

A Country ICT Survey for Tanzania

Final Report

**Miller Esselaar and Associates
November 2001**



SWEDISH INTERNATIONAL DEVELOPMENT
COOPERATION AGENCY

Department for Research Cooperation – SAREC

A Country ICT Survey for **Tanzania**

Final Report

Miller Esselaar and Associates

November 2001

Prepared for



Miller Esselaar and Associates

PO Box 251
Wilderness 6560
South Africa
Tel: 27 44 877 0568
Fax: 27 44 877 0568

Members of the Study Team:

Mr Philip Esselaar	esselaar@iafrica.com
Mr Olof Hesselmark	olof.hesselmark@bluewin.ch
Ms Tina James	tjames@intekom.co.za
Dr Jonathan Miller	jonmil@icon.co.za

November 2001

Prepared for



Swedish International Development Cooperation Agency
S-105 25 STOCKHOLM
Tel: +46 8 698 5000
Fax: +46 8 20 88 64
Website: www.sida.se

TABLE OF CONTENTS

Executive Summary.....	ii
Chapter 1. Introduction	1
1.1 Reason for report	1
1.2 Study Methods and Outcomes.....	1
1.3 Brief Overview of African and International Trends	2
Chapter 2. Tanzania Today	5
Chapter 3. The ICT Policy Process	8
3.1 Telecommunications Policy	8
3.2 The Telecommunications Regulatory Environment	9
3.3 Overall ICT Policy	10
Chapter 4. Connectivity and Access	12
4.1 International Connectivity.....	12
4.2 Fixed Line Access	13
4.3 Mobile (Cellular) Network.....	15
4.4 Data Communication Service Providers	15
4.5 Internet Service Providers (ISPs).....	16
4.6 Internet Cafés, Telecentres and Web Content	16
4.7 The ICT Industry in Tanzania.....	18
Chapter 5. Human Resources	19
5.1 The Education Pipeline: Primary and Secondary Schools	19
5.2 The Education Pipeline: Colleges and Universities	21
5.3 Private Training Institutes.....	22
5.4 The Lamtrac Report	23
Chapter 6. Structure of the ICT Sector and Major Users	24
6.1 ICT Sector	24
6.2 Public Sector - Major Users	27
6.3 The Private Sector – Major Users.....	29
6.4 Readiness for the Networked World	30
Chapter 7. Major Areas where Development Opportunities Exist.....	36
7.1 The Present Situation.....	36
7.2 Main Obstacles: Issues outside of the Industry	36
7.3 Main Obstacles: Issues within the Industry.....	37
7.4 Main Opportunities for Development Assistance	38
APPENDICES.....	42
Appendix 1: Key Ratios	42
Appendix 2: Costs of Telecommunication Services	44
Appendix 3: Costs of Mobile Calls (per minute)	45
Appendix 4: Internet Cafés, Telecentres and Web Content.....	46
Appendix 5: Dar es Salaam Internet User Survey	54
Appendix 6: Organisations visited and Officials Interviewed	55

Executive Summary

This report covers one of three country ICT surveys commissioned by Sida as part of its ongoing programme to support the use of ICT in developing countries. The project team used desk research to obtain background information before undertaking two field trips to Tanzania. During the two-week period of the first trip, over forty stakeholders were interviewed across a range of public and private organisations. Several visits were also made to Internet Cafés in Dar es Salaam. At the end of that trip the preliminary results were presented at a workshop of the interviewees and other interested parties in Dar es Salaam. The attendees were encouraged to comment on the results and also to apply a guide known as 'Readiness for the Networked World' to assess the state of ICT in Tanzania.

The project team then returned to South Africa and consolidated the information into a draft report. Following the submission of this report to Sida, a further visit to Tanzania took place, where the emphasis was on the development of ICT outside of Dar es Salaam, specifically in the town of Mwanza, together with a further analysis of the Internet Café phenomenon and a visit to the telecentre at Sengerema. Local researchers were also supervised in a short study of Swahili language websites.

Chapter One describes the study methodology in more detail and briefly examines African and international trends with particular reference to ICT initiatives in Sub-Saharan Africa.

Chapter Two deals with the socio-economic conditions in Tanzania today, noting that although 80% of the population is still employed in agriculture there is evidence of strong growth in other sectors such as Mining, Manufacturing and Tourism. Tanzania is making efforts to accelerate development and to alleviate poverty through programmes such as the Poverty Reduction Strategy and the Tanzanian Development Vision 2025.

Chapter Three examines the history and current status of the ICT Policy Development process in Tanzania. Of particular note were the creation of the Tanzanian Communication Commission in 1993, the publishing of the National Telecommunications Policy of 1998 and the recent ICT policy formulation initiatives instigated by eThinkTank and now enjoying broad acceptance by both government and the private sector. Although the country is on the path towards a more liberal ICT Sector, much still remains to be done.

Connectivity and Access is covered in **Chapter Four**, beginning with an overview of international connectivity in Tanzania and in Africa as a whole, where the status of projects such as SAT-3, Africa One and RASCOM are examined. In common with many SADC countries, the spread of mobile networks has been phenomenal, with mobile users exceeding fixed line users after only a few years of operation.

The Tanzanian Telecommunications Company Limited (TTCL) has recently been partly privatised with the sale of a 35% stake to an international consortium, but will maintain its

monopoly over fixed line voice communications until 2005. Management of TTCL appears to be progressive and has supported the establishment of Data Communication operators, who can install infrastructure dedicated to public data transmission services.

There were thirteen licensed Internet Service Providers at the time of going to press, and a large number of Internet cafés, particularly in Dar es Salaam. A preliminary analysis of the business model of the Internet cafés leads to the conclusion that the rates presently being charged for Internet access are uneconomic and that only those cafés with alternate revenue streams will survive.

There has been strong growth in the number of Tanzanian websites, and the Swahili language is used in a small but significant proportion of them. An appendix to the report provides some detail.

Chapter Five covers human resources in Tanzania, with particular reference to the 'education pipeline' from primary school through to secondary school and then onto further academic and vocational training. By any measure, education in Tanzania is in a critical state, with shortages of most resources and with a clearly inequitable system in place. Although there has been a steady increase in pupils entering secondary school over the past dozen years, the number entering Standard Seven has remained about the same. There is an unofficial syllabus for computer training for Standards Four to Seven.

At the Tertiary level the University of Dar es Salaam (UDSM) is the major institution, with 579 faculty members and over 6000 students. The Computer Science Department in the Faculty of Sciences offers degrees in Computer Science and Computer Engineering and has an up-to-date computer laboratory.

The Dar es Salaam Institute of Technology (DIT) has the objective of becoming a centre of excellence in applied science and technology. DIT currently offers qualifications at the diploma level with 121 staff, 1300 fulltime and 2400 part time students.

In addition to these public institutions, there are several private firms offering computer training in Tanzania, some of whom are well-established with good facilities.

Chapter Six deals with the ICT Sector in Tanzania, excluding those companies dealt with in Chapter 4 i.e. largely private business not exclusively focused on Telecommunications. The ICT private sector is small but nevertheless has developed a broad set of competencies. Equipment from a variety of multinational suppliers is available, mainly through agents. The project team was struck with the entrepreneurial spirit and energy of many of the individuals in these companies, supporting the belief that this sector can show very strong growth given a conducive environment. The recent lifting of sales tax on both computer hardware and software clearly signals the intention of the government to promote such growth.

The Banking Sector and the Universities are significant users of ICT, with the Bank of Tanzania being one of the largest, along with other parastatals such as the Tanzanian Electricity Supply Commission (TANESCO).

The results of the Readiness for the Networked World assessment are given in this chapter, focusing essentially on Dar es Salaam, because there is so little ICT development in the rural areas. It illustrates, inter alia, that access to telecommunications infrastructure is less critical to widespread adoption than affordability.

Chapter Seven looks at major areas where ICT can be used to spur development. Some of the main obstacles to further use of ICT outside of the industry are examined, including the macro economic situation. Within the ICT Industry, obstacles include an uncertain regulatory environment, the capacity of TTCL to provide cost-effective services, and lack of awareness of the productivity potential of ICT within Government.

Areas of possible donor support have been highlighted. These include:

- Support for the private sector through freeing up constraints on ICT usage;
- Human resource development through supporting basic computer literacy, distance learning and the use of computers in schools;
- An Agricultural Information System to provide current crop and weather information;
- e-Government initiatives, effectively broadening the knowledge base of ICT within government and the public at large; and
- Tourism support, where ICT marketing and information thrusts need to be tied to infrastructure enhancements.

Chapter 1. Introduction

1.1 Reason for report

Sida supports the rapid integration of ICT in developing countries in order to improve communications and the exchange of information. It thus intends to expand its support to ICT related projects in partner countries in Africa and funds have been allocated for ICT pilot projects. The quality of information about the ICT situation in African countries, however, differs from country to country, and in general is limited and fragmented. Therefore Sida has taken the initiative to produce country ICT Surveys that should include information regarding key ratios, connectivity, access, the human resource situation, key institutions, policy and regulatory framework.

This current study sets out to:

- Gather information and make an assessment of the ICT situation in Mozambique;
- Provide the results to Swedish embassies and units of Sida, as well as stakeholders in Mozambique and the other countries concerned; and
- Develop a suitable methodology for surveys for other developing countries, and for the updating of key information.

1.2 Study Methods and Outcomes

The methods used to achieve the objectives of this study were straightforward. The project team used desk research to obtain background socio-economic information on Tanzania, followed by the collection of previous studies of ICT in Tanzania in order to obtain reliable baseline data. The country-specific information could then be placed in the context of African and global activity in ICT.

A local consultant in Dar es Salaam was appointed to contact major stakeholders in ICT in the public and private sector and set up times for semi-structured interviews.

These interviews were designed to supplement and confirm the desk research, to obtain relevant publications such as Vision Statements, Annual Reports, and to tap subjective opinions as to prospects for ICT in the country. A two-person team conducted approximately twenty interviews of over an hour each.

The data that was obtained in this manner is summarised in the Appendices, and includes Key Ratios that relate to the Tanzanian economy, but with an emphasis on the ICT Sector.

Preliminary results were presented at a workshop to which all interviewees and selected others were invited. Thirty interviewees and other stakeholders attended. In particular the participants in the workshop were asked to apply a current assessment tool known as

the “**Readiness for the Networked World: A Guide for Developing Countries**” to assess the state of ICT in Tanzania. The Guide is intended to provide a rapid means of positioning Tanzania against a fully prepared and networked country. It uses five categories of indicators:¹

- **Network Access** – What are the availability, cost and quality of ICT networks, services and equipment?
- **Networked Learning** – Does the educational system integrate ICTs into its processes to improve learning? Are there technical training programmes in the community that can train and prepare an ICT workforce?
- **Networked Society** – To what extent are individuals using information and communication technologies at work and in their personal lives? Are there significant opportunities available for those with ICT skills?
- **Networked Economy** – How are businesses and governments using information and communication technologies to interact with the public and with each other?
- **Network Policy** – To what extent does the ICT environment promote or hinder the growth of ICT adoption and use?

The results of this assessment by the workshop group can be found in **Appendix 4**.

Subsequent to the first visit, Sida requested a follow-up visit to fill in some gaps in the data collected, visit areas outside Dar es Salaam and amplify on key aspects emerging from the first visit such as the Internet Café phenomenon. This visit took place towards the end of October 2001.

This report represents the summarisation of the project to date.

1.3 Brief Overview of African and International Trends

1.3.1 International Developments

There is extraordinary interest in ICT throughout the world. One country after another is carrying out surveys, policy studies, programmes and projects to help exploit ICT for social and economic benefit, maintain competitive position or avoid suffering the widening of the so-called “digital divide.”² There is certainly no doubt that major organisations throughout the world are benefiting from ICT-supported business processes, to the extent that for instance the protracted economic boom in the United States is attributed in major part to use of ICT. “Electronic commerce” is the phenomenon of the times, and “electronic business” and increasingly “electronic

¹ Readiness for the Networked World: A Guide for Developing Countries: Centre for International Development at Harvard University, p7

² See www.bridges.org for a recent and comprehensive report: Spanning the Digital Divide: Understanding and Tackling the Issues.

government” are already supplanting that term. While there are genuine fears that ICT will accentuate the economic advantage of the electronic “haves” over the “have-nots,” there are also analysts who argue that the developing world will be the major beneficiary of the “death of distance.” As one example, the technology now available to transmit voice signals using the Internet protocol (so-called VoIP) promises to dramatically reduce the cost of telephone calls—especially international ones—and relatively speaking the developing world will be the major beneficiaries.

On a global level the United Nations strongly emphasises the potential of ICT and has launched projects such as a volunteer corps called the United Nations Information Technology Service (‘UNITeS’), to train groups in developing countries in the uses and opportunities of the Internet and information technology; the Health InterNetwork, to establish 10,000 on-line sites in hospitals and clinics in developing countries and provide access to up-to-date medical information; and a disaster response initiative, known as “First on the Ground,” which will provide mobile and satellite telephones as well as microwave links for humanitarian relief workers in areas affected by natural disasters and emergencies.

The World Bank’s InfoDev programme funds large numbers of in-country ICT projects such as “e-readiness” assessments and e-government studies. Another World Bank project entitled the Development Gateway (www.developmentgateway.org) is funding so-called “country gateway” sites, essentially web portals intended to bring together all available development-type information for the candidate countries. A growing number of countries are using the funding and provided technology to create country gateways, but notably only one African country to date (Namibia).

In July 2000 The group of G8 countries issued its Okinawa Charter on the Global Information Society, and passed a resolution to set up the Digital Opportunities Task Force (DOT Force) and tackle priority areas including fostering policy, regulatory and network readiness; improving connectivity, increasing access and lowering cost; building human capacity; and encouraging participation in global e-commerce networks. The first substantive report from the DOT Force has been released. It was tabled together with a framework for implementation at the July 2001 G8 meeting in Italy.

Also in July 2001 the Digital Opportunity Initiative published its report—Creating a Development Dynamic—that sets out to develop a strategic framework to help guide stakeholders in investing in and implementing strategies that take advantage of the potential of ICT to accelerate social and economic development. The DOI comprises representatives of Accenture, the Markle Foundation and the United Nations Development Programme (UNDP).

1.3.2 Developments in Africa

In Africa, the Economic Commission for Africa launched its African Information Society Initiative (AISII) in 1996 and since then has been supporting several country projects to enhance National Information and Communications Infrastructures (NICIs) (see below for

its impact on Tanzania). The ECA also hosted the major African Development Forum '99 focusing on ICT. A post-ADF Forum of Heads of States is due in late 2001 and will propose ways forward in four key areas: ICT Policies and Strategies, ICTs and Health, Electronic Commerce, and ICTs for Youth and Education. The Common Market for Eastern and Southern Africa (COMESA) recently held an expert workshop to identify opportunities to foster electronic commerce within its community, of which Tanzania was until recently a member. The Southern African Development Community (SADC) is fostering information society initiatives within that region, including the signing of a telecommunications protocol and formation of a Telecommunications Regulators' Association for Southern Africa (TRASA).

In addition to the significant steps that Tanzania is taking in ICT—discussed in a subsequent section—at the individual country level in Africa there are now several examples of “top-down” ICT-related programmes: South Africa has published long range scenarios for ICT, put in place an ICT Sector Development Framework, is finalising e-commerce legislation and is in the throes of telecommunications liberalisation;³ Namibia recently commissioned a study to produce a draft ICT Policy that has now been submitted and is under review by stakeholders; Rwanda has adopted an ICT Policy and is now considering a detailed five-year implementation plan; Mauritius is working through its National IT Strategy Plan and has promulgated e-commerce legislation; Senegal is pursuing a national ICT strategy and is noteworthy for widespread presence of phone shops; Ghana has opened telecommunications to competition and privatised Ghana Telecom; and Mozambique is in the process of developing an implementation plan based on its national ICT Policy.

Given the worldwide “hype” surrounding electronic commerce, it is worth noting recent studies on the potential of e-commerce in Africa. They reveal very significant obstacles in many African countries to traditional commerce in physical goods over the Internet—primitive banking systems, poor logistics systems and time-consuming customs formalities. This points to more promising areas for e-commerce such as off-line teleservices (Data capture, digitisation of architectural drawings), and on-line teleservices (Call Centres). It also encourages an emphasis on business-to-business transactions and government procurement over the Internet, rather than business-to-consumer activity.⁴

³ In fact it is experimenting with VoIP for transmission of its own phone calls and is proposing to legalise VoIP in remote rural areas. This step is regarded as a precursor to wider deregulation of VoIP.

⁴ In this regard, the May 2001 approval of a COMESA programme on electronic commerce by the COMESA Heads of State is significant and should be tracked to implementation.

Chapter 2. *Tanzania Today*

Officially *the United Republic of Tanzania*, this East African country lies immediately south of the equator and covers an area of 945,000 square km. Dar es Salaam is the largest city. About five hours by road west is Dodoma, the new capital city and seat of government. Facing the Indian Ocean on the east, Tanzania is bordered by Malawi and Mozambique in the south; Zambia, Zaire, Burundi, and Rwanda in the west; and Uganda and Kenya in the north. The outlying territories comprise the islands of Zanzibar, Pemba, and Mafia. Based on the 1988 census, the population in 2000 was estimated to be 33 million⁵. A new census is planned for 2002.

Tanzania remains one of the least urbanised African countries; urban population is only one-third of the total. On the island of Zanzibar, however, two-fifths of the population is urban. Dar es Salaam accounts for nearly one-fifth of the total urban population. Administratively the country has 25 regions, each comprising 3-8 districts making up a total of 120 in all. There are about 9000 villages with an average of 3000 inhabitants each.

The Bank of Tanzania reports a 1999 population of 30.9 million and a per capita GDP of approx US\$246 in 1999. The per capita GDP is probably understated because of the size of the informal sector, the fact that Tanzania is largely a cash-based economy, and the difficulty of obtaining accurate information. The Bank also reports real GDP estimated growth rates of 4.1% and 5.2% for 1999 and 2000 respectively. In his June 14 2001 Budget Speech, the Finance Minister stated the intention to increase the growth rate of the economy to 5.9% in 2001 and 6.2% in 2002.

The Bank estimates inflation as 7.9% and 6.0% for 1999 and 2000 respectively and the Finance Minister aims to reduce inflation to 4.9% by end June 2001 and 4.4% by end-June 2002.

With foreign debt in excess of 80% of GDP, Tanzania is one of the so-called Heavily Indebted Poor Countries (HIPC) and as such is starting to receive interim debt relief—US\$55 million to date. To meet the requirements for further relief, the country has to undertake certain activities, including a Poverty Reduction Strategy (e.g., budget allocations to relieve poverty, school mapping, etc.) which is now embodied in its recent Poverty Reduction Strategy Paper (PRSP). The Finance Minister projects that Tanzania will reach the so-called completion point for HIPC status by the end of 2001, at which point the Paris Club creditors will write off all debt and the World Bank, IMF and African Development Bank Group 70% of the debt due to them.

In 2000 agriculture accounted for nearly 2/3rd of GDP and over 80% of the workforce and export earnings (predominantly crops, fishing and livestock). The Planning Commission notes, however, that the economy is strengthening and growth is becoming

⁵ But see following Bank of Tanzania estimate of 30.9 million in 1999.

more broadly based both from a sectoral and geographic perspective. It states that investment performance is strengthening with a marked increase in capital projects in Dar es Salaam and other regions⁶. Manufacturing contributes less than 10% to GDP, but growth is quite high relative to other sectors, mainly due to a rapid programme of privatisation of state assets under the direction of the Parastatals Sector Reform Commission (PSRC)⁷. Mining and Tourism are two other small but rapidly growing economic sectors.

In 1999 the Tanzanian Planning commission published the Tanzania Development Vision 2025. That document, together with a more recently produced Tanzania Assistance Strategy and the previously mentioned Poverty Reduction Strategy Paper comprise the top-level national guidelines that direct government activities. In particular the Vision 2025 document is refreshingly candid and realistic. Rather than set impossible goals, it calls for Tanzania to graduate from a least-developed country to a middle-income country by 2025; to transform from a low productivity agricultural economy to a semi-industrialised one. At the same time it notes several impediments:

- A donor dependency syndrome and a dependent and defeatist developmental mindset;
- A weak and low capacity for economic management;
- A failure in good governance and in the organisation of production; and
- An ineffective implementation syndrome

With regard to the last point, it expresses the concern that people are now less enthusiastic about participating in national endeavours: "Apathy has set in."

A recent Reuters press article by a Tanzanian journalist spells out concerns of the business community. It suggests that

"Despite winning plaudits for liberalisation, Tanzania's top civil servants and some of its politicians are reluctant pro-marketeers, secretly wedded to much of the African socialism of ... Julius Nyerere while turning a blind eye to corruption."

Big businesses apparently complain that the need for a streamlined tax system and modern market regulatory systems have been ignored and small businesses suffer from petty corruption and a slack market. The Chairman of the Tanzanian Chamber of Commerce, Industry and Agriculture (TCCIA) is quoted as saying:

⁶ The consultants' subjective observations suggest that there is a marked increase in South African business presence in Tanzania. They noticed a steady flow of South African businessmen through their hotel, and were told that ABSA Bank, having assumed control of NBC, had placed an order for 500 computers, a sizeable number by Tanzanian standards. They also met telecomm engineers rolling out mobile base stations for Vodacom and software engineers installing upgraded software for the national brewery.

⁷ The PSRC appears to be moving ahead with an aggressive programme of reform, with an active website and even a privatisation song!

“Private enterprise is struggling very badly. We need to streamline a host of nuisance taxes and levies to help us survive.”⁸

Vision 2025 and the other documents referred to, address these concerns and call for

- A Developmental Mindset and Empowering Culture;
- Competence and Competitiveness; and
- Good Governance and the Rule of Law.

In particular, the promotion of science and technology education and ICT's are highlighted as key strategies to realise competence and competitiveness. Vision 2025 states “ICTs are a major driving force for the realisation of the Vision.”

In summary, to quote from Sida's Country Strategy for Development Cooperation, 2001-2005:

“Tanzania is a country of paradoxes. On the one hand the economic climate has improved, but on the other hand severe poverty persists. Multi-party democracy has been introduced, but poor people still have few chances of influencing their own futures.”

Tanzania's Vision singles out ICT as a key driver for transformation. Later in this report specific developments in ICT are described, which may indeed move the emphasis from planning to implementation.

⁸ The flavour of these comments was also reflected in the consultants' interview with the Deputy Chair of the TCCIA. Interviews with small businessmen generated explicit comments about endemic corruption in the award of government contracts.

Chapter 3. *The ICT Policy Process*

3.1 Telecommunications Policy

The Tanzania Posts and Telecommunications Corporation (TPTC) was the exclusive provider of telecommunications and postal services before 1993 and also regulated the sector, including radio frequency spectrum management. TPTC operated as a state monopoly, and the Ministry for Communication and Transport was responsible for both sector policy plus some regulatory functions.

Following the Tanzanian Communications Act of 1993 TPTC was dissolved and replaced by the Tanzania Telecommunication Company Limited (TTCL), the Tanzanian Postal Corporation (TPC) and the Tanzanian Communication Commission (TCC), with the latter being responsible for the regulation of postal and telecommunication services.

The functions of TCC include:

- Licensing telecommunications and postal operators, equipment vendors and contractors and monitoring their performance;
- Allocating and managing the radio frequency spectrum;
- Type approval and standardization of telecommunication equipment;
- Regulating telecommunication and postal tariffs;
- Numbering Administration;
- Law and Policy enforcement;
- Arbitration of disputes between operators and between operators and customers;
- Promoting competition in the postal and telecommunication industries; and
- Monitoring the quality of postal and telecommunication services.⁹

The President of Tanzania appoints the Chairman of the Commission and the Minister of Communications and Transport appoints the six Commissioners. In addition, there is a Secretariat where the President appoints the Director General.¹⁰ The current Director General is Colonel Abihudi Nalingigwa, who has six Directors reporting to him, including a Director of Postal Affairs. The National Telecommunications Policy (NTP) was released by the Government in 1998 aimed at ensuring the accelerated development of the sector. The TCC has participated in, and is a member of the Telecommunication Regulators Association of Southern Africa (TRASA) and the East African Regulatory,

⁹ The Regulator (Quarterly Newsletter of the TCC), April-June 2001

¹⁰ *ibid*

Postal and Telecommunication Organizations (EARPTO). The EARPTO consists of three members (Tanzania, Kenya and Uganda) and is promoting cooperation in areas such as:

- Regional quality of service standards;
- Staff exchange and Training;
- Type-approval procedures and standards; and
- Co-ordinating a Regional position in International forums.

The National Telecommunication Forum was launched in 1999 to promote dialogue between the various stakeholders in the industry. It is not clear how effective this has been, although the Regulator states that 'the forum has led to a very fruitful exchange of ideas and views between consumers, service providers, and equipment suppliers, and has subsequently doubled as an informal forum for dispute resolution and consultation.'¹¹

Two operators are licensed to provide basic telecommunications services – TTCL (nationwide) and Zantel (Zanzibar only). TTCL has recently been privatised with the sale of a 35% stake for US\$120-million to a consortium consisting of Detecon of Germany and MSI of the Netherlands; TTCL has been granted a 4-year exclusivity period along with needing to meet obligatory installation targets or face financial penalties from the regulator.

The industry has been liberalised to some extent in that TCC has issued licences to provide Public Data Communication services in Tanzania to six companies, although not all appear to be active. The licence essentially allows these companies to provide infrastructure for use by other service providers (e.g. internet service providers) or companies. There are thirteen licensed Internet Service Providers in Tanzania and five mobile operators (Mobitel, Tritel, TTCL, Vodacom, and Zantel). This sector has shown explosive growth with the recent entry of Vodacom, a South African based company, into the market.

3.2 The Telecommunications Regulatory Environment

The Regulation of the Telecommunications Industry in developing countries in the face of rapid change is a difficult task, particularly because sufficient resources are often not available. In Tanzania, all Commissioners plus the Director General of the TCC are government appointees; in future, a more transparent nomination system may ensure greater acceptance of its role by the private sector. Members of the TCC feel that currently there are capacity problems in the monitoring and enforcement of legal requirements (e.g. illegal use of the radio spectrum) and interconnection rates.

With new technologies becoming available at an increasing rate, there are inevitable differences of opinion as to how this Sector should be regulated, with some disputes

¹¹ *ibid*, p3

going to litigation. Mechanisms to promote better communication between stakeholders are in place, such as the previously mentioned National Telecommunication Forum, newsletters produced by the TCC ('The Regulator') and workshops and seminars devoted to specific topics. The process of optimising this environment probably requires even further attention, as the pace of change is unlikely to slacken.

One of the contentious regulatory issues is the use of Internet Telephony (telephony over the public internet) and Voice over Internet Protocol (VoIP), here used to refer to telephony over private networks. Although illegal, there is much evidence of such activity taking place in Dar es Salaam. This aspect is currently receiving close attention with a public-private sector task force due to make recommendations regarding Internet Telephony and VoIP to the TCC by year-end. In conversations with the private sector it was also suggested that illegal use of the radio spectrum was going unpunished, to the detriment of the businesses that were endeavouring to operate legally. In general, it will clearly be necessary for an official and enforced position to be implemented soon in order to avoid a culture of non-compliance in the industry.

Countries in the Developed World are moving towards packet-switched networks at an increasing rate. The impact of Internet telephony on the average Tanzanian citizen can be profound, and the effect of this technology on the other stakeholders, including particularly TTCL and the Government, needs to be carefully evaluated.

3.3 Overall ICT Policy

The need, and indeed the opportunity, to develop a policy that addresses the ICT Sector as a whole has been identified in Tanzania, and various initiatives are presently under way. The most prominent has been thanks to a grouping called eThinkTank, a forum supported by the United Nations Development Program (UNDP). Their stated objective is to 'present the public and Government with ideas and suggestions to help the country into the information age.'¹² One of the priorities of eThinkTank is to help harmonize the ICT Policy and regulatory environment with that of neighbouring states and partner countries. Mainly via an electronic list server, businessmen, government employees, academics and donor organisations exchange ideas and help to initiate programs targeted at the ICT Sector. Most recently—October 19 2001—through its so-called eSecretariat, the group held a public forum where it tabled Terms of Reference for the development of an ICT policy, including the drafting of suitable legislation. A final call for proposals is now being prepared.

Also very recently, an official government group was constituted to carry the ICT Policy process forward. It comprises:

Prof. Matthew L. Luhanga - Vice Chancellor of UDSM
Hon. Dr. Batilda S. Burian (MP)
Hon. Prof. Henry R. Mgombelo (MP)

¹² www.ethinktanktz.org

Mr. Theophilus E. Mlaki, Director Costech
Dr. Zaipuna Yonah, Manager Simunet(TTCL)
Mr. David Sawe, Civil Service Department - & active eThinkTank member
Hon. George Nangale (MEALA)
Prof. Beda Mutagahywa, Head of Computing Centre, UDSM
Mr. Ali Mufuruki, Director Infotech - and founding eThinkTank member
Secretariat:
Dr. B.B. Rufunjo, Director Transport and Communications
Eng. A. B. Kowero, Director Postal & Telecommunications Services, MCT
Mr. Masegese Kamulika, IT Officer.

eThinkTank and this group are in close contact with each other and the widening circle of stakeholders both within Government and the private sector promises to make an important contribution to the development of the ICT industry in Tanzania.

Chapter 4. Connectivity and Access

4.1 International Connectivity

International telephone services provided by TTCL increased from 10.2 million outgoing call minutes in 1997 to 11.2 million outgoing call minutes in 1998, and from 19.3 million incoming call minutes in 1997 to 22.1 million in 1998. However, the cost of international calls is high and will likely inhibit the rapid expansion of these services. Part of the reason for these high costs relates to the fact that much intra-Africa traffic has to be routed via Europe. As African countries obtain greater control over their communication links and as new technologies such as VOIP become available, pressure will mount for improved and/or cheaper services.

Projects that are at various stages of completion and will affect both internal coverage and the cost of international bandwidth include:

4.1.1 SAT-3/WASC/SAFE project

Signed in June 1999 and initiated by Telkom South Africa and France Telkom, this undersea optic fibre cable system is due to become operational in December 2001, when the first segment is completed. The project consists of two segments, the first one linking South Africa and Europe and the other from South Africa to Malaysia. The SA–Europe link is expected to have landings in about 10 West African and South African countries, while the SA–Malaysia link will have initial landings in Reunion, Mauritius and India.

Although Tanzania is not part of this first phase, the opportunity to connect to the system exists. There is already a project backed by Transnet, Telkom SA, the rail group Africa East Coast and others to lay 2500 km of optic fibre from Dar es Salaam along the existing railway line to Livingstone in Zambia. The plan is then to link this with a fibre optic cable laid by Namibian Telecommunications from Windhoek to Livingstone, with connections to other central African countries planned (Kenya, Uganda, Burundi and Rwanda).¹³ Windhoek already has a high capacity fibre optic link to South Africa that can then connect to SAT-3.

4.1.2 Africa One

The most ambitious African Telecommunications project, Africa One plans to circle the continent with over 28 000 km of fibre optic cable. The completion date for this project, originally 1999, has slipped to 2002/3, and the complexity and cost of the project has raised concerns about its viability. It requires the participation of many African carriers at

¹³ www.btimes.co.za/99/1010/news/news05

a time when the Telecommunications industry world-wide is enduring a downturn, and requires US\$1.6 billion for completion, mostly from private investors.¹⁴

The initial capacity of the Africa One cable will be 10 Gbps, upgradeable to 80 Gbps; with 20–30 landing points on the African continent expected. While it is anticipated that Africa's *demand* for international bandwidth will grow robustly, the *supply* of bandwidth is forecast to rise nearly tenfold in the next five years from about 650 Mbps to 6Gbps. The utilisation of this extra capacity is likely to depend very much on cost. With the telecommunications industry in most African countries still dominated by monopoly suppliers, Africa One may have picked a bad time to roll out its services.¹⁵

4.1.3 Regional African Communications Organisation (RASCOM)

RASCOM was established in 1992 and has 44 members. Its mission is to provide satellite communications to African countries through a communications satellite owned by its members. A prime motivation is to decrease the revenue lost (estimated at US\$400–600 million) through much intra-African traffic being routed through Europe. The member states continue to hold meetings and seek pledges of funding, but once again the coordination and cost of this project represent formidable challenges, and it is not clear whether the project will be completed.

4.1.4 Other Projects

There are numerous other initiatives underway which aim to provide international access, many based on Very Small Aperture Terminals (VSAT). The next few years will provide opportunities to leverage this activity to decrease international call rates, at a pace largely determined by a country's willingness to liberalise its telecommunications industry.

4.2 Fixed Line Access

As of July 2000, TTCL had 165 000 connected lines with an exchange capacity of 234 000. A condition of the privatisation of TTCL is that at least 800 000 lines must be connected by the end of the four-year exclusivity period (February 2005). There is a difference of opinion as to how many of the connected lines are actually working at any one time, with some private sector estimates as low as 70%. The backbone network consists of fibre optic in Dar es Salaam and microwave links between major towns.

A recent experiment to roll out 180 ISDN lines was apparently taken up very rapidly.

With the assistance of international donors¹⁶, and with a view to preparing TTCL for a competitive environment, over the period 1995 to 1999 TTCL embarked on a

¹⁴ Source: Pyramid Advisory Services, quoted in The Balancing Act: Newsletter 80

¹⁵ Ibid

¹⁶ Donor participants include the World Bank, EU, African Development Bank, Sida, Cida, Danida, Japan and Kuwait Fund

US\$250 million Telecommunications Restructuring Programme (TRP). This has resulted in a network that is over 95% digitalised,¹⁷ although network quality issues still exist in the rural areas.

The TRP programme resulted in the completion of a number of projects, including:

- The Southern Highland Telecommunication Project, providing services to major towns such as Mbeya and Iringa in the Southern Region;¹⁸
- The provision of exchange lines, line plant, switching and transmission equipment to Dar es Salaam;
- Installation of a Digital microwave backbone connecting Dar Es Salaam-Zanzibar-Pemba-Tanga-Moshi-Arusha; and
- A Wireless Local Loop project was initiated in 1998 with the intention of covering Arusha, Morogoro, Kilimanjaro, Zanzibar and other regions. The status of this project is not known.

In addition to a steady move from manual to digital switches and the installation of additional capacity, TTCL also embarked on several projects aimed at improving productivity and enhancing financial controls. Included were the implementation of a new service order and billing system and additional controls placed on lines designated as 'own use' and therefore free of charge (In 1998, over 25% of lines identified as 'own use' should have been billed). A number of other actions were taken to improve financial controls, enhance productivity and make the privatisation process possible, including better management of amounts owing to TTCL by the Government and accounting for some refundable deposits as a liability and not crediting the relevant debtors (Approx TShs. 542 million est.).

TTCL moved from a loss of TShs 7 253 million in 1997 to a profit of TShs 14 231 million in 1998. Revenue increased from TShs 66 006 million in 1997 to TShs 86 055 million in 1998.¹⁹ This was despite the fact that during 1998 adjustments reducing revenue by TShs 8 453 million were made relating to general billing problems.²⁰

Additional resources were allocated to the finance department.

Fixed assets were revalued.

All loans and interest shown in TTCL's accounts as at 30 September 1998 were assumed by the Government and converted into equity.

¹⁷ Aggressive Internet Access Strategies for Empowering Economic and Service Sectors in Tanzania: The status and future plans for ICT Facilities and Services in Tanzania, Dr Zaipuna Yonah, Simunet

¹⁸ TTCL Annual Report 1998

¹⁹ Ibid, p 24

²⁰ Ibid

However, notwithstanding these and other controls implemented, the report of the auditors to the 1998 Annual Reports contained a number of qualifications, indicating that issues around good corporate governance need to be addressed before TTCL can be expected to be competitive in the global arena.²¹

4.3 Mobile (Cellular) Network

As at June 2001 there were five licensed mobile operators but only two major players viz.

MIC Tanzania Ltd, operating as Mobitel with an estimated 124 000 subscribers including a number of analogue users

Vodacom Tanzania Ltd, with an estimated 93 000 GSM users (March 2001)

Precipitated by the issuing of a GSM license to Vodacom, the growth in the number of cellular subscribers has been dramatic in recent years (estimated 65% p.a. from 1998 to 2000) with most subscribers opting for pre-paid services. Mobitel provides coverage in and around Bukoba, Mwanza, Shinyanga, Arusha, Moshi, Dodoma, Morogoro, Mbeya, Dar es Salaam, Pemba, Zanzibar, and Tanga. Vodacom has coverage mainly in Arusha and Dar es Salaam but has extended the network into Sigida, Tabora and the island of Pemba. Over 90% of their customers are prepaid. Vodacom is installing a Synchronous Digital Hierarchy (SDH) backbone network along with the access network that distributes the voice traffic further afield in Tanzania.²²

The experience of the authors as far as both coverage and quality of transmission on the GSM network in and around Dar es Salaam was mixed. For instance with one service provider, a connection was almost always made, whereas with another, connections in peak times were almost impossible.

4.4 Data Communication Service Providers

The Tanzanian Communication Commission has licensed six companies to provide Public Data Communication Services viz.

- Wilken Afsat
- Datel Tanzania
- Equant Tanzania
- Simbanet Tanzania
- Soft Tech Tanzania
- Fastcom Africa

²¹ Ibid, p 23

²² www.itweb.co.za

Of these, Wilken Afsat, Datel and Simbanet appear to be the most active. These companies are permitted to install infrastructure for data communication purposes but not for voice. Wilken Afsat, for example, provides private data networks to individual companies primarily in the Banking Sector. They support about eighty VSAT terminals in Tanzania and are a member of the Communication Operators Association of Tanzania (COAT). DATEL is a company jointly owned by France Telecom and Telenor (Norwegian Telkom). They currently employ twelve people and are set to expand in the short term. Datel connects corporate customers directly to their Point-of-Presence and charges US\$ 1500 for a 64K international link. They currently have eleven Mbps of international bandwidth. Both Wilkens Afsat and Datel mentioned that they supported an Internet exchange point (IXP) in Tanzania but could not get consensus from other stakeholders.

4.5 Internet Service Providers (ISPs)

There are presently thirteen licensed ISPs in Tanzania. The more prominent are:

- Computer and Telecommunication Systems Ltd (CATS)
- Cyber Twiga
- Simunet, a wholly owned subsidiary of TTCL
- Planetel Communications

Industry insiders give estimates of between 10 000 to 15 000 dial-up accounts in the country, with many more users via Corporate LANS and Internet cafés. Accurate figures are not available, but the proliferation of Internet Cafés in Tanzania (particularly in Dar Es Salaam, where some people estimate a thousand) indicates that there is great, unsatisfied demand in the country for some form of connectivity.

Individual ISPs also claim to be in favour of an IXP in Tanzania, but there seems to be little progress on this front. Simunet has implemented POP's in Dar es Salaam, Mwanza, Mbeya, Iringa, Morogoro, Arusha, Dodoma, Moshi, Tanga and Zanzibar. Their stated intention is to allow all Internet calls in Tanzania to become local calls and they are aggressively marketing their access services throughout Tanzania.

4.6 Internet Cafés, Telecentres and Web Content

One of the differences between Tanzania and other SADC countries is the proliferation of Internet cafés, particularly in Dar es Salaam but also elsewhere. At the request of Sida, one of the consultants (Jonathan Miller) undertook a second trip to Tanzania to investigate chiefly the viability of Internet cafés, and also the status of the first Tanzanian telecentre (located at Sengerema close to Mwanza at the southern end of Lake Victoria) and the nature of Web sites including content in Kiswahili. Appendix 4 comprises the trip report. The main findings were:

4.6.1 Internet Cafés

There are several Internet cafés in Mwanza, supported by ISPs such as MwanzaNet, Raha.com, AfricaOnline and CyberTwiga. A visit to AfricaOnline revealed that it has about 600 dialup accounts; eight clients with 32-64kb wireless leased lines and 10-15 corporate dialup customers, each sharing 32-64kb connections among their local offices. The cost of acquiring and setting up a wireless leased line is about US\$5000 and the monthly rental is US\$500. The annual rental for unlimited web usage is US\$650 (excluding TTCL charges).²³

The long-term viability of the Internet cafés in Tanzania is hard to assess, as is the number still operational. Estimates from 'insiders' range from 100 to 1000, with the most realistic estimate being 300-400²⁴. Based on an analysis of the business model of a fairly large and diversified Internet café in Dar es Salaam,²⁵ the owners concluded that a realistic charge for connectivity should be at least Tshs 2000 (US\$2) per hour, compared to their current rate of Tshs 1000 (US\$1) per hour and the general rate of Tshs 500 (US\$.50) per hour. They noted that the equivalent charge in neighbouring Kenya is equivalent to Tshs 6000 (US\$6) per hour.

It thus appears that most Internet cafés have not adequately analysed their cash-flow requirements or accounted properly for aspects such as depreciation of equipment and market forces have driven Internet access charges down to an unsustainable level. ISSAM, for instance, is relying on project fees and other services to make ends meet. It is also believed that in general the illegal provision of VoIP services is a factor sustaining many cafés.

Dr Claire Mercer from the UK has done some interviewing in Internet cafés in Dar es Salaam and is in the process of analysing approximately 200 responses from users and operators²⁶. Also as part of the InfoDev funded e-readiness assessment project, Mr Enock Yonazi of COSTECH plus a couple of colleagues have embarked on an extensive field survey of Internet cafés in Tanzania²⁷. They believe they will have some results by the end of October to share. At that stage we will be in a good position to assess future developments in this area.

4.6.2 The Sengerema Telecentre

The Sengerema telecentre is a pilot project under the Ministry of Science, Technology and Higher Education with the objective of improving communications in rural areas. Sponsors include ITU, UNESCO, IDRC and COSTECH. Access is via a 30-minute ferry trip from Mwanza and then travelling 35 km over a bad road.

²³ Future economic development in Mwanza is likely to be driven by gold mining activity, which should lead to significant economic benefits plus the upgrading of local and regional infrastructure.

²⁴ The Extensive survey of Internet Cafés referred to at the end of this section should provide a reliable estimate when it is released.

²⁵ ISSAM Internet Café, corner Sokoine Drive/Zanaki Street

²⁶ See Appendix 5 for the questionnaire

²⁷ Their questionnaire is available in hard copy on request.

The telecentre went live in January 2001, but communications were broken in April due to a lightning strike and have not been restored. At the time 246 e-mail accounts had been provided, but no Internet activity has taken place since then. Paid classes in basic computing are continuing but generate too little funding to sustain the centre. Donor funds and local pledges are needed.

4.6.3 Swahili Language Websites

An American resident in Tanzania, Mr. Michael Trupin, who has a working knowledge of Swahili, conducted this study with some help from his Tanzanian wife, Dr Christine Trupin. A search using the search engine 'Google' of the terms "baada ya", meaning 'after' in Swahili yielded 4000+ matches, although this does not reflect nearly as many discrete sites, nor an exhaustive search. The study suggests that 10% of sites having a Tanzanian focus have at least some Swahili content (A description of some of the sites can be found in Appendix 5).

Mr Trupin also conducted a personal interview with staff at NewAfrica.com, who have a comprehensive range of African sites linked to their web page. The staff at NewAfrica.com felt that there was an increase in Swahili sites, but in line with a general increase in Tanzanian sites. The researchers felt that the trend was higher for Swahili language sites. NewAfrica.com felt that the bulk of Swahili sites were aimed at outsiders learning the language and information sites for Tanzanians outside the country. This notion is supported by the presence of several Swahili-English and Swahili-other language dictionaries on the web, but there is also some evidence of religious, sporting and other local interest sites aiming to attract the local population to the web.

4.7 The ICT Industry in Tanzania

Once again, reliable statistics are not available, but the size of the industry is probably between US\$ 300 - 350 million. A major player is TTCL, with 1999 Revenues of US\$ 138 million. The overall growth of the industry is probably in excess of 25% p.a., fuelled by very buoyant sales in the cellular industry. TTCL itself grew by over 25% p.a. between 1993 and 1999. There is no manufacturing of equipment in Tanzania, and little assembly. Over eighty licences have been granted to private companies to market and support telecommunications and radio communications equipment. The structure of the Industry is covered in more detail in Chapter 6.

Chapter 5. Human Resources

In this chapter we examine the ICT human resource situation in Tanzania from two perspectives: the so-called “education pipeline” that considers the passage of children from primary school through to tertiary education, and the training of ICT technicians and professionals.

5.1 The Education Pipeline: Primary and Secondary Schools

Primary and secondary education clearly constitutes the crucial foundation for the university work needed to produce ICT professionals as well as competent users of ICT. A recent report on the state of education in East Africa draws on current statistics for Tanzania, Kenya and Uganda, as well as interviews in each country and a closing stakeholder workshop. It paints a bleak picture:

“The educational pipelines in Kenya, Tanzania and Uganda are in a state of crisis. They are deeply inequitable and of extremely poor quality. Government commitments to provide quality education for all have not been met. Educational opportunity is highly stratified, decent schooling is increasingly the preserve of a small elite, and current practices reinforce and intensify existing disparities in all three East African countries.

There are deep disparities, across sex, income levels, religion, ethnicity and geography. These differences are present at the primary level, and become pronounced further up the pipeline. Studies indicate that recent policy changes including economic liberalisation may in fact intensify inequities.

The select few who make it to university or other higher education institutions find themselves without the language and analytical skills necessary for rigorous academic study and without the practical and inter-personal aptitudes needed to thrive in a pressured social environment. In part, this turns universities into “glorified secondary schools” where teachers are forced to perform remedial education functions for which they are neither suited nor prepared.”²⁸

In 1999 Tanzania had 11 400 primary schools where 104 000 teachers served 4.2 million pupils in a ratio of 1:40. The table below shows major shortages in basic facilities:

28 Rakesh J Rajani, *The Education Pipeline in East Africa*, A Research Report and Synthesis of Consultations in Kenya, Tanzania and Uganda, May 2001 (unpublished). Sponsored by the Ford Foundation.

Table 1. Primary School Buildings and Furniture in Tanzania, Required vs. Actual, 1999

Type of Building/Furniture	Required Number	Actual Number	Number of Shortage	Actual as % Of Required
Classrooms	99,278	57,367	41,911	58%
Staff houses	116,591	26,795	89,796	23%
Toilets	168,928	64,814	104,114	38%
Stores	18,175	5,510	12,665	30%
Tables	208,383	75,397	132,986	36%
Chairs	222,000	80,173	141,827	36%
Cupboards	127,939	30,442	97,497	24%

Source: MOEC, Regional Data for 1999

While statistics for the specific additional facilities needed for ICT-related education are not available, interviewees for the current studies noted that only a very small proportion of schools had electricity and fewer telephones. The perception is that there are almost no computers in Tanzanian schools.

There has been a steady increase of pupils entering primary school, from about 480 000 in 1986 to 650 000 in 1998. The number completing standard 7 has, however remained about the same, at 370 000. 57% of school age children begin primary school education and only 38% complete it. A mere 6% enter secondary school. Gender inequities emerge at secondary school level. While male/female ratios are about 50/50 in primary school, there are approx 47% females in forms 1-4 and 33% in forms 5 and 6.

Almost all primary schools are public, while nearly half of the country's 826 secondary schools are privately run. There are two types of private schools- a few relatively well endowed near the big cities, and the majority quite poor and often in even worse shape than the public schools.²⁹ The cost of tuition in the well-endowed private schools (the so-called "international schools") is extremely high—annual fees of several thousand US dollars per child were mentioned.

With regard to computers in schools, as noted above, their presence is minimal. What computer access there is, is confined mostly to the private/elite schools, thus exacerbating the inequities. Despite this reality, an as yet unofficial syllabus for computer training for standards 4-7 has been produced and was provided by interviewees at COSTECH. It implies hands-on use of computers and the Internet from

²⁹ Rakesh Rajanji, private communication.

standard four onwards—operating a PC, using Windows, sending email and accessing the Internet. There is also an official secondary school Computer Studies syllabus for forms 1-4. It was developed in 1996 (superseding an earlier one prepared in 1993), and issued in 1997. Essentially the syllabus describes a compulsory computer literacy course in forms 1 and 2 (file management, word-processing, data base and spreadsheets), and an optional course in BASIC programming in forms 3 and 4. There is, however, no evidence that anyone is taking these courses and faculty at the tertiary level made it clear that their incoming students had minimal if any knowledge of computers.

5.2 The Education Pipeline: Colleges and Universities

Both the University of Dar es Salaam (UDSM) and the Dar es Salaam Institute of Technology (DIT) offer heavily subsidised public education opportunities for students interested in ICT. It is noticeable that the offerings of these two institutions are starting to overlap, in that UDSM is starting to offer diploma courses in addition to its traditional degree courses, while DIT is starting to offer B Tech degrees in addition to its traditional certificates and diplomas.

University of Dar es Salaam

Founded in 1961, UDSM is the major tertiary level institution in Tanzania. It has twelve faculties and eleven institutes as well as two colleges tackling land and architectural studies and health sciences respectively. The 1999 / 2000 faculty level at the main campus was 579 (11% female) and they served 6084 students (24% female). On the main campus an important unit is the Computing Centre, which provides connectivity and Internet access to all UDSM entities. UDSM is also an African Virtual University node. There are also several computer labs used for computer literacy training and executive courses for government and private sector officials.

The Faculty of Sciences has a Computer Science Department that offers a BSc (Computer Sciences). It has also just started a degree programme in Computer Engineering. The department has an up-to-date computer lab that is well used. The faculty graduated its first twenty-five computer science students in 1999. This year it surveyed where they are and what they are doing. Most are still in Tanzania, working mainly in the private sector in computer, data communications and Internet service firms. Typical jobs are network controller, systems administrator, software development, web site design, and Internet service provider.

In 2000 the department admitted 80 computer science students and geared up for 120 in 2001. Only 65 students were accepted however. The new computer-engineering offering has 40 computer engineers and 30 telecomm engineers enrolled.

UDSM has identified a gap in the market for ICT professionals and is targeting qualifications such as Cisco, MCSE and RedHat, where students will take external examinations. It has commenced a nine-month networking diploma course based on the Cisco syllabus and has forty students enrolled. It is also planning a software

development diploma based on Oracle certification. All students in Science, Law and Engineering have to take a computer literacy course.

Dar es Salaam Institute of Technology

The DIT has evolved from the 1957 Dar es Salaam Technical Institute, which in itself became the Dar es Salaam Technical College in 1962. An Act of Parliament established the DIT as an autonomous parastatal in 1997. DIT's vision is to become a centre of excellence in the fields of applied science and technology. In addition to civil, electrical and mechanical engineering, DIT has a Department of Computing offering a three-year full technician's course in computer engineering and a Department of Electronics and Telecommunications Engineering offering a 3-year full technician's diploma and an advanced diploma in electronics and telecomm engineering. Firms such as TTCL, Mobitel and Vodacom target DIT students. The first computer-engineering graduates are graduating this year. DIT also has a Department of Continuing Education that, among other courses, offers professional development programmes in computer repair, computer networking and end-user computing courses. All told, currently DIT has 121 faculty, 1300 fulltime and 2400 part time students.

DIT has very limited computing facilities: one general computing lab of fifteen Pentium 166's and a civil engineering lab comprising fifteen 486's. It does however have a detailed three-phase design for a LAN, a leased line link to TTCL and a fibre backbone and is seeking US\$100000 to make it happen.

5.3 Private Training Institutes

There are several private firms offering computer courses in Dar es Salaam. Probably the largest is Aptech, which has franchises for international offerings from SofTech, NCC Education Services, Vue, Sylvan Pro-metric and other providers. Aptech has about 150 PCs spread across several training laboratories.

Another large provider is CATS, which was founded in 1987 (out of the original ICL computer company). The company sells hardware and software, develops bespoke applications, runs an ISP and offers engineering services such as maintenance support and networking solutions. CATS's training division claims to have trained 10000 people to date. It has several training labs and offers a range of certificates, diplomas and advanced diplomas. Groups such as the UK-based IDPM, Microsoft and Sylvan Pro-metric have accredited the company.³⁰

There are several other smaller training firms in Dar es Salaam, some of whom are accredited by NIIT in India and NCC Education Services. One of note is the Tanzania Public Service College, which has transformed itself from a state organ to a private training college and is currently designing and launching a series of computer training courses.

³⁰ See the following chapter for more on CATS

5.4 The Lamtrac Report

Some months ago Sida commissioned a Swedish firm, Lamtrac to do a detailed study of the need for ICT-related vocational training in Tanzania. That report is available, and recommends three priority areas:

Development and implementation of a training programme for so-called “IT-fundis” who would provide in-company first level support to company employees on hardware and software and applications support.³¹

Development and implementation of a job-practice model for ICT professionals that would supplement other training.

A Pilot project to specify develop and implement a government department set of computer-based systems and procedures.

With regard to the training recommendations in particular, the general recommendations are very sound, but suggest that grass-roots work needs to be done to create syllabi etc. More rapid progress can be made however, by basing any such interventions on well-known international certifications such as A+ technician's courses, the International Computer Driving License for applications training, etc.

³¹ The DIT has prepared a proposal to implement this offering.

Chapter 6. *Structure of the ICT Sector and Major Users*

The ICT Sector in Tanzania, particularly the Telecommunications industry, is showing strong growth in Tanzania, albeit off a low base. This chapter deals with the sector under the following categories:

1. ICT Sector
2. Major Users in government and parastatals
3. Major Users in the private sector
4. Readiness for the Networked World

6.1 ICT Sector

IT

The IT industry in Tanzania is small, although there are a surprisingly diverse range of goods and services offered. Manufacturers such as Motorola have developed personal computers specifically for Tanzania (e.g. the Motorola Starmax, a Macintosh-compatible machine). Although the industry itself started in the 1960's there was a long period of dormancy due to the policies of the socialist government under Julius Nyerere, the effects of which are still felt today.

There are fifty two companies listed in the Tanzania Yellow Pages under 'Computer Hardware, Software and Maintenance Services ' and of these thirty nine (77%) advertise e-mail addresses and ten (19%) have Web pages. Four Companies are listed under 'Computer Consultants', four under 'Computer Training' and twenty under 'Telecommunications Equipment and Services'. There is not much overlap between the different categories, and the great majority of these companies are small; the more prominent international brand names that are conspicuous in Tanzania include

Microsoft, Compaq, Hewlett Packard, IBM, Cisco, Epson, Oracle, APC, 3Com, 3M, Nokia, Motorola, and Ericsson. Notably, most of the parent companies are not directly represented in Tanzania but operate through agents. There follows a brief description of a few prominent ICT companies in Tanzania.

Computers and Telecoms Systems (Tanzania) Ltd (CATS)

CATS had its origins in the early 1960's as a wholly owned subsidiary of International Computers Ltd (ICL). CATS has a technical staff complement of over seventy. It adopted the present name and became locally managed and controlled in 1986, and currently has the following Divisions:

Sales

The Sales division markets a range of hardware and software products from Personal computers to printers and power protection equipment. CATS is an Authorised Compaq Reseller and Service Provider, a sole distributor of Meissner Power protection equipment and A Microsoft Business Centre.

Software

The Software Division has 'the largest software team in Tanzania today', ³² employs 15+ staff, and can provide local development of Computer Application packages, implementation, training and support of Oracle as well as for selected off-the shelf products³³.

Engineering

This division performs configuring, testing and installation of equipment, installation of Local Area and Wide area networks, network design, inter alia. A staff of about 15 includes Certified Systems Engineers in Microsoft, Compaq and Novell Products.

Institute of Management and Information Technology

Established in 1987 as an ICL training Centre, the Institute offers a variety of technical and management courses including one year and two year diplomas accredited with the Institute for the Management of Information Systems in the United Kingdom. There are four training centres with over fifty computers in place. The centre, which was visited by the authors, appeared to be very professional.

Systems Integration

This Division provides Internet Services using high-speed wireless or leased-line connections and claim connectivity speeds of up to 11Mbps. Using Cisco Aironet 340 Wireless Bridge, CATS-NET offers both in-building and building-to-building connectivity. Over 1500 customers have been connected.

Computer Centre (Tanzania) Ltd

Founded in 1988, Computer Centre (CC) has a total staff complement of about 40 with offices in Arusha, Moshi, Mwanza and Zanzibar as well as the head office in Dar es Salaam.

CC has two divisions:

- Sales

Products sold include servers, laptops, desktops, printers, and software from suppliers such as Microsoft, Compaq, Epson, IBM, Hewlett Packard and APC. CC is

³² www.catsgroup.com

³³ However, a brief impression of Aptech suggests they are a larger and more diverse computer company.

a Microsoft Certified Solution provider and also supports enterprise solutions through Scala East Africa.

- Technical

CC employ twelve qualified professional engineers who are certified by Compaq, Microsoft, Novell and IBM. Maintenance contracts and networked solutions ranging from the configuring and implementing of wide area networks to setting up ISPs are offered.³⁴

Telecommunications

No telecommunication equipment is produced in Tanzania, but a number of major vendors are represented, supplying:

- Transmission equipment (e.g. Siemens, who secured a US\$52-million contract in May 2001 to rollout Phase 2 of the Vodacom Tanzania network)
- Network equipment and Switches: Newbridge, Bosch, Cisco
- Telephones/PABX : Panasonic, Alcatel, Ericsson, Nokia
- Fax Machines: Olivetti, Brother, British Telecom, Nashua, Phillips, Samsung
- Cellular Handsets: Nokia, Motorola, Ericsson, Sanyo
- Public Coin and Card Phones: Schlumberger
- Cordless Phones: Nokia, Motorola, Bosch

A description of Mobitel, a cellular operator that first provided analogue cell phone coverage in 1993, follows:

Mobitel

Mobitel Tanzania is a joint venture between Millicom International Cellular SA, an international company with interests in thirty cellular operations in nineteen countries. Mobitel claim a total of about 130 000 customers, although many of these are using their analogue network which is due to cease operations in 2003.³⁵

Mobitel was awarded a cellular licence in 1993, and by June 2000 provided coverage in Dar es Salaam, Zanzibar, Tanga, Pemba, Arusha, Moshi, Mwanza, Shinyanga, Mwadui, Mbeya, Dodoma, Morogoro and Bukoba.³⁶ This has subsequently been extended to cover other towns such as Iringa and Musoma. Mobitel began operations in the analogue cellular market but launched a GSM (digital) network in September 2000.

³⁴ www.cctz.com

³⁵ Ibid, Mobitel Newsletter of November 2000

³⁶ www.mobitel.co.tz

The launch of a prepaid card system in Tanzania (called Kadi Poa) has proved to be very successful, with cards available in prepaid dollar denominations between US\$5 and US\$50. Mobitel also offers 'fixed cellular' units that allow the seamless transmission of fax or e-mail using the customer's normal cellular phone number, and has recently launched a free Internet service called Mobinet.

General Observations

The authors could interview only a few of the computer-related companies in Tanzania. Companies interviewed made the following observations:

- The taxation system is cumbersome, costly to administer and unfriendly towards small companies.
- No tax breaks are available for companies wishing to innovate in this sector.
- The price of some basic services (e.g. electricity) is very high and is not regionally competitive.
- The availability of suitably skilled staff is a problem, although there may well be an oversupply at the lower skilled levels.
- Corruption in the awarding of Government Tenders is seen as prevalent.

6.2 Public Sector - Major Users

Tanzania has made good progress in reforming the Public Sector since the introduction of market-oriented reforms in 1986 and particularly since the move to multi-party democracy in 1995. Initiatives such as the Tanzanian Assistance Strategy (TAS)³⁷ aimed at restoring local ownership and leadership, Vision 2025 which aims to move Tanzania to a middle income country by 2025, and public and parastatal reform programmes, have collectively resulted in the privatisation or divestiture of nearly 200 parastatals,³⁸ and the reduction of government employees from 355 000 in 1992 to 270 000 in 1997.

6.2.1 Parastatals

The largest parastatals such as the Tanzanian Electric Supply Company Limited (TanESCO) and the Tanzanian Telecommunications Company Limited (TTCL) have either undergone partial privatisation or plans are well under way to effect this. The Tanzanian Government tasked the Parastatal Sector Reform Commission in 1998 to sell 100% of TanESCO to various investors. This process had not been completed at the time of this report.

³⁷ Tanzanian Assistance Strategy, Consultation Draft 1, Ministry of Finance

³⁸ Ibid, p 3

Apart from TTCL, which is a company operating in the ICT Industry, parastatals such as Tanesco and the Bank of Tanzania (Central Bank) are large users of ICT. The Bank of Tanzania, for example, employs over 40 ICT professionals and has a network of over 750 personal computers. The bank is presently engaged in the implementation of an Electronic Funds Transfer system, an Electronic Clearing House system and a Smart Card project. MICR on cheques has been introduced, although the effectiveness is likely to be low because of the largely cash-based nature of Tanzanian society.

6.2.2 Government

There are 19 ministries in the Government as well as seven Ministers of State responsible for particular aspects of government (e.g. Planning and Sector Reforms). Tanzania has not yet emphasised the developmental importance of ICT by creating a separate Ministry of Communications (or even a Ministry of Electronic Commerce, as some countries have done); presently Telecommunication matters fall under the Minister of Transport and Communications.

Tanzania currently has 25 Administrative Regions (5 on Zanzibar) and 113 Administrative districts. Recently a decentralised government structure was adopted but operations remain predominantly centralised. In accordance with the principles of market-based economic policies, the Government is encouraging the private sector to dominate economic activity while it concentrates on the core functions of government. In fact, since independence the private sector has been the dominant contributor to GDP and fixed investment; however, the response of this sector to a variety of incentives has not been as robust as expected for reasons which are mentioned in 6.3.

Macro-Economic measures to improve tax revenue collection and downsize the public sector have resulted in some significant gains. However at 13 percent of GDP, Tanzania's revenue efforts remain very low; this clearly affects the Government's ability to fund infrastructure development in ICT. Also, although the implementation of a cash budgeting system has curtailed public expenditure, much of the cost of this has been borne by donors through the development budget.³⁹

ICT is seen as a powerful tool in improving productivity in government and in providing services to Tanzanian citizens; most of the initiatives in this regard are coming from central government. However, the level of automation remains low and is exacerbated by shortages of skills, equipment and money.

The government recognises that “ a lot of data is produced, analysed and disseminated by various agencies in the Government, NGOs, the private sector and the donor community.

³⁹ Tanzania 1999; Obstacles to Private Sector Growth. Sida Country Economic Report: 2000:4 Danielson Mjema

However, these efforts are not co-ordinated”.⁴⁰ The TAS report then goes on to list a number of weaknesses in the in government systems and proposes areas for attention. At this stage the progress that is being made is hard to assess, but there are a few major system implementations that could make a substantial difference, including the connection of the accounts of all ministries to the Integrated Financial Management System, as mentioned by the Minister of Finance, Hon Basil P Mramba, in his budget speech of June 14, 2001; 28 district councils had been connected by that date and plans were in place to connect all sub-treasuries.⁴¹

6.2.3 Other Public Institutions

University of Dar Es Salaam

The University is a significant user and generator of ICT skills, with a number of well-equipped computer laboratories in evidence, a hundred students graduating in Computer Science every year and many more attending various diploma courses.

Twenty-eight buildings on the Dar es Salaam campus are connected via a high-speed optical fibre backbone and Internet access is provided via a VSAT link. Two other campuses are connected by wireless links to the main campus.

6.3 The Private Sector – Major Users

The growth of ICT in Tanzania is clearly dependent on the growth of the Private Sector as a whole. A number of measures have been taken to increase the growth of this sector⁴² but have so far failed to stimulate the hoped-for results. Some of the reasons include

Cost of establishing a business. According to Danielson and Mjema “the major obstacles here are red tape and lack of co-ordinated facilities,”⁴³ coupled with the fact that parts of the government still discourage private business, particularly foreign ones.⁴⁴

Financing. Medium and long-term loans are hard to obtain; the discrepancy between savings and lending rates is large; most credit offered by banks is in the form of overdrafts⁴⁵

Cost of Production. There exist a large number of taxes, some interpreted differently within government; Labour productivity has decreased as the reduction in government expenditure has effected the quality of education; the import system is cumbersome, inefficient and expensive.

⁴⁰ Tanzanian Assistance Strategy, Consultation Draft One, Ministry of Finance

⁴¹ Business Times ‘ Special Budget Supplement’ June 15, 2001

⁴² Tanzania 1999; Obstacles to Private Sector Growth. Sida Country Economic Report: 2000:4 Danielson Mjema

⁴³ Ibid, p25

⁴⁴ Ibid, p 26

⁴⁵ Ibid, p 27/28

These problems have been communicated and discussed at widely, and encouraging steps were taken in the recent budget, including the elimination of import taxes on computers (and, apparently, software) and the scrapping of a 'start-up' tax on new business (which was widely ignored anyway).

There are no large users of ICT in the Private Sector in the sense of networks of thousands of on-line terminals; probably the most progressive users are concentrated within the Banking Industry

Banking Industry

There are 18 Registered Commercial Banks in Tanzania, including Standard Chartered Bank, Stanbic Bank, Citibank, NBC Bank, CRDB Bank, Barclays Bank of Tanzania and Kenya Commercial Bank. Although this sector is probably more automated than any other in Tanzania, there are few ATM's in evidence and interoperability between banks through a common network has not been implemented.

6.4 Readiness for the Networked World

The section which follows attempts to summarise some of the discussion above through using a generalised 'assessment tool'.

As is the case in most SADC countries, in Tanzania there is currently little evidence of 'new economy' products and services such as electronic commerce, distance learning, multi-media, etc. Such aspects result from a complex of factors, many of which are not directly technology-related, but which combine to make a country 'ready' for the new economy. The ability of a country or region to participate in this 'Networked World' has received much attention over the past few years, and various models have been developed to try to assess the state of a country to participate in this development.

Using a guide developed by the Centre for International Development at Harvard University ('Readiness for the Networked World'), a group of local stakeholders assessed the ability of Tanzania to participate in the 'new economy' during a workshop in Dar es Salaam on 20th June 2001. As in other countries in the region, however, disparities between the main city and areas beyond are very great and at the very least require separate urban/rural assessments. In this case the assessment was confined to Dar es Salaam. Each of five groups of 3–6 people assessed the elements in a particular category as shown in the Table below (e.g. Network Access). The results are representative of informed opinion in Tanzania and represent, with some small variations, the consultant's views as well.⁴⁶ Note that the rating in the Dar es Salaam column applies to the entire category, and that the ratings are on a scale of 1 to 4, where 1= unprepared and 4= fully prepared.

⁴⁶ A full description of the Assessment Methodology can be found at: www.readinessguide.org

In the assessment guide, suggested values for the Key Performance Indicators are contained in the text e.g. to be rated a '4' or fully prepared in the Information Infrastructure aspect, Teledensity would need to be 40+ mainlines per hundred people and mobile penetration would be 14% of the population or more.

Table 2. Readiness for the Networked World

Aspect/Category	Key Performance Indicators	Dar es Salaam	Comments
Network Access			
Information Infrastructure	Teledensity Mobile Penetration	3	Teledensity has improved over past few years with rapid take-up of cellular phones; fixed line penetration is low (5.3 per 1000 people in the country) but Dar es Salaam is relatively well served (estimates about 5 fixed lines per 100 people, 10 mobile lines)
Internet Availability	Inhabitants/ISP Public Internet Access Competitive leased Line Providers Connection Reliability	3	The Internet café phenomenon has generated many more users and the existence of Data Communication companies has assisted leased line provision; however, few individuals have internet access
Internet Affordability	Rates vs. Income Competition	2	Rates are high with the exception of internet cafés where the standard charge is 1000 TSh per hour; a 128k fixed line typically costs US\$720 per month
Network Speed and Quality	Success Rate Dropped Connections Faults/10 Mainlines Xfer Speeds – Dial-up Xfer Speeds – Leased Line Backbone Capacity Packet Loss	3	Modern technology (fibre optic, wireless, network management tools) and the move to digital infrastructure has improved network speed and quality. However, official figures show a low call completion rate, especially for overseas calls. Reliable statistics not readily available

Aspect/Category	Key Performance Indicators	Dar es Salaam	Comments
Hardware and Software	Local Vs Imported Affordability	2	All hardware and software is imported. When compared to the average income of people in Dar es Salaam, few can afford it, and cost to small business is high
Service and Support	Mainline Installation Time Problem Resolution ICT Personnel	3	At a subjective level, service levels are reasonable in Dar es Salaam. Once again modern technology is making this easier to manage and increasing wireless connection bypasses problems of physical infrastructure
Networked Learning			
Educational Access to ICT's	Access at Different Levels Computers/Student Availability of Computer Labs Latest technology Networking Access to Internet	2+	Rating reflects relatively advanced state of computers and connectivity at UDSM. Minimal evidence of computers in schools other than prestigious international schools and some church schools. Schools rating alone would be barely above 1. Primary focus should be on rapid deployment of computers and the Internet in schools with associated teacher training.
Enhancing Education with ICT's	Training of Teachers Use by Teachers/Pupils Sophistication of Use Included in Curricula	2+	Again reflects that computers are used mainly at university level. Re-enforces the need to train schoolteachers in basic computer skills as a precursor introducing computers, the Internet, accessing educational material for curricular purposes.
Developing the ICT Workforce	Opportunities for Training Scope of curricula On-Line Learning	3+	In strong contrast to ICT in the school sector, there is a proliferation of opportunities for technical, programming and systems training for ICT technicians and professionals at university and private training sector levels. Almost all access is face to face. This aspect could be strongly supported by encouraging professional certification and facilitating distance learning.

Aspect/Category	Key Performance Indicators	Dar es Salaam	Comments
Networked Society			
People and Organisations Online	Awareness of Internet Use of Internet (%) Gender of Users Domains/1000 people Extent of advertising in traditional media	3+	Relatively high rating for Dar es Salaam due to Internet Café phenomenon, active Web registrations and some advertising of online information through traditional media.
Locally Relevant Content	Number and Dynamism of local websites Use of Local languages Sophistication of Use Web-Based Training Opportunities	2	While there are many Tanzanian websites, most are in English, static and advertising in character. The web has yet to become a medium for the local population to communicate. Various strategies such as competitions and prizes could be used to raise awareness of Swahili websites, and dynamic communications media such as eThinkTank.
ICT's in everyday Life	Telephone Access and Usage Household commerce use Public Internet Access Options	3	There are plenty of public phones and several thousand home users of the Internet. Mobile telephony reduces the importance of public phones, and the many Internet cafés are a strong feature. There is evidence that many Internet cafés will struggle to survive under current economic models, so effective economic research and guidance to current operators could help sustain the level of services provided.

Aspect/Category	Key Performance Indicators	Dar es Salaam	Comments
ICT's in the Workplace	Efficiency Gains through use of ICT Networking Extent Employee Internet Access Own e-mail accounts Publicise e-mail addresses	2	With the exception of a few large banks and other companies, there is minimal use of computers and telecommunications in the business sector (even in Dar es Salaam). The latest government VAT decisions are an important signal that should be re-enforced to encourage business to explore the benefits, train their employees and invest in efficiency improvements through the use of ICT.
Networked Economy			
ICT Employment Opportunities	Requirement for Technical Skills Economy based on 'Knowledge Worker' ICT seen as Strategic by Organisations	3	General awareness of ICT driven by internet cafés, news media, tertiary institutions, business and organisations like eThinkTank are creating a more favourable environment for job seekers, although private sector growth remains a concern
B2C Electronic Commerce	Use of Websites by Business Volume of online Retail	3	Overall number of Websites shows strong growth but relatively few advertising product; no online ordering in evidence. Fundamentals such as widespread use of credit cards not in place
B2B Electronic Commerce	Efficiencies in B2B Electronic Commerce Incorporation of Web into Key Processes Order processing and delivery executed electronically Electronic B2B large and growing	2	In a very embryonic state. Only a few larger businesses in a position to take advantage of this, with paper-based transactions dominating. Many of the necessary regulatory and legislative steps to secure B2B transactions (e.g. digital signatures, changes to contract law) have not been promulgated

Aspect/Category	Key Performance Indicators	Dar es Salaam	Comments
e-Government	Ministries post key Information on Web Interactive Government websites Procurement/other interactions online	2	The Government of Tanzania has an attractive national website (www.tanzania.go.tz) supporting all ministries who supply general static information. The site also provides information on a number of topics of general interest. Not regularly updated, interactive information missing (e.g. page on 'Tenders' is blank), many ministries (e.g. Energy and Resources, Home Affairs, Industries and Trade) have posted no publications on the site
Network Policy			
Telecommunications	Liberalisation Universal Access Options for Services Incumbent networks open to competition Competition in mobile Value-Added Services	3+	The country is well on its way to a liberalised telecomm arena. There is an independent regulator in place; vigorous competition in the mobile sector; and a growing consensus as to the need for a national ICT policy. Strengthening the independence and capacity of the regulator, establishing an interdepartmental task force for ICT in government and encouraging the early formulation of ICT policy will build on existing strengths.
ICT Trade	Tariffs on ICT equipment Trade in services liberalised No additional tariffs on e-commerce Foreign Direct Investment	3	While business regulations are generally cumbersome, ICT is not singled out except in a positive sense (e.g., recent zero-rating of VAT). There are no particular restrictions on trade in ICT products or FDI in the sector. A special focus on e-commerce (and associated enhancements to the banking sector) will strengthen this aspect.

Chapter 7. *Major Areas where Development Opportunities Exist*

7.1 The Present Situation

There is evidence that the use of ICT in Tanzania is gaining momentum and that the considerable effort made by the government to liberalise economic policy in recent years is bearing fruit. While the rapid integration of ICT into the economy of Tanzania faces difficulties similar to those found in other countries in the region, the government of Tanzania has shown by word and deed (such as the recent elimination of VAT on computer hardware) that it is prepared to make a special effort to try to expedite this integration.

7.2 Main Obstacles: Issues outside of the Industry

There have been various attempts to analyse what is needed to stimulate private sector growth, including an excellent country report commissioned by Sida in 1999⁴⁷ that also provided useful economic data. Many of the conclusions and recommendations of that report seem equally pertinent today and a brief summary of the major points is provided below since this has a direct bearing on the efficacy of possible ICT interventions.

Tanzania gets praise from the IMF for strong macro-economic policy implementation. This is evidenced, inter alia, by the strong decline in inflation from over 30% in 1995 to an annualised rate of less than 8% in June 1999.⁴⁸ This should be seen against the background of the following issues:

- Tax revenue remains low at 13 percent of GDP and is 'widely attributed to rampant tax evasion, corruption in Customs and widespread smuggling. The problem is well known and measures are being taken to correct it.'⁴⁹ The problem is compounded by a complex tax regime with numerous taxes.
- Public expenditure has been contained at the expense of both the Development Budget and jobs in the Public Service.
- Credit growth in the private sector is sluggish; this does not appear to be due to lack of demand, but rather because 'firms face grave problems when they attempt to raise investment finance from the formal financial market. Lending is subdued and concentrated in the major cities; small-scale borrowers are discriminated against; full collateral is required and credit is expensive. In addition, it is virtually impossible to raise finance for longer-term projects....'⁵⁰

⁴⁷ Tanzania 1999: Obstacles to Private Sector Growth, Anders Danielsson and Godwin Mjema, Country Economic Report 2000:4

⁴⁸ Ibid, p 7

⁴⁹ Ibid, p 5

⁵⁰ Ibid, p 28

- The cost of setting up a business, especially for foreigners, is high, largely due to ineffective bureaucracy, a lack of co-ordination and an anti-business attitude within the civil service. The Tanzanian Investment Centre has been established to try to solve these problems, but has met with little enthusiasm from the private sector.
- Cost of production is also high compared to other countries in the region, due to factors including labour productivity and the state and cost of infrastructure.
- Tanzania is still dependent on donor support to balance the budget; withdrawal of such support for any reason would have a detrimental effect on the economy, at least in the short term.

The Country Report mentioned above identifies four potential growth industries in Tanzania viz., Manufacturing, Mining, Agriculture and Tourism. The present survey will not examine these factors any further, except insofar as they relate to potential ICT interventions in Tanzania; full details can be obtained in the Country Report.

7.3 Main Obstacles: Issues within the Industry

The current regulatory structure, apart from being complex, is not being enforced. In addition to the common use of Internet Telephony over both private and public networks, and widely reported illegal use of radio spectrum, the boundary between Public Data Communication access and Internet Service Providers is not clear. ISPs are openly advertising building-to-building wireless communication, which seems to impinge on the territory of the Data Communication operators. The TCC is putting considerable effort into improving communication between itself and its stakeholders, but more needs to be done.

Similarly, the inability to adequately control and account for the finances of the fixed line operator, TTCL, as described in the Annual Report of 1998, does not inspire confidence in the investor community. Presumably, because TTCL has been partly privatised, these problems have been and are being given urgent attention, although the present status is not clear.

Issues relating to the **importation of goods**, the **cost of credit** and the **difficulty of obtaining finance** will also hamper the computer industry, although the explosion of Internet Cafés would seem to indicate that entrepreneurs are finding ways to deal with these issues.

There is no **strong industry body** representing the interests of the ICT industry as a whole in negotiations with the Government, although this may be changing rapidly thanks to the emergence of eThinkTank.

Awareness of the potential of ICT within government to improve productivity is low, and implementation capacity is limited. Because the government represents such an important part of the economy, this is bound to have a strongly limiting effect on growth

7.4 Main Opportunities for Development Assistance

Tanzania is at a stage of development where growth of over 6% p.a. over a long period is necessary in order to generate sufficient work to absorb new entrants to the labour market and to make inroads into widespread poverty. The major factor inhibiting such growth is the **relatively sluggish performance of the private sector**.

Accordingly, the authors feel that the most fruitful interventions would lie in supporting the government of Tanzania in creating an optimum environment for the private sector to flourish.

7.4.1. Support for the Private Sector

Empowering the ICT Industry

Since the ICT Industry is a catalyst for growth in the economy in general, is relatively small and manageable, but yet suffers from many of the constraints prevalent in the economy at large, a project to identify specific actions that could be taken to promote this industry could have important side effects. It is envisaged that such a project would include an examination of:

- The telecommunications regulatory environment, concentrating on the capacity of the Regulator as well as the effect that Internet Telephony will have on access and availability in the country and on the revenue likely to accrue to TTCL;
- Availability of funding and incentives to this sector, with a view to creating a dynamic venture capital market in Tanzania;
- The tax regime as it pertains to the ICT industry, with a view to simplification and the elimination of unnecessary taxes;
- The importation process, examining ways in which ICT could be used to streamline and improve the integrity of the operations of customs; and
- The creation of an overall ICT Policy.
- Examination of specific actions to be taken by the industry to improve its bargaining position vis-a-vis government—for example through the creation of an umbrella industry body.
- Recommendations for the establishment of an ICT cluster in Dar es Salaam.

Clearly, there are a number of sub-projects here that could be handled in isolation, but would not have the same impact as a more holistic approach. For such a project to succeed would require strong support from all stakeholders; the timing is probably good for such support to materialise.

Targeted support for Private Sector Constraints

Many of the items highlighted in above are cross-cutting i.e. they apply to all industries. There may be merit in funding a comprehensive project to optimise say the Customs procedures, through analysis, design and development to implementation.

7.4.2 Human Resource Development

Efforts by the Tanzanian government to combat inflation and manage the economy according to international guidelines have led to a reduction in spend on the education system. It is likely that continuing efforts will need to be made for some time to bridge the gap between school and industry/university. There are a number of worthwhile institutions and projects that could be supported, including:

- Increasing the capacity of existing institutions such as the Dar Es Salaam Institute of Technology who appear to have an enthusiastic team operating in the technician training area but are short of funding and infrastructure;
- Support for distance learning initiatives that aim to provide training for towns and rural centres outside of Dar es Salaam, where the great majority of ICT activity is concentrated;
- Creation and support of a school networking body such as SchoolNet that could spearhead ICT programmes in many schools. This would have to recognise the constraints of the shortage of qualified teachers, lack of funding, etc., and pay special attention to sustainability of such a programme in Tanzania; and
- Introduction of internationally accepted certifications such as the International Computer Driving License (ICDL), which leads to consistent and accredited computer training.

7.4.3 An Agricultural Information System

In the report 'Tanzania 1999: Obstacles to Private Sector Growth',⁵¹ the authors make the concluding remarks that for poverty eradication to be effective it is necessary to focus on the agricultural sector, since this sector accounts for nearly half of total production and by far the largest number of Tanzanians are dependent on agriculture for their living. They note further⁵² that

'...agriculture is the mainstay in Tanzania, in terms of employment as well as production, incomes and export revenues. Consequently, developments in agriculture to a large extent determine developments in the economy as a whole; ...'

⁵¹ Tanzania 1999: Obstacles to Private Sector Growth, Anders Danielsson and Godwin Mjema, Country Economic Report: 2000:4

⁵² Ibid, p 17

In examining agricultural production, they identify a declining per capita output, leading to greater rural-urban migration and pressure on the urban informal sector. They also note that agricultural output does not seem to be responsive to price improvements, indicating that there are some constraints in taking advantage of better prices, either through lack of information or through bottlenecks in the distribution system.

With telecommunication coverage improving, it should be possible to provide real-time prices for agricultural produce at village centres at international, regional and local levels, provide information on optimal harvesting times and new techniques for improving production, thus eliminating at least one of the constraints and enabling planners to concentrate on others such as the distribution system. The information system could also be used to provide better forecasting of product trends, perhaps enabling small-scale farmers to switch crops timeously. Of course, the agricultural industry can be improved through other interventions that do not (necessarily) use ICT, such as research and extension and investment in rural infrastructure. There may be merit in adopting a holistic approach in a more focused area.⁵³

7.4.4 Pilot Projects within Government

As is the case in Rwanda, Government has been slow to adopt ICT within individual ministries. There are for instance no government-to-citizen or government-to-business projects to examine the potential of e-Commerce in Tanzania. The Ministry that has been charged with coordination of ICT Policy within Tanzania (Ministry of Communication and Transport) should take the lead here, if necessary in conjunction with organisations such as TTCL and Tanesco and public-private groupings like eThinkTank. Some of the possibilities include the payment of utility accounts over the Internet; on-line access to application forms of various kinds; on-line medical support; etc. Such a project could be combined with the Agricultural Information System mentioned above to try to increase opportunities and productivity in Tanzania's most important sector.

7.4.5 Tourism Support Project

It is very clear that Tanzania is not reaching anywhere near its potential as far as tourism is concerned. Estimates of the number of tourists actually entering the country differ (from 220 000 to over 500 000); in any case it is not a high number. Tanzania has apparently adopted a 'quality before quantity' approach towards the tourist industry, with a view to minimizing environmental pressure on resources. However, whereas there are very good private operators, generally in niche markets, and many are using the Internet to advertise their products, the tourism industry in general appears to be disorganised, ill-

⁵³ The authors have no background in agriculture, so this suggestion would require further input from local experts.

informed and suffers from a lack of competition, which has mainly served to drive prices up without the corresponding improvement in service.

The problem is a multi-faceted one in that it requires improvements to infrastructure, the banking system, the information available, training of staff, marketing of the products, etc. However, an opportunity exists to use the already widespread deployment of the Internet to provide high-quality information via a 'Tourism Portal,' provided that it is part of an integrated effort to attract more tourists to Tanzania and has the support of the relevant ministry.

APPENDICES

Appendix 1: Key Ratios

Description	Value
Operators	
Number of fixed line telecom operators	2 ⁵⁴
Number of Data Communication Service Providers	6
Number of mobile line telecom operators	5
Number of Internet Service Providers	13
Possible Alternative Suppliers of Bandwidth	6 but data only ⁵⁵
Number of Internet Points of Presence	Not available
International Bandwidth	???
Number of cities with local modem pools for dial-up	Not available
Population of Tanzania	30 900 000 (1999)
Users	
Number of Fixed Lines installed	165 000 (July 2000)
Number of Fixed Lines per 1000 inhabitants	5.3
Temporarily inactive	Not available
Active Fixed Lines	Not available
Expansion Rate: Number of new lines/year	2001-2005: 160 000 ⁵⁶
Percentage of Digital Switchboards	95
Mobile	
Number of mobile phone subscribers	250 000 ⁵⁷
Geographical coverage of mobile networks	13+ Major towns concentrated in Northern part of Tanzania
Number of mobile telephone subscribers per 1000 inhabitants	8.1
Expansion Rate: number of new subscriptions/year	160 000 + from August 2000 to June 2001 ⁵⁸
Internet	
Number of Internet Subscriptions	10000 – 15 000 ⁵⁹
Number of Internet Subscriptions in the Capital	80% of above ⁶⁰
Number of Internet Subscriptions per 1000 inhabitants	0.26 to 0.38
Number of new Internet Subscriptions last year	N/A
Number of Internet Hosts	816 ⁶¹
Number of Internet Hosts per 1000 inhabitants	0.02
Number of new Internet Hosts last year	598 ⁶²
Number of Internet Cafés	1000+
Number of Multipurpose Community Centres	N/A
Education ⁶³	
Primary School Education (Grades 1 to VII)	
Number of Primary Schools	11 400

⁵⁴ Zantel is only licensed to operate in Zanzibar

⁵⁵ The Data Communication Service Providers

⁵⁶ TTCL; Based on the privatisation condition that at least 800 000 lines should be installed by end of exclusivity period

⁵⁷ Estimate from Industry Stakeholders; includes analogue users

⁵⁸ Estimate from Operators reports. Driven by entry of Vodacom into the market

⁵⁹ Estimate from industry insiders. Accurate figures do not exist

⁶⁰ Estimate from Industry insiders

⁶¹ Using January 2001 data from www.isc.org

⁶² Based on difference between Jan 2000 ISC Survey and Jan 2001 ISC Survey

⁶³ 1999 figures from Basic Statistics in Education 1995 – 1999, The Ministry of Education and Culture June 2000

Description	Value
Number of Primary School Teachers	104 000
Number of Primary School Students	4 190 000
Student/Teacher Ratio Primary Schools	40.3
Secondary School Education	
Number of Secondary Schools	826
Number of Secondary School Teachers	12 800
Number of Secondary School Students	247 600
Student/Teacher Ratio Secondary Schools	19.3
Overall Student/Teacher Ratio	38
Tertiary Education	
Students – University of Dar Es Salaam	6100
Faculty – University of Dar Es Salaam	579
Students (Dar Es Salaam Institute of Technology)	3700 (1300 full-time, 2400 part-time)
Faculty (DIT)	120
Students in Final Year of ICT Courses:	
University of Dar Es Salaam	Not available
Dar Es Salaam Institute of Technology	Not available
Other: Electricity Production (Million Kwh)	2 103 (1998) ⁶⁴
Value of Capital Projects for TANESCO ⁶⁵	44 541 MTShs (US\$50 million)

⁶⁴ TANESCO Annual Report 1998

⁶⁵ Ibid

Appendix 2: *Costs of Telecommunication Services*

Call Charges per minute				
Description	Peak		Off-peak	
	TShs	US\$	TSh	US\$
Local Calls				
0 – 50 kms	21	0.024	21	0.024
51 – 500 km	164	0.184	82	0.092
500 km +	297	0.334	148.5	0.167
International Calls				
Africa - Comesa		1.80		1.40
Africa – Non-Comesa		2.40		1.90
The Rest		3.20		2.60
Internet Access ⁶⁶	16.7	0.019		

⁶⁶ Standard Access charge offered by most Internet Cafés in Dar Es Salaam

Appendix 3: Costs of Mobile Calls (per minute)⁶⁷

Time Band	TSh	US\$
Peak ⁶⁸	356	0.40
Off-Peak ⁶⁹	267	0.30
Late Night ⁷⁰	89	0.10

⁶⁷ Mobitel Pre-paid Tariffs

⁶⁸ Peak: Weekdays 07h00 – 18h00; Weekends Saturday 07h00 – 14h00

⁶⁹ Off-Peak: Weekdays 18h00 – 07h00; Weekends Saturday 14h00 – Monday 07h00

⁷⁰ Late night: Everyday 23h00 – 06h00

Appendix 4: Internet Cafés, Telecentres and Web Content

Site Visit and Interview with the Directors of ISSAM Internet Café, Sokoine Drive/Zanaki Street, Dar es Salaam.

Mr Omar Said Mzee and Mr Suwedi R Kassim are the directors of ISSAM. ISSAM is claimed to be one of the more successful Internet Cafés in Dar es Salaam. It is in a good location (adjacent to a parking area for tourist buses near the Zanzibar Ferry Station). It has another location as well. Of the 28 machines at the main site, about a dozen are more or less fully occupied in data capture on an iicd project to capture the whole secondary school syllabus in Tanzania. I observed data capturers transferring data from handwritten documents to their machines⁷¹.

ISSAM offers several additional services, such as photocopying, lamination, scanning and other so-called “secretarial services,” as well as web design. They also act as brokers between locals wanting second hand cars and overseas suppliers of vehicles. They showed me a long list of second hand car dealer websites (e.g., in Japan), plus the sort of paperwork they have to complete to close a deal between supplier and purchaser. They say they make US\$100-200 per transaction and do several deals a month.

ISSAM pays US\$720 a month to TTCL for a 128 KB leased line (64kb guaranteed). An alternative to a TTCL line is to purchase a wireless connection to one of the ISPs. The going rate appears to be US\$50 per machine per month for a local proxy plus client machines (there is a minimum rental of five machines or US\$250 per month).

Rough calculations revealed the following equivalent monthly costs to run the ISSAM Internet Café:

Depreciation on equipment (2-year period)	US\$	750
Bandwidth (as above)		720
Technician plus 3 café assistants		500
Rent of premises		300
Electricity		100
Consumables		100
Taxes		80
Business licence		40
Insurances		40
Rough monthly costs		2 630⁷²

The directors were not sure of the number of paid hours per day for Internet use. They estimated 40-50, or 1200-1500 hours a month, at TSh 1000/hour⁷³. If ISSAM's income

⁷¹ See www.iicd-tanzania.org for this project and other iicd activities in Tanzania.

⁷² The directors' income is not included.

were only through Internet sales, they would need to sell about 2400 hours a month. They concluded that to make that service even marginally profitable, they should therefore be charging TSh 2000/hour. Essentially ISSAM is profitable because they have secured income as long as the iicd project lasts, and because they offer other services.

They believe that the existing business model in Tanzania is unsustainable and pointed to several cafés that have already closed down in their vicinity. They also doubt the figure of a thousand cafés in Dar es Salaam, and estimated only about a hundred. Others estimate 300-500. In the end no-one we have met seems to know how many there are. ISSAM believes that the cafés have been mushrooming only in the last year or two and there are now many unprofitable ones. They are only surviving in the short term because they get people in to buy other services⁷⁴, don't have technical support in-house, pay minimal wages, avoid tax, etc. They noted that the cost of Internet access in neighbouring Kenya is the equivalent of TSh 6000/hour.

Visit to Mwanza/Sengerema

I met very briefly with Mr Mwandambo, the Regional Manager for TTCL Mwanza, who was on his way to Dar es Salaam. I spent more time with Mr Mwanyoka, the Regional Services Manager. I asked for details on the "new" regional 2-megabit links announced by Dr Yonah at the eThinkTank conference. Mr Mwanyoka said that there had always been links to Dar, but these had now been upgraded in terms of quality and speed. He estimated 8500 telephone lines in the Mwanza region, 85% in the town itself. There were now several Internet Cafés, gaining connections from TTCL, or their own VSAT dishes or via the AfricaOnline ISP in Mwanza. Other ICT facilities were at the Lake Secondary School and the small St Augustine University in Mwanza (offering Business Admin and Mass Communications programmes). Standard Chartered Bank has electronic banking facilities in Mwanza, although the exact nature was not clear.

I saw four Internet café locations, including the so-called Community Tele-Centre that is supported by iicd. I used the Web from the Kuhunda café, which has six machines and is busy expanding into much larger premises. Response times were quite acceptable for simple web usage. They have a very good location, overlooking the marketplace. They offer secretarial services and are planning to create a room for basic computer training. I also visited TTCL, as described above, and AfricaOnline. AfricaOnline is one of several ISPs that have opened offices in Mwanza, including MwanzaNet, Raha.com and CyberTwiga. AfricaOnline has about 600 dialup accounts, eight clients with 32-64kb wireless leased lines and 10-15 corporate dialup customers, each sharing 32-64kb connections among their local offices. The cost of acquiring and setting up a wireless leased line is about US\$5000 and the monthly rental is US\$500. The annual rental for unlimited web usage is US\$650 (excluding TTCL charges).

⁷³ Already this is becoming "premium pricing" with the going rate down to TSh 500/hour. Some cafés offer up to three hours for 1000 shillings at night.

⁷⁴ Many cafés I saw advertise a range of secretarial services.

I also met and chatted informally with the Regional Manager for Mobitel in Mwanza, as well as a South African man installing mobile base stations for Vodacom and South African woman upgrading software for Tanzanian National Breweries in Mwanza. My general impression is that Mwanza is a small version of Dar es Salaam. There is demand for computer and communications services and suppliers are setting up to meet the demand. This region of Tanzania is likely to grow very rapidly over the next few years as there are several gold mines in the area that are progressively being opened up. The road system is appalling, and there is a lot of cynicism as to why the promised upgrades are not taking place. There are awarded contracts and work may just start soon. In that case access to Mwanza and the outlying areas (especially the Serengeti reserve) should improve a lot and significantly boost business and tourism activity.

Visit to Sengerema

I visited the Sengerema telecentre, via a 30-minute ferry from Mwanza and then 35km of rather bad road⁷⁵. This is a pilot project under the Ministry of Science and Technology and Higher Education to improve communications in rural areas. If it is successful it will be replicated. Sponsors include ITU, UNESCO, IDRC and COSTECH, who chair the national steering committee. My hosts were the Chair of the 17-person local Steering Committee, Mr Necheye, and the Centre Manager Mr Bugalama. The telecentre is in borrowed accommodation of two classrooms plus an office, and has a server plus ten 486 PCs donated by UNESCO and a 64 KB link to TTCL. Unfortunately in April, three months after start-up, lightning struck and since then there has been no connectivity. The reasons for the long delay are described in the latest quarterly report and are a mixture of technical mis-specifications and delays in getting expenditure approvals from Dar es Salaam. This has meant no Internet activity and no Internet classes, despite 240 email addresses having been registered. Classes in basic computing do continue however, and the latest quarterly report shows that since January 2001 414 trainees have been trained in four areas: introductory, intermediate and advanced computer training and sensitisation to the value of computing in the region (some individuals have done more than one course). I observed an intermediate class for about ten people in progress, with a part time trainer. The facilities are quite primitive, but functional. There are no technicians available to handle any real technical problems. The report notes that training fees yielded some US\$5000 in the first 9 months. Local pledges of US\$90000 were received but little has been paid yet. The balance of the funding comes from the international donors. The budget for capital and running costs for three years has had to be revised upwards for various reasons, and now stands at US\$650000, including a new building for the telecentre. The national steering committee has still to approve the new budget and source the funds. I visited the proposed site, which is right at the centre of the town of Sengerema and therefore should be a very positive development.

Overall I was impressed with the commitment of the people I met to the concept and practice of the telecentre. Creating a high-tech centre in the area, with all the problems of

financing via local and international sources, transport, availability of trainers, and especially attracting customers, is a major feat and the local manager and his steering committee are doing very well. The quarterly report expands on the above points as well as plans for the future (including an Internet café) and is available on request.

Swahili Language Websites

This study was conducted by a Tanzanian resident, American Mr. Michael Trupin, who has a working knowledge of Swahili, with some help from his Tanzanian wife, Dr Christine Trupin, both researchers focusing on public health issues and resident in Dar es Salaam. They successfully used Kiswahili words to find Swahili language sites, but of course do not pretend to have done an exhaustive search. Mr Trupin also conducted a personal interview with staff at NewAfrica.com, who have a comprehensive range of African sites linked to their web page. He reports as follows:

Interview with NewAfrica.com: NewAfrica does website hosting and design. Among their clients are tour companies, law firms and NGOs. I met with three young staff. They felt that there was an increase in Swahili sites, but that it was just part of an overall increase in Tanzanian (or Tanzania-related) sites. They believe that the bulk of Swahili sites consist of those aimed at outsiders wanting to learn the language and newspapers read by Tanzanians outside the country. They said that NGO websites tend to be for the purpose of gaining publicity outside Tanzania.

They said that the main centres of Internet activity in Tanzania are DSM and Arusha, with a little bit in Mwanza. But they said that Internet hook-ups are much more expensive outside DSM. They expect the physical infrastructure to continue to improve, bringing prices down; and that Internet cafés will spread more throughout the country, once the access becomes more affordable. A month ago a new ISP entered, PACONET (?), which may be offering much lower prices⁷⁵.

At one point NewAfrica began an initiative to help local writers, by publicizing their books on line. They submitted a proposal for funding to the Min. of Education, with no result. They could make this proposal available to Sida, if they are interested.

My own impression is that there may be more locally intended sites than the staff of NewAfrica realize. However, many of them may not be getting much local response. Yet.

Notes on selected sites:

We did a search, using Google, of the terms "baada ya", which mean 'after' in Kiswahili. This yielded 4000+ matches. The following come from the top of that list.

⁷⁵ It is on one of the roads to the new gold mine at Gaita. The Sengerema region provides mine labour and is apparently attracting business from the new mine as well.

⁷⁶ PacoNet details:

1 novemba 10 desemba kuibadilisha afrika mfungo wa bara zima la afrika 2000 siku 40 za kuomba na kufunga <http://www.nupsa.org.za/swahili/> - NUPSA: "an interdenominational Christian prayer ministry that is committed to building a strong, broad-based prayer network to support the Church to fulfil its calling as a "house of prayer for the nations".

A long page, with a calendar for 40 days of prayer and fasting (1 Nov. - 10 Dec., 2000), specifying prayers and regions to be prayed for each day. This page also available in English, Afrikaans, Arabic, English, French, Portuguese, Sesotho, Spanish, Xhosa and Zulu; and it encourages readers to translate it into other languages as well.

Chumvi Mtembezi (<http://chumvi.tripod.com/index.htm>) - has a Swahili discussion forum, cartoons, and short stories ranging from a translation of a Shakespeare tale to contemporary stories of city life in Tanzania, including stories with social/political commentary. There is also a Swahili Slang or 'Street' Dictionary, set up as a table, showing synonyms, definitions, usage examples. Discussion forum welcomes both Swahili and English submissions, does not seem to have been very active during the past year. It has submissions from members both within and outside Tanzania. Chumvi Mtembezi also hosts a web ring, which includes a site on Catholicism in Tanzania (<http://www.katoliki.faithweb.com/>).

Africanhiphop.com (<http://www.africaserver.nl/rumba-kali/lyrics/hali.htm>) - listing some rap songs in Swahili, English, and Swahili-English mix, including reference to one singer who is termed a "pioneer of rap music in local dialect". Seems to be emphasis on connecting with authentic, non-stereotypical African origins.

Afrika Leo (<http://www.afrikaleo.com/>) - a Swahili news service and network, focusing on local, national and regional coverage. Carefully constructed, with pictures, editorial cartoons from DSM papers, pages for letters to the editor and comments. Includes links to the parent, www.newafrica.com. Newafrica said to have begun with about 90 Tanzanians together with a few from neighbouring countries.

An-nuur - This page can be followed to *Islam Tanzania* (<http://www.islamtz.org/>) - a site that hosts two on-line magazines in Swahili, which discuss national and international events from a Moslem perspective. These magazines include letters to the editor, from Tanzanians in DSM and other regions of the country. The site contains much that is heavily political; including a link to book (published overseas) that has been banned in Tanzania.

Bunge News (<http://www.bungetz.org/bungenews/>) - This is a site for the Tanzanian parliament, containing newsletters discussing parliamentary issues and recent events, written both in English and Swahili. Other features include a parliamentary diary and a list of legislative acts. It does not appear to have been up-dated since 1998.

Channel Afrika Habari za afrika kutoka Channel Afrika

(www.channelafrica.org/swahili/index.html) - This is a South African news site, published in Swahili, English, French, Portuguese, Chinyanja and Silozi. It features audio news files as well.

Database of Indigenous Knowledge [Swahili] - Africa Region - The World Bank

(<http://www.worldbank.org/afr/ik/swahili/swdatab.htm>) - This site is also available in English, French, Portuguese, Wolof and Hausa. "It aims to facilitate a multilateral dialogue between local communities, NGOs, governments, donors, civil society and the private sector...ultimate objective...to help mainstream indigenous/traditional knowledge (IK) into the activities of development partners and to optimize the benefits of development assistance, especially to the poor." Much of the Swahili site is still under construction. It includes some Swahili translations of IK activities elsewhere in Africa. It solicits contributions to its database of indigenous practices. There are Tanzanian cases in the database, but no evidence yet of direct contributions by Tanzanians.

Deutsche Welle - offering multiple languages

(<http://www.dwelle.de/kiswahili/Welcome.html>) - Swahili version has international and regional news articles (extracted from German news) and sports.

FATIMA NETWORK Maswali 10 muhimu Kuhusu FATIMA Sasa YANAJIBIWA

(www.fatima.org/foreign/swfaq01.html) – This is the Swahili version of the site of an apostolate of Catholics that call themselves followers of Our Lady of Fatima. They have apparently been in conflict with the main body of the Catholic Church hierarchy for several years, being in some ways more conservative. The main site is in English, but certain documents have been translated into Swahili, French, Italian, Portuguese, Spanish and German. Apparently among the supporters of this group are some African clergy.

Introduction.htm (www.ctitz.com/introduction.htm) – this site belongs to The Confederation of Tanzania Industries, one of several trade organizations that have arisen in Tanzania in recent years. They seem to be involved in various advocacy activities on behalf of their constituent firms. The only Swahili found in the site is a translation of the explanatory and mission statements on this page.

IPP Media Komesha Page 3 (www.ippmedia.com/komesha/2001/08/04/komesha3.asp)

– this appears to be a personal interest story extracted from "Komesha," a Swahili weekly published by IPPMedia, one of the largest (if not the largest) media groups in Tanzania. This page appears to be the only Swahili portion of the site.

JARIDA LA KISWAHILI (<http://ccat.sas.upenn.edu/afl/newsletter2.html>) – Student newsletter from the U. of Pennsylvania. Good Swahili!

MBINGU ZA MEI (www.angelfire.com/nj/ntj/month/may_kiswahili.html) – This is Dr. N.T. Jiwaji's Swahili translation of his monthly page, detailing what of interest can be searched for in the night skies over Tanzania during the month of May. Dr. Jiwaji, a Dar

es Salaam resident and dedicated amateur astronomer, provides a diagram of constellations with each monthly page, every detail of which has been translated into Swahili. He gives astronomy presentations and leads stargazing expeditions at schools, and encourages both adults and children to join his astronomy club.

New Page (<http://www.bot-tz.org/markets/press/Bondpress.htm>)

SAA YA GIZA KUU YAJA (The Coming Hour of Darkness)

(<http://www.bibleguide.com/books/swahili/darkness/darkness.htm>)

Survival International - bulletin in Kiswahili on the Maasai of east Africa (www.survivalinternational.org/swahili.htm) – As it says at the top of the page: "This is the only article in Swahili available on the web from Survival International." Title – "Kenya – law to protect Maasai land must be passed" The article explains the history of the case with the Maasai in Kenya that has led to this legislative activity, together with the actions of Survival International to promote the issue. It further explains that others will benefit if the new legislation becomes law.

Sustainable Cities Programme (SCP)-Tanzania (www.scp-tanzania.org/) – Not finding any Swahili here.

Swahili Coast (www.mwambao.com/index.htm) – page mostly in English, some Swahili poetry, and a bit of Swahili dialogue in humorous story. Includes links to the Koran in Swahili, the Yale Swahili dictionary project, and an appeal to join a letter writing campaign to "Stop Irresponsible Mining in Kenya" (in English).

Swahili Concepts (http://www.tgnp.co.tz/swahili_concepts.htm) –The Swahili translation of a page explaining "terms frequently used in the field of Gender". This is the website of the Tanzania Gender Networking Programme (TGNP), one of the most important and successful NGOs in Tanzania, active in legislative and other advocacy on women's rights and other social issues, the parent of many initiatives and other NGOs. This is the only Swahili part of the TGNP site. Among its links is a site for the Tanzania Association of Non-Governmental Organizations (TANGO), which is supposed to be a national umbrella organization serving NGOs, but seems in fact to have ended up as an NGO, in competition with those it is supposed to serve.

Tanzania Bila Umasikini (www.hakikazi.org/tbu/) – this is from a plain language guide (available in both Swahili and English) to Tanzania's Poverty Reduction Strategy Paper (PRSP), produced by Hakikazi (meaning 'right to work') Catalyst. By "exchanging ideas on how to promote the rights of all people to fully participate on social, technical, economic, environmental and political (STEEP) issues", Hakikazi Catalyst hopes to make theirs (www.hakikazi.org) "one of Tanzania's most exciting civil society websites". At present, it may be virtually Tanzania's only 'civil society' website. It...

→ links to *Kabissa* (<http://www.kabissa.org/>) – "Space on the Internet for the African Non-Profit Sector" – an apparently well-endowed resource, which provides newsletters and various networking services. Which in turn...

→ links to *fahamu* ('knowledge' in Swahili) – not a Swahili site, but provides useful indexing (derived from the Open Directory Project [DMOZ]) of Tanzanian sites (finds 279) and Swahili sites (finds 46). Sub-headings for Swahili sites are also in Swahili. Fahamu: "We produce and publish CDROM based learning materials specially for the not-for-profit sector, design and manage websites, run training courses (including on-line courses), and provide support for internet-related work. Fahamu has a special programme for human rights organisations - *Adilisha*. This programme seeks to strengthen the campaigning, advocacy and organisational capacity of human rights organisations in southern Africa through distance learning and the use of computer-based learning materials. Fathom also has an active programme of social policy research on Africa."

The Civic United Front (CUF) Official Website (<http://www.civicunited.org/election/>) – election 2000 page, contains links to press releases, news articles, manifesto – mix of English and Swahili titles – but all of the links seem to be dead now. CUF is at this point perhaps the strongest opposition party. Non-members accuse the party of being only Islamic and excessively militant. Members claim that they have been the victims of violence and election rigging by the dominant CCM.

The Kamusi Project The Internet Living Swahili Dictionary (<http://www.yale.edu/swahili/>)

The Solar Cooking Archive (<http://solarcooking.org/>)

Uislamu Uliyoyofundishwa na Mtume Muhammad [s] na Ahlul Bayt [a]
(<http://al-islam.org/kiswahili/>)

Unofficial Site for TTCL IP Project (<http://dnd.ttcl.co.tz/index.html>)

www.hirondelle.org Swahili project

(<http://www.hirondelle.org/hirondelle.nsf/525125ad0c4e00a0c12564e500424876/4eab4602c1d0d726c1256a140077e620?OpenDocument>)

Yesu ni Bwana (<http://www.mwakasege.org/index.htm>)

Comments from Jonathan Miller

In addition to the sites noted above, there are also Swahili-English and Swahili-other language dictionaries on the web. Having looked at website listings such as NewAfrica, I would estimate that, of sites referring in a substantive way to Tanzania, about 10% have got at least some Swahili content.

We can consider three user categories in this context: local Tanzanians, the Tanzanian Diaspora, and non-Tanzanians with an interest in Tanzania. Among those, the use of Kiswahili to attract local Tanzanians to the web is probably of most relevance and, for instance, more detailed research into the activities of Internet Café users could be quite interesting. The present analysis has revealed a smattering of sites that might help attract Tanzanians to the web, like sports information, slang dictionaries, local humour, etc., as well as one or two religious and political sites, but this is still very impressionistic.

Appendix 5 *Dar es Salaam Internet User Survey*

Dear Sir or Madam,

My name is Dr Claire Mercer, I am a British academic teaching Geography at the University of Wales, Swansea (UK). I am carrying out a research project in Tanzania looking at information technology and society. Mr Musa Sadock/Humphrey Geoffrey/Christdom Ambilikile/Ms Aziel Elinipenda are assisting me with this project, and I would appreciate your time in answering a few short questions about yourself and how you make use of this Internet café.

Many thanks

Dr Claire Mercer

Date and Time of interview:

- (1) Age
- (2) Gender
- (3) Ethnicity/tribe
- (4) Where were you born?
- (5) Where do you live in Dar es Salaam?
- (6) What is your occupation?
- (7) What is your highest level of qualification?
- (8) Where did you learn to use a computer?
- (9) How many times do you use an internet café per week? OR per month?
- (10) Why do you use internet cafés?
 - email (Tanzania / Africa / global (where?))
(family / friends/ other?)
 - internet (Tanzania / Africa / global (where?))
(chat rooms?)
- (11) What sort of information do you access?
- (12) What is the language of most of the pages you look at?
(English / Swahili / other (which?))
- (13) In your opinion, what is the role of the internet in Tanzanian society?
- (14) Are there any disadvantages to the growth of the internet in Tanzania?

Appendix 6. Organisations visited and Officials Interviewed

Name of Institution/Organisation	Officials
Ministry of Communications and Transport P.O. Box 9144 Dar es Salaam.	Dr. B. Rufunjo - Director for Transport and Communication Eng. A. Kowero - Deputy Director Telecommunication Mr. Octovian Mageni - Senior Posts and Telecommunication Mr. M. Kamulika - IT Officer - Policy and Planning Ms. Anita Ngowi - Legal Adviser
INFOTECH Computers LTD P.O. Box 76686 Dar es Salaam	Mr. Ali Mufuruki - Chairman
Computer Centre LTD P.O. Box 1961 Dar es Salaam	Mr. Munir (?)
CRDB Bank P.O. Box 268 Dar es Salaam	Mr. Elyas Mtenga - Manager - Data Centre
Tanzania Telecommunication Company Ltd. (TTCL/SIMU NET) P.O. Box 110055 Dar es Salaam	Dr. Z.O. Yonah - General Manager - SIMU Net
Tanzania Electric Supply Company (TANESCO) P.O. Box 9024, Dar es Salaam	Mr. B. Msowoya - Deputy Managing Director Ms. Ester Masunzu - Director of Operations Mr. K.R. Abdullah - Director of Corporate Planning and Research Mr. A. Nanyaro - Chief System Engineer - Heavy Plants
Bank of Tanzania (BoT) P.O. Box 2939, Dar es Salaam	Mr. Edward A. Makwaia - Director - Management Information System Mr. Charles M. Kitwanga - Deputy Director System Design and Administration Mr. Timothy N. Kalinjuna - Deputy Director Network and Office Automation
Ministry of Education and Culture P.O. Box 9403, Dar es Salaam	Mr Ally S.M. Mwaimu
Tanzania Traditional Energy Development Environment Organisation (TaTEDO) P.O. Box 32794, Dar es Salaam	Mr. E.N. Sawe - Executive Director Mr. J. Shuma - IT Officer
United State Agency for International Development (USAID) P.O. Box 9130, Dar es Salaam	Dr. Stafford Baker - Acting Director
Computing Centre, University of Dar es Salaam P.O. Box 3509, Dar es Salaam	Prof. Beda Mutaganywa Dr H.M. Twaakyondo, Head, Computer Science Dept
Tanzania Commission for Science and Technology (COSTECH) P.O.Box 4302, Dar es Salaam	Mr. Theophilus E. Mlaki - Director Information and Documentation Mr. A. Nguli Mr. G. Kilasa

Name of Institution/Organisation	Officials
	Mr. E. Yonazi Mr. Abdallah
Tanzania Communications Commission P.O. Box 474, Dar es Salaam	Eng. Emmanuel T.K. Mange, Director of Frequency Management, Acting Director General Dr.R. Mfungahema - Economic Regulations Mr. Goodluck J.S. Ole Medeye - Director Finance and Administration Mr. James M. Kilaba
Mobitel P.O. Box 2929, Dar es Salaam	Mr. J.A.R. Bell - General Manager
Dar es Salaam Institute of Technology P.O. Box 2958, Dar es Salaam	Dr. B.S. Mahenge Dr. R.J. Masika Mr. J.Y. Chalho
DATEL Tanzania Ltd P.O. Box 76794, Dar es Salaam	Mr. Alain Rolland - General Manager Mr. Idd H. Mbita
CATS Dar es Salaam	Mr. Joe Pereira - Director of Services Software and Training
TANZANIA Chamber of Commerce Industry and Agriculture (TCCIA), P.O. Box 9713, Dar es Salaam	Mr. E. Mwenda - IT Specialist Mr. Suprapasen - Advisor
KPMG (eThinkTank) P.O. Box 580, Dar es Salaam	Mr. S. Ntiro
Civil Service Department P.O. Box 9143, Dar es Salaam	Mr. David Sawe - Director - Management Information System
WILKEN AFSAT (T) LTD P.O. Box 40781, Dar es Salaam	Mr. Abdallah Mhende - General Manager
United National Development Programme (UNDP) P.O. Box 1982, Dar es Salaam	Mr. Riku Asikainen - IT Project Officer
Swedish Embassy P.O. Box 927 Dar es Salaam	Mr. Ralph Karhammar - Sida - Dar es Salaam Ms. Petra S. Dry - Sida/SAREC Stockholm
Computer Worldwide Ltd P.O. Box 4220, Dar es Salaam	Mr. Mohamedali Bhalloo - Chief Executive Office



SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
S-105 25 Stockholm, Sweden
Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64
Homepage: <http://www.sida.se>