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2007 Ethiopia
Telecommunications Sector Performance Review
a supply side analysis of policy outcomes

Lishan Adam

Research ICT Africa! (RIA!) fills a strategic gap in the development of a sustainable information society and network knowledge economy by building the ICT policy and regulatory research capacity needed to inform effective ICT governance in Africa. The network was launched with seed funding from the IDRC and seeks to extend its activities through national, regional and continental partnerships.

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List of Abbreviations

ADB	African Development Bank
ADSL	Asymmetric Digital Subscriber Line
BFWA	Broadband Fixed Wireless Access
COMESA	Common Market for Eastern and Southern Africa
CTIT	College of Telecommunication and Information Technology
DSL	Digital Subscriber Line
GATS	General Agreement of Trade in Services
GDP	Gross Domestic Products
GSTIT	Graduate School of Telecommunication and Information Technology
EBA	Ethiopian Broadcasting Agency
EICTDA	Ethiopian ICT Development Authority
ETA	Ethiopian Telecommunications Agency
ETC	Ethiopian Telecommunications Corporation
ICT	Information and Communication Technology
FWA	Fixed Wireless Access
IGAD	Inter-governmental Authority on Development
MPLS	Multi Protocol Label Switch
PPP	Purchasing Power Parity
PSTN	Public Switched Telephone Network
ISP	Internet Service Providers
RIA	Research ICT Africa! Network
RFP	Request For Proposal
SPR	Sector Performance Review
TRE	Telecommunications Regulatory Environment
UNDP	United Nations Development Programme
VISP	Virtual Internet Service Providers
VOIP	Voice Over IP
VSAT	Very Small Aperture Terminal
WTO	World Trade Organisation

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Ethiopia

Introduction

The Ethiopian Telecommunications Sector Performance Review (SPR) 2006 builds on the SPR of 2004. It aims to measure the success of the communications sector policy and the realisation of targets set by the government against what was achieved by the incumbent operator. The report explores the progress that was made in rolling out advanced ICT services such as a broadband multimedia network and promoting rural infrastructure. The purpose of the review is to provide a balanced overview of the performance of the ICT sector in Ethiopia based on the available data in 2006, to empower all the stakeholders (regulators, government, private sector, civil society groups, business and academia) to improve the ICT sector governance in the country.

The Sector Performance Review is informed by the Ethiopian government's ICT sector programme but it focuses on the telecommunications sector. The objectives of the government's ICT programme are:

- To create an enabling policy, regulatory and legal environment for the growth and utilisation of ICTs;
- To develop the necessary ICT human resources, infrastructure, rural access, ICT standards, and local content;
- To strengthen various national ICT policy, regulatory and advocacy institutions to facilitate the mainstreaming of ICTs for socioeconomic development;
- To facilitate the use of appropriate technologies for development of applications and content for rural development, good governance, and service delivery in priority sectors.

Ethiopia does not have a specific high-level programme or policy for the telecommunications sector. Its telecommunication sector policy is rooted in Council of Ministers' regulation No. 10/1996 that empowers the incumbent operator to retain a monopoly status. The Ethiopian Telecommunications Corporation receives a monopoly licence from the regulator, the Ethiopian Telecommunications Agency (ETA) in an exchange for efficiency and quality of service requirements and infrastructure expansion targets. The targets are set by the ETC itself and

approved by its influential Board of Directors and the regulator. In the absence of other public policies or programmes on telecommunications, the ETC's own strategic plan serves as the only tool against which the performance of the telecommunications sector could be measured.

The ETC's Strategic plan 2004-2006 set the following modest but realistic targets:
- Increase fixed-line telephone penetration to 1.7% by 2006;
- Increase telecommunications point of presence to 5 000 locations and make telephone services available to 10% of the population within walking distance of 5 km;
- Expand mobile penetration by 3% in 2006;
- Migrate to an IP-based broadband network;
- Establish a core fibre along six major routes;
- Establish a second international gateway.

The incumbent has made substantial progress in almost all of these areas. The fixed line penetration has reached 1% in 2006, and mobile penetration 1.15%. Progress was also made in the rural access front, particularly in connecting rural towns that did not have access, and ETC's own stations were expanded to around 904 places, mostly in rural towns. About 5 000 villages were linked to modern communications. The incumbent has also rolled out about 4 000 km of fibre backbone in five directions from the capital. The fibre network is expected to expand the vital connectivity to rural areas while also improving the quality of domestic and international links. The ETC has also migrated to an IP-based network and established a second international gateway.

Building on its apparent success, the incumbent issued another strategic plan for 2005-2010 with focus on improving customer services to a very high standard and upgrading infrastructure to Next Generation Network. The 2005-2010 plan pledges the following targets:
- Raising teledensity to 3%;
- Providing universal access to communications to 40% of the population within a distance of 5 km;
- Improving mobile penetration to 6%;
- Increasing the number of Internet subscribers to 150 000 by 2010;
- Providing access to 15 000 rural villages; and
- Completion of 8 000 km fibre link throughout the country.

However, observation shows that ETC's focus on infrastructure rollout had a negative impact on the quality of service. The ETC became yet another government outlet where customers queue to pay their communications bills at its payment centres. A failure of a billing system in 2006 did not only cost the incumbent hundreds of thousands dollars, but also raised concerns about the validity of original government assumption that a change in the top management could actually make a monopoly

service provider more efficient. The ETC changed most of its management in 2006 following the fiasco with the billing system. The new management promised a significant improvement in services and launched a Request for Proposal for upgrading the infrastructure to meet the targets cited above through vendor financing.

POLICY AND REGULATORY ENVIRONMENT

The telecommunications policy reform process began in 1996 with the issuing of proclamation 49/1996 that established the regulator, the Ethiopian Telecommunications Agency. The Council of Ministers' Regulation No. 10/1996 that established the Ethiopian Telecommunications Corporation as a public enterprise with monopoly over telecommunication services followed this. The public monopoly policy environment has changed only slightly since then. The regulator remained too weak to enforce quality of service targets, set tariffs and carry out major regulatory functions.

At the same time, Ethiopia went through a series of ICT policy formulation initiatives prompted mainly by regional and international organisations. A series of meetings that took place between 1998 and 1999 led to discussions of various policy issues and a draft policy document circulated by the Ethiopian Science and Technology Commission. A parallel process by the ICT unit at the Prime Minister's office had also successfully developed strategies for increasing ICT use in the public sector. The two initiatives were merged in 2001 following the government reshuffle and the calls for the reduction of the duplication of effort. The government established the Ethiopian Information and Communications Development Authority (EICTDA) in 2003. EICTDA has developed the latest version of the ICT policy which is now publicly available at its web site www.eictda.gov.et

PUBLIC ACCESS

Following the establishment of the EICTDA, the Ethiopian Government launched several high-profile ICT projects in 2004 including a Schoolnet programme to connect around 560 secondary schools, the Woredanet network that linked 611 districts to regional and central government and an Agrinet project that connected agricultural research institutions. The government has also introduced ICT vocational training and advanced education at college and university levels. Advanced degree programmes in computer science, electronics, telecommunications and information theory, software engineering and programming, technical management and management information systems were introduced. These projects have contributed to the improvement of the ICT sector and created awareness about the potential of ICTs for development.

While still minimal by global standards, public sector access to communication services has improved significantly due to these projects and

various donor funded ICT programmes at institutional and national levels. Telephone penetration at public institutions stands at about 8% in 2006 while access to computers has reached 10%. The majority of districts and schools now have access to the Internet, boosting the number of civil servants that could potentially own an e-mail account. An estimated 10% of the 424 067 civil servants could potentially have access to email accounts by 2006.

However, while the massive rollout has increased access and awareness of the implication of ICTs in teaching, learning and public administration, much still remains to be done to improve ICT impact on the ground or bring about ICT assisted development. The key challenges to Ethiopia are:

- Improving the understanding of the weakness and strength of information and communication technologies when they are applied to solve complex problems of education, public administration and research, and the conditions that should be met for ICTs to be effective in these areas;
- Building skilled human resources to manage complex socio-technical projects such as Schoolnet and Woredanet;
- Carrying out ongoing analysis of the cost benefits of various investments to correct failures. For example, a mid-term or regular review of Schoolnet and Woredanet projects would be useful to build on success and correct failures.

PERFORMANCE AND GAPS

Ethiopia has made some notable progress between 2004 and 2006 in the ICT sector. The availability of fibre connection to major towns and multimedia broadband network connections to schools and all districts, establishment of a government data center and availability of mobile SIM cards at government-licensed shops are some of the notable successes over the last three years. The progress has also exposed various gaps on the policy, regulatory, infrastructure and human resources fronts. Table 1 presents an overall performance of the sector and some of the emerging gaps.

TABLE 1. SECTOR PERFORMANCE AND GAPS

Area	Performance /achievements	Gaps	
Infrastructure mainlines and mobile	• tele-density of about 1% • mobile density of 1.15% • 4000 km fibre cable	• lack of a long-term broadband strategy with a holistic picture of public and private sector needs	– pros and cons of relying vendor financing
Internet and Broadband Access	• broadband and multi-media network	• high costs of international leased line • inefficient and under-subscribed broadband services	
Universal Access	• rural connectivity to about 4761 villages • nationwide access through 904 ETC stations	• inadequate participation of the private sector in the delivery of services • limited financial, technical and institutional innovation • absence of a universal access strategy	
Policy and regulation	• willingness to open Internet services • licensing of community radio stations	• delays in licensing Virtual ISPs	– lack of strategy for introduction of competition
Human Capacity	• improved technical capacity through series of graduate schools (Addis Ababa University, CTIT)	• limited skills in policy and regulation and large-scale ICT project development and management	
Public sector access	• launching of Woredanet, Schoolnet, Agrinet, Ethernet • availability of applications for tax administration, legislation, trade and commerce, etc.	• capacity and skills shortage • monitoring and evaluation challenges • structural problems such as delays between plans and realisation • gaps between ICT potentials and what can be achieved under local circumstances and realities	

It is important for the government to build on the achievements and its commitment, cited above, to roll out communication infrastructure as a

public benefit and bridge some of the gaps outlined in Table 1. Policymakers need to:

- Speed up a gradual participation of the private sector in the provision of communication services;
- Strengthen the regulator so that it carries out its duty in guiding the ICT industry;
- Carry out regular independent analysis of the ICT sector in order to develop strategies that meet growing challenges and local contexts and capabilities;
- Improve the capacity and the legitimacy of the regulator.

Building the skills of policymakers and middle managers on the implications of global, regional and national ICT markets, policy and regulation is important to bring Ethiopia closer to other countries and to speed up ICT assisted social and economic growth. Policymakers also need to support, participate and utilise research results for decisionmaking in the ICT sector.

Socio-economic Contexts

Ethiopia is a federally organised country with about 75 million people, characterised by a wide range of ecological and climatic conditions. It is landlocked in east Africa between the Sudan, Eritrea, Djibouti, Somalia, and Kenya, all of which (other than Eritrea and Somalia) have a substantial information and communication infrastructure. Many parts of the country are isolated due to mountainous terrain and a weak road infrastructure. Nearly 80% of the population (63 million) lives in rural areas and is dependent on agriculture. The share of the rural population within two kilometres of an all-season road is about 17%.

This agrarian setting poses a significant challenge to the delivery of affordable communications. Ethiopian topography and income levels make universal access strategies built around innovative business and technological solutions very important. The current "one-size fits all" approach by the incumbent operator to connect rural villages through a rural connectivity project needs to be rethought from business, technology and sustainability perspectives.

Being one of the world's least-developed nations with a per capita income of about US$130, Ethiopia's economy has had to respond to the ongoing impact of drought and problems of poverty and disease. The country faces security challenges with its neighbours, particularly with Somalia and Eritrea. The poverty cycle has put a significant strain on its economic growth. Ethiopia's real GDP was about US$8 billion in 2004 with agriculture accounting for 48%, industry 10% and the service sector 42%. The economy has recovered after the end of the war with Eritrea in 2002. The real GDP grew by 11% in 2003/2004 and 8.8% 2004/05, according to the African Development Bank.

The World Bank African Development Indicators for 2006 rank Ethiopia as one of those countries with sustained economic growth over the last ten years. Its economy grew by 5.5% in 2005. Ethiopia has also received about US$3.5 billion debt service relief that it began investing in infrastructure development and social services such as providing clinics and schools in rural areas. Substantial progress has been made in school enrolment and the extension of health services to rural areas over the last decade, as can be observed from hundreds of schoolchildren flooding streets of major towns and rural villages in the mornings and afternoons. The desire for new communication technologies that address education, health, jobs and public administration needs is therefore enormous.

Notwithstanding these improvements, Ethiopia's human development indicators are the lowest in the world. The UNDP 2005 Human Development Report ranked Ethiopia 170 out of 174 countries in terms of the

Human Development Index (HDI) and the poverty gap continues to widen. The poor in Ethiopia are extremely vulnerable to exogenous shocks, especially flooding (as seen in the month of October 2006 in the eastern town of Dire Dawa), drought, price shocks and poverty-related diseases like HIV/AIDS, malaria and tuberculosis.

Population pressure has also had an obvious impact on the Ethiopian economy. The fertility rate remains high, together with consistently high poverty levels. Although UNDP HDI data on expenditure and consumption show that the incidence of poverty has fallen from 44% in 2000/2001 to 36% in 2004/2005, poverty still remains rampant. The consumer price index (1995=100) was 165. The cost of living has risen steeply in recent years, particularly in 2006 following adjustments to the price of fuel. For many the cost of living has become unbearable, a relatively new phenomenon in the country where poor but resourceful people have survived economic challenges for centuries.

The communication sector is one of those that was hit by the rising cost of living. The high incidence of poverty and rising cost of living will continue to have a direct impact on the spending on communication services. For example, the Annual Revenue Per User for cellular line has shown a significant decline from US$15 in 2004 to US$7 in 2006. The falling ARPU is in line with continental trends. A tariff revision study that was launched in 2007 is expected to bring the ARPU further down. While this is good news for the consumers, service levels need to improve to widen the revenue base of the incumbent. Increase in tariffs will undoubtedly put a lot of economic pressure on household incomes. A further fall of ARPU is expected as communications reach the bottom pyramid of the population.

TABLE 2. SOCIO-ECONOMIC INDICATORS OF ETHIOPIA

Socio-economic indicator	Data	
GDP Per Capita	US$130 (2006, estimated)	
GDP Per Capita (PPP)	US$900 (2005, estimated)	
Population (2006)	**Total**	**75 067 000**
	Rural	62 895 000
	Urban	12 172 000
Consumer Price Index (1995=100)	165	
Percentage of urbanisation	16.2%	
Exchange rate	Birr 8.69 = US$1	
Implied PPP Conversion Rate (IMF)	1.23	
Households	**Total**	**15 013 400**
	Urban	2 434 400
	Rural	12 579 000

Source: IMF, World Bank, CIA, World Fact Book, Ethiopian Central Statistical Agency

The political and governance landscape has also some bearings on the diffusion of information and communication technologies. Ethiopia has a four-tier system of government: the Federal Government; Regional Governments; Zonal and Woreda Administrations. The country is divided in nine regions. Regions are divided into 66 zones, which are further divided into about 611 districts (Woredas). The Woreda is the main unit of government responsible for provision of public services. All the Woredas have now been connected to new information and communication technologies (telephone, fax, Internet) but the majority of Woredas do not have the staff with basic skills and resources to make the best use of these technologies. The extent to which the Woredas become comfortable with new technologies will be the yardstick of the ICT uptake by the public sector nationwide.

Policy and Regulatory Framework

TELECOMMUNICATION POLICY

Ethiopian telecommunication policy is fixed to a monopoly of communication service by the government. The policy 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) (as amended), in which the government created the regulator, the Ethiopian Telecommunications Agency (ETA). The Council of Minister's Regulation No 10/1996 that followed this established the Ethiopian Telecommunications Corporation as a public enterprise with monopoly over telecommunication services. The current policy and regulatory environment of the telecommunication sector is summarised in Table 3.

In effect, the Council of Ministers' Regulation merely extended the mandate of the former Ethiopian Telecommunication Authority that had monopoly over telecom services. Since then, the ETC has remained a state-owned corporation operating for "profit" with direct governmental budget assistance for rolling out the infrastructure.

However, no external and thorough cost benefit analysis of ETC's investment has been made over the years to suggest that it is actually operating at a profit. The ETC has a positive cash flow that it reports at the end of every Ethiopian calendar year (subtracting expenditure from revenue), but that does not suggest it operates at a profit or loss. It uses an accounting system for reporting purposes, but 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 by what factor Internet connection is profitable over mobile segment or fixed line. A stringent cost-pricing regime using modern telecommunications accounting models is critical for the public and government to have an overview of the contribution of telecommunications investment to development and for the incumbent to maximise its profit.

The ETC receives a monopoly licence from the regulator; for that it must meet efficiency, quality of service and infrastructure expansion targets. Each year the ETC must submit a performance and business report to the regulator and to its influential board of directors. The government does not directly intervene in the day-to-day operations of the ETC and the regulator has not been empowered to take sanctions against missed targets.

The ETA's Strategic plan for 2004-2006 set the following targets:
- Increase fixed line telephone penetration to 1.7% by 2006;
- Increase telephone access to 5 000 locations and make telephone services available to 10% of the population within walking distance of 5 km;

- Expand mobile penetration by 3% in 2006;
- Migrate to an IP-base broadband network;
- Establish a core fibre along six major routes;
- Establish a second international gateway.

While improvements have been made between 2004 and 2006 in terms of network rollout to 4 764 villages, establishing of 4 000 km fibre, migrating to IP-based broadband network and the mobile and fixed line targets were not met. The regulator does not take action even if the incumbent misses targets or customers complain continuously of the substandard services.

TABLE 3. REGULATORY AND POLICY HIGHLIGHTS
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

Telecommunication services	Policy
Fixed line and mobile services	ETC is the sole provider of fixed and mobile services. The services are bundled together
Internet services	ETC is the sole provider of Internet service; Virtual ISPs are allowed to buy bandwidth and resell Internet
Downstream value added services such as call center, cyber café and messaging services	Downstream value added services such as call centres, pay phones and messaging services are allowed for competition. However, there are a few legally registered phone shops;Cyber café services are allowed
Call back and other long distance services that use modern technologies	Call back or use of modern technology to divert the international traffic is not allowed and is punishable by fines and imprisonment.
VSAT	Individuals and enterprises are not allowed to own VSATs. International organisations are allowed to own VSAT with payment of traffic compensation or "landing right" fees on case by case basis. The regulator is being empowered to license VSATs
VoIP	VoIP is not allowed
Telecommunications equipment	Sale of mobile and telephone handsets is allowed.

INSTITUTIONAL ARRANGEMENTS

The regulator, the Ethiopian Telecommunications Agency (ETA), 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. The establishment of the regulator as a viable institution with adequate and skilled staff took another two years. This was followed by change of the ETA management in 2001, with two acting General Managers over the period of a year, until the current general manager was formally appointed in 2002.

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 issued in 1999 (proclamation 47/1999) gives the Ministry of Transport and Communications the power to issue directives without recourse to the regulator. Without distinction on whether the directives are of policy or operational nature, the Ministry can direct the sector without involving the ETA if it deems necessary. Effectively, the ETA acts as a department within the ministry.

The communication sector governance framework and institutional arrangement comprises a number of players that have influence on the regulatory environment. These include the Prime Minister, who makes ultimate decisions on policy and regulatory matters, and the Council of Ministers who approve communications regulations and set the budget of the Ethiopian Telecommunications Agency. The Ministry of Transport and Communications 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 ICT sector falls within the Ministry of Capacity-Building that defines the national ICT strategy and promotes ICT in public services. The Ministry hosts the Ethiopian ICT Development Agency (EICTDA) that is responsible for the development and implementation of the national ICT policy. The ICT Development Agency works closely with the regulator but does not always take into account telecommunications sector issues in its policy provisions. A separate ministry, the Ministry of Information, deals with the broadcasting sector and oversees the activities of the Ethiopian Broadcasting Agency (EBA.) The Ethiopian Broadcasting Agency was established recently and has begun to issue radio licences after a protracted debate over the opening up of the broadcasting sector to enterprise.

The telecommunication sector is largely managed by an influential ETC Board of Directors that supervises the Ethiopian Telecommunications Corporation. The Board sketches the telecommunications strategy of the country and appoints senior managers of the ETC. Although the board

does not interfere much with the work of the regulator, it is far more influential in making decisions with regard to the telecommunications sector. Figure 1 shows the governance framework for the communication sector in Ethiopia

FIGURE 1. INSTITUTIONAL ARRANGEMENTS
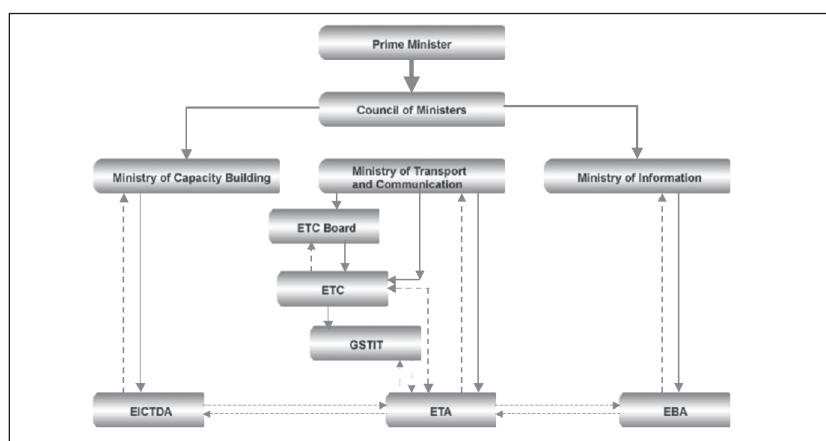
The regulator has no board of directors or councillors; nor does it have sufficient human resources to deal with complex regulatory challenges such as licensing, frequency assignment and monitoring, setting and enforcing tariffs, dispute resolution, maintaining quality of service and promoting universal access. It has been unable to attract and retain skilled employees with legal, regulatory, management and technical skills, partly due to low public sector remuneration. In effect, there is a gross absence of those skills in the country.

The public monopoly of telecommunication services leaves 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, and importers of communications equipment that were authorised under Proclamation No. 281/2002. In the broadcasting sector the government established the Ethiopian Broadcasting Agency that regulates frequency assignment and content in that sector. EBA has recently issued licences to a community radio and commercial FM stations to increase access to news and entertainment and promote community empowerment.

ETA's capacity in executing its mandate is currently being improved through proposed legislation that permits the regulator to cover the telecommunications and postal sectors. This will raise additional challenges, since ETA is entering into the new territory of a postal sector that requires maintaining the availability of an affordable, high quality, universal postal service, improving the quality of service by setting targets for delivery of mail, reviewing domestic and international tariffs,

responding to consumer complaints and developing various guidelines for different courier services.

Overall, the legitimacy of the regulator is central to the policy and regulatory environment in Ethiopia. An effective and legitimate regulatory body cannot be achieved without competition; and competition cannot be achieved without good regulatory institutions. Government policy actions to gradually introduce competition would strengthen the regulator, and this will in turn promote further competition.

WTO GATS Commitments

Ethiopia has not committed to the General Agreements on Trade in Service, nor has it accessed the WTO to date. The government has been working on membership of the WTO for some time. Ethiopia's request for accession to the WTO was circulated in January 2003 The General Council established a Working Party on Ethiopia's accession within a month of February 2003 with the UK as chair, to consider its application. Although the government was scheduled to submit a memorandum of foreign trade regime, laws and tariffs within a year, the process took some three years before Ethiopia's memo was accepted by the Council, with some strong reservations, in November 2006. One aspect of this reservation was the government's stance on a grace period of eight years before it opens its financial and telecommunication sector to competition.

In an effort to analyse the implications of competition to the telecommunications sector and to equip itself with evidence against telecommunications liberalisation at the WTO negotiations, the Ministry of Trade and Industry issued a Request for Proposal and selected an American firm, Nathan Associates, to study the impact of liberalisation of the telecom sector. The preliminary result of the study was released in early 2007, suggesting the government unbundle the services and introduce competition in the mobile and Internet segments. However, it is unlikely that the government will open up the sector in a short period.

New Policy Development

Recent ICT policy development in Ethiopia is driven by a growing recognition of the role of information technology for development and pressure from the international financial institutions like the World Bank. Ethiopia's own experience in implementing high profile projects like Woredanet and applications in the public sector (tax management, legal information systems, debt management, utilities management) has increased its commitment to ICT-assisted development. International institutions that are supporting these efforts are very keen to see the government create an enabling environment for private sector' participation in the delivery of communications services. The World Bank, for example, has attached the following conditions to one of its loans for the ICT sector:

- Opening up the Internet sector and licensing ISPs by September 2005;
- Opening up competition in rural communication and licensing qualified, autonomous, legally established entities as rural connectivity providers within two years of the start of the project;
- Opening up the broadcasting sector and licensing qualified autonomous, legally established entities as Community Radio providers by October 2005.

International pressure and government's own commitment have yielded four major policy initiatives during the last two years:

New Telecommunications Act

The Ministry of Communications and Transport has been working on a new communications Act that is expected to empower the regulator to assume a stronger role in regulating the postal and telecommunication sectors. The Act is expected to give more power to the regulator in licensing VSAT service providers and playing a key role in regulating universal access and tariffs.

A New ICT Policy and Strategy for the ICT Sector

Ethiopia has been working on its national ICT policy for over a decade. The ICT policy paper of 2003 was the basis for establishment of the Ethiopian ICT Development Authority (EICTDA), which is mandated with overseeing the development and implementation of a new national ICT policy and strategy. EICTDA has produced a new policy document in 2006. Although the policy document has not been ratified it serves as a key government document for managing the ICT sector.

Licensing Community Radio Operators

A significant effort was made by the Ethiopian Broadcasting Agency to strengthen its institutional capacity to assume a major role in regulating the broadcasting sector in recent years. EBA has licensed public radio stations for Addis Ababa, Amhara, Debub, Harari and Dire Dawa regions and upgraded the status of two stations to commercial broadcasters. It has issued licences to two new commercial radio operators – Zami Public Connections (ZPC), and Tisae Fine Arts & Adei Promotion in February 2006 and to a community broadcaster located in the south of the country in September 2006. This has improved awareness of community and commercial broadcasting and opened the airways to some extent.

Efforts Towards the Introduction of Competition in the Internet Sector

Following the commitment to the World Bank, the Ethiopian Telecommunications Agency issued a directive for licensing Virtual Internet Services Providers (VISP) that lease capacity from the ETC and sell it to the public. This in part was in response to increasing demand for Internet service, and following the installation of high-capacity and high-speed

Broadband Internet Network by the ETC with a huge amount of investment capital. The possibility of the ISP market opening up has created some enthusiasm and opened opportunities for private sector, individuals and organisations that had been waiting for participation in the Ethiopian communication sector for some time.

However, the incumbent operator and the regulator did not implement the directive as hoped, due to some difficulties in appreciating the Internet market. The directive requires certain levels of education and experience from potential providers. Moreover, interconnection between VISPs through exchange points is prohibited. It is expected that licences will be issued in 2007 to prospective ISPs, which will be likely to struggle to provide services to users under very stringent conditions.

The above initiatives have brought some hope that the policy and regulatory environment will embrace competition in the medium term. However, analysis of progress so far shows confusion with regard to the direction of the ICT sector policy in general and the telecommunications and Internet services regulation in particular. On one hand the government has shown strong commitment to improve the infrastructure and create an enabling policy and regulatory environment, on the other, it did not soon enough allow the private sector to share the burden of capital investment in the sector.

There has been some attempt to attract private sector investment in the communication sector in recent months. The incumbent floated a bid for a US$1.5 billion investment through vendor financing for expansion of fixed-line capacity to 4 million, and a mobile network to 7 million, construction of 10 000 km fibre routes and linking 10 000 villages in November 2006. The detail of how this can be achieved is not clear. The current market dynamics and the incumbent's experience suggests that a combination of competition and vendor financing may bring substantial benefit to the economy in the longer term through improved network rollout, innovation and savings to public resources.

Public Sector Use of Information and Communication Infrastructure

The public sector is one of the growing users of communication networks. Recent government commitment to public sector reform and ongoing informatisation of the civil services have contributed to improvement in access to ICTs by the government.

Policies and Programmes for ICTs in the Public Sector

The government has shown a strong commitment to the promotion of efficient communication between various tiers of the public sector as part of its civil service reform. The civil service reform ICT strategy emphasises:

- Consolidation and integration of civil and public service computerisation projects at Federal and Regional Governments levels
- Setting up nationally integrated sectorally and regionally distributed information systems;
- Connecting Federal and Regional Governments through Local and Wide Area Networks up to the district (Woreda) levels
- Identifying, designing and implementing Government Information systems and networks and setting up a government portal;
- Improving the web presence of Federal and Regional Government bodies;
- Developing a national network and information exchange systems between sectoral ministries and regional institutions responsible for different sectors;
- Promoting community access to online government services;
- Strengthening information and knowledge management in public administration in order to deliver services in trade, commerce, legal systems, business registration, tax payment etc.
- Setting up programmes that will strengthen ICT-supported governance and service delivery at Federal and Regional Government levels.

To implement these civil service ICT objectives, the government has launched an ICT-Assisted Development Programme with a series of e-government initiatives like Woredanet, intended to link districts to the federal government. Table 4 shows a list of major projects that contributed to public sector connectivity over the last five years.

TABLE 4. MAJOR PUBLIC SECTOR ICT PROJECTS

Project name	Achievements
Woredanet	Linking up of 611 districts to a national data centre located in Addis Ababa. Woredas (districts) have access to Internet, telecommunication, video conference and databases at national level
Schoolnet	Connecting of 560 secondary schools including Technical and Vocational scholls to the Internet and launching technology-mediated distance education
Ethernet	Connection of 13 public universities to high speed data network and the Internet
Agri-net	Connection of 30 agricultural research institutions
Healthnet	Linking up of regional hospitals and introduction of telemedicine applications
e-Applications	Implementation of applications on tax registration, national accounts, business registration and legal management information systems by 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.

The introduction of information and communication technologies to district level was the major achievement in Ethiopia's quest to improve access to communication to the public sector. Previously, official reports would take months to reach the capital. Often early warning signs of famine, such as falling livestock prices, would not get through until a cri-

sis had developed. While Woredanet has not yet been tested in such circumstances, access to communications at remote district level has empowered officials who would not otherwise have been able to link up with zonal, regional and federal government bodies.

The Ethiopian ICT Development Authority is in the process of setting up an e-government portal and deploying an ICT master plan and e-applications to support the Woredanet project and improve access to e-government applications by the public. There are also plans to produce a national ICT master plan that would lead to the connection of government offices nationwide.

ACCESS TO TELEPHONES

Despite these efforts, access to communications in government is very low except for the federal government, where telephone access is relatively high. Data on public sector access to communication are scarce and difficult to obtain. The total number of fixed telephone lines accessible to government staff was about 45 366 in 2003 and 41 855 in 2004. This was very limited compared to a staff base of about 800 000 (including about 400 000 civil servants, and additional government staff such as military and police). The teledensity of the public sector is estimated to be around 8% in 2006.

TABLE 5. PUBLIC SECTOR ACCESS TO TELEPHONES

Year	2003	2004
Number of civil servants	389 563	398 148
Estimated total government staff base including police, military and contact personnel	780 000	800 000
Number of Mainlines accessible to government staff	45 366	41 855
Government staff tele-density	6%	5%

Source: ETC, Federal Civil Service Commission and World Bank estimates

ACCESS TO THE INTERNET

The situation is similar with regards to Internet access. There were about 389 563 civil servants in Ethiopia in 2003 of whom about 2 200 had e-mail accounts (based on 735 government EthioNet accounts each having 3 users). This implies that about 5% of civil servants had e-mail access at the time. The figure is small if one takes all government employees, including military and police, into account. The situation has improved slightly over the last three years with the completion of the various e-government projects cited above, and an estimated 10% of 424 000 civil servants have potential access to an email account by 2006.

ACCESS TO COMPUTERS

There has been a strong desire to use computers in the public sector in Ethiopia. Discussions with ICT private sectors that service government networks and applications indicate that access to computers is not a major problem in public institutions in the country. According to the director of a private sector company "computers are not the issue at the moment, but usage is." There are an estimated 6 000 computers in public institutions throughout the country and about 10% of the public sector staff have some access to computers.

However, the EICTDA and UNDP survey in 2004 shows that only 20% of those who own computers had some form of networks. About 40% who owned computers indicated that they did not have budget for the ICTs, suggesting that access to computers is either externally funded or they did not have budget to maintain ICTs for that year. The remaining majority (54%) said they spend less than 10% of their budget on ICTs.

CHALLENGES TO ICTS USE IN THE PUBLIC SECTOR

Lack of resources and advanced skills are the main challenges to the applications of ICTs in public administration. The shortage of skilled personnel is severe outside of the capital. Resources for the purchase of computers, implementing and maintaining applications were also regarded as important by government institutions that often rely on donor funding.

TABLE 6. ICT USE CHALLENGES IN THE PUBLIC SECTOR

ICT related problems faced by organisations in 2004 Public Institutions	Percentage that reported the challenge
Computer Skills Shortage	51%
Problems with staff acceptance of computers	4%
Problems with adjustment to computer systems	7%
Problems with computer system installation and implementation problems	8%
Problems relating to after sales customer support	0.3%
Problems with monitoring new development	2%
High cost of computer products and services	26%
Industrial relations problems due to computerisation	-
Language Proficiency	0.6%

Source UNDP/EICTDA, 2004, – The Ethiopian ICT Baseline Study – Volume III- Deployment and Exploitation of ICT in the Public and private sectors: A Comparative Analysis, Unpublished

Discussions with the private sector and some public institutions suggest that skills and resource shortages are the main bottlenecks to ICT development in 2006. Overall assessment of the ICT usage by the public sector in Ethiopia indicates:

- A significant public sector investment in ICTs over the last five years through donor funding to individual institutions and through government ICT programmes such as Schoolnet, Woredanet, Agrinet and Ethernet. This has improved access to communications at all levels and awareness of opportunities;
- Lack of credible cost-benefit analysis to suggest that ICT assisted development is achievable. Monitoring and evaluation are essential to build on strengths and mitigate failures;
- A significant skills shortage at all levels – to implement projects at district level and to manage a complex socio-technical ICT programme at national level. As a result there is lack of appreciation between what ICTs actually do for the public sector and what is possible under different circumstances at different levels – geographic or institutional. It is not obvious to many experts that ICT assisted development is not only about the technology – that it requires a new way of doing things, incentives, skills and moreover, improvisation and iteration at local levels;
- The participation of local private sector and experts in major public sector projects has been very low. The policy and regulatory environment should be improved to allow the private sector to participate in the delivery of ICT applications and communications services.

REGIONAL COOPERATION ON POLICY AND REGULATION

The foregoing domestic ICT policy and regulatory environment has had substantial implications for Ethiopia's participation in regional policy and regulatory forums. While Ethiopia has played a significant role in hosting major regional events that have made important decisions on ICT development in Africa, by virtue of the fact that Addis Ababa is a major African capital, the country has not benefited from this exposure or from good practices in other countries.

Ethiopia's state-owned communications market structure has been the main deterrent to its contribution to and benefit from regional regulatory innovation. For example, COMESA's model guidelines on interconnection, licensing and radio frequency management were not applicable to the situation in Ethiopia where there is no competition. Ethiopia has remained a passive participant in regional workshops rather than engaging actively with its counterparts in key policy and regulatory decisions.

Conversely, regional efforts of ICT policy and regulation remained shallow in addressing member state's needs. Regional ICT policy and regulatory initiatives do not take into account difficulties in understanding what countries have achieved and what is needed. For example, there is some mismatch between what Ethiopia intends to achieve in its ICT policy and COMESA's model ICT policy. Ethiopia's national ICT strategy focuses mainly on improving the capacities of the public sector to achieve government decentralisation goals, while COMESA's

model policy aims to achieve a host of issues from increasing competition to the development of a sustainable ICT sector. Furthermore, regional cooperation mandates the adoption of a common telecommunications policy as a strategy for the development of the national and regional telecommunications infrastructure that has proved difficult to achieve.

The participation of Ethiopian institutions in regional bodies is coordinated through the Ministry of Foreign Affairs or Ministry of Finance and Economic Development. This means local institutions have to receive authority from these ministries in order to participate in regional ICT-related matters. This often makes it difficult for relevant institutions to take decisions and promote effective coordination. Moreover, regional organisations like COMESA and IGAD do not have mechanisms for involving the civil society organisations and private sector. Limited participation of CSOs, media and marginalised groups in domestic ICT policy meant that they were not consulted when regional decisions were made. Ethiopia's participation in regional ICT policy has continued to be influenced by its progress in trading with other countries in the region and the extent of competition in its domestic communications market.

Market Structure and Investment

Market Structure

Ethiopia's telecommunications industry is characterised by a vertically integrated market run by a state owned enterprise outside the realm of competition. The Ethiopian Telecommunications Corporation has a monopoly over all telecom services including fixed, mobile, Internet and other value added service. Although the investment proclamation No. 116/1998 encourages private sector' participation in the telecommunication services in partnership with the Government, this was not implemented. A search for a strategic investor that could generate fresh capital and transfer technical expertise, implementation experience and management skills was activated in 2002. The possibility of selling part of the ETC shares to private partners was also explored by engaging a consulting firm, PricewaterhouseCoopers, that undertook audits of ETC assets in the same year. This was followed by an attempt to partially privatise the incumbent through offering a sale of 30% of the ETC equity.

However, the selling-off of shares of the incumbent was not pursued, for various reasons including "lack of interest from investors", uncertainties about strategic partnership and the government's apprehension about the impact of telecommunications liberalisation on the economy, not least on power relationships. 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. Under a new management, the ETC issued a strategic plan with focus on upgrading the technology to the Next Generation Networks, diversifying services to meet the growing demand for broadband connectivity, business process improvement, and up-skilling its human resources to be able to deal with IP-enabled services.

Progress so far indicates that despite pressures from international financial institutions for competition, and in the absence of local initiative for liberalisation of the communication sector, Ethiopia's telecommunications market structure will continue to be state owned for a few years to come. Telecommunications are viewed as strategic assets for the economy and national security. Ethiopia has been negotiating for a grace period of eight years with the WTO before opening its telecommunications and financial sector for foreign investment.

The government has been reluctant to open up the telecommunication sector. Senior policymakers have been cautious when it comes to introduction of competition. The main line of argument so far was that "liberalisation will not result in positive net changes to poor people due to the profit motives of the multinational companies that are interested in the cream telecom market". This argument is invalid, since private invest-

ment versus subsidy auction (where investors bid for lower subsidy to provide services in rural areas) has now become particularly effective in developing countries like Chile and Uganda. RIA! household and focus group studies show that poor people often pay more than the wealthier section of the society, in terms of time and fees, to make phone calls and therefore rural access is profitable for small and large players alike.

The incumbent argues that telecommunications infrastructure is a public good and the government is best placed to promote universal access. The government also feels it has the obligation to deploy communication networks to rural areas as per its decentralisation programme, and the incumbent operator should do this. Other factors such as employment and labour disputes are also taken into account in the argument against competition. There is merit in some of the arguments, particularly in government's role in rolling out broadband infrastructure that underpins Ethiopia's future economic growth, but clinging to inefficient services will not serve the development purpose.

Another obvious reason why the government would like to hold on to the state owned enterprise is its interest in recouping the massive investment in recent years. The ETC has spent large amounts of capital to develop its monopoly network. Significant investment of time, financial and other resources encourages risk-aversion and promotes sustaining the status quo. This was not counterbalanced by the assessment of the potential positive impact that private investment might have on cost of business, economic growth or potential fiscal revenues through taxation.

Nevertheless, policymakers are conscious of the fact that good service delivery and profit cannot be achieved through the current monopoly arrangement. The main mechanism against ineffectiveness of the ETC so far was to change the management and see if that could lead to efficient state owned enterprise. This mechanism faltered in 2006 with three major reshuffles of management. The ETC board appointed new managers early in the year, followed by the firing of the chief executive officer in June 2006. More senior managers were dismissed in September 2006 over the failure in the billing systems. Simultaneously, the quality of service reached its lowest level in 2006. Critics argue that the change in management would not change the structural problem of public monopoly – its inefficiency and ineffectiveness. What government needs is a well-thought out plan that builds on its achievements and enables it to deploy better infrastructure and services through carefully-crafted public and private sector partnerships.

MARKET INVESTMENT

Ethiopia's investment in the telecommunication sector has seen a substantial increase in recent years. 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. As a result, progress was made in rolling out broadband infrastructure, particularly fibre links to rural towns, a direct high-speed connection to Sudan, Djibouti and Kenya, installation of a broadband multimedia network and improvement of mobile access throughout the country. Connection to rural villages was also improved. Terrestrial access to Sudan has now cut down over-dependence on satellite connectivity for international Internet bandwidth.

However, it has become clear that the government will not be able to continue investing in massive infrastructure rollout in the long term. To continue such an infrastructure rollout, the ETC issued a request for proposals worth US$1.5 billion through vendor financing in November 2006. The project aims to expand fixed-line penetration to 5% to about 4 million lines and 7 million cellular lines, install 10 000 km optical fibre and connect 10 000 rural villages, including installation of CDMA wireless local loop and optical backbones.

Given the current telecommunications industry where vendors have become more selective about which companies and countries they help finance, it was difficult for Ethiopia to attract many vendors to invest US$1.5 billion except for the low-cost telecom equipment manufacturers such as Huawei and ZTE of China. Critics of the approach of vendor financing argue that the scheme could lead to a few vendors with limited experience providing services and undercutting established vendors from Europe, America and Asia that may bring more value, standards and quality of service. Those in favour of vendor financing argue that the scheme will bring the 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 regulations. Table 7 summarises the arguments and counter-arguments against vendor financing of the communications infrastructure development in Ethiopia.

TABLE 7. ARGUMENTS AND COUNTER-ARGUMENTS ABOUT VENDOR
FINANCING

Pros	Cons
– fast-track rollout of infrastructure – financing easily accessed – maintains government's ownership of the sector – improves efficiency of network rollout since vendors won't be bound by traditional bureaucracy – easily managed and administered	– locks into a few vendors with limited experience and technology – reduces opportunity for standardisation and innovation, if ETC does not build its capacity to follow up with the development of new technologies – undercuts established vendors that may bring better technology, reliable network, quality or management style to the country – may increase cost of networking at the beginning in order to attain compatibility with existing switching network and vendor technology

Given the uncertainty of the telecommunications environment, it is
important for the government to craft a policy that combines vendor
financing with competition, so as to benefit from fast-track infrastruc-
ture rollout, technological excellence and innovations, at the same time
maintaining compatibility with existing networks, rather than locking
itself up with one or two vendors. Introduction of competition in the mar-
ket would also reduce the burden of vendor credit (which has to be paid
by the public) in the longer term.

CONTRIBUTION TO GROWTH

The contribution of the telecommunications sector to GDP is still low in
Ethiopia. The GDP at market price has improved significantly between
2000 and 2005 while the contribution of the telecommunications sector
changed only slightly. Telecommunications revenue was 1.3% of the GDP
in 1996 and grew to about 2.3% in 2005. In contrast, the investment in the
telecommunications sector as a percentage of GDP has jumped substan-
tially since 2003. This shows that despite significant investment, the
direct contribution of the telecommunications sector in economic growth
is still very low.

TABLE 8. CONTRIBUTION OF THE TELECOMMUNICATIONS SECTOR TO THE GDP

	2000	2001	2002	2003	2004	2005
GDP at market price (millions)	6528	6,268	6,400	6650	8250	9020
Telecommunications investment	37.3	46.3	29.0	128	300	500
Telecommunication investment as % of GDP	.59	0.73	0.45	1.9	3.6	5.5
Telecommunication revenue (millions)	87.7	107.8	104.4	121	144	210
Telecommunication revenue as % of GDP	1.4	1.7	1.6	1.8	1.75	2.3

Source ITU World Telecommunications Indicators Database (2003), ITU African Telecommunications Indicators (2004), World Bank, ETC Annual Statistical Bulletin 2005/2006

CONTRIBUTION TO EMPLOYMENT

The contribution of telecommunications to employment is significant. The ETC is one of the largest public sector employers in the country with 11 234 employees in 2006 of which about 7.4% had university degrees. About 2.6% of the 424 607 civil servants are employed by the ETC. The bulk of ETC employees (32%) did not complete secondary education. About the same number have college diplomas, and the rest are high school graduates. The proportion of male to female remained the same, hovering around 70:30 for almost a decade. The ETC was unable to improve the gender gap, despite the recent increase in the number of women attending college and tertiary education. Table 9. shows the state of employment in the telecommunications sector.

TABLE 9. STATE OF EMPLOYMENT IN THE TELECOMMUNICATIONS SECTOR

Year	1999	2000	2001	2002	2003	2004	2005	2006
Male	4 267	4607	4 868	5 058	5 416	5 897	6 290	7 764
Female	2 306	2 476	2 502	2 522	2 497	2 632	2 803	3 470
Total	6 573	7 083	7 370	7 580	7 913	8 529	9 093	11 234
% of women	35	35	34	33	32	31	31	31
Fixed lines	194 494	231 945	283 683	353 816	404790	494 008	610 347	725 046
Mobile lines	6 740	17 757	27 500	50 369	100 000	155 534	410 630	866 709
Total phones	201234	249 702	311 183	404 185	504 790	649 542	1 020 977	1 606 959
All Phones /employees	31	35	42	53	64	76	112	149

Source: Ethiopian Telecommunications Corporation, Annual Report 2005/2006

Figure 6 reveals that the proportion of telephone lines to the number of staff has improved over the last ten years. However, it is important to note that ETC does not have disaggregate data and clear operational lines between its fixed, mobile and Internet services; therefore it is difficult to gauge whether the enterprise is actually efficient or not. Observation shows that the incumbent is grossly over-staffed with under-skilled employees, but does not have adequately trained staff to manage the complex telecommunications network and business in a dynamic telecommunications market environment.

FIGURE 2. NUMBER OF FIXED LINES PER EMPLOYEE
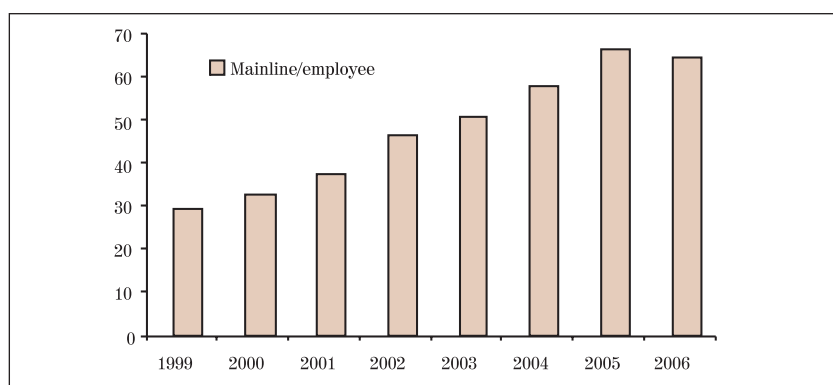
Source: Ethiopian Telecommunications Corporation, Annual Report 2005/2006

In an effort to improve the human resources capacity for the deployment of the new generation networks, the ETC has upgraded its fifty-year-old Ethiopian Telecom Training Institute to a graduate College of Telecommunications and ICT-CTIT in 2004. The CTIT has begun training in telecommunications engineering and telecommunications management and the first trainees are expected to graduate in 2007. However, there is still a wide gap in the capacity of the incumbent operator in strategic planning, project management implementation and in dealing with the complex policy and regulatory challenges facing the telecom sector and the telecommunications market dynamics. Telecommunications management requires exposure to new ideas, knowledge and situations, access to good mentors, iteration and improvisation that cannot be gained through graduate education alone.

Otherwise, the employment that was created outside the ETC itself has been important. Although it is difficult to quantify, the expansion of mobile phones and Internet to rural towns did not only increase the number of small businesses but also created employment opportunities for secondary school and college leavers, particularly for women who would otherwise not have job opportunities due to the male-dominated job environment in Ethiopia. Likewise, the contribution of telecommunications

sector to rural employment has been remarkable; as the ETC continued to outsource construction and earthmoving work to private participants, often to families owning the land where fibre-optic lines cross. Over 5 000 daily labourers often benefit from ETC's construction work annually.

Access to ICTs

Network Capacity

The network capacity has grown over the last five years. The fixed-line telephone capacity has doubled off a small base of 511 474 in 2001 to 1 022 399 in 2006. The incumbent now has almost full digitisation of its circuits. The percentage of digital lines to analogue has grown from 83.22% in 2001 to 99.4% in 2006. Table 10 presents progress made in improving network capacity and achieving full digitisation.

TABLE 10. EXCHANGE CAPACITY AND PERCENTAGE OF DIGITISATION OF THE NETWORK

| Year	2001	2002	2003	2004	2005	2006
Total Exchange capacity	511 474	600 337	649 593	722 548	872 228	1 022 399
% of digitisation	80.30	83.22	89.36	97.18	98.30	99.38

Source: ETC Annual Statistical Bulletin 2005/2006

Network Coverage and Subscriber Numbers

Fixed Line

Ethiopia's mainline teledensity stands at less than 1% and is still low compared to the African average of about 2.5%. The national telecommunication switching capacity stands at 1 022 399 lines of which about 725 046 were connected in September 2006. This represents an annual growth of about 13% from 610 347 lines in 2005. Although fixed line growth has seen a substantial increase from 0.25% in 1996 to almost 1% in 2006, there is still a large unsatisfied demand. There were 56 053 registered subscribers on a waiting list for fixed lines at the end of September 2006, slightly fewer than the 58 755 in 2005. Figure 3 shows that the ETC began attend to the waiting list in 2005.

FIGURE 3. WAITING LIST AND NUMBER OF MAIN LINES
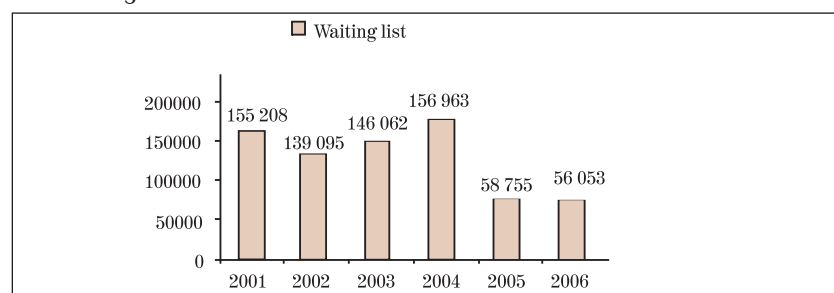
Source: Ethiopian Telecommunications Corporation: Annual Statistical Bulletin 205/2006

However, it is important to note that the waiting list could actually be misleading, because it does not account for needs where the incumbent does not have network coverage and offices. About 5% of the population (4 million) could be waiting for fixed telephone lines if the network coverage were available throughout the country. The incumbent's plan to extend fixed lines by 4 million by 2010 is expected to satisfy this short-term demand.

RURAL AND UNIVERSAL ACCESS

Ethiopia has neither a written universal access strategy nor a universal access fund. The regulator was not entrusted with defining the universal access strategy. However, there is an overall policy that recommends that all rural areas receive reasonable access to telephones based on the government decentralisation framework to district (Woreda) and village (Kebele) levels. The present universal access strategy was designed around reaching out to the last level of public administration structure, the Kebeles. There are around 18 000 Kebeles in Ethiopia that were formed during the ousted socialist regime. Kebeles continued to function as key points for community self-administration and development.

In the absence of a well-defined universal service strategy, the ETC launched rural access using two major approaches:

- Incremental roll-out of services to rural areas using VSAT, Digital Radio Multi Access System, UHF, VHF, Long line and RF radio; and
- Implementation of a rural connectivity project based on government's decentralisation framework.

The incremental rolling out of services to rural areas, particularly the use of VSAT, was able to improve access in some remote areas. There were 904 stations by September 2006, of which 391 were connected to digital automatic telephone exchanges, 377 were pay stations & Rural Radio Communication (RRC). The remaining 136 were manual exchange stations that employed semi-automatic facilities.

The rural connectivity project was aimed at complementing the incremental approach of setting up ETC stations throughout the country. It was planned to connect about 18 000 farmers' associations in two phases – 3 000 in 2005, 15 000 in 2006, using wireless local loop technology and VSAT. Each rural station will be provided with a PC, phone, fax and Internet access. It was envisaged that each station costs between US$8 000 and US$15 000 to set up. The incumbent also planned to hire 36 000 graduates of technical and vocational schools to operate village communication centres and provide all ranges of communication services to customers.

By 2006, rural connectivity was far behind its original goals. The ETC underestimated the challenges of rolling out networks to 18 000 stations around the country within two years. Only 4 674 villages were connected by September 2006. There are plans to extend connectivity to the remaining 10 000 villages by 2010. This seems to be more realistic compared to the original plan of connecting all Kebeles by 2006.

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. The RCP was based on conviction that the same technology works for everyone and that rural people wish to access similar communication tools. Ethiopia lacks a well-thought out and sustainable universal access plan driven by demand, technological and business innovations and quality of service. The RCP did not take small players such as rural cooperatives, the private sector and resellers (eg women) into account. Extending connectivity to all rural towns where the community assembles for buying and selling would make economic sense, followed by reaching out to villages where demands are high. It is unlikely that the ETC can sustain an additional 36 000 staff in addition to its current bloated workforce.

Allowing small players would alleviate the sustainability problem; at the same time it creates more employment and societal benefits. The involvement of rural cooperatives and entrepreneurs in the delivery of rural communication would not only relieve the incumbent from managing a large-scale and complex distributed project, but would also create opportunities for the regulator to play a key role in licensing and regulating service providers and in carrying out research on cost, infrastructure and technology options and capacity issue. In short, the participation of the private sector in rural communications projects would enable the regulator to regulate. The process could unleash creativity in establishing a universal access fund and financing rural communications, using various approaches ranging from the popular reverse auction to rural cooperatives.

Given the historical experience with rural cooperatives in Ethiopia during the socialist regime, models that are built around cooperatives and those that involve women could also be very attractive. Micro-lending that has shown some success in other areas could be adopted to the provision of communication services. Different models of shared access facilities such as telecentres in schools, libraries and clinics, etc, should be explored by the regulator and policy makers in order to promote access, employment opportunities and bring spill-over effects in bringing public sector e-applications, such as land registration, to those who need them most.

MOBILE ACCESS

Mobile subscription has been growing and making up for lack of adequate fixed-line access in Ethiopia. The number of mobile subscriber outpaced that of fixed-lines in 2006, five years behind the phenomenon in the rest of countries in Africa. The mobile teledensity that was 0.58% in 2005 has jumped to 1.15% in 2006 with some 866 700 subscribers by September 2006. Although this is high by local standards, it is very low when compared to the African average of about 15% and neighboring countries – cellular penetration was 20% in Kenya and 7.34% in Uganda in 2006. The number of pre-paid subscribers is increasing fast. Pre-paid subscribers accounted for 87% of cellular users in 2005 and 94% in 2006.

The pent-up demand for mobile phones is high in towns like Dire Dawa and Jimma where the switching capacity remains insufficient, and places where network coverage has not yet reached. Although the demand for service has decreased substantially in the capital, thanks to the availability of SIM cards at retail outlets, the mobile network has reached its saturation point in 2006. The quality service, such as call completion rates, has plummeted.

FIGURE 4. FIXED AND MOBILE LINES GROWTH
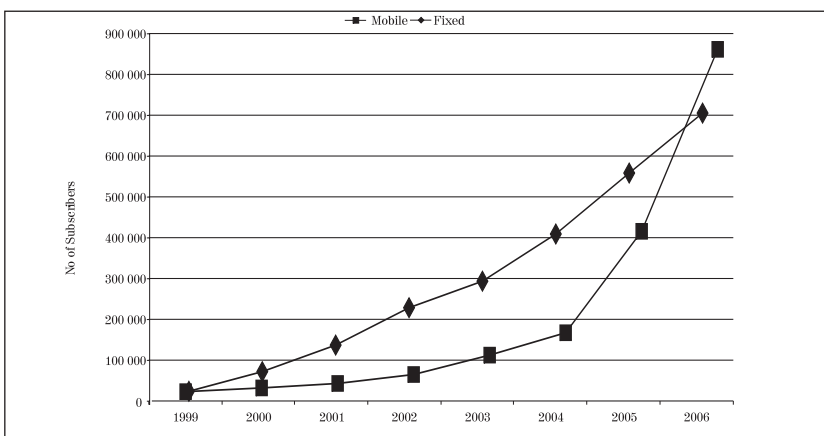
Source: Ethiopian Telecommunications Corporation: Annual Statistical Bulletin 2005/2006

INTERNET ACCESS

Access to the Internet has also improved significantly over the last five years. Internet access was introduced in 1996 and has shown marked growth since 2005. There were 25 765 Internet subscribers by 2006 yielding a density of about one subscriber per 3 000 people. Although Internet subscription has doubled between 2004 and 2006, Ethiopia still lags behind the African Internet subscription average.
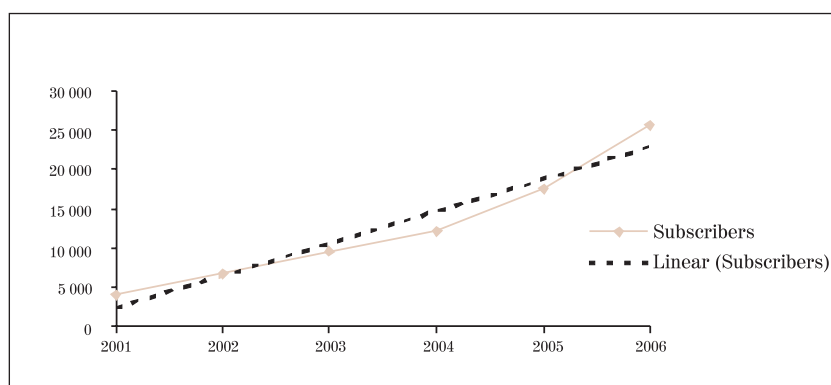
FIGURE 5. INTERNET SUBSCRIBERS GROWTH

Source: Ethiopian Telecommunications Corporation: Annual Statistical Bulletin 2005/2006

Access to Internet bandwidth has improved substantially. ETC had 72 MBps international link (58 MBps for downlink and 14 MBps for up link) by September 2006. It is upgrading the bandwidth by 34 MBps via the international link to Djibouti, and Sudan has initiated a long-term plan to improve the capacity by another 155 MBps. The commission of a 34 MBps direct fibre link to Sudan at the end of 2006 has increased access to over 100 MBps and brought substantial relief to the congested international link. This is also expected to boost online commercial services, such as international banking, that are long overdue in Ethiopia. Although there is progress in these areas, the capacities on offer are way behind global trends and are indicative of the ongoing digital divide between connectivity in rich countries and developing countries like Ethiopia.

BROADBAND ACCESS

The ETC introduced its first five leased lines to costumers in 1999, followed by another five in 2000. A major change occuredr in 2001, following the introduction of a dedicated Digital Data Network (DDN) service that provided the underlying ETC's broadband infrastructure with a frame relay connection of up to 2 Mbs, although the maximum speed that was available for subscription was 512 Kbps. In addition to customers in the capital, the Digital Data Network service was available to subscribers in nine other towns, namely Bahr Dar, Debre Zeit, Dire Dawa, Awassa, Mekele, Nekempt, Nazreth, Jimma and Dessie.

In 2003, the ETC launched a nationwide broadband multimedia and Internet network project that was inaugurated in June 2004. The network is composed of optical network systems with a 2.5 Gbits optical ring that interconnects telecommunication services within the capital, a multi-service switching IP/ATM system that provides integrated switching for multimedia traffic within Addis Ababa and other regional towns

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like Bahr Dar, Mekele, Dessie, Debre Zeit, Nazereth, Dire Dawa, Awassa and Jimma, and a broadband access service to clients through Asymmetric Digital Subscriber Line (ADSL), Broadband Fixed Wireless Access (FWA) and Low Density Wireless Access. The network has the capacity to provide a Virtual Private Network through multi-protocol level switching and broadband Internet access. ETC has also planned to implement a Multi Protocol Label Switch- (MPLS) enabled backbone to integrate its various services.

The Broadband Internet Network has the capacity to accommodate more than 100 000 dialup Internet service subscribers, for whom a quarter of the switches are now connected, and over 3 000 leased line subscribers. The number of subscribers has grown ever since the reduction of the tariff by half. There were 15 broadband subscribers in 2004 ranging from major banks to federal government offices. The number of ADSL subscribers in Addis Ababa reached 30 by September 2004. The number of subscribers to digital data networks grew from 65 in 2003 to about 800 in 2006.

Pricing of ICTs

PSTN

RESIDENTIAL

Favourable consumer pricing is a major aspect of universal service, particularly in rural areas where the ability to pay is low. Ethiopia's pro-poor and pro-rural policy has been effective in terms of maintaining a relatively affordable telecommunications tariff for over a decade. The pricing of the telephone service comprises a one time connection fee, monthly subscription fees and per minute call charges, with a slight difference between residential and business customers. Table 11 show the breakdown of charges, including connection fee, monthly fee and per minute charges for domestic communications distances.

TABLE 11. FIXED TELEPHONE TARIFFS

Fixed Telephone	
Connection fee	Birr 305 (US$35)
Monthly rental:	
Business	Birr 17 (US$2)
Residential	Birr 8 (US$1)
Local Calls	0.2 Birr for six minutes (US$0.02 for six minutes)
20 hours local call	US$4
International Tariff Africa, Asia, Europe, America	Birr 10 / min (US$1.15/min)
Calls to Djibouti	Birr 7/min (US$.8)

Source: Ethiopian Telecommunications Corporation, Company Profile 2006

BUSINESS

The business sector pays similar connection charges and usage rates in Ethiopia to those of residential subscribers, but it enjoys better access to telecommunication services. The ETC keeps a separate waiting list for business and residential users. While residential subscribers may wait for over two years to obtain telephone lines, a business often gets its connection within a few weeks to three months.

PRICE REGULATION

The local fixed line tariffs are relatively cheap when compared to other African countries. A three minute local call costs about 0.1 Birr (US$0.01). However, the situation is different when one accesses telephones from privately-operated "kiosk phones" scattered around the country that charge between 0.40 and 0.60 Birr for three minutes. Kiosk phones charge two to four times the actual ETC tariff for local and domestic long-distance calls. With only 4 294 public payphones in operation by September 2006, 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 lucrative service is enticing more private service providers to the streets. There is a growing telecommunications service providers on the street of Addis Ababa, emulating the umbrella telephones in Nigeria or bicycle communications operators in Uganda. Table 12 shows comparison of telecommunication tariffs of selected countries in Africa. Although the cost of local calls is the lowest, Ethiopian telephone connection charges are higher than those of Malawi, Madagascar, Mozambique and neighbouring Sudan.

TABLE 12. RESIDENTIAL AND BUSINESS TELEPHONE TARIFFS 2005

Country	Residential connection charges	Residential connection charges	Business subscription charges	Business subscription charges	Cost of local call in US$
Egypt	87	1.4	173	2.2	0.01
Sudan	21	2.4	21	2.4	0.06
Eritrea	65	2.2	65	2.2	0.04
Kenya	30	6.6	30	6.6	0.11
Ethiopia	41	0.9	41	2	0.02
Djibouti	56	11.3	56	11.3	0.08
Uganda	67	5.6	67	5.6	0.19
Mali	38	8.5	38	8.5	0.10
Madagascar	25	5	25	5	0.21
Zambia	10	2.1	31	4.2	0.08
Mozambique	18	8.3	18	8.3	0.15
Malawi	10	0.8	10	0.8	0.10
Tanzania	35	3.8	35	3.8	0.16
Ghana	101	3.2	101	3.2	0.17

Source ITU Measuring the Information Society, ICT Opportunity Index and World Telecommunications/ICT Indicators, 2007

There was no change to local calls and domestic long-distance tariffs in Ethiopia in the last decade. The international long-distance tariff was revised downward in 2003. All international calls except those to Djibouti cost the equivalent of US$1.15 per minute regardless of geographic region. This is in contrast to the previous pricing regime that grouped international tariffs based on geographic regions namely Africa, Asia, America and Europe.

TABLE 13. DOMESTIC LONG DISTANCE AND INTERNATIONAL TARIFFS

Domestic long distance tariff (3-minute call in US$)				
Year	Local 1-15	16-200	201-300	551-700
1996	0.01	0.06	0.30	.60
2003	0.01	0.06	0.30	.60
International tariff (3-minute call in US$)				
Year	Africa	Europe	Asia	America
1996	1.50	1.87	2.30	2.50
2004	1.15	1.15	1.15	1.15

Source: Ethiopian Telecommunications Corporation, Company Profile 2006

As can be seen from Figure 6, over 50% tariff reduction was achieved in international calls made to America and Asia from 2003.

FIGURE 6. COMPARISON OF INTERNATIONAL TARIFFS 1996/2006
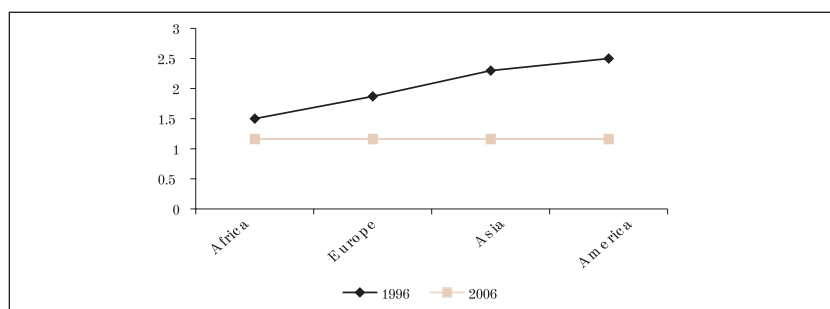
Source: Ethiopian Telecommunications Corporation, Company Profile 2006

The number of international outgoing minutes has increased substantially since price adjustment in 2003. Incoming and outgoing calls have both increased since then, indicating that price adjustment can actually fuel usage. The number of outgoing minutes doubled from 14.3 million in 2003 to 28.7 million minutes in 2006. Similarly, the incoming minutes grew four times from 55 million minutes in 2003 to 240 million minutes in 2006.

FIGURE 7. OUTGOING AND INCOMING MINUTES (MILLIONS)
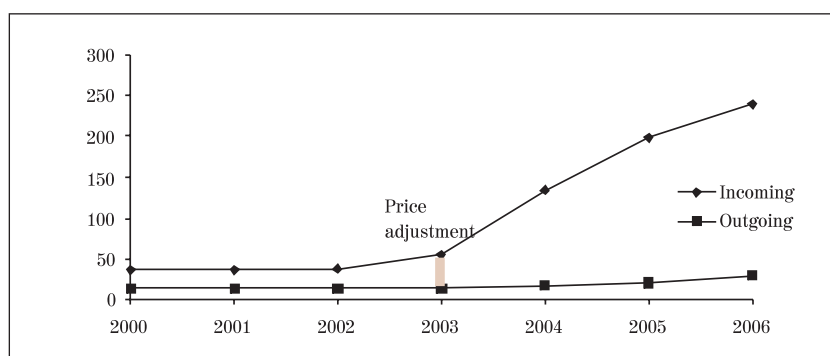
Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletin 2005/2006

CELLULAR PRICING

The mobile service is one of the growing segments of communications in Ethiopia. The number of subscribers has doubled year on year ever since its introduction in 1999. Mobile to mobile call charges stand at about 0.72 Birr per minute (US$0.083). Certainly, the mobile tariff is one of the lowest in the world. This explains why the demand for mobile service is growing. Most people including those in rural areas regard mobile service as a necessity, not as a substitute. There is a saying in Illubabor, one of the remotest areas of Ethiopia that "access to cell phone and marriage cannot be avoided!"

ETC does not have a uniform nationwide mobile tariff, contrary to global trends towards distance neutrality due to the minimum impact distance has on costs. Distance remains important in the mobile tariff setting in Ethiopia, apparently penalising subscribers for mobility. The ETC keeps different numbering schemes for different parts of the country; there are four tariff zones. Calls cost US$.083 a minute within the same tariff zone but double that (about US$.20 a minute) between different tariff zones. A customer from Addis Ababa pays US$0.2 for a call to a customer in Dire Dawa, even if he is in Dire Dawa at the time of the call, simply because the caller and receiver numbers show different tariff zones. The same customer can call his family in Addis Ababa 500 km away, for US$.083. Such tariff structure is not cost-based or supportive of the underlying motive of mobile ownership, mobility, and impacts negatively on usage.

TABLE 14. MOBILE TARIFF

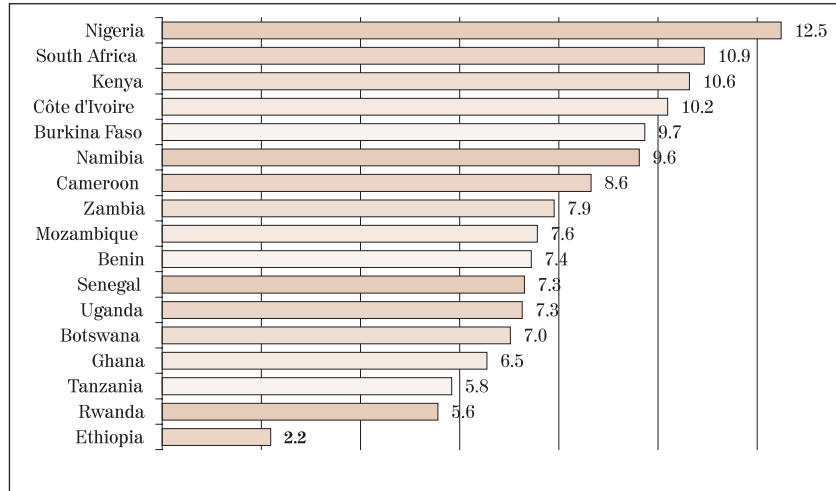|	2005	2006			
		Individual	Business	Public	International
Post Paid subscriptions	Birr 858.90 (US$99)	Birr 858.9 (US$99)	Birr 1132.90 US$131	Birr 944.90 (US$ 109)	Birr 1484 (US$ 172)
Post-paid Monthly fee	Birr 50 (US5.8)	Birr 50 (US5.8)	Birr 50 (US5.8)	Birr 50 (US5.8)	Birr 50 (US5.8)
Prepaid subscriptions	Birr 458.10 (US 53)	Birr 368.1 (US42)	Birr 458.10 US 53	Birr 458.10 (US 53)	Birr 399.00 (US 46)
Post paid / Pre-paid tariff	Mobile to Mobile local – Peak Birr 0.72 (US0.083) per minute Mobile to mobile within different tariff zones Birr 1.50 (US0.20) Mobile to Mobile local off-peak Birr 0.30 (US0.05) per minute Mobile to mobile within different tariff zones Birr 1.25 (US0.15) Mobile to fixed line 0.72 Birr/minute (US0.083 /minute] with same tariff zones 1.50 Birr/minute (US0.20/minute) between different tariff zones International Birr 10 (US1.15) per minute				

Source: Ethiopian Telecommunications Corporation, Company Profile, 2006

The introduction of a pre-paid service has eliminated the monthly subscription fee and encouraged the demand for cellular service. By the end of 2005, 87% of subscribers were pre-paid. Besides avoiding monthly charges, the pre-paid service reduces the need to pay monthly fees by travelling to ETC pay stations. ETC requires its customers to pay monthly charges at designated stations, and penalises those who fail to settle their bills in the specified time of five days, often by disconnecting them from the service. The contract subscription of mobile services is also highly bureaucratic and elaborate. The incumbent requires subscribers to present various documents, letters and guarantees before authorising a contract. This explains why the pre-paid service is becoming so popular in Ethiopia, with over 94% of the subscribers in 2006 using a pre-paid service.

Despite the lack of a non-uniform national tariff, ETC's mobile prices are reasonably low by African standards, perhaps artificially so. The cost of SIM cards is relatively high. ETC has cut the cost of pre-paid SIM cards from US$53 to US$42 in 2006, to encourage subscription following their availability from designated shops. Even with the reduction of fees, SIM cards are still expensive compared to many African countries where they are available free or for a nominal fee.
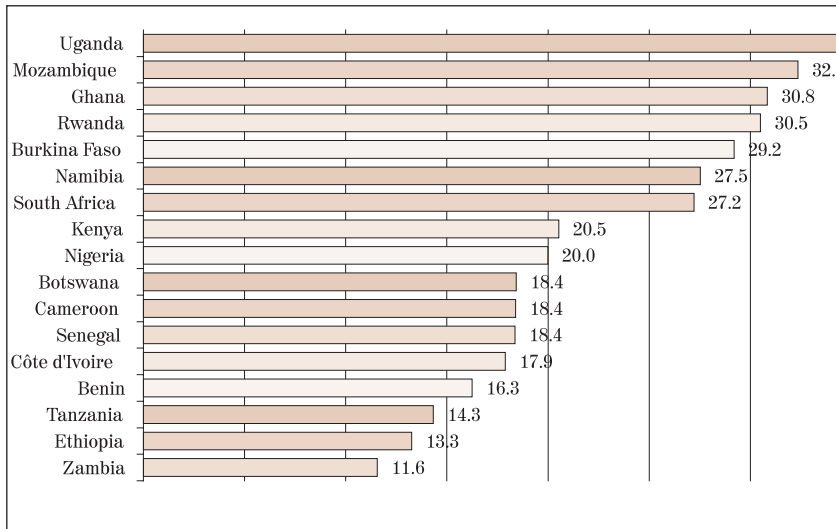
Using an OECD method to establish the cost of a basket for low mobile users that would be aligned to African mobile usage rather than to their middle or high user baskets, RIA!'s comparative analysis of pricing across several African countries demonstrates that prices in Ethiopia remain low, as can be seen in the tables below, either nominally or even adjusted for purchasing power parity. There are obvious caveats to the pricing in the table, as all markets are not evenly liberalised or tariffs rebalanced. So the very low prices in Ethiopia with its very low penetration rates are unlikely to reflect cost-based prices or to impact negatively on their ability to extend the network from current operating profits.

FIGURE 8A. 2006 LOW OECD USER BASKET – COST IN US$ USING NOMINAL END OF 2006 EXHANGE

Country	Value
Nigeria	12.5
South Africa	10.9
Kenya	10.6
Côte d'Ivoire	10.2
Burkina Faso	9.7
Namibia	9.6
Cameroon	8.6
Zambia	7.9
Mozambique	7.6
Benin	7.4
Senegal	7.3
Uganda	7.3
Botswana	7.0
Ghana	6.5
Tanzania	5.8
Rwanda	5.6
Ethiopia	2.2

Source Esselaar, Gillwald and Stork (2007)

FIGURE 8B. 2006 LOW OECD USER BASKET – COST IN US$ USING IMPLIED PPP CONVERSION RATES

Country	Value
Uganda	
Mozambique	32.
Ghana	30.8
Rwanda	30.5
Burkina Faso	29.2
Namibia	27.5
South Africa	27.2
Kenya	20.5
Nigeria	20.0
Botswana	18.4
Cameroon	18.4
Senegal	18.4
Côte d'Ivoire	17.9
Benin	16.3
Tanzania	14.3
Ethiopia	13.3
Zambia	11.6

Source Esselaar, Gillwald and Stork (2007)

The low level of economic activity, lower mobile tariffs and absence of mobile value added services such as Short Messaging Service (SMS) means the incumbent was not able to derive much revenue from the mobile segment. Table 15 shows that the proportion of revenue did not grow with the number of cellular subscribers.

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TABLE 15. CELLULAR REVENUE

Year	2001	2002	2003	2004	2005	2006
Number of subscribers	27 532	42 950	51 234	155 534	410 630	866 709
Mobile revenue in million US$	12	14	19	29	60	69
ARPU	US$36	US$26	US$31	US$16	US$10	US$$7

Source: ETC Annual Statistical Bulletin, 2005/2006

The cellular average revenue per user has fallen over the last five years. The ETC earned about Birr 603.8 million from mobile services in 2006. This translates to an average revenue per user of Birr 58 (US$7), a very low figure compared to neighbouring countries like Kenya and Uganda where ARPU lingers around US$12. The falling of the ARPU contradicts with government's original assumption that the mobile sector is a "cash cow" for the government. The ETC needs to introduce innovative packages to encourage mobile usage and improve the ARPU.

INTERNET PRICING

Internet pricing has been revised downward in 2005 following the adjustment in 2002 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. The price was quoted in US$ but was payable in local currency. Earlier than 2002, the ETC assumed that Small Home Small Office (SOHO) users do not need more than eight hours' access to the Internet and should pay US$4 for additional hours they spend browsing the net. Such a fee structure was unsustainable.

TABLE 16. INTERNET USAGE FEE STRUCTURE BEFORE 2000, 2002, 2006

Category	Year	Set up	Monthly charge	Service	Additional hours	30 hrs (Internet + phone + tax)
Individuals /Private company	2000	US$56	US$19	8 hrs 1 MB	US$4	US$132
Individuals		US$75	US$34	15 hrs 1 MB	US$4	US$118
International NGOs		US$113	US$75	40 hrs 1 MB	US$4	US$96
Public Institutions		US$38	US$25	40 hrs 1 MB	US$2	US$39
Non-profit		US$56	US$38	40 hrs 1 MB	US$2	US$54
All Subscribers	2002	US$38				US$40
All subscribers	2006	US$20	US$7			US$26

Source: Ethiopian Telecommunications Corporation, Company Profile 2006

The ETC revised access prices downward by about 50% in 2002 and again by another 50% in 2005. The downward revision has eliminated the differential fees. Customers are billed based on the amount of usage, and those who browse the Internet for a longer period are rewarded. Consequently, the total cost of dialup Internet access has dropped from US$40 a month to US$26 a month between 2002 and 2006 as shown in Table 17.

TABLE 17. COMPARISON OF COST OF DIAL UP ACCESS BETWEEN 2002 AND 2006

2002	
Cost of communication	**Cost of dialup access**
Connection fee Birr 305 (US$35)	Connection Fee: Birr 332 (US$38.5)
Monthly rental:	Monthly Rental Fee : Birr 23 (US$2.65)
Business: Birr 17 (US$1.98)	
Residential: Birr 8 (US$0.93)	
Monthly telephone charge for 30 hours:	Internet Usage Fee Schedule
Rental+subscription+VAT	Up to 1800 minutes Birr 0.11/minute
Residential: Birr 75 (US$9)	1801-3600 minutes Birr 0.08/minute
Business: Birr 88 (US$10)	Above 3600 minutes Birr 0.06/minute
	Monthly Fee for 30 hrs Birr 254 (US$30)

<div align="center">

2002 Total Telephone and Internet cost for 30 hours a month

Residential users Birr 330 (US$39)

Business users   Birr 342 (US$40)

</div>

2006	
Cost of communication	**Cost of dial up access**
Connection fee Birr 305 (US$35)	Connection Fee: Birr 156 (US$18)
Monthly rental:	Monthly Fee:
Business Birr 17 (US$1.98)	Birr 60 (US$7)
Residential Birr 8 (US$0.93)	Thirty hours fee: Birr 141 (US$16)
Monthly telephone charge for 30 hours	
Rental+subscription+VAT	
Residential: Birr 75 (US$9)	
Business: Birr 88 (US$10)	

<div align="center">

2006 Total Telephone cost and Internet charge for 30 hours = US$26

</div>

Source: Ethiopian Telecommunications Corporation, Company Profile 2006.

The downward revision of Internet tariffS in 2005 has contributed to increased usage and subscription, suggesting that competition in this segment will continue to fuel usage. Figure 9 shows a sharp rise of Internet subscription between 2005 and 2006.

FIGURE 9. INTERNET SUBSCRIBERS
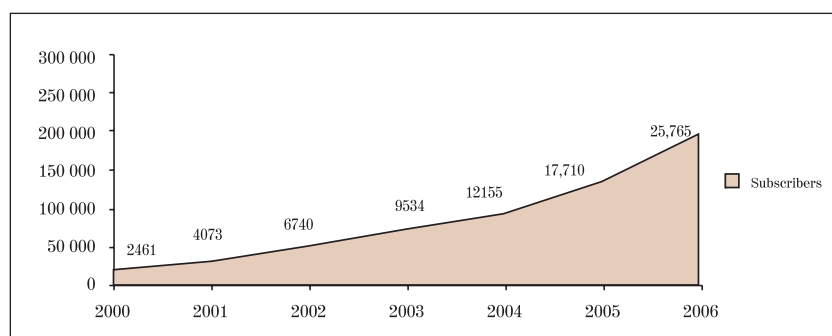
Source: Ethiopian Telecommunications Corporation

However, income has not changed in real terms over the last ten years, so even with reduced charges, the cost of communication services remained high for the majority of Ethiopians. Using the global measure of 30 hours, Internet usage costs of US$26 represent a quarter of the salary of an average schoolteacher or a nurse. These are unlikely to access the Internet unless it is available at the closest public access centres or at schools and clinics – a reminder for the need to extend access to institutions where the majority of Ethiopians work and live.

The revision of tariffs in 2002 had a significant impact on the revenue of the incumbent. Internet revenue plummeted in 2003 but has since recovered. Figure 10 shows that on the average Internet revenue is growing in line with the number of subscribers since 2005.

FIGURE 10. INTERNET SUBSCRIBERS AND REVENUE GROWTH YEAR ON YEAR 2000-2006
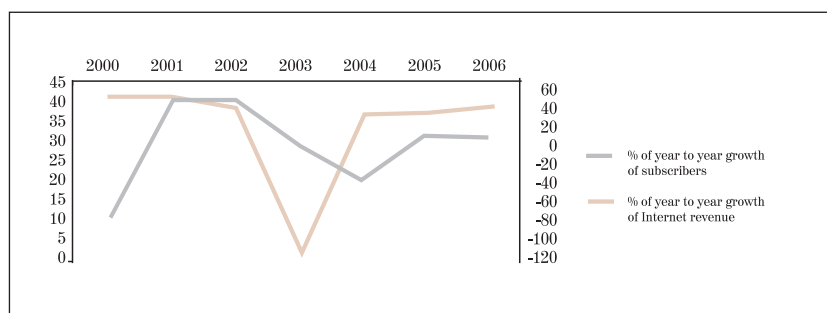
Source: Ethiopian Telecommunications Corporation, Annual Statistical Bulletins 2000-2006

On the other hand, the downward revision encouraged the proliferation of cyber cafés that resell dial-up access to occasional Internet users at reduced prices. Cyber cafés charge between 20 to 60 cents a minute. The majority of cyber cafés in Addis Ababa charge Birr 0.30 a minute. The per hour cybe café charge ranges between US$1.40 to US$4.20 with the majority charging around US$2 an hour.

TABLE 18. CYBER CAFE USAGE CHARGES

Cyber Café charges to users		
Highest charge per hour	Birr 36	(US4.20)
Average charge per hour	Birr 18	(US2.10)
Lowest charge per hour	Birr 12	(US1.40)

Source: Survey by the Author

BROADBAND ACCESS PRICING

The availability of shared DSL and broadband fixed wireless access has also prompted the ETC to introduce a new tariff to attract small businesses and institutions. The shared DSL and wireless access price is reasonably affordable for institutions that would like to be online most of the time. The number of subscribers has improved following revision of the tariff. There were about 800 subscribers to the broadband services in 2006.

TABLE 19. BROADBAND MULTIMEDIA SERVICE TARIFFS

Speed	Type of service	Inclusive of equipment installed for the customer		Exclusive of equipment installed for the customer	
		Pre-service payment	Monthly fee	Pre-service payment	Monthly fee
64 KBps	ADSL	US$530	US$228	US$410	US$207
	BFWA data only	US$835	US$282		
	BFWA data and voice	US$1467	US$395		
128 KBps	ADSL	US$869	US$361	US$746	US$299
	BFWA data only	US$1.172	US$415		
	BFWA data and voice	US$1.803	US$867		
256 KBps	ADSL	US$1.600	US$700	US$1.480	US$680
	BFWA data only	US$1.906	US$754		
	BFWA data and voice	US$2.538	US$867		
512 KBps	ADSL	US$3.069	US$1.380	US$2.950	US$1.360
	BFWA data only	US$3.376	US$1.434		
	BFWA data and voice	US$4.007	US$1.546		
1 MBps	ADSL	US$6.010	US$2.740	US$2.889	US$2.718
	BFWA data only	US$6.314	US$2.794		
	BFWA data and voice	US$7.291	US$2.905		
2 MBps	ADSL	US$11.886	US$5.457	US$11.766	US$5.436
	BFWA data only	US$12.192	US$5.512		
	BFWA data and voice	US$12.824	US$5.624		

Source: Ethiopian Telecommunications Corporation, Company Profile 2006

The absence of competition in international links means that cost of international bandwidth remained prohibitive in Ethiopia. A new 64 KBps link costs the private sector US$7 432 a month (US$116 k/month), fifty times the average price available to many institutions in Africa. Table 19 shows that a 1 MBps line costs US$58 433 a month – ten to 20 times the average price currently available from service providers in Africa.

TABLE 20. INTERNATIONAL LEASED CIRCUIT TARIFF

	To connect with the currently operational link	To connect with the newly established link in the future		
	For business and NGOs	Non-profitable governmental organisations	For business and NGOs	Non-profitable governmental organisations
64 KBps	4 515	3 215	7 432	6 132
128 KBps	7 775	5 175	10 692	8 092
256 KBps	15 012	9 812	17 929	12 729
512 KBps	29 485	19 085	32 402	22 002
1 MBps	58 433	37 633	61 350	40 550
1.5 MBps	87 380	56 180	90 297	59 097
2 MBps	116 327	74 727	119 224	77 644

Source: Ethiopian Telecommunications Corporation: Company Profile, 2006

Figure 11 shows comparison of the cost of international satellite bandwidth in selected countries in the region based on the data compiled by Balancing Act Africa in August 2006. It is clear from the figure that the cost of international bandwidth in Ethiopia is high compared to neighbouring countries such as Kenya, although it somewhat comparable to that of Cameroon and Malawi.

FIGURE 11. COMPARISON OF INTERNATIONAL TARIFF
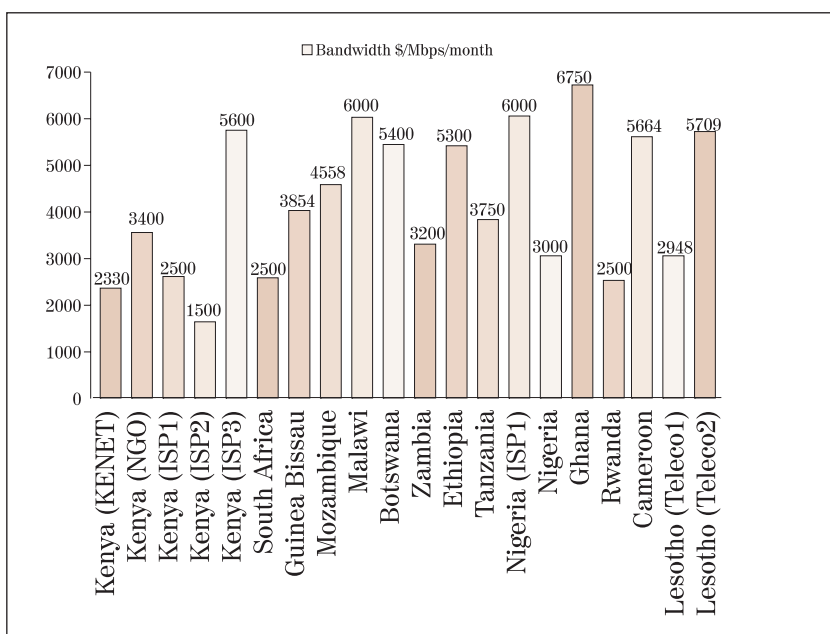
Source: Balancing Act Africa, Africa Satellite Report 2006

ETC rates for web hosting and other Internet-related value-added services such as domain registration are also high when compared to international pricing for domain registration and web server space.

TABLE 21. INTERNET SERVICE TARIFF

Additional email box	US$2.3/month
Disk space for data	US$2/MB
Disk space for radio	US$5/MB
Domain name registration fee	US$58/year
Internet setup fee	US$48

Source: Ethiopian Telecommunications Corporation: Company Profile 2006

Telecommunications Regulatory Environment Perception in Ethiopia

A telecommunications regulatory environment perception survey was carried out in December 2006 to solicit the views of the private sector, academics and government entities regarding the telecommunications regulatory environment, particularly market entry by the private sector based on a methodology designed by RIA!'s sister network LIRNEasia (Samarajiva et al 2005). The Telecom Regulatory Environment (TRE) methodology asserts that regulation alone is not enough – it has to result in good performance. Therefore the perception of the private sector and academics on the risk of telecommunication sector investment would be useful 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. These dimensions are measured on a five point Likert scale from (1) highly ineffective, (2) ineffective, (3) neither ineffective nor effective, (4) effective, (5) highly effective.

Applying the TRE methodology to the telecommunications monopoly setting in Ethiopia was found difficult for two reasons. First the outcome of such a survey was all too obvious. One participant noted that "the outcomes are well known, there is no competition, interconnection and tariff-regulation here." Another academic stated that "it is difficult to say that we have regulation with a monopoly operator and a weak regulator." Samarajiva & Dokeniya (2005) also concluded that, "the question of the effect of TRE on investment decisions makes sense only in an environment where market forces dominate." The dimensions and scope of regulatory performance and status of telecommunications regulatory environment in Ethiopia are shown in Table 22.

TABLE 22. TELECOMMUNICATIONS REGULATORY ENVIRONMENT OF ETHIOPIA

| 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. License conditions, exclusivity issues.	Monopoly market, communication license can only be issued to the incumbent operator. Other's such as VSAT license can only be issued to international organizations 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. Frequency allocation.	Radio frequency allocation has not been an issue under command and control system except for a few FM radio stations that were licensed to operate.
Interconnection	Interconnection with a major operator should be ensured at any technically feasible point in the network. Quality of interconnection should be equivalent to the incumbent's and access charges should be reasonable. Interconnection should be offered promptly.	Absence of competition in both fixed and mobile market means interconnection is not a major pre-occupation in Ethiopia.
Tariff Regulation	Tariff regulation of charges to consumers.	Tariff is set by the incumbent and not regulated.
Anti-competitive Practice Regulation	Anti-competitive cross-subsidisation, use of data obtained from competitors with anti-competitive results, excessive prices, price discrimination and predatory pricing, refusal to deal and cross-subsidies.	Not applicable under a monopoly setting where there is no competition.
Universal Access	Access to underserved areas, expanding access to ICTs including the Internet to rural areas.	Universal access strategy is absent except for rural infrastructure rollout by the incumbent and a rural connectivity project to connect 15 000 villages.

Based on: Samarajiva et al (2005)

The second challenge was finding the right individuals with some regulatory background to participate in the survey. Telecommunications regulatory environment expertise and overall knowledge of the telecommunications market are in short supply in Ethiopia.

However, in an effort to bring objectivity to and create baseline data for future assessments, the opinions of 15 knowledgeable persons (stakeholders from academia and the private and public sectors) were collected. It was not possible to assemble all of the respondents in one place. Instead questionnaires were taken directly to individuals who were regarded as knowledgeable on the issue of regulation. E-mail was used in cases where the individuals were difficult to reach. All but two responded to the survey.

The survey has also shown that it is difficult to gather objective assessment of the telecommunications regulatory environment in Ethiopia due to cultural, social, political and organisational factors and different

vested interests. Telecommunications regulation, particularly the issue of competition, is a sensitive subject in Ethiopia. For example, academics with some affiliation to public organisations were not forthcoming in criticising the telecommunications regulatory environment. Perception is shaped based on where one stands vis-a-vis government's interest, as shown in figure 12.

FIGURE 12. CONTINUUM OF PERCEPTION OF TELECOMMUNICATIONS REGULATORY ENVIRONMENT
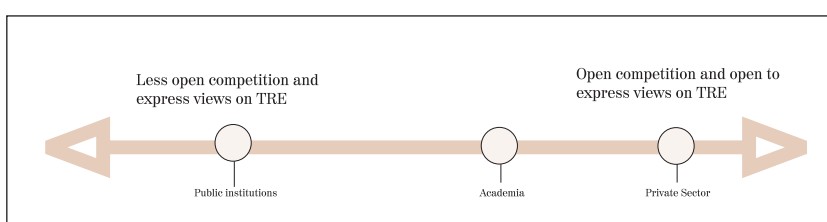
Overall, there was consensus among all the participants that the market entry and the quality of service of the telecommunications sector are highly ineffective and tariff regulation and interconnection are also ineffective. The majority of respondents felt that access to scarce resources such as radio frequency spectrum, and tariff regulations, are not effective. The anti-competitive practice is poor since there is no competition in the telecommunications sector in the first place. Survey participants agree that recent progress in rolling out telecommunications has improved access to underserved areas and the progress is effective. Table 23 summarises the median of perceptions of the telecommunications regulatory environment.

TABLE 23. SUMMARY OF PERCEPTION ON TELECOMMUNICATIONS REGULATORY ENVIRONMENT

Dimension of Telecommunications Regulatory Environments	Perception
Market Entry	Highly Ineffective
Interconnection	Ineffective
Quality of Service	Highly Ineffective
Tariff Regulation	Ineffective
Scarce Resources	Ineffective
Regulation of AnticompetitivePractices	Highly ineffective
Universal Access	Effective

The findings indicate that the regulatory framework was not effective in promoting competition, interconnection, regulation of tariff and quality of service. In comparison with regulatory perception surveys, which do

not simply assess the regulator but the entire telecommunications regulatory environment which include the policy framework and regulatory effectiveness, Kenya fared badly with the third most negative perception of the eight countries surveyed, and in which only two countries, Nigeria and Côte d'Ivoire , were viewed positively.

FIGURE 13. EFFICIENCY OF REGULATORY ENVIRONMENT – INTERCONNECTION AND FACILITIES: COMPARISON OF SELECTED AFRICAN COUNTRIES
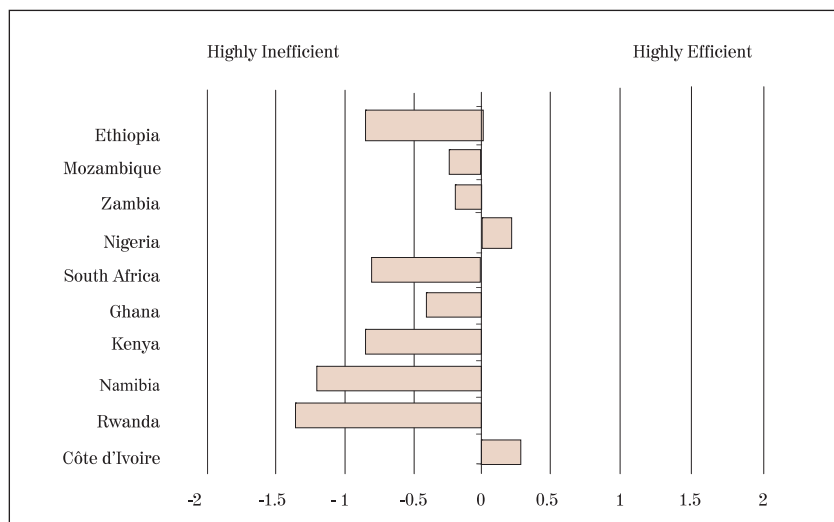
Source: Gillwald and Esselaar, (2007)

Conclusion: Responding to Policy and Regulatory Challenges

The Sector Performance Review and Telecommunications Regulatory Environment survey indicate that policy and regulatory challenges are central to ICT sector development in Ethiopia. Recommendations to address the underlying challenges to telecommunications sector policy and regulation can be grouped into four areas:

- Dealing with inefficiency and ineffectiveness of the incumbent operator in responding to customer needs and the demands of public and private institutions for connectivity, communications and data exchange services. The situation was exacerbated by the defunct billing system and ETC's focus on rolling out a massive infrastructure in recent years;
- Improving the utilisation of existing broadband infrastructure;
- Enhancing the legitimacy of the regulator;
- Building human resource capacity to manage the dynamic ICT, regulatory and communications market environment.

DEALING WITH INEFFICIENCY AND INEFFECTIVENESS OF THE INCUMBENT

The ETC is one of the vast organisations with over 11 234 employees and 904 service stations throughout the country, implementing a host of projects ranging from backbone infrastructure to linking telephone lines to households. The monopoly over all communication-related services has made the incumbent increasingly less efficient and effective as its work force increases and its mandate expands. The quality of service has fallen considerably over the last two years, resulting in limited network connection, call completion rates and deteriorating customer care. The actual bundling of mobile, fixed and Internet and Value Added Service was another contributor to the slow response to services. ETC has launched a process of separating the different parts of its business into "profit centers", with a clear distinction between the transport and service access divisions. However, this categorisation was to suit the monopoly structure and centralised management rather than unbundling mobile, Internet and fixed services to improve service quality and access.

ETC's recent "outsourcing" of its infrastructure to vendors through vendor financing may improve its attention to the quality of service, but the underlying inefficiency cannot be addressed without crafting a strategy that combines vendor financing of infrastructure with the gradual introduction of competition into the sector. The gradual participation of the private sector in various segments (down-stream, Internet, mobile and fixed) would not only improve competition but also relieve the government from the investment burden in telecommunications.

The gradual introduction of competition to the communication sector would:

- Reduce government and ETC reliance on vendors for building the infrastructure, at the same time promoting innovation, quality of service and standards;
- Assist in building the capacity of the private sector, particularly the Ethiopian high-tech communications businesses that will be able to compete at regional and global levels;
- Allow for the regulator to gain valuable experience that would prepare it to assume a key regulatory role when the market is fully open to competition.

In the short term, the regulator needs to establish quality of service benchmarks and make the incumbent accountable for those quality standards. This requires:

- Building the capacity of the regulator in defining quality benchmarks, auditing QoS reports that are submitted by the incumbent;
- Empowering the regulator to apply the appropriate sanction when the incumbent fails to meet those standards;
- Putting consumer protection frameworks into place, including complaint registration and resolution procedures.

IMPROVING THE UTILISATION OF EXISTING COMMUNICATIONS INFRASTRUCTURE

The government has in recent years spent a significant amount of resource on rolling out broadband infrastructure and linking up schools, universities, agricultural research institutions and public institutions. The broadband multimedia network that was inaugurated in June 2004, and 4 000 km of fibre connections to various towns, are among the major infrastructure investments. However, the overall utilisation of the broadband network has been very low. While connectivity to health, education and public sectors may improve the use of existing bandwidth, experience shows that intensive use of the broadband network depends on availability of a wide range of applications to different users, delivered by the private sector, and affordable broadband tariffs.

On the other hand, while recent investment in the communications sector and launching high profile projects are encouraging, spending on ICT by itself is no guarantee of its effective use or higher productivity. A significant policy shift is required by the government to improve the utilisation of the available broadband infrastructure through:

- Opening up the market for Internet and content providers that add value to public sector applications and Internet services;
- Driving broadband take up by revising broadband access tariffs to match global practices and streamline network installation processes;
- Reviewing, monitoring and evaluating the progress made in imple-

menting large-scale ICT projects like Schoolnets, to build on strengths and mitigate failures or partial failures.

IMPROVING THE LEGITIMACY AND CAPACITY OF THE REGULATOR

The weakness of the regulator was frequently cited as a major drawback to the liberalisation of the telecommunications sector in Ethiopia. However, it is difficult to build the capacity of a regulator when it is entirely dependent on government for its authority. On the other hand, the introduction of competition will not be effective without regulatory capacity and political will. Positive regulatory results can only occur when government begins to introduce competition in the telecommunications sector to drive the more efficient allocation of resources.

Firstly, ETA's governance framework needs to change from being fully dependent on the government to becoming an institution with independent commissioners or board to be seen as legitimate in the eyes of consumers and investors while maintaining its allegiance to the government. It should be free from political pressure in its decisions to promote competition in the communication sector. It should have 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.

Secondly, 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 governs 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. ETA's capacity should be built in:

- Designing and implementing universal access strategies;
- Improving its understanding of broader issues of competition and liberalisation;
- Consumer pricing and tariffs in the telecommunications sector;
- Radio frequency management, licensing and pricing;
- Establishing a framework for following up with technical standards; and
- Pricing and regulation of Internet and postal services.

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

Technical and Policy Capacity Development

One of the recurrent challenges observed during this review was Ethiopia's lack of adequate human resource capacity to deal with complex ICT market, regulation and policy issues, and to implement large socio-technical projects like Schoolnet. The establishment of the College of Telecommunications and IT and graduate schools in computer engineering, informatics, etc, is a good step towards developing a technical capacity in the sector. Such effort should be matched by building policy and regulatory capacity at all levels – senior policymakers, regulators, middle managers, experts and technicians. Technical and policy capacity can only be developed through years of education and work experience, and it is hasty to assume that all is well through graduate education and short-term training. Policymakers need to aim for long term technical and policy and regulatory capacity development. In the short term there is a need to:

- Build the capacities of those dealing with large-scale socio-technical projects like Woredanet and Schoolnet through mentorship and on the job training by experienced specialists in social and technical aspects of ICT application in development;
- Appoint independent and neutral advisors on ICT and development drawn from the diaspora, eminent scientists and local implementers, to utilise local knowledge and encourage knowledge flow on infrastructure, policy, regulation, application and sector development issues and to allow the government to undertake ongoing strategic review of the direction of the ICT sector and make policy and decisions appropriate to local context rather than borrowing from inappropriate experience elsewhere;
- Improve the awareness of policymakers of the challenges of new technologies, particularly IP networks and the associated regulatory challenges.

Capacity-building will, however, be futile without a governance framework that allows the sector to thrive through gradual introduction of competition and a flexible regulatory structure to enable it.

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