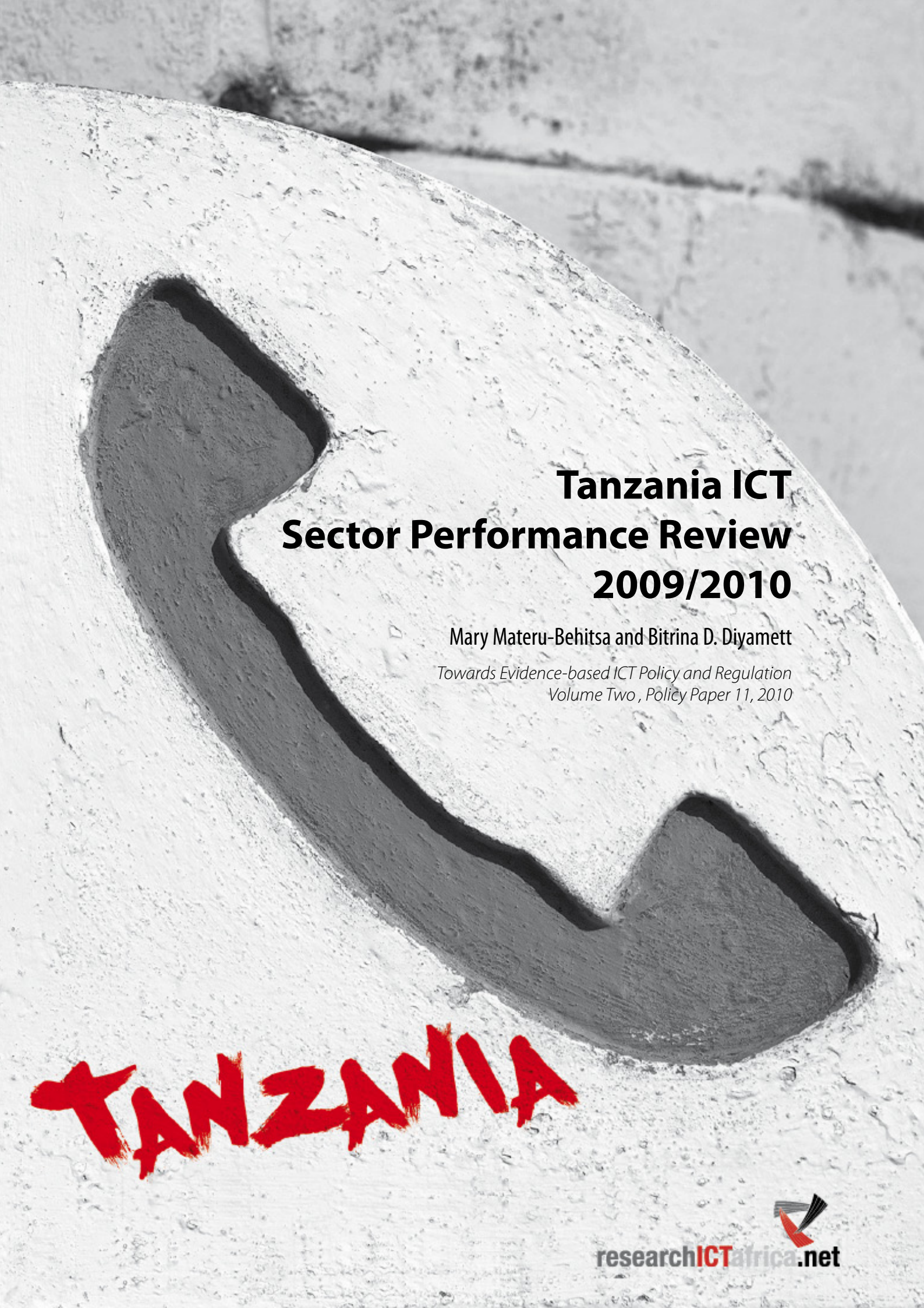

Tanzania ICT Sector Performance Review 2009/2010

Mary Materu-Behitsa and Bitrina D. Diyamett

Towards Evidence-based ICT Policy and Regulation
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Research ICT Africa

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

Biography

Bitrina Diyamett is an Executive Director of ATPS-Tanzania, which is an NGO charged with independent policy research in science, technology and innovation (STI). She previously worked with the Tanzania Commission for Science and Technology (COSTECH) as programme officer for the coordination of social science research, including policy research in science, technology and innovation, in the country. Bitrina holds a Masters degree in Science and Technology Policy from Research Policy Institute (RPI) Lund University, Sweden, and a PhD in Development Studies from the University of Dar es Salaam, Tanzania. Bitrina has earned a fair share of consultancies and publications in the area of science, technology and innovation policy. Much of her past and current research work and publications - including PhD thesis - has focused on systems of innovation in the context of least developed countries.

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ATPS-Tanzania

Africa Technology Policy Studies Network, Tanzania Chapter (ATPS-Tanzania)

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Executive Summary

Tanzania's telecommunications sector was the fastest growing sector of the economy in 2009, recording 21.9% growth, up from 20.5% in 2008. The sector contributed 2.1 % to the GDP in 2009, up from 2.5% in 2008 (Tanzania Budget Speech 2010/11).

A milestone in telecom liberalization was achieved by the establishment of the Telecommunications Regulatory Authority (TCRA) in 2003

The Communication Act of 1993 paved the way for the liberalization of the telecommunication sector, while the National Telecommunication Policy (NTP) of 1997 provided the framework for further reforms and private-sector engagement in the sector. A milestone in telecom liberalization was achieved by the establishment of the Telecommunications Regulatory Authority (TCRA) in 2003 as an independent agency for the regulating and licensing of postal, broadcast and communication industries. The TCRA is mandated to promote competition and economic efficiency, protect consumer interests, grant licenses and enforce license conditions, regulate tariffs, and monitor performance.

Under the TCRA, the number of licensed telecommunications operators increased from 5 in 2003 to 62 in 2009. Most of these were issued under the Convergence Licensing Framework (CLF), which the TCRA effected in 2006. Voice subscribers (mobile and fixed-line) increased from about 1.5 million in 2003 to 17 million in 2009, while tele-density increased from 4% to 43% during the same period. Private sector engagement, which was facilitated by the liberalisation of the sector, increased competition, improving services and reducing tariffs. For example, pre-paid telephone tariffs dropped on average by about 40% from Tshs 359 (US$0.3) per minute in 2003 to Tshs 216 (US$ 0.2) per minute in 2009.

The line ministry, the Ministry of Communications, Science and Technology, provides a policy guide. Policy guides include the National ICT Policy of 2003, and the National Telecommunications Policy of 1997. The legal framework is provided by the Tanzania Communications Act of 1993, the Tanzania Broadcasting Services Act of 1993, the Tanzania Communications Regulatory Authority Act of 2003, and the Universal Communications Service Access Act of 2006.

Given the dynamic nature of the telecommunications sector, these policies, legal provisions and regulations require regular review to accommodate new services and a changing business environment. For example, the Tanzania ICT Policy lacks provisions for electronic money transactions and electronic transactions in government business. In terms of the regulatory environment, the sector has regulations for broadband, consumer protection, content licensing importation and distribution, installation and maintenance, interconnections, numbering and electronic address, radio communication, spectrum, tariffs and quality of service.

In terms of market structure, the telecommunication market comprises licenses for network carrier infrastructure development, network services for fixed and mobile operations and network applications services.

The fixed-line subscriber base has been eroded by the mobile market

The fixed-line subscriber base has been eroded by the mobile market. While fixed-line subscriber numbers increased from 154,420 in 2005 to 172,922 in 2009, the number of mobile SIM cards sold increased from 3.5 million to 17.5 million. There are two fixed-line operators (TTCL and Zantel), while there are seven mobile operators. In terms of tariffs, the minimum mobile telephone voice pricing is 1 shilling per second within the same network. Generally, on-net tariffs are lower than off-net tariffs. Internet penetration is about 1.3%, and the number of internet users is estimated to be 520,000. There are 23 registered internet service providers.

Human resource development for the sector is not adequate, although engineering and ICT training institutions have increased enrolments. For example, university enrolments in engineering, science and ICT rose from 3,334 in 2001 to 6,404 in 2005.

Tanzania is implementing a national backbone project. The roll-out for a national backbone is underway and expected to be ready by 2011. The terrestrial backbone will be critical to a country sharing planned undersea cables, the first of which, SEACOM, reached Dar es Salaam in July 2009. Preparations for its deployment were inadequate. To date there is still debate on its management, distribution and utilization, with only a few ISPs connected.

Broadcasting is largely analogue, with the wider population using free-to-air transmission

Broadcasting is largely analogue, with the wider population using free-to-air transmission, although preparations for the switch over to digital broadcasting are taking place. Radio broadcasting is by far the most popular media in rural and semi-urban areas.

There are three e-money schemes: M-pesa (Vodacom), ZAP (Zain) and Z-Pesa (Zantel) and three banks offer mobile banking services. Although the government has embraced e-government as a major driving force behind efficient and effective transactions in government departments, there are big challenges posed by the demand for requisite infrastructure, policies, capacity development, ICT applications and content development in the national language, Kiswahili.

Social and Economic Background

Country Profile

Tanzania has an area of 945,000 sq km (365,000 sq miles) and a population of about 40 million. Dodoma is the official capital and the seat of the parliament, while Dar es Salaam is the commercial capital and home to many government institutions and diplomatic missions. There are about 120 ethnic groups on the mainland, although none exceeds 10% of the population, as well as minority Asian and expatriate communities. The national and official language is Kiswahili, which is most widely spoken. English is used for international communication and as a medium of instruction for secondary and higher education. Tanzania adopted a multi-party political system in 1992 and has been a relatively stable country, having held peaceful elections every five years since 1995.

There are about 120 ethnic groups on the mainland, although none exceeds 10% of the population, as well as minority Asian and expatriate communities

Table 1: Tanzania Demographic and Economic Status[1]

Indicator	Data
Area	945,000 sq km (365,000 sq miles)
Population	43,187,823 (NBS projection for 2010)
Urban population	11,378,015 (NBS projection for 2010)
Rural population	31,809,808 (NBS projection for 2010)
Population growth	2.9% (2002 estimate)
Years for compulsory schooling	7
Literacy rate	80.2% (2005 estimate)
Gross Domestic Product (GDP)	US$12.1 billion (2005)[2]
GDP - Per Capita	US$316 (2005)
Inflation rate	12.7 (2008), 12.5 (2009)
Currency and Exchange rate	Tanzanian Shillings (TZS): 1US$ = 1,317.5 TZS (2009)
Labour force	20.8 Million
Contribution of Communication Sector to the GDP	20.1% (2007)[3]
Life expectancy	46 years
Infant mortality rate	85.8 deaths/1000 live births (2007 estimate)

Economic Status

Tanzania's economy relies heavily on agriculture, which accounts for nearly half of GDP and employs 80% of the workforce. Tourism is growing in importance and ranks as the second highest foreign exchange earner. Mineral production has grown significantly in the last decade and provides over 3% of GDP and accounts for half of Tanzania's exports.

Long-term economic growth through to 2005 featured a pickup in industrial production and a substantial increase in minerals output. Banking reforms in the second half of the decade helped increase private-sector growth and investment. Continued donor assistance and macroeconomic policies supported this positive growth rate, despite the world recession. According to the Ministry of Finance and Economic Affairs (2009), Tanzania recorded good economic performance in 2009. In 2008, the GDP grew by 7.4% compared to 7.1% in 2007, which is within the projected target of 6 to 8 percent by 2010. The thrust of government policy during the year 2008/09 was to consolidate achievements and promote growth through strengthening operational efficiency and enhancement of strategic resource allocation for infrastructure development and projects with a multiplier effect on the economy.

Banking reforms in the second half of the decade helped increase private-sector growth and investment

[1] Unless otherwise stated, source of data is National Bureau of Statistics (NBS)
[2] URT (2008) Statistics Handbook on Communications, Science and Technology 2007/2008
[3] URT (2008) Statistics Handbook on Communications, Science and Technology 2007/2008

Table 2: Real GDP Growth Rate 2001-2008

2001	2002	2003	2004	2005	2006	2007	2008
6	7.2	6.9	7.8	7.4	6.7	7.1	7.4

Source: National Economic Survey (2009)

The Status of Telecommunication Sector Development

the Communications Act of 1993 paved the way for the government's move to liberalize the communications sector

Before the liberalization of the telecommunication sector, the telephone communication service was the monopoly of the TTCL, a state-owned company under the Tanzania Posts and Telecommunications Corporation (TPTC). The TTCL held a monopoly in the provision of communication and was also responsible for the regulation of the telecommunication sector. In the context of a wider economic liberalization policy in the country, the Communications Act of 1993 paved the way for the government's move to liberalize the communications sector. This led to the split of the TPTC into the Tanzania Posts Corporation (TPC), the Tanzania Telecommunications Company Limited (TTCL) and the Tanzania Communication Commission (TCC). The National Telecommunications Policy (NTP), launched in 1997, pushed for further reforms in the sector. Today, telecommunications is one of the most liberalised sectors of the economy in Tanzania. Due to convergence of information and communication technologies and respective services, regulation of Tanzania Communication Commission and the Tanzania Broadcasting Commission (TBC) activities were subsumed under one agency, the Tanzania Communications Regulatory Authority (TCRA). The TCRA is an autonomous government agency established by the TCRA Act no. 12 of 2003 as an independent authority for the regulation and licensing of postal, broadcasting and electronic communications industries in the United Republic of Tanzania.

The establishment of the TCRA marked a new era for the communications sector in Tanzania that has been characterized by growth in investments and operations including penetration. The TCRA effected a Converged Licensing Framework (CLF) in 2005. Under CLF, TCRA has issued licenses under Network Facility (NF), Network Service (NS), Application Service (AS), and Content Services (CS) categories. In a phasing out arrangement, licenses are also issued under the old regime in the areas of Public Data Operators Licenses, Internet Service Providers, Private Dedicated Data Communications, and Postal and Courier Operators.

The number of ISP and data operators increased from 22 in 2003 to 62 in 2009

The number of ISP and data operators increased from 22 in 2003 to 62 in 2009 (Table 3), voice subscribers (both fixed and mobile) increased from 1,445,006 to 17,642,408 (Table 4), and prepaid voice (telecommunication) per minute tariffs decreased by about 40% over the same period (Table 5).

Table 3: Licensed Telecommunication Operators

Number/Year	2003	2004	2005	2006	2007	2008	2009
Voice Mobile Operators	5	5	5	6	6	6	7
ISP/Data Operators	22	23	23	25	34	60	62

Source: TCRA

Table 4: Voice Subscriptions

Number/Year	2003	2004	2005	2006	2007	2008	2009
Fixed Network Subscriptions	147,006	148,360	154,420	151,644	163,269	123,809	172,922
Mobile Network Subscriptions	1,298,000	1,942,000	2,963,737	5,614,922	8,322,857	13,006,793	17,469,486
Total Subscriptions	**1,445,006**	**2,090,360**	**3,118,157**	**5,766,566**	**8,486,126**	**13,130,602**	**17,642,408**
Teledensity (Penetrations)	4%	6%	10%	15%	21%	32%	43%*

Source: TCRA 2010
**Percentage of the population against SIM cards sold*

Table 5: Prepaid Voice Telecom Tariffs per Minute (T.Shs)

Year	2003	2004	2005	2006	2007	2008	2009
On-net Calls	270	247	256	251	233	244	199
Off-net Calls	375	337	356	326	330	340	352
East Africa Calls	569	437	449	356	342	338	355
International Calls	1,940	1,526	1,651	551	499	500	501
Average Tariff	359	312	328	267	256	264	216

Source: http//www.tcra.go.tz

Policy and Regulatory Development

Overview

The main policies guiding developments in the telecommunications sector are the National Telecommunications Policy (1997), the National ICT Policy (2003), The National Postal Services Policy (2003) and the National Information and Broadcasting Policy (2003).

The National Telecommunications Policy of 1997 is the basic document and provides vision to 2020. The policy aims at ensuring accelerated development of telecommunications infrastructure and services so as to accelerate access to telecommunication services by all sectors of the national economy as part of the national development strategy.

Tanzania's ICT Policy was approved by parliament in 2005 to provide Government guidance on ICT issues

Tanzania's ICT Policy was approved by parliament in 2005 to provide Government guidance on ICT issues.

Lack of an overall ICT Policy and poor harmonization of initiatives had previously led to the random adoption of different systems and standards, unnecessary duplication of effort and waste of scarce national resources on the one hand, and lack of strategies for the utilization of ICT as a driving force for national development on the other. The policy articulates ten main focus areas in harnessing ICT in Tanzania: strategic ICT leadership, ICT infrastructure, ICT industry, human capital, legal and regulatory framework, productive sectors, service sectors, public service, local content and universal access.

the need for ICT policy review to address the observed weaknesses was evident

While the ICT policy is well articulated, its implementation strategy is not. For instance, an ICT Benchmarking Report for the EAC (2009) revealed the following challenges: the implementation process lacked ownership, the institutional and governance structure was not articulated, and there was lack of capacity for coordination at the respective ministry, while competition for resources among ministries, departments and agencies was stiff. Thus the need for ICT policy review to address the observed weaknesses was evident. Such a review should also build on synergies of East African regional cooperation in ICT policies, which will foster a consistent regional policy framework to achieve economies of scale and promote regional integration.

Broadband connectivity within the region and the development of a single market in East Africa makes stronger the case for Tanzania to update its national ICT policy to reflect regional and global perspectives. The East Africa Community (EAC) ICT policy harmonization framework has identified eight (8) priority areas including broadband communication, affordable universal access, human resources development, regulatory harmonization, ICT application, job creation, entrepreneurship and international cooperation as the major areas of regional policy focus.

Tanzania developed a National Information and Broadcasting Policy in 2003 which aims to provide an enabling environment for the development and growth of the sector throughout the country, encourage media houses to offer professional and impartial services, and encourage the setting of standards for work and professional code of conduct. The policy encourages private and government investments in all areas, especially those not attractive to business. However, to date there is still no law that enforces the national ICT Policy of Tanzania. This makes both the policy itself and the regulatory body (TCRA) somewhat ineffective, as the TCRA needs a legal framework to enforce what is stipulated by the policy.

the ICT Development Policy requires every licensed telecommunication service provider to extend services to cover rural areas

For example, the TCRA universal access strategy draws its mandate from the Tanzania Development Master Plan (Tanzania Development Vision 2025) and the Rural Development Strategy (RDS) of 2001. According to the Government master plan, each village should be provided with telecommucation facilities by 2020. In the same vein, the ICT Development Policy requires every licensed telecommunication service provider to extend services to cover rural areas. The RDS promotes the introduction of information and communication technology in rural areas through the creation of tele-centres that offer a wide variety of public and private information-based goods and services, and which support local economic or social development. Such services might include basic communication by telephone, fax, e-mail, internet access, etc.; public and semi-public sector services such as tele-medicine, distance education, municipal governance services, etc.; and private sector services like news distribution, telecommuting services, training, access to information on markets, crops and weather conditions etc. The Universal Communications Services Act of 2006 provides for special concessions to service providers in this sector.

Regulatory Issues

The laws that are directly applicable to the sector include the Tanzania Broadcasting Services Act No 6 of 1993, Tanzania Communications Act No 18 of 1993; Tanzania Communications Regulatory Authority Act No 12 of 2003; and Universal Communications Service Access Act of 2006. These legislations have been harmonized and replaced by the Electronic and Postal Communications Act (EPOCA) in 2010 (URT, 2010).

The main challenge in the regulatory environment is building capacity to maintain a proactive legal framework that can keep pace with the rapidly changing telecommunication technology and e-business environment. The areas that need attention include data access rights, privacy protection, computer frauds & crimes, security and privacy of e-transactions, establishment of rules governing e-transactions, and delivery of e-opportunities to the wider population. TCRA has been instrumental in the development of the Electronic and Postal Communications Bill, which has provisions for these.

The main challenge in the regulatory environment is building capacity to maintain a proactive legal framework

Regulatory Environment and Instruments

The Tanzanian telecommunications regulatory environment is currently based on the "converged" licensing framework, and is not restrictive regarding entry requirements. The non-restrictive regulatory environment has introduced competition in the telecommunications sector, which has facilitated much of the growth and success in mobile telephony. As mentioned earlier, the regulating body is the Tanzania Communications Regulatory Authority (TCRA), established by the Tanzania Communications Regulatory Authority Act No 12 of 2003 as an independent government agency. The parent ministry is the Ministry for Communications, Science and Technology.

The objective of the TCRA is to regulate telecommunications, broadcasting and postal matters in Tanzania, as well as to improve the regulatory framework by promoting effective competition and economic efficiency, protecting the interests of consumers, regulating rates and tariffs, and monitoring the performance of the sector. The TCRA is mandated to oversee the restructuring and liberalization of the sector in line with the government's wider move to liberalize the economy through restructuring and engagement of the private sector.

The TCRA is mandated to oversee the restructuring and liberalization of the sector in line with the government's wider move to liberalize the economy

The Authority is responsible for ensuring that the communications sector enhances the welfare of Tanzanians through:

- promotion of effective competition and economic efficiency
- protecting the interests of consumers
- promoting the availability of regulated services
- licensing and enforcing license conditions of broadcasting, postal and Telecommunications operators
- establishing standards for regulated goods and services
- regulating rates and charges (tariffs)
- managing the radio frequency spectrum
- monitoring the performance of the regulated sectors
- monitoring the implementation of ICT applications

(Source: TCRA Website http//www.tcra.go.tz)

The TCRA has powers to obtain information, documents, and evidence; to hold inquiries, and to regulate tariffs in the sector. According to the TCRA, activities in the sector are guided by a number of regulations:

- The Tanzania Communications (Broadband Service) Regulations 2005;
- The Tanzania Communications (Consumer Protection) Regulations 2005;
- The Tanzania Broadcasting Services (Content) Regulations 2005;
- The Tanzania Communications (Licensing) Regulations 2005;
- The Tanzania Communications (Importation and Distribution) Regulations 2005;

- The Tanzania Communications (Installations and Maintenance) Regulations 2005;
- The Tanzania Communications (Interconnection) Regulations 2005;
- The Tanzania Communications (Telecommunication Numbering and Electronic Address) Regulations 2005;
- The Tanzania Postal Regulations 2005;
- The Tanzania Communications (Radio Communications and Frequency Spectrum) Regulations 2005;
- The Tanzania Communications (Tariff) Regulations 2005;
- The Tanzania Communications (Type Approval of Electronic Communications Equipment) Regulations 2005;
- The Tanzania Communications (Quality of Service) Regulations 2005; and
- The Tanzania Communications (Access and Facilities) Regulations 2005.

The policy and regulatory functions of the Ministry and the regulatory agency are clearly delineated in the Act establishing the TCRA

The policy and regulatory functions of the Ministry and the regulatory agency are clearly delineated in the Act establishing the TCRA. As provided by this Act, the Fair Competition Commission (FCC) is an independent government body established under the Fair Competition Act, 2003 (No. 8 of 2003) to promote and protect effective competition in trade and commerce, and to protect consumers from unfair and misleading market conduct. It has been mandated to make necessary interventions that ensure competition to regulate the market and that prevent significant market dominance, price fixing and extortion of monopoly to the detriment of the consumer and market stability. The FCC is a government agency under the Ministry of Industry, Trade and Marketing.

The FCC Act co-exists with sector-specific regulatory frameworks. It therefore co-exists with the Communications Regulatory Act. The Act establishing the TCRA gives it the authority to deal with all competition issues which may arise in the course of discharge of operator functions, and to make appropriate recommendations to the FCC or any other relevant authority on issues concerning (a) any contravention of the Fair Competition Act, 2003 Bureau of Standards Act, or any other written law; (b) actual or potential competition in any market for regulated services or additional costs in the market that are likely to be detrimental to the public.

Convergence of technology in the telecommunications sector has necessitated the adoption of a technology- and service-neutral licensing regime

Convergence of technology in the telecommunications sector has necessitated the adoption of a technology- and service-neutral licensing regime, the Converged Licensing Framework (CLF). The CLF was introduced in February 2006 and constitutes four license clusters: Network Facilities License (NFL), Network Services License (NSL), Applications Service License (ASL) and Contents Services License (CSL). These licenses cover international, national, regional and district market segments.

Under the NFL category, a licensee is authorized to install, own, control and provide access to electronic communications facilities, such as fixed links, radio communications transmitters, satellite stations, submarine cable, fiber/copper cable, towers, switches, etc., to other licensed operators on a commercial bases. The NSL category allows a licensee to operate and maintain public electronic communication networks with various technologies (like CDMA, GSM WCDMA, WLL, ADSL) that involve intelligent network platform signaling control, traffic distribution switching translation and quality of services control. Examples of network services include mobile services, fixed-line services, bandwidth services and broadcasting distribution services.

The ASL covers the provision of electronic communications services to end-users. Access to these services can be through the establishment of private facilities and networks, or through procurement and reselling of services from licensed facilities or/and network service providers e.g. Internet Service Providers, virtual mobile providers, payphone services, or fixed/mobile services. The CSL covers provision of content services such as satellite broadcasting, broadcasting terrestrial free-to-air TV, terrestrial radio broadcasting, subscription TV and other broadcasting services.

Under the CLF, the TCRA has issued 14 Network Facility Licences, of which eight are national, seven both national and international, and one international

Under the CLF, the TCRA has issued 14 Network Facility Licences, of which eight are national, seven both national and international, and one international. Of these, six were issued between June 2008 and September 2009. During the same time, 13 Network Services Licences were issued, of which five are national, six national and international, and one international. Of these, five were issued between June 2008 and September 2009. Sixty-one Application Services Licenses were issued, of which 43 are national, 12 national and international, and one international. One licence for a district and five for regions (within the country) were also issued. Of these, 20 were issued between June 2008 and July 2009. The number of operational licensees is not easy to determine, as business operation goes

through different stages of development before it starts offering services. The TCRA as an organization issues licences after being satisfied that the applicant meets the requirements. A survey needs to be done to determine the different levels of operation for the different licensees.

The proposed Electronic and Postal Communication Act 2009 was passed by Parliament in 2010 after a consultative process involving the Parliamentary Committee for Infrastructure, the Minister for Communications, Science and Technology, Tanzania Communications and Regulatory Authority officials, mobile phone operators, civil society groups, representatives from security markets and other stakeholders to discuss the Bill. The Bill, among other things, had clauses that required mobile operators to float shares on the Dar es Salaam stock market, re-distribute frequencies in the aftermath of digital broadcasting, share network resources and infrastructure at a time of stiff competition due to many new operators waiting to enter the market, and register SIM-cards.

SIM Card Registration

The Electronic and Postal Communications Act (EPOCA) of 2010 makes SIM-card registration mandatory

The Electronic and Postal Communications Act (EPOCA) of 2010 makes SIM-card registration mandatory for every person owning or desiring to own and use a SIM-card. TCRA has published an order requiring all SIM-cards to be registered by their holders by 30th June 2010. The reasons given include:

- protecting consumers from misuse of communication services
- enabling consumers to be identified as they use value-added services such as mobile banking, mobile money transfer, electronic payments for services such as water, electricity, pay-TV etc
- enhancing national security
- enabling network operators to "know their customers"

Although public response was slow at the beginning, the exercise has picked up momentum. Several challenges were met, particularly regarding registration of costumers in rural areas, lack of individual identification documents, and electric power interruptions among others. While the current number of SIM-card holders is estimated at 14,903,024, by end of December 2009, only 6,378,643 SIM-cards had been entered in the registration databases, which was less than 50% of the target. This compelled TCRA to extend SIM-card registration 30th June 2010.

Local Loop Unbundling

new entrants to the market (challengers) are offered access to facilities established by the incumbent

According to Arbore, local loop unbundling (LLU) is a regulatory process of allowing multiple telecommunications operators to use a physical connection (local loop) between a customer and incumbent local exchange carrier. The local loop is unbundled so that the beneficiary does not have to pay for network elements or facilities which are not necessary for the supply of its services. Unbundled access is a form of regulation during liberalization, where new entrants to the market (challengers) are offered access to facilities established by the incumbent that are hard to duplicate (for technical or business reasons). According to the ITU, in some developed economies broadband has been facilitated by regulating local loop unbundling in developed markets with an extensive and well-developed incumbent fixed network. This allows new entrant operators access to end-users without having to invest heavily into network deployment, thus encouraging service-based competition. However, most developing countries, like Tanzania, are faced with a fundamentally different situation, where network deployment and growth still needs to be encouraged, and operators still need to recover their investment costs. Unbundled service costs would therefore be higher and a less attractive approach to encouraging service competition. Operators in Tanzania are offered incentives for network deployment, network-based competition, and incentives for cost-sharing in backbone network deployment. There is a Bill to this effect, and discussions with stakeholders are underway before it is presented to parliament.

Number Portability

Number portability has been available in Tanzania since 2008

Service Provider Number Portability is a service that gives a mobile subscriber the option of retaining his/her mobile phone number even after switching to a different network, providing customers with the flexibility to migrate with their numbers to any network. Number portability has been available in Tanzania since 2008, and has been popularized by new operators in the market. Tanzania does not offer carrier pre-selection services. Most people appreciate the number

portability service. In Tanzania, it is usually introduced by new entrants in the market as an incentive that is associated with promotions. Operator sales staff move from place to place offering to subscribe new customers with numbers similar to those they already have. It is, however, difficult to assess success rates as no statistics are available. VoIP service is authorized and available in Tanzania, though not very popular. Datel (Alink) is one of the VoIP service providers.

Market Structure

The existing market structure comprises basic telephone service i.e. local, national long distance and international; radio mobile services; and value added services (including data). There are four market segments.

The first market cluster is *Network Carrier Infrastructure*, dealing with construction and provision of carriage facilities for transmission, such as earth satellite, VSAT, submarine cable, fiber-optic cable and microwave links and harnessing of excess capacity of companies/organizations which currently own communications facilities for their operations.

It is a dynamic market requiring innovation, given that most equipment is not locally manufactured

The Switching and Connectivity Facility Licence covers the construction and provision of connectivity facilities such as exchanges, nodes, servers and routes while the Support Facility Licence authorizes the construction and provision of support facilities like towers and ducts. This segment is competitive as there are 15 licensed operators in the market. It is a dynamic market requiring innovation, given that most equipment is not locally manufactured.

The second market segment deals with *network services for fixed and mobile telephone operations.* Fixed telephone service licenses will authorize the operation of networks and provision of voice and data services. Markets are split geographically into international, national, regional and district segments. There is only one type of license for operating and providing cellular mobile services nation-wide.

The third market segment is provision of *network applications services*, which include the Internet, payphones, e-applications, Internet telephony, tracking services, mobile virtual network services, trunk radio services and value added services.

The fourth market segment is *Content Service Provision*, which includes segments based on activity, geographical segmentation and community factors for terrestrial television broadcasting, free-to-air terrestrial sound broadcasting, free-to-air terrestrial television and terrestrial television subscription broadcasting. Others segments in the cluster include cable television, satellite television, subscription broadcasting and satellite-free sound broadcasting.

Competition in all market segments is high. The main challenge is the lack of market research that a newcomer can rely upon for investment purposes.

Human Resource

Human resource capacity to support general ICT deployment is weak

Human resource capacity to support general ICT deployment is weak. However, since 2005, with the support of external development partners, several initiatives have been put in place to address the problem:

- The Tanzania eSchools initiative
- Information and Communication Technology (ICT) Policy for Basic Education (July 2007), which will, among other things, structure the adoption of ICT within the education sector.

The Information and Communication Technology (ICT) Policy for Basic Education envisages integration of ICTs in pre-primary, primary, secondary and teacher education, as well as non-formal and adult education. Three other policy documents that govern the education sector development in Tanzania, namely; the Education and Training Policy of 1995, the Primary Education and Development Plan (PEDP) 2002-2006, and the Secondary Education Development Plan (SEDP) 2004-2009, emphasize the need for access to and improved quality of education for all, and prioritize ICT-based information management at all levels and the introduction of computer courses into primary and secondary education. Higher education institutions offer electronics and computer and telecommunication engineering courses. The Dar es Salaam Institute of Technology and the University of Dar es Salaam have such courses, for instance. Enrollment has been increasing at technical schools and university colleges. Additionally, private institutions offering computer training at lower levels are on the increase, as shown in Table 8 below.

private institutions offering computer training at lower levels are on the increase

Table 6: Human Resource base for the ICT Sector

	Institutes of Technology[4]		University Enrolments[5]	
	Total Enrolments	Graduates per year	Engineering	Science & ICT
2001	-	-	1385	1949
2002	-	-	2502	2174
2003	-	-	1619	3369
2004	1682	-	1565	3347
2005	1633	364	1597	4807
2006	1884	589	-	-
2007	2244	554	-	-

[4] Source: URT (2008) Statistics Handbook on Communications, Science and Technology
[5] Tanzania Commission for Universities: http://www.tcu.go.tz/

Telecom, Internet and Broadcasting Market Analysis

Overview of the Contribution of the Telecommunications Sector to the Development in Tanzania

Tanzania has a fully competitive telecommunications sector. There are two fixed-line operators and seven operational mobile networks, with four additional players licensed. The national fixed telephone operators are the TTCL and Zantel. They also offer national and international mobile telephone services. The TTCL fixed-line network has been digital since 2004. However, teledensity for fixed-line has remained extremely low, with only around 300,000 lines installed and many out of service. The TTCL offers Integrated Services Digital Network (ISDN) with Basic Rate Interface, Primary Rate Interface as well as ADSL broadband services.

Tanzania has one of the fastest growing ICT markets in Africa

Until July 2009, the TTCL operated a countrywide IP network for local and international connectivity to the internet, using a 140Mb/s digital microwave backbone to extend internet links and CDMA wireless to reach fixed services. The Ministry of Finance and Economic Affairs reported the contribution of the communications sector to the GDP in 2007 to be as high as 20.1%. In addition, according to TCRA, tele-density – a measure of access to telephony and other ICT services of 100 people occupying a specific area or region – has been increasing. In the year 2000 for example, Tanzania's tele-density was a mere 1%, but as of June 2008 it had risen to 25%. It was 43% by the end of 2009. Tanzania has one of the fastest growing ICT markets in Africa. This enormous growth can, however, be elusive, and should be interpreted with caution as it mainly depends on the number of subscribers as provided by operators. Caution in interpreting telephony statistics is needed due to the following reasons:

- In Tanzania most subscribers have more than one mobile phone line, and it is not uncommon to find individuals with multiple SIM-cards, often from up to four operators.
- Most phone line owners are urban dwellers, so if the calculation of tele-density takes into account land area as a factor, the above figures will be highly reduced.
- One phone may serve a household or be shared by several people in a work setting.
- Some operators may inflate their subscription numbers to attract more customers.

Table 7: Voice Telecommunications Penetration (Teledensity)[6]

Years	Subscriptions	Population	Teledensity(%)
2005	3,544,207	37,267,530	10
2006	5,766,566	38,523,907	15
2007	8,486,126	39,816,363	21
2008	13,130,602	41,146,284	32
2009	17,642,408	43,187,823[7]	43

Since the connection of the country to the international fibre-optic cable (SEACOM), new services and products have been introduced

Since the connection of the country to the international fibre-optic cable (SEACOM), new services and products have been introduced. Currently, the TTCL offers voice services which include Bongo Phone, Prepaid Services, Prepaid Calling Card, Post Paid Services, Rafiki Public Phone, and TTCL Mobile. Data communication services include broadband, wireless broadband, Mobile Internet, Virtual Private Network (VPN) providing dedicated end-to-end connectivity to multiple sites in different geographical locations with scalable and guaranteed bandwidths of 64Kbps to 100Mbps, and leased digital and analogue circuits. Zantel is based in Zanzibar, but with the liberalization of the market got license coverage to the mainland. It has a fixed-line and mobile telephone network. Zantel is fast penetrating the mainland, offering lowest rates in fixed, broadband and mobile telephony. Zantel offers mobile banking branded Z-Pesa.

The mobile telephone market is the fastest growing sector, with more than 17 million subscribers in a population of about 43 million (see Table 6). The major operators are Vodacom, Zain, TiGO and TTCL-mobile, Zantel-mobile and Sasatel. The penetration level is only around 30%, implying that there is still room for growth.

VoIP Internet telephony is authorised and liberalised. 3G mobile and wireless broadband service has gained ground. The landing of the marine fibre cable in Dar es Salaam in July 2009 has been the major booster of the Internet sector, which had been hampered by the low level of development of the traditional fixed-line network.

The broadband market in Tanzania is still unexploited. Many years of bandwidth starvation forced business to adopt low-bandwidth survival techniques that relied mainly on satellite services, which will gradually change. Power interruptions, a weak infrastructure base (especially the lack of computers available to access networks), low ICT literacy among the general public and low purchasing power are also key factors. The average revenue per user (ARPU) continues to fall. For example, Vodacom reported the following about Tanzania for the year 2009: 'ARPU in local currency declined in most of the international operations due to the growth in lower-usage customers, shrinking disposable income due to economic conditions, and aggressive competitive pressure on tariffs in the form of discounted airtime and free on-net call promotions by competitors. Besides the pricing pressure, which is being exacerbated by worsening economic conditions, new licences are being awarded, raising the competitive stakes in all our markets considerably' (Vodacom Report, 2009). The declining ARPU for Zain and Vodacom is shown below.

Many years of bandwidth starvation forced business to adopt low-bandwidth survival techniques

Table 8: ARPU for Zain and Vodacom (2006-2009)

Year	Zain (US$)*	Vodacom (US$)**
2006	12	8.10
2007	11	7.0
2008	9	5.9
2009	6	4.2

*Source: *Zain Annual Report, **Vodacom Annual Report*

Access is not just about availability. Cost affects usage. The high cost of communication is still a barrier. While competition has brought down prices, the cost of access is still too high to have a transformatory impact. More needs to be done to bring down call tariffs and educate people on how to exploit and use broadband for economic development. Computer hardware in use in Tanzania is imported, making high computer prices a barrier to access. E-business and telecommunication infrastructure is incomplete without affordable computing facilities. Like telephone and Internet costs, computer prices have been falling, but not to the extent of being affordable to most people. Many individuals, not just businesses, need to have access to reasonably priced computers for education, recreation, business and other activities.

More needs to be done to bring down call tariffs and educate people on how to exploit and use broadband for economic development

Poor electricity supply is a major problem. Efficient power supply is only guaranteed by power generators. This increases costs as fuel is very expensive, constituting a barrier to growth and development of e-services. While availability has grown, this has not been matched by quality of service. Fair and honest marketing and competition, and transparency in revenues and costs is important.

The need for ICT expertise in the telecom sector has not been matched with a human resource development plan to build the expert capacity for its maintenance and further development. More efforts should be invested in encouraging the development of IT and telecoms expertise in Tanzania. There is a need to develop human capacity in areas such as technical, management, research and development, security, strategic planning, e-business and e-governance.

Human resource development in ICT can be encouraged through increased awareness amongst students and the wider public of opportunities and capabilities in ICT. The environment should encourage ICT education and provide incentives, especially for those investing in research, development, training, software and other creative efforts. Acquiring infrastructure is great, but it is serious investment in education that will bridge the digital divide and enhance the quality of infrastructure, the quality of access, the quality of usage, and the quality of growth.

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The major telephone companies (TTCL, Zantel, Vodacom, Zain, Tigo) directly employ more than 5,000 people. Many more are employed in communication-related services like reselling airtime, servicing and repair of mobile phones, maintenance of base stations and masts, etc. This notwithstanding, it is difficult to get employment statistics for the sector given the lack of a national database for such statistics.

The provision of plentiful, reliable, inexpensive international bandwidth is being credited with ushering in a new era of broadband connectivity. However, the improvements that it can bring are unlikely to be felt immediately, as there are many other developments that need to take place in order for any kind of broadband revolution to take place. As well as international bandwidth, Tanzania needs to keep developing its national backbone infrastructure in order to facilitate the expansion and improvement of broadband access to more of the population and utilization of this potential in government operations.

Tanzania needs to keep developing its national backbone infrastructure in order to facilitate the expansion and improvement of broadband access

Fixed-Line Coverage

Until early 2006, the fixed-line telephone service in mainland Tanzania was the monopoly of TTCL and Zantel in Zanzibar. In 2006 Zantel received a national licence to offer telecommunication services on the mainland. Before the introduction of mobile telephone services in Tanzania in 1995, basic telecom services were provided by the TTCL through a Public Switched Telephone Network (PSTN) using Integrated Services Digital Network(ISDN) with Basic Rate Interface (BRI) and Primary Rate Interface (PRI) and ADSL broadband services. The TTCL fixed network has national coverage. Zantel is also expanding its network on the mainland.

Mobile Coverage

Mobile telephone service has been liberalized since its introduction in Tanzania. There are seven active operators: TTCL, Zantel, Vodacom, Zain, Tigo, BoL and Sasatel, and two new applicants. The arrival of the Seacom submarine cable in Dar es Salaam has stimulated new interest and mobile operators are ready to invest in infrastructure to facilitate speedy exploitation of the availed broadband. It is evident that Tanzania had not made adequate plans and preparation for the rollout of the marine cable to the rest of the country. Zain, for example, was ready to invest in laying down the national backbone or lease it from the government to speed up the process. It is now clear that the government is laying down the national backbone in collaboration with telephone operators. Several mobile company operators, employing the CDMA technology licensed under CLF since 2007, are now becoming operational after setting up requisite infrastructure, administrative and other supportive requirements.

the government is laying down the national backbone in collaboration with telephone operators

Execellentcom, set out in June 2008 plans for the rollout of a nationwide network within one and half years with an initial capacity of two million subscribers. It plans to invest US$500 million over five years into voice and data services, and create about 500 jobs in the process. Dovetel Limited received a network facilities, network services and application services licence in June 2008, and launched services in Dar es Salaam in 2009 under the name Sasatel. Egotel and MyCell were licensed in November 2008. Smile Communications Tanzania received a network facilities and network services licence in July 2009. Operators are encouraged to share infrastructure, including base stations.

The cost of mobile services has fallen considerably, although interconnection fees, taxes and levies add to the cost of the services. Telecom equipment is subject to 20% import duty and 20% VAT, and 7% excise tax on mobile airtime. Following the launch of mobile data and 3G broadband services, mobile operators are set to become leading players in the Internet sector as well.

Internet Coverage

Tanzania's Internet sector had remained underdeveloped due to the limited reach of the traditional fixed-line network and the lack of international fiber connections. Until the arrival of the first international submarine fiber cable in July 2009, the country relied entirely on satellite links for its international Internet bandwidth, which resulted in high retail prices that were unaffordable to the majority of the population. Internet cafes have contributed to some degree of Internet usage, but in terms of Internet penetration Tanzania still lags behind other countries in the region with similar GDP per capita and literacy levels.

Until the arrival of the first international submarine fiber cable in July 2009, the country relied entirely on satellite links

Mobile network operators are well positioned to become key players in Internet service provision with their extensive national infrastructure, following the introduction of mobile data and 3G broadband services.

Table 9: Internet users

Year	Users (thousands)	Penetration (%)
2003	250	0.7%
2004	333	0.9%
2005	384	1.0%
2006	390	1.0%
2007	400	1.0%
2008	520	1.3%

Source: BuddeComm (October 2009) based on ITU and industry data

Note: Internet users are those accessing the Internet from school, university or work, as well as from individual household or business accounts. Hence, the number of Internet users is always greater than the number of subscribers. Internet subscribers are individuals who pay for Internet access accounts. For example, a work account is just one subscription but can have many users within that one subscription (BuddeComm).

The Internet market in Tanzania is likely to be driven by businesses that can use a combination of Internet and mobile telephone technology to offer enhanced but affordable services. Potential areas include payment of utility bills, accessing news, radio, mobile banking, election campaigns, and education. The landing of the Seacom submarine cable in Dar es Salaam has already impacted on cost. Effective October 2009, the TTCL reduced its Internet prices by more than 50% (see Table 15 for comparison of old and new prices for broadband). According to the TTCL, high volume Internet users like banks, large businesses and corporations, government agencies and educational institutions are the main direct beneficiaries thusfar. For small and medium businesses like cyber cafés, the TTCL reduced prices by 50 per cent. Whereas $200 initially bought 5GB, for the same cost one can now buy 10GB. The TTCL offers unlimited access for the monthly price of Tsh45,000 ($43), with a speed of up to 256Kbps for non-commercial clients (see appendix for comparison of old and new prices).

In 2009, Tanzania received $100millon in credit through the World Bank International Development Association

In 2009, Tanzania received $100millon in credit through the World Bank International Development Association under the Regional Communications Infrastructure Programme (RCIP3) to promote affordable communications services in the country. The RCIP3 grant is planned to enable Tanzania to leverage developments in the telecommunications sector and overcome associated challenges through a combination of sound policy and regulatory frameworks, competitive market structures, and catalytic investments into public-private partnerships to accelerate the rollout of infrastructure networks that are aimed at enhancing universal access. Building the national backbone and the establishment of the Universal access fund are such developments. Despite considerable developments in the ICT sector, Tanzania has only 1.3 percent telephone and Internet user penetration as compared to 6.7 for Africa.

Free Internet service to students has been offered

Free Internet service to students has been offered mainly through educational institutions, while paid access to the general public is mainly provided by the private sector in Internet cafes. Availability of personal computers is still very low in Tanzania: less than 1%[6]. Multipurpose Community Telecentres (MCTs), offering basic telecom services like telephone, fax, Internet, e-mail and computer facilities designed to serve both individuals and businesses, and to provide training and distance learning services, are few and far between.

Tanzania's first MCT was established in 2000 by the Tanzanian Commission for Science and Technology (COSTECH) in partnership with the Canadian International Development Research Centre, UNESCO, the Danish International Development Agency and TTCL. Evaluation of these centers may reveal important information about the best way to expand the service. In the period under review, Vodacom established Internet cafes in three towns: Dar es Salaam, Dodoma and Arusha, using its 3G mobile network under the 'Wireless Reach' initiative. In collaboration with the GSMA Development Fund and Qualcomm, the initiative encourages the cafes to be run by local entrepreneurs.

In November 2009, Convergence Wireless Networks (Convergence Wireless), a joint venture between Convergence Partners and Comsol Wireless Solutions (Comsol), acquired a 35% stake in the WIA Company Limited (WIA), a Tanzanian wireless connectivity provider focused on the

[6] Rural Poverty Portal: http://www.ruralpovertyportal.org/web/guest/country/statistics/tags/tanzania

Convergence Wireless will provide high-level support at strategic and operational levels

enterprise market segment. Convergence Wireless will provide high-level support at strategic and operational levels and facilitate access to resources across the wider convergence partners' network. WIA's growth strategy focuses on upgrading its core network around Dar es Salaam, deployment of a new national WiMAX access network covering key business centers, as well as the broadening of its value-added solutions to include virtual private networks, managed network services and applications hosting for large enterprises across the country.

According to the International Telecommunication Union (ITU), there were 520,000 Internet users as of June 2009, which is 1.3% of the population, and 6,400 broadband Internet subscribers as of December 2009.

Table 10: Internet Usage and Population

Year	Usage	Population	Penetration
2000	50,000	14,712,000	0.3 %
2002	500,000	13,874,610	3.6 %
2005	820,000	12,247,589	6.7 %
2009	520,000	41,048,532	1.3 %

Source: World Internet Stats: Usage and Population Statistics (2009)
http://www.internetworldstats.com/af/tz.htm

While bandwidth may have been a problem, there are many other factors that contribute to Tanzania's low Internet penetration and use. This situation may call for research based information and home-grown solutions to sustainable use of the Internet for development.

Tanzania lacks comprehensive data giving details of Internet users across the country

With regard to Internet access and use, Tanzania lacks comprehensive data giving details of Internet users across the country. The data available is mainly aggregated from Internet café surveys and this does not depict the real situation of Internet usage. The number of people who use their handsets to access the Internet is not documented, for example. There were approximately 520,000 Internet users in Tanzania in 2009 (Table 10).

Internet Service Providers Market

According to the Tanzania Internet Service Providers Association, there are 23 registered Internet Service Providers (ISPs)[7].

Mobile phone providers, namely Vodacom, Zain and Sasatel, have since 2008 introduced mobile Internet services. There are two Internet exchange points in Tanzania: Tanzania Internet Exchange Point based in Dar es Salaam, and Arusha Internet Exchange Point. There are plans to establish exchange points in Dodoma and Mwanza. The ISP market is growing, as the potential for Internet-based services is still high. The Tanzania Internet Exchange (TIX) point in 2009 received a copy of the "K" DNS root server that is being operated by the regional Internet registry in Europe, known as RIPE NCC, through the AfriNIC-led Internet infrastructure project, which is intended to improve the resilience to distributed denial of service attacks by setting up copies of root servers. The root server in Tanzania is expected to improve scalability and resilience of DDoS attacks, reduce the overall delay in the data transfer between clients and servers and improve the overall stability of the Internet in the country.

Broadband Market and Coverage

In educational institutions like universities, 'bandwidth hungry' Internet-based emails were blocked from access on campus

Until mid-2009, low bandwidth was a major setback in the development, penetration and use of Internet in Tanzania. Low bandwidth was responsible for high Internet access rates in public Internet cafés, high costs from ISPs and outright frustration from users. In educational institutions like universities, 'bandwidth hungry' Internet-based emails were blocked from access on campus, while bandwidth management policies proposed bandwidth rationing.

A new digital era unfolded with the landing in Dar es Salaam in July 2009 of the much-awaited Seacom fiber-optic cable. With over $600 million invested in it, it took about two years to build. The

[7] Tanzania Internet Service Providers Association - TISPA - Members
Source: http://www.tix.or.tz/tispa/members.html

cable is expected to fundamentally change the underlying economics of the communications business in the country. The incumbent fixed and mobile operator, the TTCL, slashed costs by 50% after connecting its network. Further competition for international capacity and pricing is expected when the TEAMS and the EASSy cables arrive.

The most important aspect of these developments is the enhancement of access and lowering of the cost of transferring data, thus facilitating multimedia data transfer. Prior to this, Tanzania used satellite communication to connect to the Internet. SEACOM is expected to lower the connectivity cost from about $300 per megabyte per second to $100, reducing Internet charges considerably[8]. Financial institutions, mobile telephone operators, non-governmental organizations, television stations, educational and research institutions are the main beneficiaries, although full exploitation of the availed broadband will depend on the level of preparedness on the ground.

The National Fiber Backbone

The national fiber backbone is now being built through government partnership with the private sector, particularly major mobile operators. The backbone will network all regional headquarters within the country and connect Tanzania with its eight neighbors: Kenya, Uganda, Rwanda, Burundi, Democratic Republic of Congo, Zambia, Malawi, and Mozambique. The work contract was signed in February 2009, and the project is expected to be completed by the end of 2010. The project is financed by a soft loan from China. The national fiber backbone will be owned by the government under the operational management of the TTCL.

The backbone will network all regional headquarters within the country and connect Tanzania with its eight neighbors

Investment in 3G network development is evident, especially from the main mobile phone operators, Vodacom, Zain, Tigo, the TTCL and Zantel. In 2009, Zain Tanzania Ltd. secured US$270m from a mix of local and international lenders to support its continuing network expansion. In total, by the end of 2009, Zain had invested over US$500m in network infrastructure development. Vodacom secured a syndicated loan of US$90m to finance its company capital expenditure[9].

A dormant project, initiated with support from the Ericsson Group and UNEP, to establish bio-fuel powered radio base stations in two regions in Tanzania was activated in 2009. Undertaking the feasibility, Diligent Energy Systems BV noted that if Ericsson would get the backing of one or two major mobile phone operators, the project would be commercially viable. The project aims at bringing reliable but environmentally safe mobile phone services to rural people in Mtwara and Lindi. There is concern about the operational safety of the increasing number of base stations, antennas and other facilities that support mobile phone transmission.

The project aims at bringing reliable but environmentally safe mobile phone services to rural people

Broadcasting Market and Coverage

Broadcasting Market

Radio and television broadcasting in Tanzania is predominantly free-to-air. It is largely analogue-transmitted terrestrially. It is characterized by three modes of transmission, each requiring viewers to have suitable receiving equipment:

- Terrestrial transmission (requiring a suitable domestic antennae or dish);
- Satellite transmission (requiring a satellite dish); and
- Cable transmission (requiring a physical cable link to the receiving equipment).

The wider population use free-to-air transmission because it does not require a subscription to view or listen to radio or television programmes. Radio broadcasting is, compared to television, by far the most accessed service. Some radio broadcasts cover the whole country, while others cover segments only. Television covers major urban areas.

Subscription broadcasting, especially cable television services, have gradually developed over the years. There are 28 TV license holders. Of these, three offer nationwide Satellite Content Services by subscription. These are Multichoice Tanzania Limited, GTV (Tanzania) Limited, and Mussa Television Network. There are 53 radio license holders and 869 satellite customers.

[8] Source: The Citizen Daily, 23.07.2009

[9] Vodacom Group has Faith in Tanzania Telecoms
http://www.tanzaniainvest.com/tanzania-telecoms/news/323-vodacom-group-has-faith-in-tanzania-telecoms

Service Coverage

radio and TV stations in Tanzania can be categorized into three groups: National, Regional and District

Most FM bandwidth radio and TV stations are urban-based. A relatively small number of radio stations on FM bandwidth cover the rural areas. AM/MW bandwidth radio stations, on the other hand, cover both urban and rural areas. Depending on coverage, radio and TV stations in Tanzania can be categorized into three groups: National, Regional and District. National broadcasters are those which cover all the regions of the country in both rural and urban settings. Only four radio stations and three TV stations boast a countrywide coverage:

Tanzania Broadcasting Corporation (TBC). This is a state/government-run radio and television service. Through AM and Medium Wave (MW) bandwidths, TBC boasts a country-wide signal coverage in Tanzania. TBC signal reaches rural and urban areas of the country on both the mainland and Zanzibar islands. TBC1 (television station) signal also covers the entire country and is also available by satellite.

Radio One/ITV. This is a privately-owned broadcaster run by the IPP group of companies. Radio One broadcasts over AM and FM bandwidths and covers almost the entire country. In some remote rural areas, however, Radio One signal strength is weak. Likewise, ITV covers almost all regions of Tanzania with a relatively weaker signal in rural areas.

Radio Free Africa/Star TV is a private media group. Radio Free Africa (RFA) broadcasts via both the FM and AM/MW ranges. RFA and Star TV signal coverage is also countrywide. These radio and TV stations can also be accessed via satellite. Signal strength and availability in rural areas may be limited.

Radio Maria. This is a church-run radio service with countrywide coverage. It is owned by the Catholic Church and broadcasts via the FM range and also via satellite. Until January 2010, and probably to date, it was the only Tanzania-based radio accessible on the Internet. Radio Maria boasts good signal strength in rural areas.

Lack of electricity and poor accessibility are the major hindrances to radio and TV signal penetration in rural areas

There are also radio and TV stations with regional or district coverage. Most of these radio and TV stations operate with smaller capital investment and are privately owned. Again, these are mainly based in urban centres. Lack of electricity and poor accessibility are the major hindrances to radio and TV signal penetration in rural areas.

Digital Switchover

The future of the subscription broadcasting market lies in the fact that there is going to be much more specialization in content creation, distribution, transmission, delivery and provision of support services for subscription management. The digitalization of content has allowed content to be offered on any device, network or platform. Very recently, in June 2006, the ITU approved planning for introduction of terrestrial digital broadcasting (specifically frequency bands 174-230 MHz and 470-862 MHz) using the Digital Video Broadcast (DVB) family of standards. This has made it possible for DVB to be available on many platforms, namely: satellite (DVB-S and DVB-S2); cable (DVB-C); terrestrial television (DVB-T) and terrestrial television for hand held (DVB-H). Digitalization of content has paved the way to convergence of technology. The convergence of technology has made it possible for viewers to access a wider range of services delivered via television sets.

Tanzania is preparing for the conversion to digital broadcasting to meet the 2015 deadline set by the International Telecommunications Union

Tanzania, along with countries in the Southern Africa Development Cooperation (SADC) region, is preparing for the conversion to digital broadcasting to meet the 2015 deadline set by the International Telecommunications Union (ITU). SADC has set the deadline for member countries to December 2013. Member countries (including Tanzania) have agreed to adopt a unified approach to digital television migration to help converters and operators develop harmonious policies and regulations, and to share experiences.

Subscription broadcasting service providers currently on analogue platforms have to make efforts to migrate to a digital platform in a phased approach to meet the national target of switching off all analogue services by 2015. New entrants to subscription broadcasting services have to adopt a digital platform, and the TCRA will not license new entrants who opt to use analogue technology.

The main challenge has been to align policy and legislation to ease the migration to digital broadcasting in terms of investments in technology, and consumer awareness. Subsequent to these developments, the responsible ministry, stakeholders and the TCRA held a forum to discuss challenges; among them the standardization of the conversion process, measures to reduce costs to the consumer and service providers, e.g. reducing tax on 'set-top boxes', and gradually phasing the process. Accordingly, the National Broadcasting Corporation (TBC) will start trial transmission in four regions in December 2009, and expand to six more regions by January 2010.

Star Media Tanzania and Basic Transmission Ltd. (operators) have been licenced to set the necessary infrastructure to spearhead the move. Major challenges are emerging around appropriate use and/or re-distribution of released analogue spectrum, and how to help individuals without the capacity (knowledge, skills or financial resources) to upgrade their TV sets.

Content in the Broadcasting Market Segment

Content is divided into two categories: foreign-content programmes created and broadcast from outside the country through satellite networks, and locally created content which is produced and broadcast locally. Local content providers may use cable television operator networks, MUX networks, 3G operator networks or IPTV networks. The MUX network connects multiple CTX 9400 and 9000 DSi systems and multiple CTX Operator Workstations into a single network. IPTV is a system through which digital television service is delivered using the architecture and networking methods of the Internet Protocol Suite over a packet-switched network infrastructure, e.g., the Internet and broadband Internet access networks, instead of being delivered through traditional radio frequency broadcast, satellite signal, and cable television. Market segments for local content services are National, Regional, District and Community.

Ownership

Foreigners may not run media institutions, and foreign investment in any media outlet may not exceed 49%. Furthermore, foreigners may be employed only as technical experts and, even then, only where such expertise is not available locally.

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Network Subscribers

Fixed-Line Subscribers

The fixed network subscriber base has been eroded by the mobile market. The total number of telephone subscribers is claimed to approach 15 million. In 2009, there were 444,471 TTCL fixed-line subscribers compared to 5,921,265; 4,435,462 and 3,264,565 mobile phone subscribers for Vodacom, Zain and Tigo respectively.

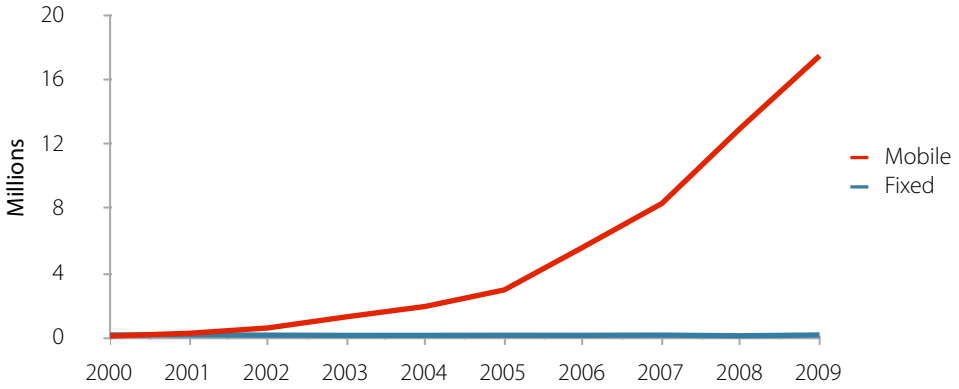

Figure 1: Trends of Mobile and Fixed Lines Subscriptions 2000-2009

Source: TCRA website www.trcra.go.tz

Rural-based subscribers and students remain the main source of new subscribers for the traditional voice and text messaging services

It is difficult, however, to get exact number of subscribers per network as many people subscribe to more than one network. Rural-based subscribers and students remain the main source of new subscribers for the traditional voice and text messaging services. Broadband-based services may however attract new and retain urban-based and corporate customers.

Table 11: Number of fixed lines as a percentage of the population

Country	2006	2007	2008
Tunisia	12,65	12,18	12,45
South Africa	9,22	8,91	8,62
Botswana	7,24	7,41	7,4
Namibia	6,61	6,57	6,54
Senegal	2,26	1,95	2,22
Kenya	1,23	1,67	1,67
Cameroon	1,01	1,34	1,66
Benin	1,32	1,19	1,42
Cote d'Ivoire	1,23	1,73	1,34
Ghana	1,65	0,62	1,12
Ethiopia	1,12	1,11	1,1
Burkina Faso	0,83	0,95	1,06
Nigeria	1,07	0,86	0,92
Uganda	0,54	0,53	0,71
Zambia	0,75	0,72	0,7
Tanzania	0,4	0,29	0,4
Mozambique	0,36	0,35	0,36
Rwanda	0,24	0,17	0,33

Source: ITU

It is evident in Table 11 that in 2008 there was a decline in the number of fixed-line subscribers as a percentage of the population, not only in Tanzania but in all countries with the exception of Botswana, Burkina Faso, Cote d'Ivoire, Cameroon and Kenya. In 2009 there was an increasing trend in the number of fixed-line subscribers as a percentage of the population across all the countries with the exception of Botswana, Cote d'Ivoire, Ethiopia, Namibia and South Africa.

in 2008 there was a decline in the number of fixed-line subscribers as a percentage of the population

Table 12: Subscribers Per Operator

Year	BENSON	CELTEL	TIGO	TTCL Fixed	TTCL MOBILE	VODA COM	ZANTEL MOBILE	ZANTEL FIXED	TOTAL
2005	-	882,693	422,500	154,420	-	1,562,435	96,109	-	3,118,157
2006	-	1,516,832	760,874	150,897	6 390	2,975,580	355,246	747	5,766,566
2007	3 300	2 505 546	1 191 678	157 816	72 729	3 870 843	678 761	5 453	8 486 126
2008	3 000	3,862,371	2 569 527	116 265	105 804	5 408 439	1 057 652	7 544	13 130 602
2009	3,101	4,910,359	4,178,089	157,321	115,681	6,883,661	1,378,595	15,601	**17,642,408**

TCRA:Telecommunications Statistics as at September 2009
Source: http://www.tcra.go.tz/publications/telecomStatsSept09.html

Table 13: Voice Telecommunication Subscribers Market Share (2005 - 2009)

Year	2005	2006	2007	2008	2009
Fixed Lines	154,420	151,644	163,269	123,809	172,922
Mobile	3,389,787	5,614,922	8,322,857	13,006,793	17,469,486
Total	**3,544,207**	**5,766,566**	**8,486,126**	**13,130,602**	**17,642,408**
Mobile Share	96%	97%	98%	99%	99.9%

Source: Fieldwork, October to December 2009

Mobile Subscribers and Trend

Tanzania has a fairly vibrant mobile market, and it is growing well. As indicated in Table 4, the mobile sector contributed to 99% of all voice subscription in 2009. Although Vodacom is still by far the largest mobile operator, maintaining a market share of more than 39%, Zain and Tigo are fast-growing. In 2009 Zain had a 28% market share, and Tigo had made greater gains, leaping to 24% from 17.7% in 2008. This means that the three operators control more than 87% of Tanzania's mobile market. The figure below shows the trend in voice operator subscriptions from 2000-2009.

Vodacom is still by far the largest mobile operator, maintaining a market share of more than 39%

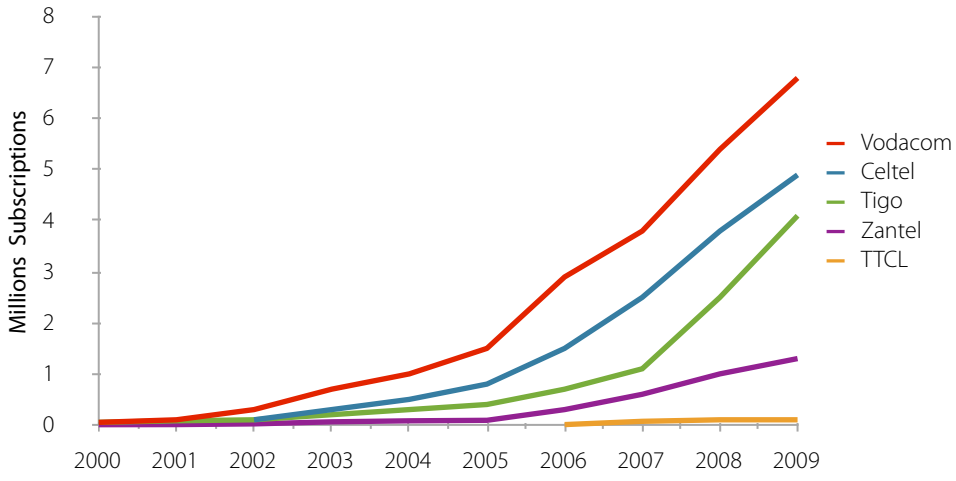

Figure 2: Mobile subscriber trend 2000-2009
Source: TCRA website www.trcra.go.tz

Table 14: Mobile subscribers as a percentage of the population

Country	2006	2007	2008	2009
Botswana	44,10	60,86	77,34	96,12
Tunisia	73,60	77,89	84,59	94,96
South Africa	81,54	86,02	90,60	92,67
Ghana	23,30	33,25	49,55	63,38
Cote d'Ivoire	20,70	37,11	50,74	63,33
Benin	13,00	24,45	41,85	56,33
Namibia	29,73	38,31	49,39	56,05
Senegal	25,75	30,53	44,13	55,06
Kenya	19,96	30,06	42,06	48,65
Nigeria	22,40	27,35	41,66	47,24
Tanzania	14,37	20,16	30,62	39,94
Cameroon	17,20	24,31	32,28	37,89
Zambia	13,84	21,43	28,04	34,07
Uganda	6,77	13,69	27,02	28,69
Mozambique	11,00	14,08	19,68	26,08
Rwanda	3,41	6,72	13,61	24,30
Burkina Faso	7,10	10,94	16,76	20,94
Ethiopia	1,10	1,54	2,42	4,89

Source: ITU

Internet Subscribers

Tanzania had an Internet penetration of 1.3%, corresponding to 520,000 Internet users

According to the International Telecommunications Union (ITU), by June 2009 Tanzania had an Internet penetration of 1.3%, corresponding to 520,000 Internet users. The world's average penetration rate in 2009 was 23%, while Africa's average stood at 4.2%.

Table 15: Estimates of Internet users in Tanzania 2003-2008

Year	Users
2003	250,000
2004	333,000
2005	384,000
2006	390,000
2007	400,000
2008	520,000

Source: BuddeComm (October 2009) based on ITU and industry data

There are 25 registered Internet service providers. It was not possible to get statistics for Internet subscribers because such data is not collected by the regulator. Sections 3.4 and 3.5 provide some additional data and information about Internet in Tanzania.

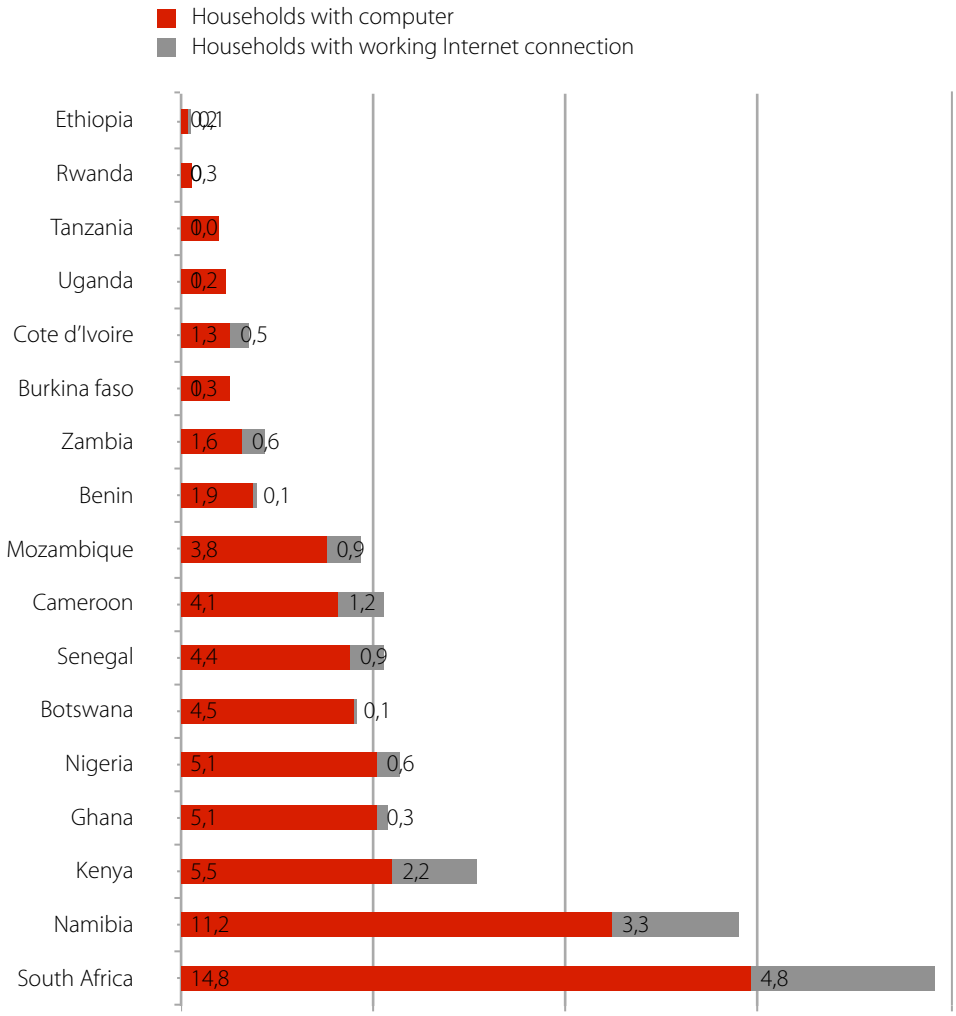

Figure 3 – Households with a working computer and Internet connection in Africa

Source: RIA ICT Access and Usage Household and Individual Survey 2007-2008

The ITU indicates that Internet penetration in Tanzania was equal to 1.3% in June 2009, while Figure 3 above is based on a household survey conducted by RIA between 2007-2008. The figure illustrates the fact that in Tanzania personal computer ownership is almost absent and the majority of households have no Internet connection, indicating that there is a need for demand-supply stimulation for the country to become connected. A major hurdle is the cost of personal computers and Internet-enabled devices.

The ITU indicates that Internet penetration in Tanzania was equal to 1.3% in June 2009

Broadband subscribers

Apart from mobile broadband, there are now several infrastructure projects for submarine cables and terrestrial optical fibre cables, for example SEACOM, TEAMS and EASSY projects along the East African Coast. The SEACOM cable, a submarine fibre-optic with a length of approximately 15,000 km, was launched on 23rd July 2009 and has an enormous capacity of 1.28Tb/s (terabits per second). This will enable high-speed Internet downloads, cheaper prices in comparison to current satellite pricing, peer-to-peer networks, high definition TV, and IPTV. The overall impact on broadband growth into services such as e-learning, e-health, e-government and e-commerce will be unprecedented.

Apart from mobile broadband, there are now several infrastructure projects for submarine cables and terrestrial optical fibre cables

Table 14: Mobile subscribers as a percentage of the population

	Internet users in 2009 per 100 inhabitants	Fixed broadband Internet subscriptions in 2009		Mobile cellular subscriptions with broadband access 2009	
		per 100 population	Total	per 100 population	Total
Tunisia	34, 07	3,63	372 818		
South Africa	8, 82	0,96	481 000	10,52	5 271 825
Botswana	6, 15	0,77	15 000	2,97	58 000
Senegal	7, 36	0,47	58 720		
Ghana	5, 44	0,11	27 399	0,24	58 007
Rwanda	4, 50	0,08	8 388	0,15	15 177
Zambia	6, 31	0,06	8 000	0,03	4 314
Mozambique	2, 68	0,05	12 502	0,40	92 468
Nigeria	28, 43	0,05	81 958	4,89	7 565 435
Cote d'Ivoire	4, 59	0,05	10 000		
Burkina Faso	1, 13	0,04	6 000		
Kenya	10, 04	0,02	8 349	4,98	1 981 048
Benin	2, 24	0,02	1 791		
Namibia	5, 87	0,02	430**	1,48	32 211
Uganda	9, 78	0,02	6 000	1,10	360 000
Tanzania	1, 55	0.02*	6,439*	1,37	601 324
Cameroon	3, 84	0,00	900	0,49	96 600
Ethiopia	0, 54	0,00	3 498	0,10	84 773

Tanzania ITU data for 2008
** Telecom Namibia had 6000 ADSL subscribers in November 2009*

only 0.02 percent of broadband Internet subscriptions are fixed-line based

Tanzania has one of the lowest rates of penetration of Internet users in comparison with other African countries. The table above shows that only Ethiopia and Burkina Faso in 2009 had fewer Internet users per 100 inhabitants than Tanzania. Since only 0.02 percent of broadband Internet subscriptions are fixed-line based, almost all users of broadband services are connected through wireless technologies. The percentage of mobile subscriptions with broadband access in 2009 is equal to 1.37%. Even though the penetration rate of mobile broadband is remarkably low, this percentage is slightly higher than the African average, suggesting that the mobile broadband services market is growing faster than in other African countries.

Communications Service Pricing

Fixed-Line Pricing

Fixed-line telephones are preferred for businesses with fixed office locations, as they portray some sort of permanency. Fixed-line tariffs are affordable, provided communication is between the same fixed network lines. However, they are unpopular due to inadequate maintenance causing long down-times. Off-peak rates for a TTCL fixed-line local call within the same network are 60 shillings per minute and 1.5 shillings per second. Off-off-peak rates for TTCL fixed-line calls are 120 shillings per minute and 3.0 shillings per second. It is 230 shillings per minute flat rate with all other operators locally and 330 shillings for East Africa, and 400 shillings for Burundi, Rwanda, Malawi, Egypt, Zambia, Mozambique, SA, India, Europe, North America, Pakistan and Lebanon, and 550 shillings for the rest of the world.

Fixed-line tariffs are affordable, provided communication is between the same fixed network lines

Table 17: TTCL Voice per Minute Tariffs

Origination			Termination					
Daily			Own Network			Other Operators		
			TTCL Fixed		TTCL Mobile	National	EA	International
			Local	STD				
6:01 am - 6:00 pm	TTCL Fixed	Prepaid	120	150	150	230	330	400*/550**
		Post paid	110	150	150	230	330	400*/550**
	TTCL Mobile	Prepaid	180	180	180	230	330	400*/550**
		Post paid						
6:01 am - 6:00 pm	TTCL Fixed	Prepaid	60	60	60	230	330	400*/550**
		Post paid						
	TTCL Mobile	Prepaid	150	150	150	230	330	400*/550**
		Post paid						

Source: Fieldwork, October to December 2009

Table 18: TTCL Voice per Second Tariffs

Origination		Termination					
		Own Network			Other Operators		
		TTCL Fixed		TTCL Mobile	National	EA	International
		Local	STD				
TTCL Fixed	6:01 am - 6:00 pm	2.5	3.0	3.0	4.0	6.0	8.0*/9.0**
	6:01 pm - 6:00 am	1.5	1.5	1.5			
TTCL Mobile	6:01 am - 6:00 pm	3.5	3.5	3.5	4.0	6.0	8.0*/9.0**
	6:01 pm - 6:00 am	3.0	3.0	3.0			
* Zone A	Burundi, Rwanda, Malawi, Egypt, Zambia, Mozambique, SA, India, Europe, North America, Pakistan and Lebanon						
** Zone B	Rest of the world						

Source: Fieldwork, October to December 2009

Mobile Pricing

On-net technology offers lower tariffs when compared to off-net tariffs across all operators

The fixed wireless and mobile phone minimum tariff is 1 shilling per second, offered within the same network locally. On-net technology offers lower tariffs when compared to off-net tariffs across all operators, whether using GSM or CDMA. The highest local tariffs are charged for cell/mobile to fixed-line calls or vice versa, ranging from 100 to 380 shillings per minute. Off-net and on-net short message service (sms) costs are the same, although the cost varies from 20 to 45 shillings per message according to network. Each operator offers lower tariffs or special rates for wholesale and bundled pre-paid services. Average pre-paid tariffs per operators as at June 2009 (shillings per minute) are as shown in Table 19 below.

Table 19: Average pre-paid tariffs as at June 2009

Tariff	VODACOM	ZAIN	TIGO	ZANTEL	TTCL	BENSON
On Net Calls	251	255	60	218	120	50
Off Net Calls	383	340	360	253	230	150
East Africa Calls	350	343	409	356	330	250
International Calls	507	507	500	482	475	290
SMS National	45	47	37	44	NA	20
SMS International	100	106	65	83	NA	NA

Source: Fieldwork, October to December 2009

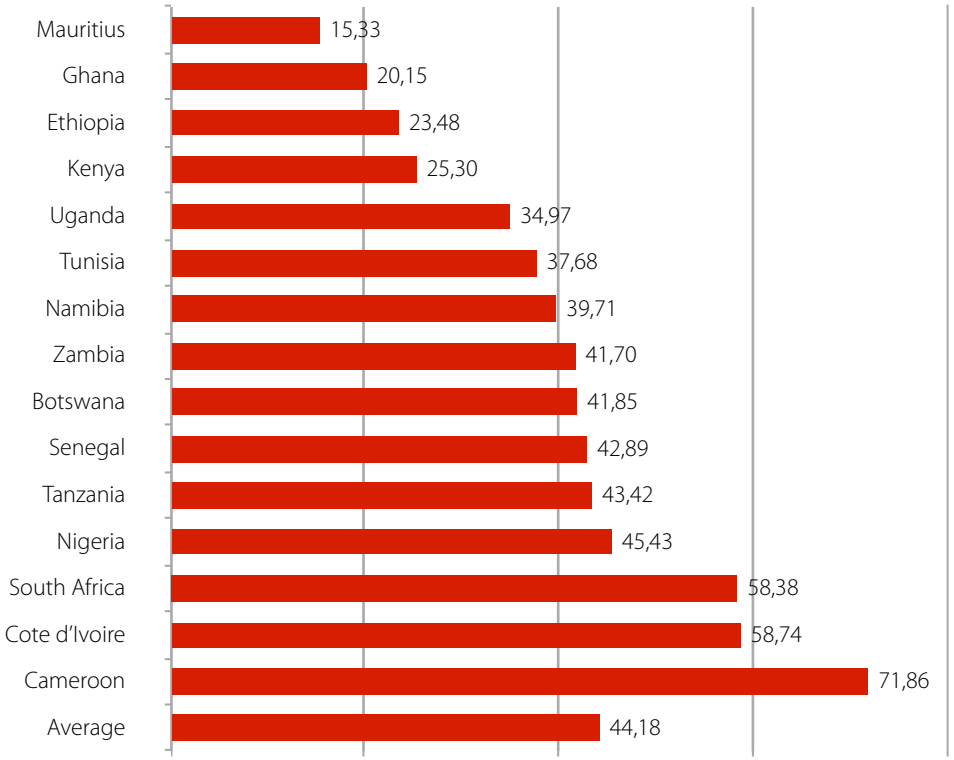

Figure 4: Total Cost of Ownership in US$

Source: Nokia 2007

In a global pricing study, Nokia has calculated the monthly total-cost-of-ownership (TCO) for mobile phones for a series of countries. On this price index, Tanzania comes in just below the $44.18 dollar average. With a TCO of US$43.42, the country is followed by Nigeria, South Africa, Ivory Coast and Cameroon, which all come in just above the global average cost.

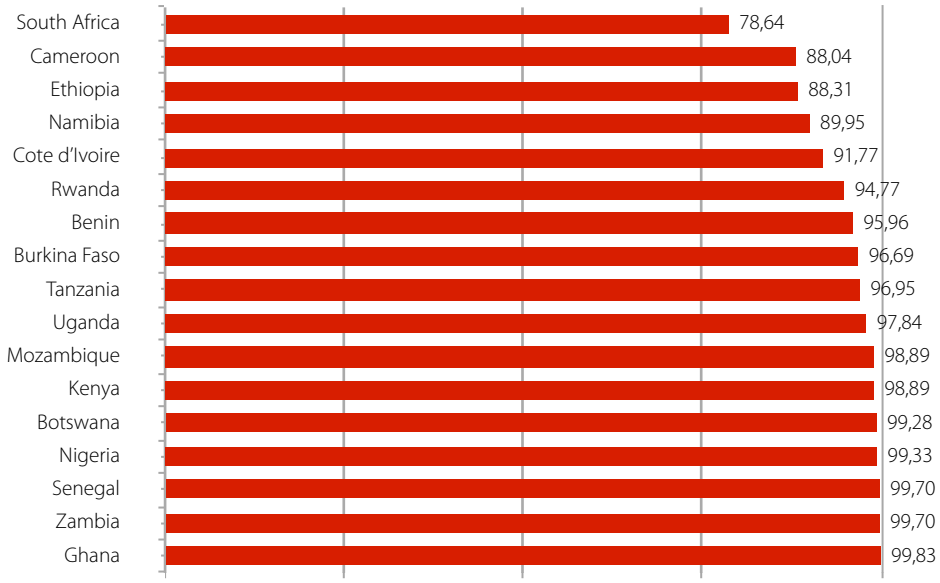

Figure 5: Share of mobile subscribers that were prepaid users in 2007/8

Source: RIA household survey

The figure above depicts the fact that almost all mobile subscribers were prepaid users in 2007/2008 (Gillwald & Stork, 2008), confirming the overall African trend of pre-paid subscribers of SIM-cards. The choice of a pre-paid mobile service is linked to irregular and low-income patterns across the majority of the population, who prefer the pre-paid solution as it allows for greater flexibility in expenditure.

almost all mobile subscribers were prepaid users in 2007/2008

Table 20: Cheapest prepaid product in a country compared with cheapest prepaid product from dominant operators for OECD usage baskets (2006 definition) for 18 RIA countries

	Cheapest prepaid product in the country in USD			Cheapest prepaid product from dominant operators			Difference (% = difference / dominant price)					
	Low User	Medium User	High User	Low User	Medium User	High User	Low User		Medium User		High User	
							%	USD	%	USD	%	USD
Botswana	5,04	10,28	20,67	5,04	10,28	20,67	0%	0,00	0%	0,00	0%	0,00
Ethiopia*	3,74	7,59	14,98	3,74	7,59	14,98	0%	0,00	0%	0,00	0%	0,00
Mozambique	7,45	15,07	29,88	7,45	15,07	29,88	0%	0,00	0%	0,00	0%	0,00
Senegal	6,12	12,31	24,25	6,12	12,31	24,25	0%	0,00	0%	0,00	0%	0,00
South Africa	7,64	15,38	29,63	7,64	16,12	33,13	0%	0,00	5%	0,74	11%	3,50
Tunisia	5,06	10,24	20,19	5,06	10,24	20,19	0%	0,00	0%	0,00	0%	0,00
Zambia	6,57	13,28	25,99	6,60	13,54	26,37	0%	0,03	2%	0,26	1%	0,38
Cameroon	8,59	16,42	30,45	9,30	17,91	33,22	8%	0,71	8%	1,49	8%	2,77
Uganda	6,33	12,90	24,05	6,95	13,90	26,85	9%	0,62	7%	1,00	10%	2,80
Burkina Faso	11,04	22,65	45,19	12,54	25,98	52,52	12%	1,50	13%	3,33	14%	7,33
Côte d'Ivoire	7,00	14,34	28,88	8,15	16,34	31,59	14%	1,15	12%	2,00	9%	2,71
Ghana	2,29	4,36	8,01	3,04	6,10	12,16	25%	0,75	29%	1,74	34%	4,15
Benin	4,92	11,05	24,75	7,50	14,74	27,84	34%	2,58	25%	3,69	11%	3,09
Kenya	3,35	6,37	11,42	5,93	11,82	22,78	44%	2,58	46%	5,45	50%	11,36
Namibia	5,06	10,74	22,19	8,96	18,27	36,19	44%	3,90	41%	7,53	39%	14,00
Rwanda	3,74	7,94	16,59	6,87	13,63	26,45	46%	3,13	42%	5,69	37%	9,86
Nigeria	3,63	7,58	15,48	7,76	15,85	32,13	53%	4,13	52%	8,27	52%	16,65
Tanzania	2,93	6,06	12,24	7,26	15,24	31,84	60%	4,33	60%	9,18	62%	19,60

** Ethiopia only has one operator*

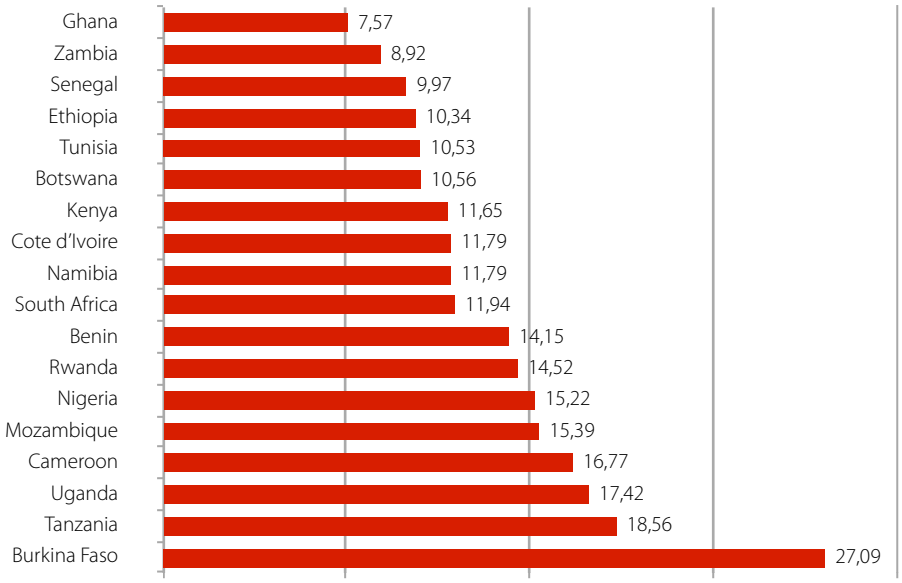

Figure 6: OECD Low Usage Basket PPP for cheapest product of dominant operators

Source: www.researchictafrica-data.net

The excellent regulatory effort in Tanzania to reduce prices is undermined by the special taxes on communications equipment and services

Adjusted for purchasing power, Tanzania remains one the highest in terms of mobile prices (OECD low usage basket PPP), followed by another poor country, Burkina Faso, despite their relatively good performance before the adjustment. The excellent regulatory effort in Tanzania to reduce prices is undermined, however, by the special taxes on communications equipment and services. As highlighted above, telecom equipment in Tanzania is subject to 20% import duty and 20% VAT and there is a 7% special tax on mobile airtime.

Broadband Pricing

Broadband service costs have dropped drastically since the landing of the SEACOM cable in Dar es Salaam. The TTCL, for example, is offering a cost reduction between 20% and 50% as shown in the table below:

Table 21: Comparison of old and new broadband prices

TTCL Residential/personal Broadband Services			
Service	**Old Price per MB (TZS)**	**New Price per MB (TZS)**	**Price Advantage (%)**
Broadband Standard	95.00	75.00	-20%
New Service	**Price (TZS)**	**Speed (up/down) – Shared**	**Charging**
Broadband Unlimited	45 000,00	256/256	Monthly (rolling)

Small and medium enterprises Broadband Services (The prices have been reduced by 50–62% as seen in the last column)			
Old Usage (GB)	**New Usage (GB)**	**Old Price (TZS)**	**Price Advantage (%)**
0.44	1	30,000.00	-55%
1	2	60,000.00	-49%
2	4	100,000.00	-49%
5	10	200,000.00	-49%
10	20	360,000.00	-49%
20	40	450,000.00	-49%
50	100	1,000,000.00	-49%
Unlimited Package		54,000.00	New Package

The Retail Price for Broadband Standard (Non-package) is Tsh 75 per MB

NOTE:

- For packages, if in-package usage is not finished within a month it expires (no carry forward)
- If package usage is finished before the month ends, customer is charged on a flow basis at Tshs75 per MB until the month ends
- For any additional top-ups carried out above the package, when the month ends, remaining balance shall be carried forward into the next month
- At the beginning of each month, all package accounts must be topped-up with balance equivalent to the monthly package; otherwise service will not be made available
- A broadband account that is not topped up expires after 30 days since it was created
- For any top-up performed, account validity is increased by 30 days for each Tshs10,000.00
- When account validity expires, the account is deleted from a system
- To restore a deleted account, the customer has to pay installation charges as a new subscriber

Dedicated Broadband Tariffs					
Monthly Service	**Old Price (TZS) VAT Exclusive**	**Old Price (TZS) VAT Inclusive**	**New Price (TZS) VAT Exclusive**	**New Price (TZS) VAT inclusive**	**Change (%)**
Ded 64K	762,711.86	900 000,00	381,355.93	450 000,00	-50%
Ded 128K	1,525,423.73	1,800,000.00	1,525,423.73	860 000,00	-52%
Ded 256K	2,711,864.41	3 200 000,00	1,254,237.29	1 480 000,00	-54%
Ded 512K	4,745,762.71	5,600,000.00	1,881,355.93	2 220 000,00	-60%
Ded 1024K	7,796,610.17	9,200,000.00	2,661,016.95	3 140 000,00	-66%
Ded 2048K	10,508,474.58	12 400 000,00	3,966,101.69	4 680 000,00	-62%

TTCL tariffs
Source: http://www.ttcl.co.tz/tariffs_overview_Eng.asp

Zantel charges 1 shilling per second within its network and 5.5 shillings to all other operators. Zantel International Tariffs[10] are divided into 4 zones as follows:

- Zone 1, costing 5.5 shillings per second, for United States of America, Canada, France, Norway, Spain, Germany, Ireland, India, Italy, Pakistan, United Kingdom, Sweden, and Denmark;
- Zone 2, costing 6.0 per second, for Congo DR, UAE, Sudan, Israel, Comoros, Lebanon, Yemen, China, and Oman;
- Zone 3, costing 5.5 shillings per second, for Mozambique, Zambia, Rwanda, Zimbabwe, Kenya, Malawi, Uganda, South Africa, and Burundi; and
- Zone 4, costing 10 shillings per second, for the rest of the world.

Interconnection Facilities Leasing and Costing Model

In order to reduce mobile termination rates towards the cost of an efficient operator, Tanzania conducted a cost study. As a result, Tanzania interconnection is based on a Forward Looking Long Run Incremental Cost (FL-LRIC) model. It is referred to as 'Determination No.2 of 2007 on cost-based Interconnection Rates for voice call termination in the United Republic of Tanzania'. Based on this, interconnection rates applicable to telecommunication network operators in the United Republic of Tanzania from 1st January 2008 to 31st December 2012 are shown below:

Tanzania interconnection is based on a Forward Looking Long Run Incremental Cost (FL-LRIC) model

[10] Zantel Tariffs
Source: http://www.zantel.co.tz/tariff.html

Table 22: Applicable Interconnection Termination Rates for 2008-2012

	1st Jan. 2008	1st Jan. 2009	1st Jan. 2010	1st Jan. 2011	1st Jan. 2012
Voice call termination rates (US$ cents)	7.83 (=TSH97.00)	7,65	7,49	7,32	7,16

Source: TCRA

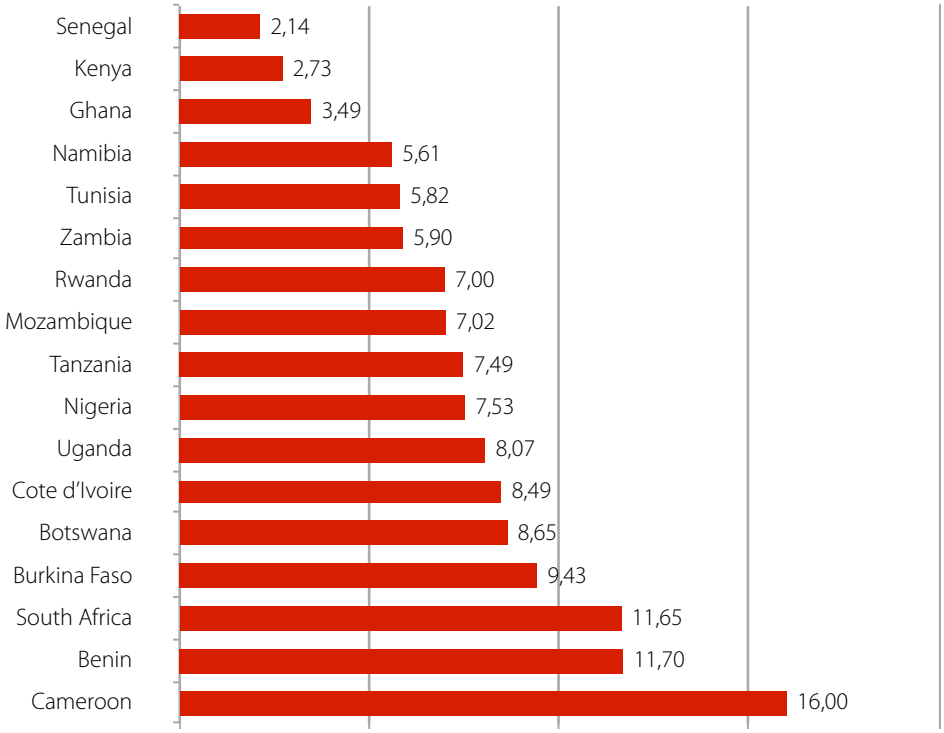

Figure 7: Mobile termination rates in US cents (FX = average September 2010)

Source: RIA comparative analysis 2009/2010

an international gateway operator must pay an international carrier to terminate a call in a foreign country

Outgoing international calls are not subject to regulation because an international gateway operator must pay an international carrier to terminate a call in a foreign country based on charges arrived at by commercial negotiations.

Incoming international calls, irrespective of their origin, transiting through the international gateways within Tanzania pay a cost for terminating calls on the national network in accordance with applicable interconnection regulations.

E- & M- Applications

E-Money and M-Banking

Currently there are two E-money schemes in Tanzania, namely, TemboCard and FedhaCard, which are operated by two different commercial banks. Three banks currently offer mobile banking services. Customers are able to receive information such as salary alerts and account balances through their mobile phones.

Three banks currently offer mobile banking services

Mobile payment services are offered by major mobile phone companies whereby their customers are able to send, spend and receive money without having a bank account. Zantel offers Z-Pesa, Vodacom has M-Pesa, and Zain offers Zap.

Mobile banking and payment services are initiated by a customer who fills out an application form and hands it over to registered agents. Upon direct cash deposit or link up with a customer's bank, the customer gets a mobile wallet, which allows them to use their mobile phone in much the same way as a bank account debit card, and manage their money through their handset. Currently, airtime re-charge, water and electricity bills, and major stores accept such payments.

E-Government

E-Government is about a government using computer technology, software and the Internet to manage and deliver services in three overlapping focal points: external interaction, connecting citizens and process improvement. E-Government strategies typically aim to generate improvements in one or a combination of these focal points.

Few Tanzanians are connected to the Internet. The focus of e-Government in Tanzania is unlikely to be the same as in parts of the developed world where over 50% of the population is connected. Given this fundamental constraint, the *Connected Citizens* focal point, comprising initiatives such as online voting, online tax remittance, electronic payment of fees and fines and online application for documents and licences, is likely to be untenable.

The *Process Improvement* and *External Interaction* focal points, on the other hand, would appear to be far more promising. Given the large amounts that the government spends on international procurement and the high levels of corruption that pervade public institutions, the potential to lower transaction costs whilst increasing transparency is undoubtedly high and desirable. The government faces considerable difficulties in delivering quality services internally (financial management and control, human resources and payroll management, providing policy information, standardising procedures, and so forth), and opportunities exist in initiatives to enhance process efficiencies.

the potential to lower transaction costs whilst increasing transparency is undoubtedly high and desirable

This means that improvements towards more efficient, effective, reliable, and transparent procurement (over the Internet) will have a very significant impact. Tanzania has launched integrated HR and Payroll systems covering about 280,000 public servants, reducing ghost workers and improving control and accuracy.

The government has embraced e-governance as a major driving force behind efficient and effective business transactions in government departments, particularly in financial procedures and making the government machinery more transparent to the public.

Pointing at government financial auditing, the Chief Secretary said: "We are creating an e-government that will be operational soon and it will drastically change the way we do things and manage our resources." He was addressing the annual auditors' meeting attended by auditors from government ministries, departments and related institutions audited by the Controller and Auditor General. The National Audit Office has adopted TeamMate software and Audit Command Language and will be rolled out in all ministries and regional headquarters. The process is expected to be complete by the end of 2012.

the language of Internet content poses a significant challenge, underscoring the importance of having Internet content in languages that one's citizens can read

However, given the high demands placed by e-government on a multitude of foundational pillars (which include prerequisites of infrastructure, appropriate policies, capacity development, ICT applications, and relevant content that need to be in place to fully implement e-government services) progress is slow. For example, the language of Internet content poses a significant challenge, underscoring the importance of having Internet content in languages that one's citizens can read. An e-Government portal in Tanzania must be in Kiswahili with an English language option.

The Telecommunications Regulatory Environment Survey

Introduction

The telecommunications regulatory environment survey was conduced with a view to gaining a sense of the general perceptions of sector stakeholders

The telecommunications regulatory environment survey was conduced with a view to gaining a sense of the general perceptions of sector stakeholders on the regulation of the operations of the sector. The survey was based on a methodology and a set of questionnaires. On a 1-5 scale, where 1 represented Highly Ineffective and 5 represented Highly Effective, perceptions were sought on seven dimensions about the fixed sector, the mobile sector and the broadband telecommunications sector: Market Entry, Access to Scarce Resources, Interconnection, Tariff Regulation, Regulation of Anti Competitive Practices, Universal Service Obligation (USO) and Quality of Service (QoS). As guided by the methodology, three categories of respondents were purposely identified:

Category 1:

Stakeholders directly affected by telecom sector regulation (e.g. Operators, Industry associations, Equipment suppliers, Investors)

Category 2:

Stakeholders who analyse the sector with broader interests (e.g. Financial institutions, Equity Research Analysts, Credit Rating Agencies, Telecom consultants, Law firms)

Category 3:

Stakeholders with an interest in improving the sector to help the public (e.g. Academics, Research organisations, Journalists, Telecom user groups, Civil society, Former members of regulatory and other government agencies, Donors, Current government employees from organizations related to the telecom sector EXCLUDING those in the telecom regulatory & policy hierarchy i.e. excludes anyone from the regulatory agency, policy-making body [often Ministry of Post and Telecom or similar], the Minister in charge of Telecommunications etc.)

Data was collected from Dar es Salaam, Arusha and Moshi

Based on the criteria, a list of potential respondents was prepared by the survey team. A total of 67 potential respondents belonging to the three sectors were selected for the survey and a questionnaire sent to them either in hard copy or electronic depending on respondents' preference. Data was collected from Dar es Salaam, Arusha and Moshi between November and December 2009. 54 responses were received.

Weighting of Respondents

There were 54 responses, representing the three categories as indicated in Table 17. Weighting for the categories was necessary to achieve a balanced representation of each category so that all three categories contribute equally to the final score as required by the methodology.

Table 23: Respondent Categories and Weighting

Category	Description	Responses	Weighting
1.	Stakeholders directly affected by telecom sector regulation : Operators, Industry associations, Equipment suppliers, Investors etc.	24	0.75
2.	Stakeholders who analyze the sector with broader interests: Financial institutions, Equity Research Analysts, Credit Rating Agencies, Telecom consultants, Law firms etc.	13	1.38
3.	Stakeholders with an interest in improving the sector to help the public: Academics, Research organizations, Journalists, Telecom user groups, Civil society etc.	17	0.06

Table 24: Average Weighted Scores

Measure	Ave. Weighted Score
F1 - **FIXED** Market Entry	3.04
F2 - **FIXED** Access to Scarce Resources	2.72
F3 - **FIXED** Interconnection	3.14
F4 - **FIXED** Tariff Regulation	2.89
F5 - **FIXED** Regulation of Anti Competitive Practices	2.43
F6 - **FIXED** Universal Service Obligation (USO)	2.57
F7 - **FIXED** Quality of Service (QoS)	3.1
M1 - **MOBILE** Market Entry	3.7
M2 - **MOBILE** Access to Scarce Resources	3.5
M3 - **MOBILE** Interconnection	3.3
M4 - **MOBILE** Tariff Regulation	2.8
M5 - **MOBILE** Regulation of Anti-competitive Practices	2.67
M6 - **MOBILE** Universal Service Obligation (USO)	2.7
M7 - **MOBILE** Quality of Service (QoS)	3.51
B1 - **BROADBAND** Market Entry	3.29
B2 - **BROADBAND** Access to Scarce Resources	3.4
B3 - **BROADBAND** Interconnection	2.9
B4 - **BROADBAND** Tariff Regulation	2.7
B5 - **BROADBAND** Reg. of Anti-competitive practices	2.53
B6 - **BROADBAND** Universal Service Obligation (USO)	2.69
B7 - **BROADBAND** Quality of Service (QoS)	2.81

Results

Scoring

Respondents were asked to rank, on a scale ranging from 1 to 5, the effectiveness of the regulatory environment in the Fixed, Mobile and Broadband sectors in seven dimensions: Market Entry, Access to Scarce Resources, Interconnection, Tariff Regulation, Regulation of Anti-competitive Practices, Universal Service Obligation and Quality of Service.

Comparison of Weighted Scores

Comparison of the weighted scores for each sector and dimension reveal in all aspects, except tariff regulation, that the mobile sector was perceived as the most effective. The fixed sector was rated second while ISP sectors was rated least effective. The fixed sector only fared well in tariff regulation. The broadband band sector fared well in market entry and access to scarce resources. In all sectors, anti-competitive practices scored lowest on the scale. See Figure 1 for a general trend per sector and dimension.

The broadband band sector fared well in market entry and access to scarce resources

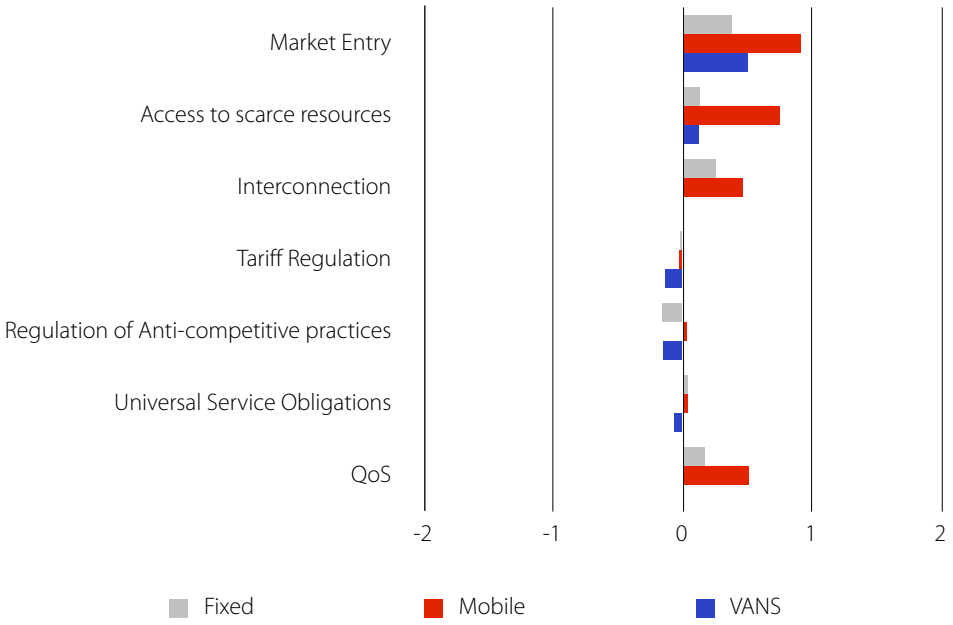

Figure 8: Comparison of the Weighted Scores for Each Sector and Dimension

Perspectives for Each Sector

Fixed Line Sector

General comments about the fixed-line sector as provided by respondents:

- Fixed telecom services are based in towns while rural areas have been neglected
- More work needs be done to increase the effectiveness and quality of service and reduce prices of service. A lot of bills are wrong, not sent or overcharged and the regulators have not done anything about it.
- Fixed telephone firms are few, thus taking monopoly of the sector. Market forces cannot very much influence the operators.
- The regulator should think of tariff reduction in the fixed-line sector
- The fixed-line sector is dominated by one operator, difficult to regulate anticompetitive practices

Compared across sectors, the results revealed an average rating for the fixed sector in all dimensions. Tariff regulating and regulation of anti-competitive practices were rated as highly ineffective. See Figure 4 for rated opinions in the fixed sector.

Tariff regulating and regulation of anti-competitive practices were rated as highly ineffective

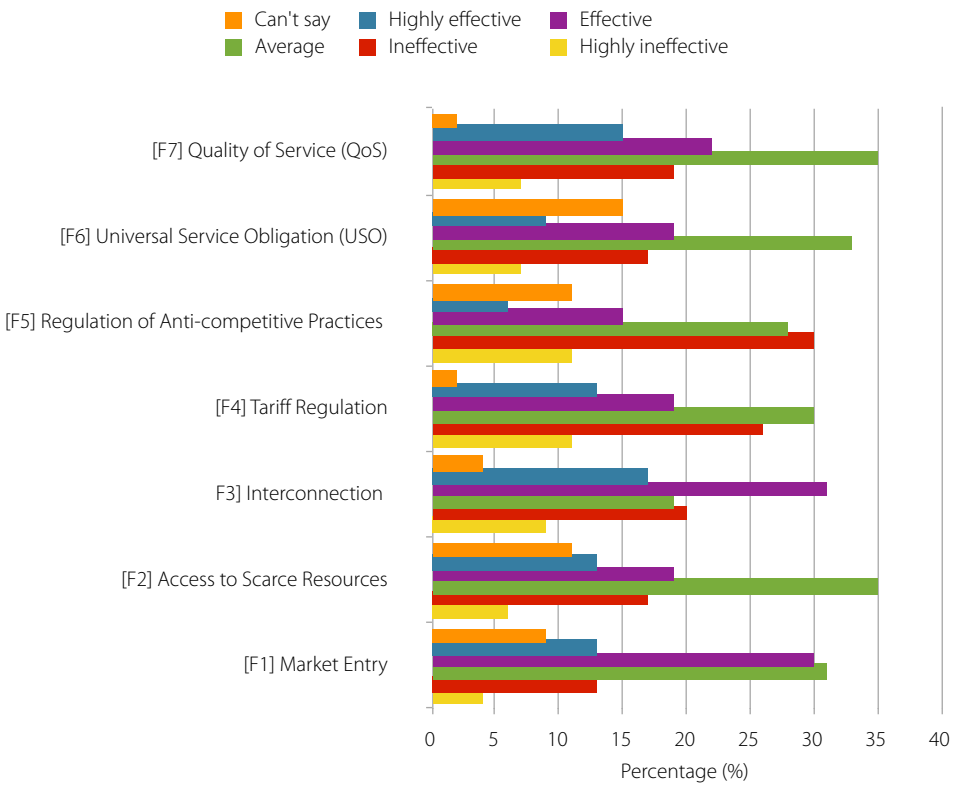

Figure 9: Fixed Line Sector – Perspectives in percentage responses per dimension

Mobile Sector Perspectives

General comments about the mobile sector by respondents

- Mobile sector has moved strongly into providing data services
- Airtime costs are not friendly to users from all service providing mobile companies
- In general, there is a NEED to reduce cost of service to consumers
- No consortium available and no willingness in making any as available companies fear of competition
- The price for calling is very expensive. It is cheaper to call America from the Internet than call a local mobile number. It is cheaper to use Internet to call a local mobile and other network than to use your mobile phone.
- Internet usage through mobile network operator (MNOs) modems still expensive
- Regulator must now start to ensure the quality of mobile handset products
- Interconnection and regulation on anti-competitive practices may be an issue for the mobile sector
- The mobile sector has grown fast and has a wide geographical coverage, becoming successful. Regulation is up to date.

Ratings

Compared across sectors, the mobile sector was rated higher in all dimensions. Market entry, access to resources and interconnection were also rated effective. The Universal Service Obligation was rated less effective in this sector. See Figure 10 below for rated opinions in the mobile sector.

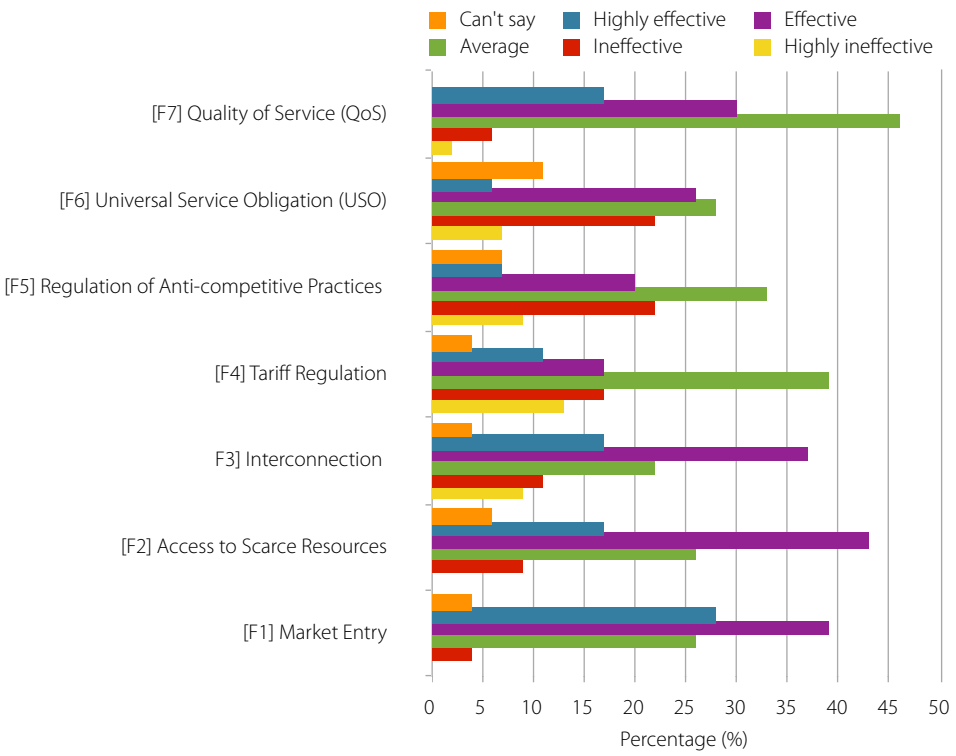

Figure 10: Mobile Sector Perspectives in percentage responses per dimension

Broadband Sector Perspectives

General comments regarding the broadband sector

- It is not possible to share broadband information between service providers
- Broadband service is mostly based in towns. Rural areas have been neglected.
- TCRA in general is doing well to regulate but there is discrepancy in delivering procured bandwidth to regions is ineffective, as we do not have the infrastructure in place and where is in place it is expensive costing more than bringing bandwidth from outside
- The cost is low, price and quality is very good, but speed of implementation is too slow. The benefit of the fiber optic is not transformed to customer on unlimited packages
- Broadband service is almost non-existent. Internet connection in Tanzania is incredibly slow and therefore, unreliable. Additionally, the cost of Internet in Tanzania is way too much. It's not unusual to walk out of the Internet café without achieving whatever you wanted. Downloading a very small file can take ages. Now that fiber optic cables are well in place, I expect to see improvements in speed and cost decline.
- Increase supervision and controlling of price for broadband
- Reliability of broadband sector is still a problem
- The broadband sector is new and still slowly adopted due to lack of electricity especially in rural areas. Regulatory measures in the broadband sector should be enhanced.

Ratings

Market entry for the broadband sector was rated as effective

Market entry for the broadband sector was rated as effective. However, this may be based on what the regulation provides for in documentation, but have little to do practical experience because the sector is new.

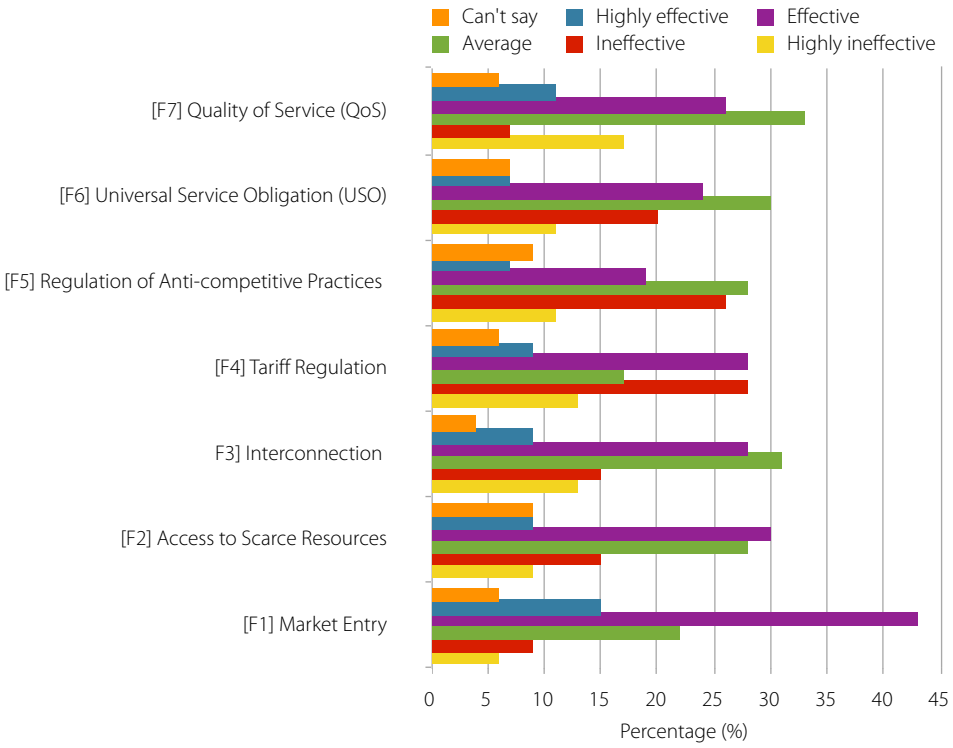

Figure 11: Broadband Sector Perspectives in percentage responses per dimension

Conclusion

Market Entry: There were concerns about the transparency of licensing. It was felt that applicants should know the terms, conditions, criteria and length of time needed to reach a decision on their application. There were also concerns about licence conditions and exclusivity issues.

Access to Scarce Resources: Some respondents wanted timely, transparent and non-discriminatory access to spectrum allocation. Assignment of telecommunication numbers (numbering resources) and rights of way was also an issue of concern. Frequency allocation, telephone number allocation and tower/mast locations and safety were also issues of concern.

Frequency allocation, telephone number allocation and tower/ mast locations and safety were also issues of concern

Inter-connection: Interconnection with a major operator should be ensured at any technically feasible point in the network. The quality of interconnection needed to be similar to services offered by a provider's own network, and it was felt rates for interconnection needed to be even more reasonable. Sharing of incoming and outgoing International Direct Dialling (IDD) revenue was requested. Payment for cost of interconnection links and switch interface was considered too high. There should be penalties for technical disruption of interconnection.

There should be penalties for technical disruption of interconnection

Regulation of Anti-competitive Practices: Respondents alleged that there were anti-competitive practices in cross subsidisation in the market, using information obtained from competitors with anti-competitive results. Some respondents claimed that network operators were not making technical information about essential facilities and commercially relevant information available to competitors on a timely basis. Claims of excessive prices, discrimination and predatory low pricing were also made. Technical disruption of interconnection by competitors was also noted.

Universal Service Obligations (USO): Respondents were of the opinion that USO was a good move, but cautioned that its administration of the service should be transparent, non-discriminatory and competitively neutral. A need to educate targeted beneficiaries of the service was expressed.

Quality of Service: Respondents noted a discrepancy between actual performance of service compared to what is promised. For example, while there is a lot of advertisement on new services and how to subscribe, there is little information on how to unsubscribe, causing a lot of frustration to customers. Voice transmission quality (for mobile and fixed telephones), connection speeds or throughput (for broadband) were also areas of concern.

Conclusions and Recommendations

1. It appears that the general public lacks awareness on developments in the telecommunication sector and its potential contribution to national development. There is a need to provide education about developments in the telecommunications sector, particularly on availability of broadband communication facilities, and how these developments can be used to harness and enhance economic development. Investors in the sector need to foresee these in the long run as economic gains reflected in growing ARPU.

Stakeholders (both government and private), could take an interest in research and development activities as a basis for sustained growth and development

2. Research and Development (R&D) activities in the sector are limited, while telecommunications usage data and statistics are not regularly collected. This makes it very difficult to establish or predict trends in the sector without carrying out extensive research. Stakeholders (both government and private), could take an interest in research and development activities as a basis for sustained growth and development of the sector.
3. Customer service was rated low by respondents of the survey. This calls for improved quality of customer support, especially help desk services and customer support.
4. Respondents complained about the poor quality of handsets. Sub-standard and imitation brand handsets are abundant in the local market, posing danger to users. Mobile phone operators can help ensure quality control through the sale of low-cost quality handsets.

We recommend that regulation on installation of masts and towers be enforced

5. Respondents observed haphazard installation of telephone masts and towers. We therefore recommend that regulation on installation of masts and towers be enforced.
6. Time-based Internet access charge models may be limited in a broadband environment. Internet and data service providers may need to be helped to review their Internet access charge models. For example, time-based Internet access charging models may need to be replaced by data (file size) charging models.

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Appendices

Appendix 1 : TTCL Tariffs

Source: http://www.ttcl.co.tz/tariffs_overview_Eng.asp

TTCL Residential/Personal Broadband Services

Service	Old Price per MB (TZS)	New Price per MB (TZS)	Price Advantage (%)
Broadband Standard	95.00	75.00	-20%
New Service	**Price (TZS)**	**Speed (up/down) – Shared**	**Charging**
Broadband Unlimited	45 000,00	256/256	Monthly (rolling)

Small and Medium Enterprise Broadband Services
(The prices have been reduced by 50–62% as seen in the last column)

Old Usage (GB)	New Usage (GB)	Old Price (TZS)	Price Advantage (%)
0.44	1	30,000.00	-55%
1	2	60,000.00	-49%
2	4	100,000.00	-49%
5	10	200,000.00	-49%
10	20	360,000.00	-49%
20	40	450,000.00	-49%
50	100	1,000,000.00	-49%
Unlimited Package		54,000.00	New Package

The Retail Price for Broadband Standard (Non-package) is Tsh 75 per MB

NOTE:

- For packages, if in-package usage is not finished within a month it expires (no carry forward)
- If package usage is finished before the month ends, customer is charged on a flow basis at Tshs75 per MB until the month ends
- For any additional top-ups carried out above the package, when the month ends, remaining balance shall be carried forward into the next month
- At the beginning of each month, all package accounts must be topped-up with balance equivalent to the monthly package; otherwise service will not be made available
- A broadband account that is not topped up expires after 30 days since it was created
- For any top-up performed, account validity is increased by 30 days for each Tshs10,000.00
- When account validity expires, the account is deleted from a system
- To restore a deleted account, the customer has to pay installation charges as a new subscriber

Dedicated Broadband Tariffs

Monthly Service	Old Price (TZS) VAT Exclusive	Old Price (TZS) VAT Inclusive	New Price (TZS) VAT Exclusive	New Price (TZS) VAT inclusive	Change (%)
Ded 64K	762,711.86	900 000,00	381,355.93	450 000,00	-50%
Ded 128K	1,525,423.73	1,800,000.00	1,525,423.73	860 000,00	-52%
Ded 256K	2,711,864.41	3 200 000,00	1,254,237.29	1 480 000,00	-54%
Ded 512K	4,745,762.71	5,600,000.00	1,881,355.93	2 220 000,00	-60%
Ded 1024K	7,796,610.17	9,200,000.00	2,661,016.95	3 140 000,00	-66%
Ded 2048K	10,508,474.58	12 400 000,00	3,966,101.69	4 680 000,00	-62%

MPLS VPN Tariffs

MPLS VPN Service	Speed (Kbps)	Monthly Price (USD)
64Kbps - Symetrical	128	300,00
128Kbps - Symetrical	256	500,00
256Kbps - Symetrical	512	800,00
512Kbps - Symetrical	1024	1 050,00
1024Kbps - Symetrical	2048	2 040,00
1536Kbps - Symetrical	3072	3 500,00
2048Kbps - Symetrical	4096	4 100,00

For MPLS VPN capacity more than 2Mbps symmetrical (4Mbps) the price is USD 730.00 per Mbps. All prices above are VAT exclusive

TTCL PRIVATE LEASED CIRCUITS TARIFFS:
The table below shows TTCL's currently applicable leased lines tariffs.

Distance Range	Digital leased lines prices (USD)/month (VAT exclusive)					
	64Kbps	128Kbps	256Kbps	512Kbps	1Mbps	2Mbps
0-5	150.00	240.00	360.00	600.00	840.00	1,200.00
6-50	232.00	370.00	555.00	925.00	1,295.00	1,850.00
51-100	349.00	558.00	815.00	1,306.00	1,841.00	2,690.00
101-150	466.00	746.00	1,075.00	1,687.00	2,387.00	3,530.00
151-200	583.00	934.00	1,335.00	2,068.00	2,933.00	4,370.00
201-250	700.00	1,122.00	1,595.00	2,449.00	3,479.00	5,210.00
251-300	817.00	1,310.00	1,855.00	2,830.00	4,025.00	6,050.00
301-350	934.00	1,498.00	2,115.00	3,211.00	4,571.00	6,890.00
351-400	1,051.00	1,686.00	2,375.00	3,592.00	5,117.00	7,730.00
401-450	1,168.00	1,874.00	2,635.00	3,973.00	5,663.00	8,570.00
451-500	1,285.00	2,062.00	2,895.00	4,354.00	6,209.00	9,410.00
501-550	1,402.00	2,250.00	3,155.00	4,735.00	6,755.00	10,250.00
551-600	1,519.00	2,438.00	3,415.00	5,116.00	7,301.00	11,090.00
601-650	1,636.00	2,626.00	3,675.00	5,497.00	7,847.00	11,930.00
651-700	1,753.00	2,814.00	3,935.00	5,878.00	8,393.00	12,770.00
701-750	1,870.00	3,002.00	4,195.00	6,259.00	8,939.00	13,610.00
751-800	1,987.00	3,190.00	4,455.00	6,640.00	9,485.00	14,450.00
801-850	2,104.00	3,378.00	4,715.00	7,021.00	10,031.00	15,290.00
851-900	2,221.00	3,566.00	4,975.00	7,402.00	10,577.00	16,130.00
901-950	2,338.00	3,754.00	5,235.00	7,783.00	11,123.00	16,970.00
951-1000	2,455.00	3,942.00	5,495.00	8,164.00	11,669.00	17,810.00
1001-1050	2,572.00	4,130.00	5,755.00	8,545.00	12,215.00	18,650.00
1051-1100	2,689.00	4,318.00	6,015.00	8,926.00	12,761.00	19,490.00
1101-1150	2,806.00	4,506.00	6,275.00	9,307.00	13,307.00	20,330.00

NOTE:

- Analogue leased lines are only offered for short distances (Within 5Km) and are charged at USD130.00 per month (VAT exclusive)
- Installation charges for all leased lines are USD 600.00 (VAT exclusive)
- For higher bandwidths and international leased circuits the tariff will be negotiated based on actual bandwidth required and route
- Terminal equipment DTU/NTU is a responsibility of a customer. You will be given the number, type and make of the equipment after survey have been conducted to establish your requirements

Appendix 2

List of Internet Service Providers

- AfricaOnline
- Afsat Comm. (T) Ltd.
- Alink (T) Ltd.
- Benson Informatics Ltd. (BOL)
- Cats-Net
- Costech
- Satcom Networks
- SimbaNet
- Star Tel (T) Ltd.
- TTCL
- University Computing Centre
- Vizada Network
- Vodacom (T) Ltd.
- WiA Co. Ltd.
- Zee Communications Ltd
- Zanzibar Telecom Ltd.-Zantel
- MIC (T) Ltd.
- Selcom Broadband Ltd
- Arusha Node Marie (ANM)
- Arusha Art Ltd (CyberNet)
- Alldean Satellite Networks (T) Ltd
- Frank Habicht
- Tembo World Ltd.

List of Abbreviations and Acronyms

ADSL	Asymmetric Digital Subscriber Line
ARPU	Average Revenue per User
ASL	Applications Service License
BRI	Basic Rate Interface
CDMA	Code division multiple access
CLF	Converged Licensing Framework
COSTECH	Tanzanian Commission for Science and Technology
CSL	Contents Services License
DNS	Domain Name Server
EPOCA	Electronic and Postal Communications Act
GDP	Gross Domestic Product
GSM	Global System for Mobile
ICT	Information and Communication Technologies
IDD	International Direct Dial
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecommunication Union
MCT	Multipurpose Community Telecentres
LLU	Local Loop Unbundling
NFL	Network Facilities License
NSL	Network Services License
NTP	National Telecommunications Policy
PRI	Primary Rate Interface
PSTN	Public Switched Telephone Network
R&D	Research and Development
RCIP3	Regional Communications Infrastructure Programme
SIM	Subscriber Identity Module
TIX	Tanzania Internet Exchange
TBC	Tanzania Broadcasting Commission
TCRA	Tanzania Communications Regulatory Authority
TPC	Tanzania Posts Corporation
TPTC	Tanzania Posts and Telecommunications Corporation
TSH	Tanzanian Shillings
TTCL	Tanzania Telecommunications Company Limited
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
URT	United Republic of Tanzania
VPN	Virtual Private Network
WCDMA	Wideband Code Division Multiple Access
WLL	Wireless Local Loop

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