobile communications tend to be very efficient and often need a few thousand employees to run a network servicing tens of millions of customers. On average most mobile operators have 2000 subscribers per employee; therefore having 400 subscribers per employee is very far from being an efficient operator. The incumbent is grossly over-staffed, with 80% of the staff under-skilled to manage its increasingly intelligent Next Generation Network.
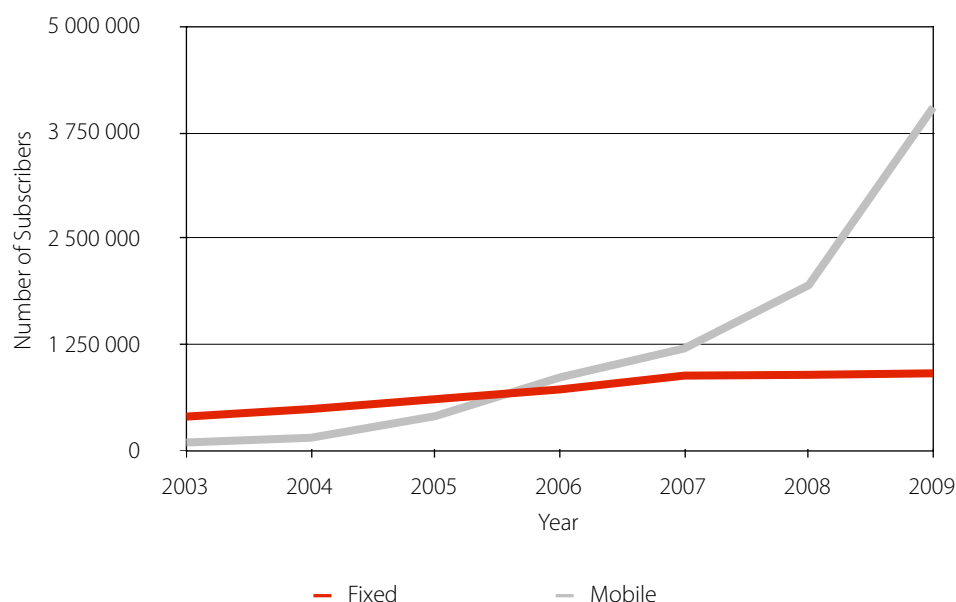
The actual contribution of the communication sector to employment is mainly through its spill over effect. The expansion of mobile phones and Internet to rural towns did not only increase the number of small business but created employment opportunities for secondary school and college graduates, particularly for women who would otherwise have had no employment opportunities. The employment that was created in running mobile accessories shops, cyber cafés and phone booths has been significant.

The Size of the Telecommunications Market

Ethiopia is one of the countries that face limited territorial coverage of mobile and fixed services and lag behind the rest of Africa in terms of the introduction of state-of-the-art services such as

mobile banking. The communications market comprises fixed, mobile and Internet services segments. The wireless infrastructure comprises Broadband Fixed Wireless Access (BFWA), Global System for Mobile (GSM), Code Division Multiple Access (CDMA) and Wideband Code Division Multiple Access (WCDMA).

Ethiopia's communications market is far behind the global average. Fixed-line teledensity stands at 1.14%. Although the number of mobile subscribers has doubled in 2009, mobile teledensity jumping from 2.5% to 5% over this period, this is too low when compared to the global mobile subscription average, which was 67% in 2009. Figure 3 shows the size of the growth in the fixed and mobile communications markets.

Figure 3. Mobile and Fixed Market

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

Internet subscription has seen substantial growth between 2007 and 2009. The number of Internet subscribers stands at 71,059, representing about 0.09% of the population. While Internet access has improved, with mobile broadband and the availability of cyber cafés throughout major towns, the unreliability of the network has been the major setback to improved usage. It is estimated that about 500,000 Ethiopians (0.6% of the population) use the Internet, which is one of the lowest rates in the world.

Figure 4. Growth in Internet Subscribers

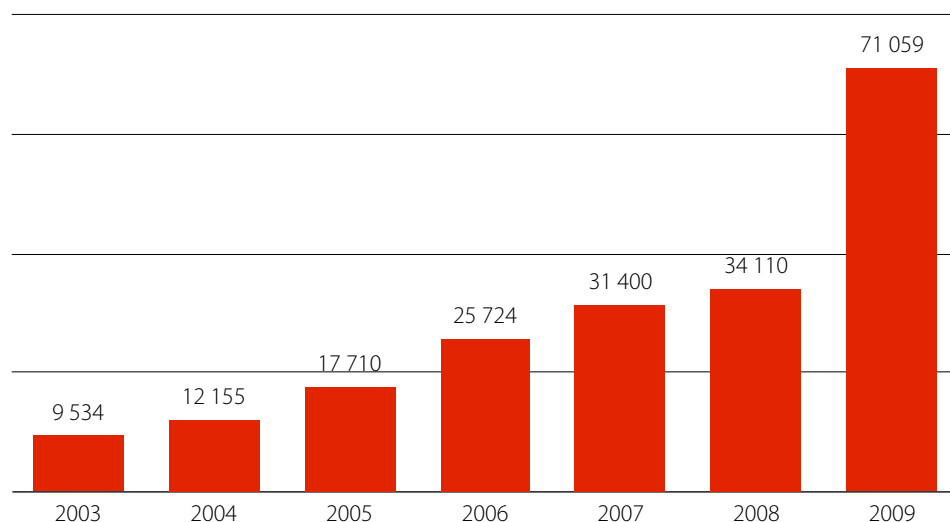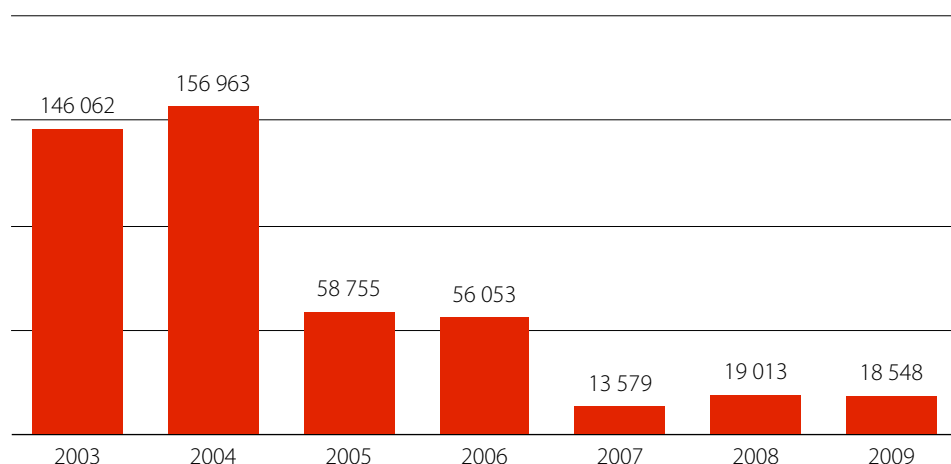*Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009*

While Internet access has improved with the availability of cyber cafés throughout major towns and mobile broadband, the unreliability of the network has been the major setback to its improved usage.

Access to communication services in Ethiopia is characterised by a high pent-up demand. The registered waiting list for fixed-line communication was 13,579 in 2007 and increased by a third to 19,013 in 2008, although this was dropped to 18,548 in 2009,[17] possibly as people substituted mobile for unavailable fixed services. The waiting list for mobile services is also extensive, with over a quarter of the population of 80 million (20 million users) waiting for their first mobile SIM cards.

Figure 5. Waiting List for Fixed Line

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

Figure 6 shows that although the ETC began attending to the waiting list as of 2005, it was unable to eliminate the number of subscribers that are still waiting for their first fixed phones. In effect, the number of those waiting for fixed phones has been growing since 2007.

Comparative analysis of the communications market in Ethiopia with neighbouring countries like Kenya and Sudan shows that Ethiopia lags far behind its neighbours and is unlikely to catch up with the rest of the world unless it develops competitive policies that stimulate sector growth.

Table 7. Communications Market Gap between Ethiopia and Neighbouring Countries

	Ethiopia	**Kenya**	**Sudan**
Mobile (2008)	3%	39%	30%
Internet Users (2009)	360,000	3,360,000	3,800,000
Broadband Penetration (2008)	.0005%	0.01%	0.02%
Driver of Universal Access	Incumbent	CCK	NTC
Regulator	Partially independent	Fully independent	Partially independent

Financial Analysis

Ethiopia's investment in the telecommunication sector has seen a substantial rise since 2002. Capital investment jumped from US$29.1 million in 2002 to US$128 million in 2003. The capital budget doubled in 2004 to US$300 million and rose to about US$500 million in 2005. In 2005, the government realized that it would not be able to meet the US$500 million investment per year. To continue such an infrastructure rollout, the ETC issued a request for proposals for a soft loan in mid-2006. Following interest from China, the government entered into a vendor financing loan agreement with China's Zhongxing Telecom Corporation (ZTE) at the end of 2006.

Critics of the vendor financing loan argue that the scheme could bind Ethiopia to a few vendors, undercutting innovation and choice. Those in favor of the vendor financing scheme argue that it brought urgently needed finance and could help the government to fast-track the rolling out of infrastructure, since the vendors will not be bound by traditional public sector procurement

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[17] Ethiopian Telecommunications Corporation, Annual Statistical Bulletin, 2008/2009

regulations. Others contend that the loan could tie the Ethiopian telecommunication services to Chinese firms, who will continue to dictate the level of the infrastructure and the quality of service. Observers also contend that the ETC will not have any choice but to continue to borrow more from the Chinese banks to maintain its massive network in the coming years. Table 8 summarises some of the arguments for and against the vendor financing loan scheme.

There is a growing skepticism about the vendor financing scheme.

Table 8. Argument for and against vendor financed loan

Source: Personal Communication 2009

Argument in favour of vendor financing loan	Arguments in opposition to vendor financing loan
Government will have access to quick and relatively cheap investment to roll out massive infrastructure.	Vendor financing will increase the cost of networking due to lock-in effect. Government should not have entered into a loan agreement to roll out infrastructure that could have been achieved through private sector investment. Private sector would have brought the much needed network rollout technical expertise, quality of service and government tax as evidenced in neighbouring countries. The government would have been an income earner rather than a borrower.
ETC will have access to technical expertise in a relatively short period of time.	The scheme will lock ETC into a single vendor over a long term, and will therefore be locked into specific vendor equipment. The language differences and absence of expertise in NGN on the ground would make it difficult for transfer of technical expertise by ZTE.
The scheme will allow the ETC to maintain control of the network and facilitates the rolling out of infrastructure in rural areas.	The ETC could have achieved same through strategic partnership with a foreign company. In effect, the ETC is currently trying to achieve that by engaging France Telecom. The rolling out of infrastructure by ZTE will make it harder to attract a strategic partner that could bring technical and management expertise.
The vendor financing scheme could improve efficiency of network capacity since vendors will not be bound by traditional bureaucracy.	The scheme should have to pass through routine ETC procedures, therefore it is unlikely for it to achieve a desired result within the planned time frame.

While the loan was hailed at the beginning as a knight in shining armour, it is becoming increasingly clear that the inherent inefficiency of a monopoly service provider will make it difficult for the government to generate the requisite revenue to pay the loan back and sustain network maintenance and operation at the same time. The Annual Revenue Per User and the Quality of Service has been declining in recent years, making it difficult for the ETC to generate enough cash to sustain the rollout of its Next Generation Network.

**Table 9. Mobile Annual Revenue Per User in Birr**

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin, 2008/2009

Year	2004	2005	2006	2007	2008	2009
Mobile Revenue in Birr	259,216,338	512,823,401	995,336,278	1,565,536,463	1,568,721,959	2,684,856,281
Number of Mobile subscribers	155,534	410,630	866,700	1,208,498	1,954,527	4,051,703
ARPU in Birr	1667	1249	1148	1295	803	663

Mobile operation is one area where the incumbent's revenue base is increasing. However, a careful analysis shows that the Annual Revenue Per User is plummeting so fast that the ETC is not benefiting from its increasing mobile subscriber base. The Annual Revenue Per User has declined by 50% between 2007 and 2009 and 17% between 2008 and 2009.

Although the ETC's mobile revenue is increasing, the Average Revenue Per User is falling dramatically.

The situation gets worse when mobile ARPU is translated into US$. Figure 6 shows the annual Revenue Per User in US$ between 2004 and 2009. The Mobile ARPU for 2009 stands at US$50 which translates to US$4 per month – almost a half of the lowest ARPU of US$7 per month in most countries in Africa.
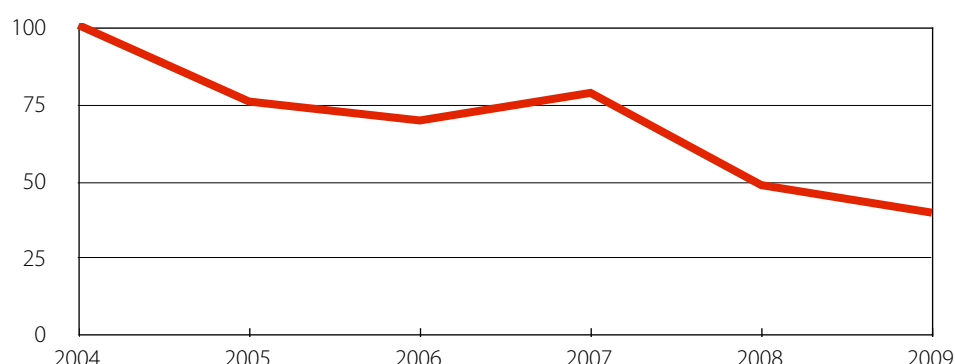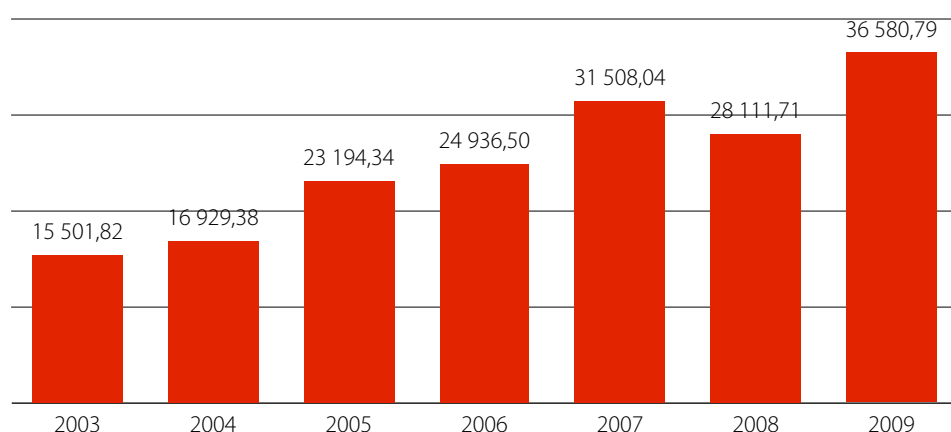

Figure 6. Mobile ARPU in US$

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin, 2008/2009

The absence of innovations around mobile offering and the low quality of service are some of the major reasons for the decline in the ARPU. Few amongst the public are aware of the voicemail or call-waiting services. Text messaging (SMS) is not widely used in Ethiopia due to the slow pace of its adoption and the disruption between 2005 and 2007. SMS was not able to pick up after its reintroduction on the eve of the Ethiopian Millennium in September 2008.

The absence of innovations around mobile offering and the low quality of service are the main causes of the falling ARPU.

ETC's revenue per employee has improved substantially, except for 2008 where the upward trend was disrupted due to more hiring during 2008. The number of ETC staff jumped by 5% in 2008 while revenue rose only by 0.2% as shown in Figure 7. The improvement in revenue per employee does not necessarily mean productivity improvement. The ETC has yet to achieve the desired productivity of about one employee per 2000 subscribers needed to be regarded as a highly productive institution.

Figure 7. ETC Revenue Per Employee in USD

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

No cost audit has been made, based on modern communications accounting models, to suggest that the incumbent is actually profitable.

The ETC generates adequate positive cash flow which it reports on an annual basis. However, no cost audit has been made, based on modern communications accounting models, to suggest that the incumbent is actually profitable. The ETC has an accounting system that it uses for reporting its revenue minus expenditure, but it lacks a systematic cost/pricing regime for its investment and revenue and disaggregated figures for its different "profit centres" (fixed, mobile and Internet services). For example, it is not clear what it costs to run its Internet services and by what factor Internet is profitable over the mobile or fixed line segment or vice versa.

Given the uncertainty of the telecommunications environment and the drop in revenue despite massive investment, it would be important for the government to carry out regular cost audits.

Communications Network Coverage

The communication infrastructure in Ethiopia comprises a combination of satellite, optical fiber, microwave, multi access, UHF and VHF radios. Satellite has been a major communication medium for a long time. Ethiopia's reliance on satellite has declined in recent years following the direct connection to Sudan and Djibouti and the construction of a significant national fibre backbone.

Fixed Line Coverage

Fixed-line coverage has seen growth from its lower base in 2003. Fixed-line telephone capacity has tripled, from 649,593 in 2003 to 1,769,024 in 2009. The percentage of digital lines to analogue has grown from 89.64% in 2003 to 99.87% in 2009.

The increase in exchange capacity in recent years was mainly due to the introduction of the CDMA-WLL service. Figure 8 shows that only about half of the circuits were in use by 2009.

The increase in fixed-line exchange capacity in recent years was mainly due to the introduction of the CDMA-WLL service.
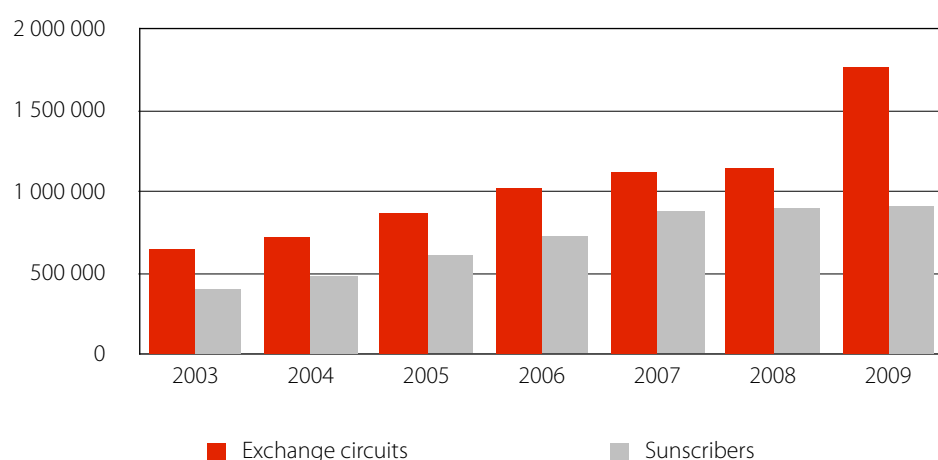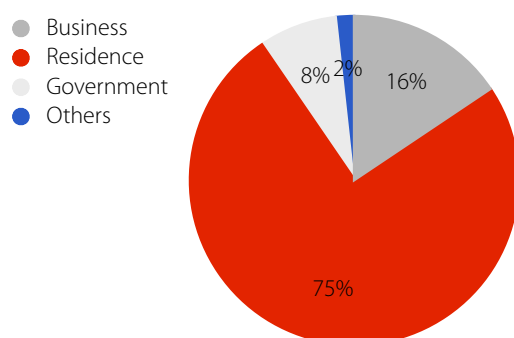

Figure 8. Exchange Capacity and Subscriptionto Fixed Line

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

Fixed-line teledensity stands at 1.2%, which is very low compared to the global average of 18% in 2009. It is far behind the planned 6% to be attained in 2010. In its 2008/2009 report the ETC offered a justification for its failure to meet its own fixed line targets by citing an ITU report that reported slow fixed-line growth around the world. While the slow growth of fixed lines is evident in many countries, the decline in mainlines was followed by a dramatic increase in mobile coverage and broadband access in other developing countries. The low mobile and broadband subscription in Ethiopia was unable to substitute for slow fixed-line development as in the case of other countries.

Household subscribers represent three quarters of the fixed-line subscribers. The public, private and international institutions that represent about a quarter of the subscribers generate the bulk of ETC's revenue. International organizations, such as NGOs and the United Nations account for about 2% of the subscribers, while the business comprises 15.6% as shown in Figure 9.

Figure 9. Subscription Pattern of the Fixed Line

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

Fixed Wireless Coverage

The introduction of a CDMA network in 2007 to reach 2.4 million subscribers has contributed to the availability of more fixed lines. There were 56,310 subscribers to the CDMA Wireless Local Loop network in 2009, representing about 6% of the total fixed telecommunications subscribers and 2.5% of the envisaged CDMA subscribers target.

In addition, the ETC introduced pre-paid CDMA 1X and Evolution Data Optimizsd (EVDO) services to facilitate high speed Internet access for mobile users. The service attracted many users due to its pre-paid business model, high speed (compared to dial up) and the convenience of mobility. However, the deteriorating quality of service has begun to put off new subscribers in 2010.[18] A typical CDMA 1X that operates at 256 Kbps has dropped to around 20 Kbps in March 2010, while an EVDO that originally operated at around 1 Mbps dropped to 100 Kbps, generating anger from those enjoying high quality broadband network service at the beginning.

Mobile Coverage

Notwithstanding recent improvements, mobile coverage is still very low in Ethiopia. The signal does not reach most rural areas except for the main roads fanning out from the capital Addis Ababa. A 2008 GSM map shows that only the major towns, such as Bahir Dar, Dire Dawa, Dessie, Harar, Mekele, Nazreth and Nekempt were covered as shown in Figure 10.[19]

Figure 10. Mobile Geographic Coverage 2008

Source: GSM World - http://www.gsmworld.com/cgi-bin/ni_map.pl?cc=et&net=et

The switching capacity of the mobile network in 2001 was 4,808,248, of which 4,051,703 lines were subscribed. This implies that 84% of the total circuit has already been used. Mobile radio coverage and quality is generally uneven across the country, with the capital Addis Ababa the most connected, and some regions, such as Southern Nations and Nationalities People (SNNP) and Benshagul-Gumuz, barely connected with only about 1% population coverage. This has been a

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[18] Personal Communication with CDMA and EVDO users

[19] http://www.gsmworld.com/cgi-bin/ni_map.pl?cc=et&net=et

significant barrier to universal access to voice and broadband communication. Table 10 shows network switching coverage as percentage of the population in different regions.
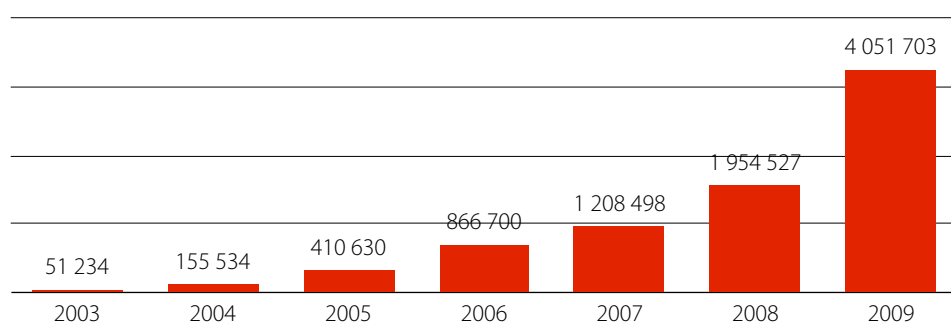
Table 10. Mobile Switching Coverage of Different Regions in 2009

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009, Ethiopian Statistical Agency

No.	Administrative Region	Radio Network Capacity*	Population	% Coverage
1	Tigray	279,821	4,664,071	6
2	Afar	18,286	1,494,199	1
3	Amhara	651,242	18,167,982	4
4	Oromiya	869,515	29,737,371	3
5	Somali	79,531	4,713,619	2
6	Benishangul Gumuz	3,812	735,430	1
7	S.N.N.P	213,794	15,995,819	1
8	Gambella	6,746	358,511	2
9	Hareri	133,712	198,980	67
10	Addis Ababa	2,368,267	2,917,295	81
11	Dire Dawa	183,522	369,641	50
Total subscribers = Pre-paid 3,996,177 Post-paid 55,526 Total 4,051,703	Total Circuit 4,808,248		79,352,918	6

However, mobile subscription has been growing steadily and making up for the lack of adequate fixed lines access in Ethiopia (see Figure 11). The proportion of post-paid subscribers has declined in recent years, with the majority of the subscribers opting for pre-paid. Pre-paid subscribers account for 98.6% of total mobile subscribers.

Mobile radio coverage and quality is generally uneven across the country, which has implications for universal access to voice communication.

Year	Subscribers
2003	51 234
2004	155 534
2005	410 630
2006	866 700
2007	1 208 498
2008	1 954 527
2009	4 051 703

Figure 11. Mobile Subscription

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

Mobile teledensity, which was 6% in 2009, is far from its planned ten million subscribers by 2010. Although current penetration remains high by local standards,[20] it is very low when compared to progress in other countries. Ethiopia has trailed its neighbours by a large margin when it comes to mobile penetration. The number of SIM cards sold in Ethiopia is 10 times lower than in neigbouring countries such as Kenya and Sudan.

SIM cards are generally in short supply in areas outside of the capital. There have always been long queues to obtain SIM cards each time the ETC announces their availability. The upgrade of network

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[20] There is a tendency to exaggerate these achievement, but the figures do not add up to the access realities elsewhere
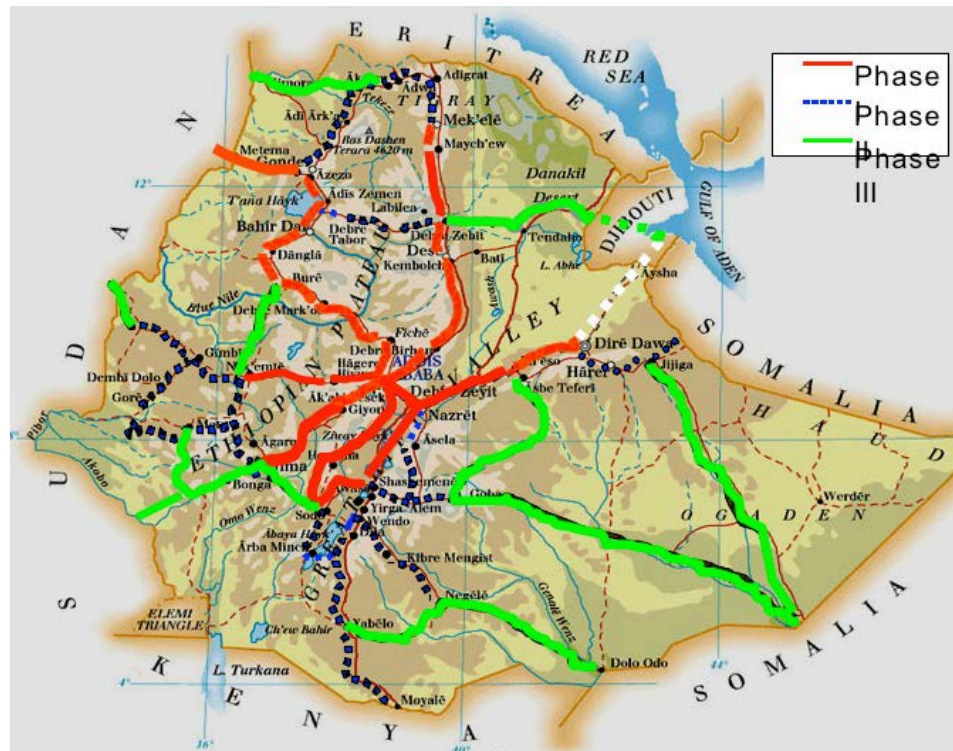
often takes a year, thus leading to a long list of customers waiting for SIM Cards. The fluctuation in the availability of SIM cards has a direct impact on mobile handset prices, which often jump by 50% when new SIM cards are available.

Access to cheap handsets is another barrier to communications once the hurdle for SIM cards is overcome. The cheapest handset costs Birr 400 (US$30), which is beyond the reach of those at the Bottom of the Pyramid. The ETC, in collaboration with ZTE, has plans to build a US$5.2 million mobile handsets plant in Ethiopia, which is expected to bring the cost of handsets down and improve innovations around local languages.

National Backbone

Although a mobile penetration of about 6% is relatively high by local standards, this is far behind the penetration rates achieved in neighboring countries.

Ethiopia has been building its fibre backbone. A national backbone fanning out from the capital Addis Ababa in seven directions has been under construction following the signing of a loan agreement with ZTE. The 10,000km fiber network connects 78 towns with a capacity of STM-1 (i.e. 155 Mb/s), 46 towns with a capacity of STM-16 (i.e. 2.5 GB/s) and 9 towns with a capacity of 10 GB/s. A total of 113 towns out of the envisaged 500 have been connected to the optical fiber transmission link by the end of 2009.

Figure 12 shows the route of the national backbone, which is expected to be completed by the end of 2010. Phase I of the network was completed in 2008 and phase II was completed by mid 2010. The ETC is implementing Phase III at the moment.

Figure 12. A National Backbone Plan
Source: Ethiopian Telecommunications Agency, 2009

A total of 113 towns out of the envisaged 500 have been connected to the optical fibre transmission link so far.

While the completion of the national backbone in three phases is expected to address the communications gaps throughout the country, the reliance on public financing and an external loan will create a major setback for further network expansion and maintenance. Fibre vandalism is beginning to emerge in remote parts of the country where limited protection is provided by local authorities. This does not only disrupt the critical national infrastructure but also poses quality of service challenges.

The ETC has also been working towards improving its international bandwidth in recent years through a fibre link to Sudan. The current bandwidth stands at 897 Mbps, which breaks down into 537 Mbps fiber links, a 342 Mbps satellite connection and an 18 Mbps microwave link via Djibouti, a very small pipe compared to the size of the economy, the demand and the population. The ETC intends to upgrade its international bandwidth to 4 Gbps following the signing of a US$47 million
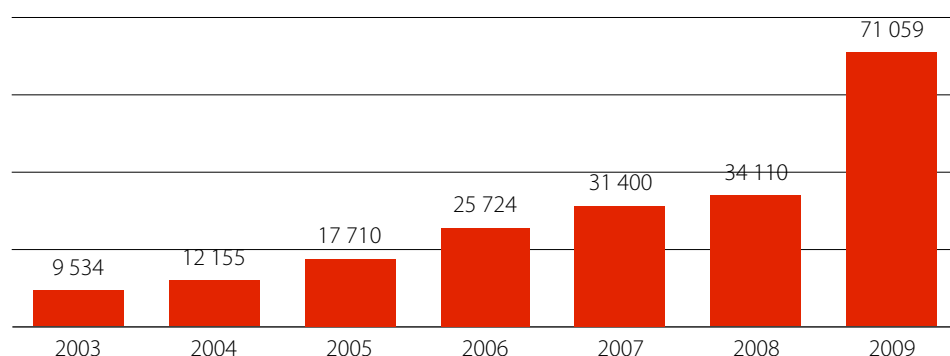
agreement with SEACOM to purchase 20 STM-1 lines (3.1 Gbps) in March 2010 to meet the growing demand for international connectivity.

Internet Coverage

Internet coverage has been improving in recent years (see Figure 13). The number of subscribers has doubled in 2009 along with the introduction of mobile access using CDMA 1X and EVDO. There were 71,059 subscribers, which translates into 0.09% of the population. It is estimated that there are about 500,000 Internet users in Ethiopia in 2009, which implies that only 0.6% of the population has some form of Internet access. Ethiopia is way behind the world average Internet usage of 25.9%.

Fibre vandalism does not only disrupt the critical national infrastructure but also poses quality-of-service challenges.

Figure 13. Internet Coverage

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

The diffusion of the Internet is partly hampered by the monopoly on its market that has elsewhere been liberalised. In August 2005, the government issued a directive that allows private companies to provide Internet service through the ETC's infrastructure, but the regulations to implement Virtual Internet Service Provision (VISP) were not promulgated. Consequently, Internet services remained a monopoly of the incumbent, often resulting in frustratingly slow connections and sometimes complete disconnection from the global network altogether.

Ethiopia is way behind the world average Internet usage of 25.9%.

Broadband Access

The number of broadband users is growing, although it did not pick up as in the case of other countries. There were 3498 broadband subscribers in 2009, a very low figure compared to the sheer size of institutions, SMEs and households that can afford access to high speed networks. The introduction of mobile broadband service in 2008 brought much relief for mobile consumers. The low quality of service and inadequate marketing means mobile broadband is still in its infancy, representing just around 0.005% – a very low figure when compared to a global average of 9.5%.

Broadcasting Coverage

The broadcasting sector has seen a dramatic improvement over the last two decades following the fall of the military regime that tightly controlled the sector. The print media has been liberalised and air-waves were freed for community and private FM radio stations. The government still controls television and long-range radio broadcasting. A number of regional governments, including Oromiya, the Tigray and Somali regions and Addis Ababa own their own radio and TV stations. There are about 2 million television sets and around 8 million radio sets in Ethiopia. This implies that about 12.5% of the households own TV sets and 50% of the households have access to radios in Ethiopia.

Table 11. Distribution of TV and Radio Stations
Source: Ethiopian Broadcasting Agency – http://www.eba.gov.et/web/data/Broadcast/main.htm

Public TV stations	Public radio stations	Private FM and radio stations	Community radio stations
Ethiopian Television (ETV)	Ethiopian radio FM Addis 97.1		Kenbata Community Radio
Oromiya TV	Oromiya Radio Oromoya 92.3 FM		
Dire TV	Dire FM 106.1		Kore Community Radio Sude Community Radio
Addis TV	Addis FM 96.3	Sheger 102.5 FM Zami Radio FM 90.7 Radio Fana radio Radio Fana FM 98.1 Dimitsi Woyane Tigray Afro FM 105.3	Jimma Community radio
Somali TV	Somali regional radio Somali		Kombolcha Community Radio Kaffa community radio Waghumera Community radio Argoba Community radio
Other regions	Mekele FM 104.4		
	South FM 100.9		
	Harari FM 101.4		
	Amhara Regional Radio Bahir Dar 96.1		

Broadcast licensing data from the Ethiopian Broadcasting Agency[21] shows that diversity of language and coverage of radio and TV stations has improved significantly over the last decade. The Amharic, Oromifa, Tigirigna, Afar, Harari, Somali, English and French languages are covered by TV stations while over 20 local languages are broadcast over private, public and community radio stations. The Ethiopian Radio and Radio Fana are the most popular and widely available, with total geographic coverage over 80% of the country. In total about 90% of the country is covered by radio signal. Less than 10% of the country is covered by TV signal.

There are two pay-TV companies – GTV and Multi-choice – that broadcast premium programmes such as the popular English Premier League soccer. There are about 7500 subscribers to pay-TV, of whom 80% are in the capital Addis Ababa. In addition there are about 150,000 households that have access to Arab Sat, a "free" satellite broadcast to major news channels such as BBC, France 24 and Aljazeera along with many national TV stations from the Middle East and Africa.

Notwithstanding the progress made in opening the airwaves for public and community broadcasters, Ethiopia has yet to build diverse, quality media. The number of private and community radio stations is insignificant compared to the size of the country and thirst for information. Radio stations are mainly concentrated in the capital and a few major towns. In addition there is a need for improved quality of broadcasting content.

The government needs substantial resources to expand universal access to broadcasting and communication networks and to upgrade/maintain existing networks. A further massive loan is neither practical nor economically sustainable. Therefore there is a need for a carefully crafted policy that combines external loans with competition and public and private partnerships in order to sustain the building of next generation and converged networks and services.

Network Access Pricing

Communication Pricing Overview

Contrary to expectations, pricing for domestic fixed and mobile services remained very low in Ethiopia. The Organisation for Economic Cooperation Development (OECD) price basket methodology, which uses data from dominant operators that have 50% market share, shows that Ethiopian mobile prices are relatively low compared to most countries in Africa. Of the 18 countries

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[21] http://www.eba.gov.et/web/data/Broadcast/main.htm

that were surveyed by Research ICT Africa, only Ghana has a lower price than that of Ethiopia, as shown in Figure 15.
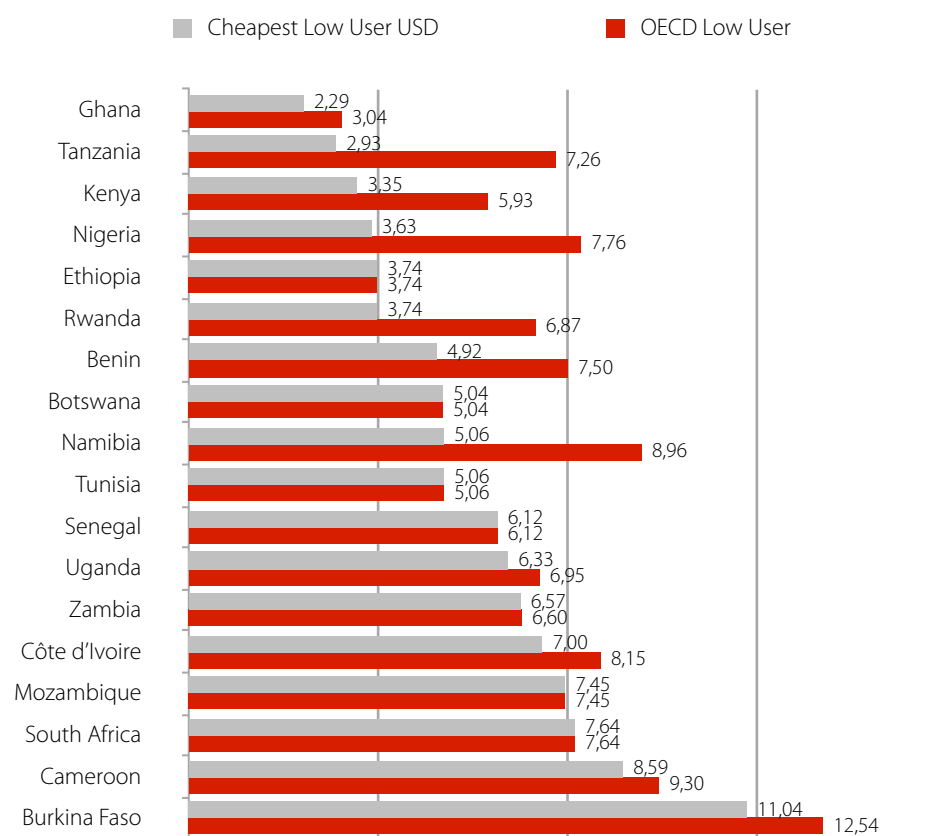
Figure 14. Mobile Tariff for Selected African Countries Using OECD Price Basket
Source: RIA (2010) African ICT Sector Performance Review 2009-2010

Similarly, ITU data for 2010 indicates that the fixed-line tariff is one of the lowest in Africa. In effect, the local call rate of US$0.02 compares with low tariff countries like Egypt and Tunisia.[22] The data further shows in 2006 the price for 20 hours of Internet was US$14.64 – slightly higher than that of Tunisia (US$11.50) and Egypt (US$4.20) but still the lowest compared to the majority of African countries.

However, Ethiopian mobile, Internet and fixed prices should be seen in the context of the average income. Ethiopia's GDP per capita in purchasing power parity is about US$900 – about seven times less than that of Egypt (US$6000) and nine times less than that of Tunisia (US$8200). The average income of a nurse and school teacher is Birr 1300 (US$100). 30 hours of Internet usage costs about 15% of the average salary of a school teacher. Combined Internet and mobile usage would cost about a quarter of of the average income of a nurse or school teacher. Therefore the prices are not that low in real terms when compared to income and the growing inflation.

Fixed-line Pricing

The local call prices for fixed line have not changed for quite a long period. The government maintained a pro-poor and pro-rural policy that kept local and domestic long distance prices to a minimum. The fixed-line tariff comprises a one-time connection fee, monthly subscription fees and per minute call charges with slight differences between residential and business customers. Table 12 shows a breakdown of charges, including connection fee, monthly fee and per-minute charges for fixed-line communications.

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[22] ITU, African Telecommunications Indicators, 2008.

Table 12.Fixed-line Call Tariffs

Source: Ethiopian Telecommunications Corporation, http://www.ethionet.et/services/fixedtariff.html

Services	Prices
Fixed Telephone Connection fee	Birr 242 ($18)
Monthly rental:	Birr 17 ($1.2)
Business	Birr 8 ($0.6)
Residential	0.2 Birr for 6 minutes (US$0.015 for six minutes)
Local Calls	
20 hours local call	$3
International Tariff Africa, Asia, Europe, America	Birr 11.5/min (US$0.9/min)
Calls to Djibouti	Birr 8/minute ($.6)

The high international tariff is a subject of dissatisfaction with telephone users as evidenced by the proliferation in "grey" market telephone use, even if this is deemed illegal.

It is evident from Table 12 that the local fixed-line tariffs are relatively cheap when compared to other African countries and probably not cost-based. A six-minute local call costs about 0.2 Birr (US $0.015). However, the story is rather different when one accesses telephones from privately-operated "kiosk phones" scattered around the country that charge between 0.40 and 0.60 Birr per minute – almost twelve to fifteen times of the regular rate. With only 5025 public payphones in operation by September 2009, privately-operated "kiosk phones" enjoy more customers than public pay phones. Despite recent efforts to register and license public phone call providers, the majority of kiosk phones are not regulated.

The domestic long-distance prices comprise two zones. Towns that belong to the same tariff zone pay less compared to calls between towns in different tariff zones. Calls within the same tariff zone cost Birr 0.4 (US$0.03) peak and Birr 0.25 (US$0.02) off-peak, while prices across tariff zones are Birr 1.20 (US$0.09) peak and Birr 1.00 (US$0.8) off-peak.

The international long-distance tariff was revised downward in 2003 and has not changed since. All international calls but those to Djibouti cost the equivalent of Birr 11.5 (US$0.9) per minute inclusive of tax, regardless of the continent. This is in contrast to previous pricing regime that divided international tariffs on the basis of continents – Africa, Asia, America and Europe. Calls to Djibouti cost Birr 8.05 (US$.6) inclusive of tax.

The high international tariff is a subject of dissatisfaction with telephone users, as evidenced by the proliferation of "grey" market telephone use, even if this is deemed illegal. The high tariff is also responsible for the decline in outgoing calls as compared to incoming calls over the last ten years. The number of outgoing minutes remained constant over the last six years indicating that the high prices did not encourage more outgoing calls. Incoming calls have seen a steady growth over the time period as shown in Figure 15.

The widening gap between outgoing and incoming minutes indicates traffic reversal due to high cost of communications.
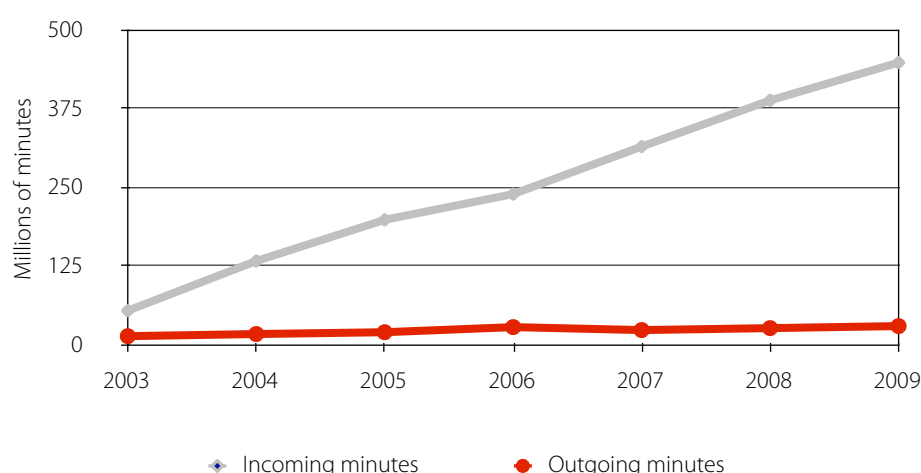
Figure 15. Incoming and Outgoing Calls

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

The ratio of incoming minutes to outgoing minutes was 3.8 in 2003 and jumped to 15 in 2009. This implies that for every outgoing minute there were 15 incoming minutes in 2009 compared to only

about 4 in 2003. While the incoming calls are important for international settlement, the widening gap between outgoing and incoming minutes indicates traffic reversal due to high cost of communications. Most Ethiopians in the Diaspora are more likely to use cheap international calls to call their relatives than to ask them to call them from Ethiopia where the prices are exorbitantly high.

Mobile Pricing

Mobile to mobile call charges stand at about 0.83 Birr (US$0.06) per minute including tax – some of the lowest in the world. The mobile tariff structure emulates that of fixed-line tariffs; therefore no uniform national tariff is used as in other countries. The ETC divides mobile services in tariff zones – those who subscribe to numbers beginning with 910, 911, 912, 913, 916, 917 and 920 belong to the same tariff zone while those using numbers beginning with 914, 915 and 918 belong to another tariff zone. A call between 910 and 912 numbers costs 0.83 Birr (US$0.06) but a call from 910 number to 914 costs twice as much – Birr 1.725 (US$0.12) inclusive of tax – even if the caller is sitting next to the recipient. The lack of uniform mobile tariffs is an absurd pricing scheme that did not take mobility and tariffs around the world into consideration.

ETC imposes a compulsory charge of about US$1.5 to maintain a mobile service.

In addition, the ETC adds a compulsory charge of US$1.87 per month to maintain the mobile service. Those who could not pay within the specified period are disconnected and expected to pay US$2 for reconnection. Table 13 shows the mobile tariff as of December 2009.

Table 13. Mobile Tariff as of December 2009

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2008/2009

	Prices
Post-Paid subscription	Birr 414 (US$31)
Pre-paid subscription	Birr 169 (US$13)
Pre-paid monthly compulsory recharge	Birr 25 (US$1.87)
Call tariff	Mobile to Mobile local peak Birr 0.83 (US$0.06) per minute Mobile to mobile within different tariff zones Birr 1.725 ($0.12) Mobile to Mobile local off-peak (between 20:00 to 24:00_ Birr 0.345 ($0.03) per minute Mobile to mobile within different tariff zones Birr 1.44 ($0.11) Mobile to Mobile local tariff off-peak (between 24:00 -6:00) Birr 0.196 (US$0.02) per minute Mobile to mobile between different time zones Birr 0.83 (US$0.06) Mobile to fixed line 0.83 Birr/minute (US$0.06 /minute] with same tariff zones 1.50 Birr/minute ($0.20/minute) between different tariff zones International Birr 11.5 ($0.9) per minute

The cost of the SIM card is another barrier to subscription to mobile services, particularly to those with low incomes. Although the cost of SIM cards has come down dramatically from US$42 in 2006 to US$13 in 2009 and US$5 in 2010, the price is still high when compared to many African countries where SIM cards can be obtained for as little as US$2, or even for free as part of a subscription.

The low level of economic development, lower mobile tariffs and absence of mobile value-added services such as the Short Messaging Service (SMS) means the incumbent was not able to derive the expected revenue from its mobile segment. An SMS costs about half of a voice call (i.e. $0.02 for local and US$0.5 for international message), a high price that had a negative impact on SMS uptake.

Internet Pricing

Internet pricing has undergone several revisions in 2002, 2006 and 2009 to encourage further usage. Prior to 2002, Internet pricing was based on five subscriber categories: individual home users, private businesses, international organisations, public institutions and local non-profit organisations. A fee structure that was based on volume of usage was introduced in 2002. At the time 30 hours (1800 minutes) of use was US$40. In 2006, the ETC revised the price downward, leading to a reduction of the set-up fee to US$20, a compulsory monthly usage charge of US$7 and volume use-based tariffs. The revision in 2006 brought the price of 30 hours Internet usage down by almost a half (US$26) from its value in 2002. Further downward revision took place in 2009, by which stage 30 minutes of Internet use cost US$14.

The downward revision of Internet tariffs since 2006 has contributed to the increase in the number of subscribers.

Table 14. Dialup Internet Pricing

Source: Ethiopian Telecommunications Corporation, Company Profile 2006

Year	Set up fee	Monthly charge	Service	Additional hours	30 hrs (Internet + telephone + tax)
2002	$38				$40
2006	$20	$7	-	-	$26
2009	$7.6	$3.1	600 min	.10/min	$14

The downward revision of Internet tariffs since 2006 has contributed to an increase in the number of subscribers. However, Internet revenue has seen a continuous decline, suggesting that the incumbent operator's Internet business is the least profitable. Internet service provision requires considerable innovation and value add, which are grossly absent from the ETC offerings. The quality of Internet service has been declining since 2007, with increased usage of cyber cafés and public access in schools, universities, businesses and government institutions. The overall decline in quality of service is one of the factors that contributed to the plummeting of Internet Annual Revenue Per User as shown in Figure 16.

The overall decline in quality of service is one of the factors that contributed to the plummeting of Internet Annual Revenue Per User.
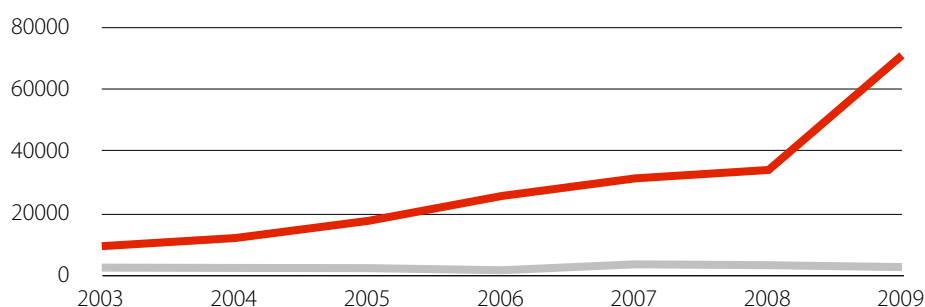
Figure 16. Annual Revenue Per User from the Internet Service

Source: Ethiopian Telecommunications Corporation: Annual Statistical Bulletin

Figure 16 indicates that although the subscriber number grew eightfold between 2003 and 2009, the revenue per user declined threefold.

On the other hand, the downward revision of tariffs and the availability of broadband access encouraged the proliferation of cyber cafés that resell dial-up access to occasional Internet users at reduced prices. Cyber cafés charge between Birr 0.40 to Birr 0.60 cents a minute. The per hour cyber café charges range between US$1.80 and US$3 an hour.

Broadband Access Pricing

The ETC introduced DSL and Broadband Fixed Wireless Access (BFWA) services in 2005, followed by CDMA 1X and EVDO in 2008. The DSL and BFWA offerings were overpriced from the very beginning. 1 Mbps DSL access was about US$3000 per month in 2006. The broadband tariff was revised downwards in May 2009 where DSL prices were cut by 30% to 75% depending on the speed. The price of the 1 Mbps DSL connection was revised downwards by 75% to US$820 in 2009, still high compared to international tariffs.

The CDMA 1X is charged on a per-minute basis, with a compulsory Birr 25 (US$1.8) charge every month and usage fee of Birr 0.10 (US$0.007) per minute up to 1300 minutes and Birr 0.07 a minute there after. EVDO, which is theoretically rated at about 700 Kbps and which in fact operates at the dialup rate, costs Birr 4049 (US$302) per month for unlimited usage inclusive of tax.

The price of a 1 Mbps DSL connection was revised downwards by 75% to US$820 in 2009, still high compared to international tariffs.

Table 15. Broadband Multimedia Service Tariffs

Source: Ethiopian Telecommunications Corporation, Corporate Profile 2006, Annual Statistical Bulletin, 2008/2009

Speed	Type of service	Inclusive of equipments installed for the customer	
		Pre-service payment	**Monthly fee**
128 Kbps	ADSL (2006)	869	361
	ADSL (2009)	193	217
	BFWA data only (2006)	1172	415
	BFWA data only (2009)	421	257
	BFWA data and voice (2006)	1803	867
	BFWA data and voice (2009)	893	341
256 Kbps	ADSL (2006)	1600	700
	ADSL (2009)	193	318
	BFWA data only (2006)	1906	754
	BFWA data only (2009)	421	358
	BFWA data and voice (2006)	2538	867
	BFWA data and voice (2009)	893	441
512 Kbps	ADSL (2006)	3069	1380
	ADSL (2009)	193	582
	BFWA data only (2006)	3376	1434
	BFWA data only (2009)	421	622
	BFWA data and voice (2006)	4007	1546
	BFWA data and voice (2009)	893	706
1 Mbps	ADSL (2006)	6010	2740
	ADSL (2009)	193	696
	BFWA data only (2006)	6314	2794
	BFWA data only (2009)	421	736
	BFWA data and voice (2006)	7291	2905
	BFWA data and voice (2009)	893	820

Ethiopia's broadband prices are the highest in the region, possibly in the world, even with the downward revision of the tariffs in May 2009. A 1 Mbps DSL connection costs around US$820[23] per month in Ethiopia, US$75 in Lesotho[24] and around US$25 in the United States.[25] ITU calculations indicate that average monthly subscription of broadband in Ethiopia is US$486.51,[26] which

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[23] Ethiopian Telecommunications Corporation, Broadband Multimedia Prices, http://www.ethionet.et/services/leasedlineinternetbbmntariff.html

[24] DSL Prices of Telecom Lesotho, http://www.telecom.co.ls/products/ASDL_Tariffs.php

[25] Bellsouth, DSL Prices, http://www.bellsouth.com/consumer/inetsrvcs/index.html

[26] Possibly based on 512 Kbbps

translates into $1,739.27 when adjusted for Purchasing Power Parity ,[27] and is one of the highest tariffs in the world save for prices in the Central African Republic.

The high broadband price has a determinant effect on the number of subscribers. The low quality of service is another factor that increased the cost of broadband services and consumer frustrations. Among the factors that have contributed to the declining quality of communication services were the:

- Inability of the incumbent to meet the pent up demand. The growing demand for communications meant that the incumbent operator was forced to add subscribers to existing network without increasing the pipe.

- Lack of adequate human resources – The ETC lacks adequate highly skilled workforce to address customer problems and shape traffic based on usage.

- Limited understanding of consumer preference and challenges.

- Inadequate consumer education and sensitisation.

The completion of the ETC core network and connection to SEACOM is expected to ease the frustration of broadband customers. In the long term the regulator needs to enforce quality-of-service standards and Service Level Agreements that will make the incumbent accountable for the fluctuation of its broadband services.

Broadcasting Pricing

There is no uniform pricing for broadcasting advertisement. The Ethiopian Radio and Television has a significant coverage and market share in broadcasting, followed by Radio Fana, which was able to market its services aggressively. The Ethiopian Television is supported by the government and advertising while Radio Fana operates on a commercial basis. There is a TV licence fee of Birr 50 (US $4) annually but it has been difficult for the national broadcaster to collect the fees.

Advertising rates vary considerably between 10,000 Birr (US$750) to 1,000 Birr (US$75) depending on the spot and time. There are reductions for non-Amharic languages such as Oromifa, Tigrigna, Afar and Somali. Non-commercial advertising is very cheap; often as low as US$3 a minute.

Interconnection Fee

The ETC operates a seamless communications network, therefore there is no requirement for interconnection fees between its mobile and fixed line services. There is no termination fee for fixed-mobile and mobile-mobile. Call rates between mobile and fixed are charged at the mobile-to-mobile prices as shown in Table 16.

Table 16. Fixed and Mobile Connection Tariffs

Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin, 2008/2009

Connection type	Local		International	
	Peak	**Off-peak**	**Peak**	**Off-peak**
Mobile to fixed	0.83 (US$0.06)	0.37 (US$0.03)	13.3 (US$0.9)	13.3 (US$.9)
Fixed to fixed	0.23 (US$0.017)	0.23 (US$0.017)	11.5 (US$0.8)	11.5 (US$0.8)
Mobile to mobile	0.83 (US$0.06)	0.37 (US$0.03)	13.3 (US$.9)	13.3 (US$.9)

The absence of termination fees means that the cost of communication was not increased due to interconnection charges. While local prices remain relatively low by global standards the international rates are the highest. The introduction of termination fees will likely lead to increased international call tariffs if the prices are not revised down.

The pricing of mobile, fixed and broadband services shows that while local and domestic call tariffs are relatively low, international call tariffs and broadband prices are exorbitantly high and had a negative effect on revenue, subscriber numbers and network usage. The falling quality of service creates additional cost to consumers while curtailing overall national competitiveness. Regulatory innovations are required to address the cost and quality of service challenges in the communications sector.

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[27] International Telecommunications Union, Measuring the Information Society 2010

Telecommunications Regulatory Environment Perception in Ethiopia

The vertically integrated monopoly market structure in Ethiopia implies that regulatory interventions are very limited. The regulator's job is mainly to look after the behaviour of the monopoly operator and small players at the lower end of the market such as equipment suppliers and resellers of Internet and mobile services.

Regulations in the area of interconnection and pricing are almost non-existent. The incumbent operates a seamless network that makes interconnection and termination charges unnecessary. The regulator does not set prices. It has limited power to impose a rebalanced tariff. Unbundling of the network elements were also unnecessary since there is no new entrant and competition. Mobile Virtual Network Operators that resell services and Voice Over the Internet Protocol (VOIP) are not allowed.

Table 17. Telecommunications Regulatory Environment Dimensions and Situation in Ethiopia

Based on: Samarajiva et. al. (2005).

Dimension	Scope	Regulatory environment under monopoly setting
Market Entry	Transparency of licensing. Applicants should know the terms, conditions, criteria and length of time needed to reach a decision on their application.	Monopoly market, communication license can only be issued to the incumbent operator. Others such as VSAT license can only be issued to international organisations with the consent of the minister on a case by case basis.
Access to Scarce Resources	Timely, transparent and non-discriminatory access to spectrum allocation, numbering and rights of way.	Radio frequency spectrum has not been allocated except for a few FM radio stations that were licensed to operate.
Interconnection	Interconnection with a major operator at a technically feasible point in the network. Interconnection should be offered promptly on a qualitative basis.	Absence of competition in both fixed and mobile markets means interconnection is not a major pre-occupation
Tariff Regulation	Tariff regulation of charges to consumers	Tariff is set by the incumbent and not regulated
Anti-competitive Practices Regulation	Anti-competitive cross-subsidisation, excessive prices, price discrimination and predatory pricing, refusal to deal and cross-subsidies.	Not applicable under a monopoly setting where there is no competition in the first place
Universal Access	Access to underserved areas, expanding access to ICTs, including the Internet, to rural areas	Universal access strategy is absent except for a rural infrastructure rollout plan by the incumbent operator

The falling quality of service creates additional costs to consumers while curtailing overall national competitiveness.

The Ethiopian Telecommunications Agency is responsible for the communication sector spectrum, while the Ethiopian Broadcasting Agency is responsible for allocation of the broadcast spectrum. The ETA did not come up with an elaborate spectrum plan due to monopoly over the existing spectrum by ETC. Ethiopia has neither spectrum policy nor guidelines for the usage of spectrum commons. The EBA undertook a study of the spectrum for the broadcasting sector in 2007 which is used as a basis for assigning frequencies to private and community radio broadcasters.

The absence of expertise and regulation in the area of communication sector standards is self-evident. There has been limited discussion about standards or adoption of a technology-neutral licensing framework. Type approval is limited to mobile handsets and some equipment imported by international institutions and individuals, often after these are seized by customs. The absence of a universal access policy and strategy also means that the regulator was unable to regulate universality, impose obligations on the operator or establish a universal access fund. In sum, the regulatory framework remained very weak with little ability to carrying out any considerable economic and technical regulation.

The regulatory framework remained very weak, with little potential to carry out any considerable economic and technical regulation.

Surveys of the Telecommunications Regulatory Environment (TRE) in 2006 and 2009 confirm the above scenario. The Telecommunications Regulatory Environment (TRE) measures the perception of key stakeholders of the actual regulatory situation – particularly of market entry by the private sector based on a methodology designed by Samarajiva et al (2005).[28] The methodology asserts that having the regulator or regulatory document alone is not sufficient – it has to result in good performance. It argues that the perception of key stakeholders such as private sector and academics could provide a useful insight into the actual situation of the market and could enable the market to gauge regulatory performance.

The TRE methodology has six dimensions: (i) market entry, (ii) access to scarce resources, (iii) interconnection, (iv) tariff regulation (v) anti-competitive practices regulation and (vi) universal access. Table 17 provides a summary of the dimensions and regulatory situation in Ethiopia.

A TRE survey in 2006 covered fifteen prominent respondents from private sector, academia and civil society. The 2006 result showed that market entry and the quality of service of the telecommunications sector are poor. The majority of respondents felt that access to scarce resources such as radio frequency spectrum and tariff regulations are not satisfactory. The anti-competitive practice is poor since there is no competition in the telecommunications sector in the first place. Survey participants allowed that progress in rolling out telecommunications in rural areas has improved access to underserved areas, and therefore that progress towards universal access was satisfactory as shown in Figure 17.
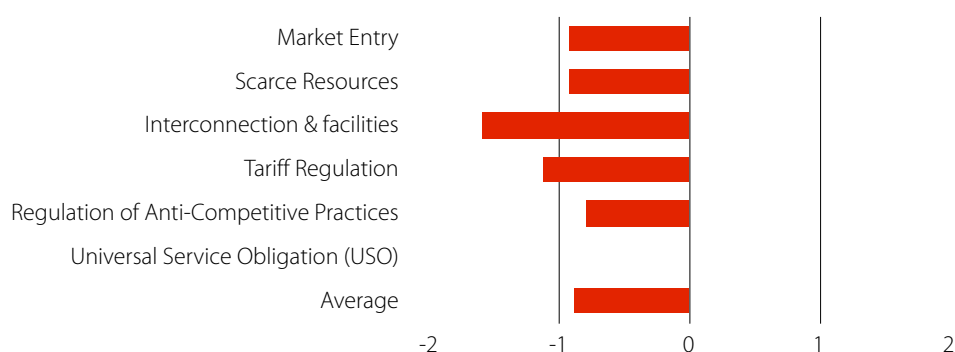

Figure 17. TRE Result in 2006

The 2006 TRE showed that the market entry and the quality of service of the telecommunications sector are poor.

A comparative analysis of the Telecommunications Regulatory Environment in 2006 with other African countries showed that Ethiopia scored the worst compared to 14 other nations except for Namibia and Rwanda as shown in Figure 19.

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[28] Samarajiva, Rohan and Dokeniya, Anupama (2005). "Regulation and Investment: Sri Lanka Case Study," in: Mahan, A. and Melody, W.H. (Eds) (2005). Stimulating Investment in Network Development: Role of Regulators. Pp. 141-176. World Dialogue on Regulation for Network Economies (WDR). http://www.regulateonline.org/content/view/435/31/
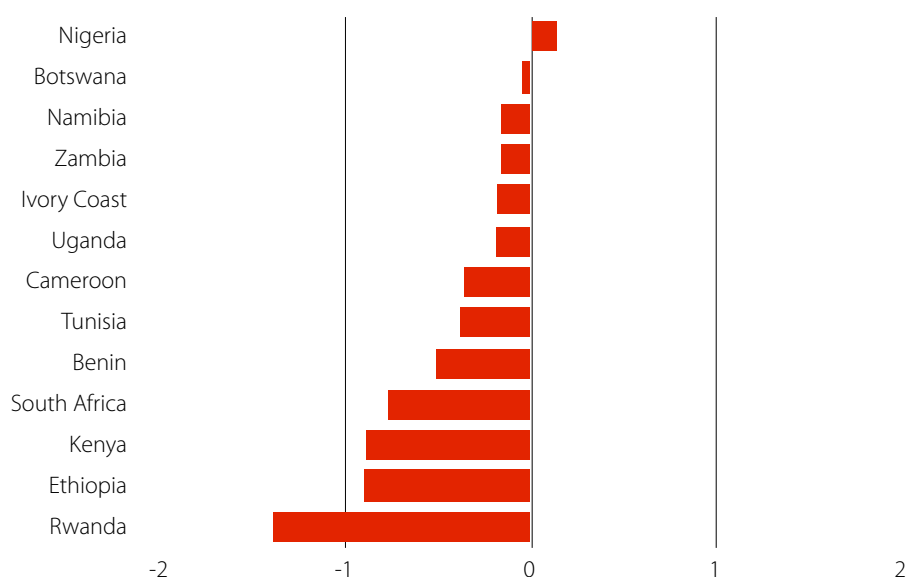
Figure 18. TRE comparison with African countries in 2006

Source: Research ICT Africa (2010) African Telecommunications Sector Performance Review 2009-2010.

The 2009 TRE survey covered 47 prominent individuals from the private sector (equipment suppliers, operators, IT companies), academic and research institutions, the financial and banking sector, the media and the public sector. Results indicate that despite massive investment in the communication sector and an improvement in the number of subscribers, the perception of the regulatory environment has fallen sharply from 2006. It is likely that the hopes and enthusiasm for massive network rollout in 2006 have now dissipated with the falling quality of service. A comparative analysis between perceptions in 2006 and 2009 shows a sharp decline in the overall perception of the Telecommunications Regulatory Environment (see Figure 19).


The sharp decline in perception of the TRE in 2009 shows frustration with the quality of service and limited enthusiasm with the changes in the telecom sector.

Figure 19. Comparison of Telecommunication Regulatory Environment Perception in 2006 and 2009

Source: TRE Surveys, 2006 and 2009

Those surveyed indicated that the ICT market has become more anti-competitive and that market entry is becoming more difficult. There was also a general feeling that the quality of service has gotten worse. The only positive movement of perception is in the area of tariffs. This was partly due to revision of mobile SIM card and broadband tariffs between 2006 and 2009.

A comparative analysis of TRE in African countries shows that the regulatory environment in Ethiopia was the worst in the region in 2009 (see Figure 20). The TRE in Rwanda and Namibia has improved significantly while becoming worse in the Ethiopian case.
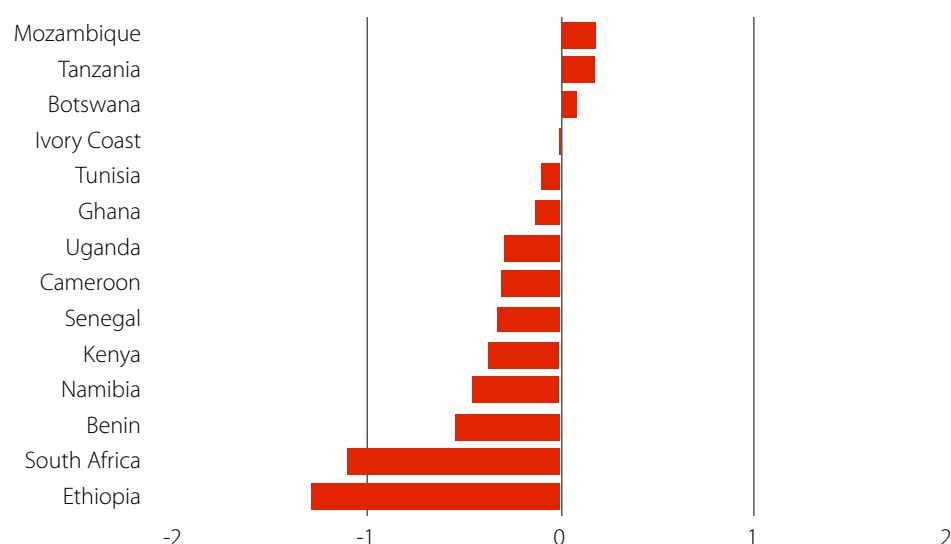
Figure 20. Telecommunications Regulatory Environment of African Countries in 2009
Source: Research ICT Africa (2010) African Telecommunications Sector Performance Review.

The decline in the perception of the regulatory environment does not only indicate an understanding of the role of competition for development of the communications in Ethiopia by industry experts, academia and media but also shows a significant frustration about the low quality of service. Notwithstanding government investment in the ICT sector, the general perception is that efforts centred around the public sector were unable to bring the desired service quality, widespread access and affordability, in particular in the area of broadband services that underpin the development of a competitive ICT sector.

The TRE conclusion shows that desired service quality, widespread access and affordability, in particular in the area of broadband services, have not been achieved.

ICT Applications, Projects and Services

The ICT applications and services component has been growing over the last decade, spearheaded by high profile government projects that aim to connect schools, districts, health establishments, academic institutions and government offices. Table 18 lists some of the major government sponsored projects.

Table 18. Major Public Sector ICT Projects

Project name	Achievements
Woredanet	Linking up 631 districts to a national data centre located in Addis Ababa. Woreda's (districts) have access to Internet, telecommunication, video conference and databases at national level.
Schoolnet	Connection of 684 secondary schools including Technical and Vocational schools to the Internet and launching technology-mediated distance education.
Ethernet	Connecting 13 public universities to a high-speed data network and the Internet.
Agri-net	Connecting 49 agricultural research institutions.
Healthnet	Linking up regional hospitals and introduction of telemedicine applications.
E-applications	Various bodies of the government such as the Ministry of Internal Revenue, National Statistical Agency, the Ministry of Trade and Industry and Ministry of Justice have implemented applications on tax registration, national accounts, business registration and legal management information systems.

The introduction ICTs to schools, districts and research centres has created a significant awareness of the role of ICTs in communication, information exchange and promoting effectiveness.

The introduction of information and communication technologies to schools, districts and research centres has created a significant awareness of the role of ICTs in communication, information exchange and promoting effectiveness. The Ethiopian ICT Development Agency has launched

various projects including setting up community centres, establishing ICT parks and centres of excellence in ICT research and development, deploying a national e-government portal and establishing frameworks and standards for improving public sector connectivity.

On the other hand, the applications, research and development activities by the private sector have been insignificant, which is not surprising in an environment so non-conducive to innovation. Private sector initiatives were limited to systems development, networking, project implementation and hardware and software services. Other areas of enterprise activities include custom software development such as payroll systems, human resources management, hospital management, point of sale, online reservation, hotel booking and school management systems.

The potential of the Internet and mobile technology was not tapped in Ethiopia due to the lack of a conducive environment for innovation. There are a few companies involved in web development, content management systems, and e-commerce solutions. Innovations around SMS technology were stalled following the disruption of the SMS service between 2005 and 2007. Mobile account access has been implemented by two private banks, but mobile banking did not take off due to limited awareness, lack of trust and an absence of the necessary legislation. Efforts to participate in Business Process Outsourcing by a few startup companies faced structural challenges including fluctuation of electricity, inadequacy of broadband network, lack of venture capital and more importantly availability of managerial and technical skills of a global standard.

In summary, there is a significant discord between government efforts to improve access to health, education, trade and other public information and the environment necessary to enable it. The role of the private sector in developing applications that support farmers, health establishments, banks, schools and enterprises has been limited.

The potential of the Internet and mobile technology was not tapped in Ethiopia due to the lack of a conducive environment for innovation.

The lack of highly skilled and experienced human resource capacity to deal with complex ICT networks, market, regulation and policy issues is the core challenge in Ethiopia.

Recommendations for Policy Actions

It is important to devise and implement instruments that will redress the frustration of network users and enhance quality that help generate revenue lost to bad services.

The Ethiopian communications market has seen significant improvements, but this has been off a very low base. It still faces considerable challenges. The market is characterised by low-level service penetration compared to global averages, poor quality of service, excessive broadband and international call pricing that have a limiting effect on the revenue of the incumbent and competitiveness of enterprises, individuals and institutions. The inadequate skill in planning, designing, implementation and maintenance of communication networks and services, along with the absence of policy and regulatory capacity, is the underlying reason for Ethiopia's falling behind the rest of the world. Public policies need to address these shortcomings to speed up the quest to become a knowledge and middle-income economy.

Skilled Network and Policy Planners, Implementers and Troubleshooters

One of the core challenges facing the Ethiopian ICT sector is the lack of highly skilled and experienced human resources to deal with complex ICT networks, market, regulation and policy issues and to implement large socio-technical projects like Schoolnet, Woredanet and Ethernet. The recent introduction of PhD and Masters programmes in telecommunications and computer engineering is a good first step. Such an effort should be matched with building technical and hands-on expertise in designing, planning, implementation and troubleshooting networks and developing policies and regulation. Technical and policy capacity can only be developed through years of education, research and work experience, and it is hasty to assume that graduate education will create the necessary "equip" that will design the future of Ethiopia's communications market. In the short term there is a need to:

The ETA's governance framework needs to change gradually, from being fully dependent on the government to an independent institution with capacity and legitimacy to regulate.

- run a series of comprehensive courses on communications and broadcasting sector planning, policy and regulation for senior policy makers based on cases and experiences around the world;
- develop special and intensive hands-on certification-driven training on Internetworking technologies and Next Generation Networks for the core ETC staff; and
- build communications research capacity to facilitate research-driven decision making at all levels.

Improving Network Quality of Service

The rapidly falling quality of services in the broadband and mobile markets has been detrimental to the revenue of the incumbent and the competitiveness of enterprise, institutions and individuals at all levels. While the completion of ETC's core and access network and international connectivity are expected to improve the quality of service, it is important to devise other instruments that will redress the frustration of network users and enhance quality that help generate revenue lost to bad services. In the short term it is important to:

- build the capacity of the regulator in defining quality benchmarks, auditing QoS reports that are submitted by the incumbent;
- empower the regulator to apply the appropriate sanctions when the incumbent fails to meet those standards;
- implement Service Level Agreements and Customer Service Charters that will bind the incumbent to quality standards and make it accountable if the standards are not met; and
- put consumer protection frameworks in place, including complaint registration and resolution procedures

Regulatory Capacity Building

The capacity and legitimacy of the regulator is another important factor that will have a positive effect on sector growth. The weakness of the regulator was frequently cited as a major bottleneck to the liberalisation of the telecommunication sector in Ethiopia. However, it is difficult to build the capacity of a regulator when it is fully dependent on a government budget and falls under civil service remuneration. On the other hand, the introduction of competition will not be effective without regulatory capacity and a political will. Positive regulatory results can only occur when government begins to gradually introduce competition in the telecommunications sector.

Empowering the Ethiopian Telecommunications Agency is essential to ensuring a fair deal for consumers and for it to act as impartial referee among all the stakeholders. The empowerment process should involve:

- providing the ETA with a distinct legal mandate to issue regulations in the consumer interest;
- establishing an independent board of directors that steers development in the communications sector and guides the regulator;
- exempting the regulating agency from civil service salary rules that make it difficult to attract and retain well-qualified staff; and
- providing the ETA with a reliable source of financing its operations.

The ETA also needs to enhance its legitimacy and independence by improving its competence in telecommunications policy and regulation and regulating in the public interest while promoting innovation and profitability of operators. The creation of an ETA board/council drawn from government, civil society and the private sector would increase its legitimacy and independence. In order to be seen as legitimate in the eyes of the consumers and investors, the ETA's governance framework needs to change from being fully dependent on the government to an institution with independent commissioners or a board. It should be free from political pressure in its decisions to promote competition in the communication sector. It should have the legal and functional independence from network operators and service providers to assume the responsibility of facilitating market entry by new players, guarding against anticompetitive practices of the incumbent, and ensuring that the benefits of competition are passed on to consumers.

Nothing prevents Ethiopia from making similar progress to that of its neighbors over the next decade, so long as careful policy choices are made in the communication sector.

The regulator needs to hire and retain highly qualified personnel. The gradual introduction of reform should go hand in hand with building human capacity in technical regulations that govern standards for equipment, radio spectrum usage and radio communication facilities, interconnection standards and other technical matters and social concerns including consumer protection, promoting universal service and affordable access.

The government needs to consider merging various entities dealing with communications, such as EBA, EICTDA and ETA to benefit from economies of scale and promoting converged policy and regulation along with global trends.

Increasing Revenue Per User

The falling Annual Revenue Per User in mobile and Internet markets means the incumbent's revenues will continue to plummet unless innovative products are put in place and quality of services improved. In order to improve the ARPU, the incumbent needs to:

- carry out in-depth market research on usage of its network in order to establish user preference choices;
- introduce innovative products;
- enhance quality of service; and
- stimulate usage in reducing broadband and international fixed-line prices.

Gradual introduction of competition

Ethiopia's competitiveness cannot be improved through the current vertically integrated market structure in the communication sector. Monopoly is neither desirable from the competitiveness individuals, firms and nations as a whole nor from the revenue that the government generates from the ICT sector.

The experiences of neighbouring African countries shows that governments fare better when they introduce an environment for competition and innovation on a gradual basis. In Kenya for example, the combined government tax revenue from the operators is close to $1 billion. Sudatel is one of the most competitive operators in the African market. Nothing prevents Ethiopia from making similar progress over the next decade, if careful policy choices are made in the communication sector. In the short term the government needs to:

- carry out an assessment of local and international market and trends and design alternative policy regulatory choices;

- introduce competition in less profitable segment of ETC's operations such as the Internet, web content and domain registration market;
- license a second mobile operator to bring the subscriber number in par with other African countries (from the current 4 million to 40 million users); and
- improve the efficiency of the incumbent.
- The above cannot be achieved without the appreciation by policy makers of the impact of an improved and competitive communications sector to the economy and the effectiveness of institutions, enterprises and individuals. It needs to make a commitment to move away from a vertically integrated ineffective market to an environment that brings quality, choice and innovations in this critical sector.

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