

Final Report:

**A Three-Country ICT Survey for
Rwanda, Tanzania and
Mozambique**

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November 2001

Prepared for



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Chapter 1: Introduction

This report is the culmination of fieldwork and research in three countries: Mozambique, Rwanda and Tanzania. Individual reports on the three countries are already available; this report summarises the key indicators for each country and attempts to highlight the similarities and the differences between them, as well as to make recommendations on possible future interventions.

1.1 General Economic and Political Conditions

All three countries are poor, underdeveloped Southern African nations; they are ranked 168(Mozambique),164 (Rwanda) and 156 (Tanzania) on the Human Development Indices compiled by the United Nations Development Program (UNDP). Both Tanzania and Mozambique are large countries with extensive coastlines (945 087 and 799 379 square kilometres, respectively), whereas Rwanda is much smaller (26 338 Square kilometres, about the size of Belgium) and landlocked.

Two of the countries (Mozambique and Rwanda) are recovering from disastrous civil wars. In the case of Rwanda, the civil war also involved genocide of one ethnic group against another. The third country, Tanzania, although not involved in civil war, is moving from the legacy of a lengthy failed experiment with Socialism. The histories of the three countries are evident in the economy, and in the social and political structures that exist. Although nominally democratic, the institutions of democracy can best be described as fragile, with Tanzania probably most advanced in this respect. All three countries have been taking positive steps to improve the lives of their citizens, but economic growth has been slow or negative for some time.^{1 2}

¹ Source: UNDP Country Tables, September 2001

² Mozambique's growth rate has however been as high as 10% since the 90s, but has to be seen against the very high donor funding levels being injected into the economy.

Figure 1: GDP/Capita Average Annual Rate of Change (1975-1998) - Percent

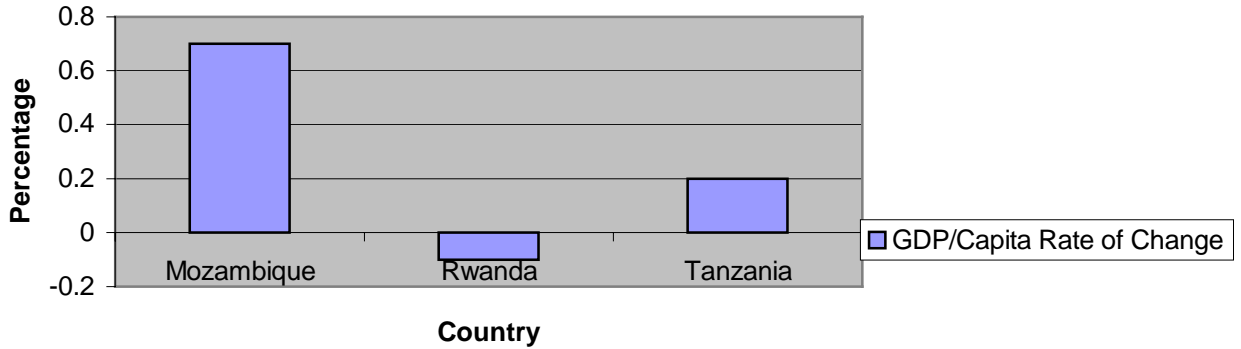
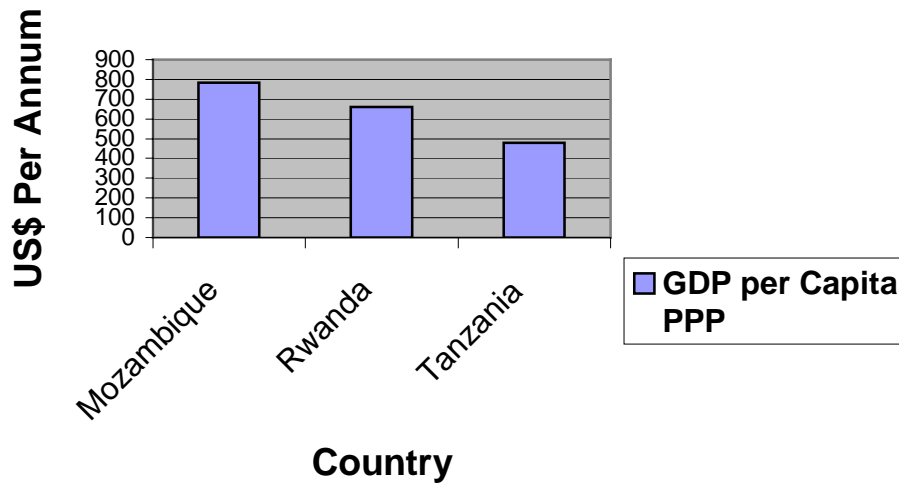


Figure 2: GDP Per Capita – Purchasing Power Parity (1998)³

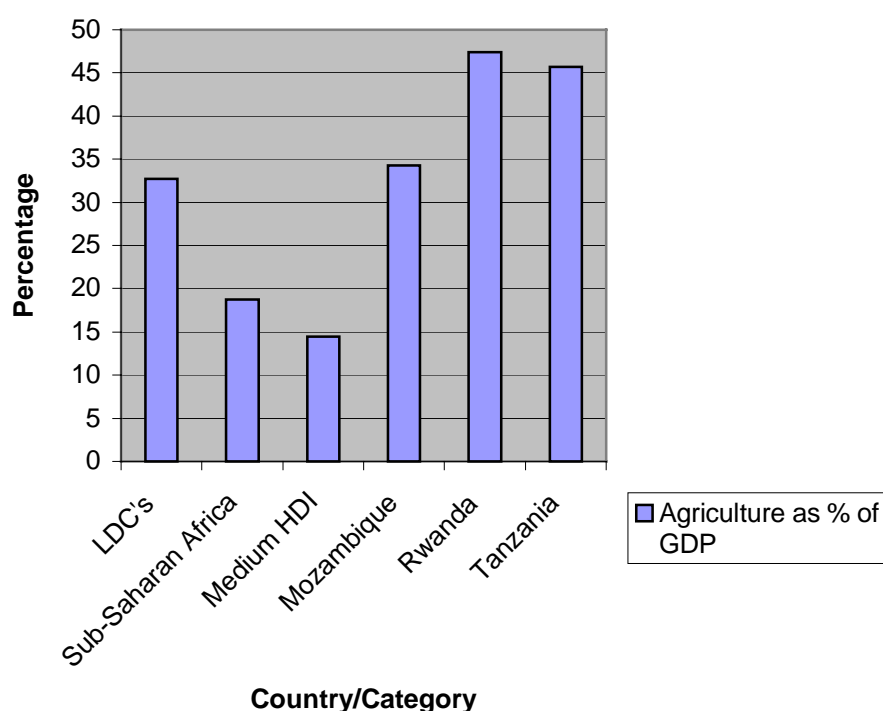


The economies of all three countries are largely cash-based; the use of cheques and credit cards is confined to a local elite, foreigners and capital cities of the three countries. As a consequence, measures of economic activity are certainly understated, probably by a substantial percentage. Nevertheless, by any measure, the countries are very poor.

³ Ibid

Although an analysis of the competitive position of Mozambique, Rwanda and Tanzania is beyond the scope of this report, it is clear that for some time to come the agricultural sector will continue to play a dominant role in the lives of the poor. The chart below illustrates that, even when compared to the Least Developed Countries (LDC's), the rest of Sub-Saharan Africa, or those countries with a Medium Human Development Index (HDI), agriculture comprises a high percentage of the economies of all three countries .

Figure 3: Agriculture as a Percentage of GDP – 1998⁴



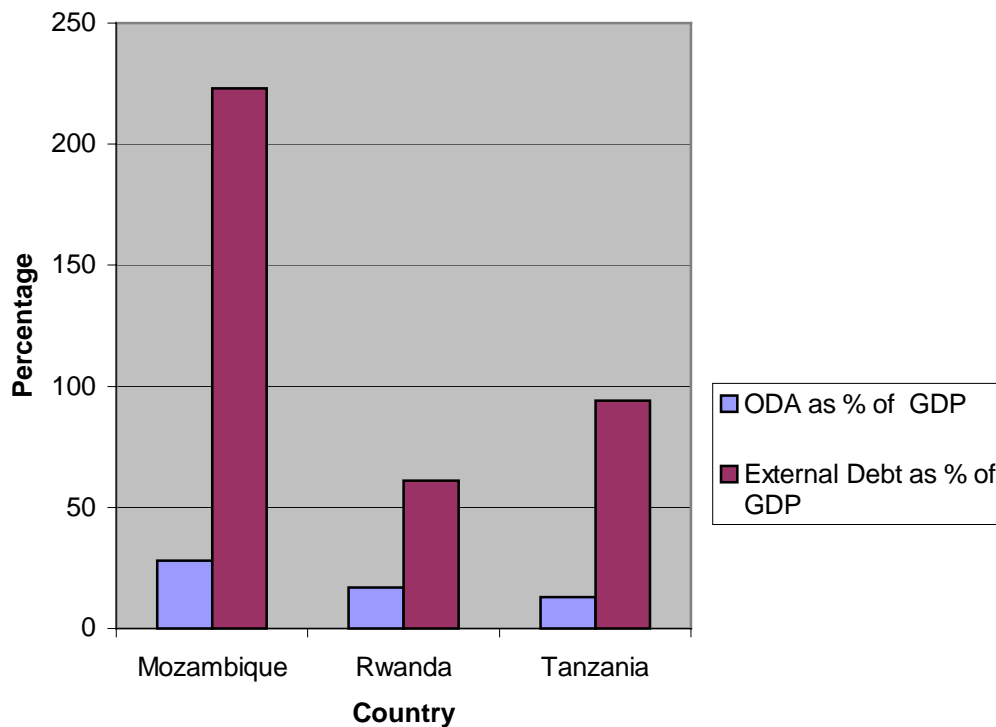
Another noteworthy aspect of all three economies is the extent to which each is dominated by one city – Maputo (Mozambique), Kigali (Rwanda) and Dar es Salaam (Tanzania). This has some positive aspects, such as the possibility of initiating ICT cluster development in these cities, or the introduction of cable TV in Maputo due to the high population density that makes this possible. It does mean though that essential infrastructure (roads, electricity, telephones, sewage, running water) is often not available or is not suitable for commercial use outside of the main cities.

Because of generally unfavourable conditions for the development of private enterprise, the public sector is inevitably a major player in any new initiatives that

⁴ UNDP Country Tables, September 2001

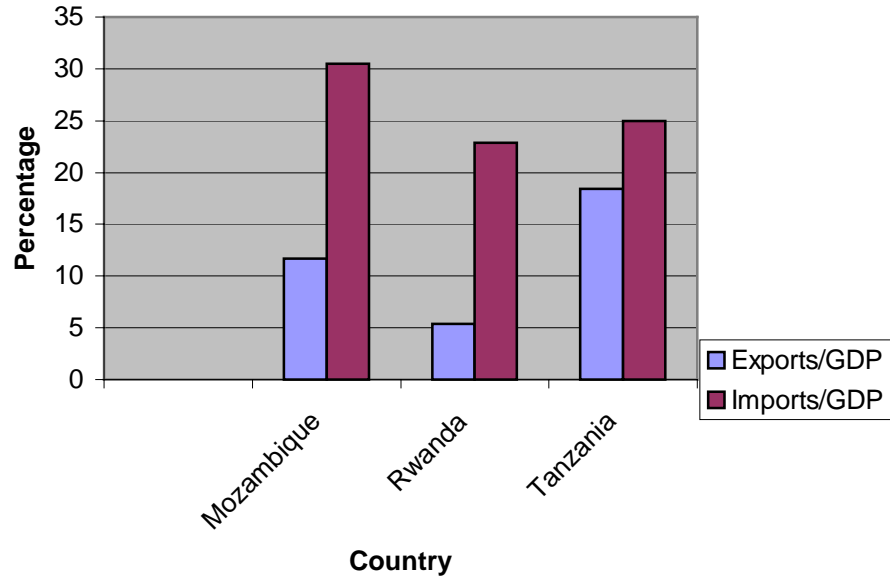
need to take place. This can often be an inhibitor, although there is an increasing awareness that the government needs to play a more facilitative role in economic development. The economies of all three countries are heavily dependent on Development Assistance (See Figure 4) for a sizable portion of their GDP. They import substantially more than they export and the internal debt as a percentage of GDP is high (Figure 5).

Figure 4: Official Development Aid (ODA) and External Debt as a percentage of GDP⁵



⁵ UNDP Country Tables, September 2001

Figure 5: Exports/Imports as a Percentage of GDP⁶



⁶ UNDP Country Tables, September 2001

Chapter 2: Study Methodology

The study methodology for all three countries was essentially the same, and involved four overlapping phases:

- Phase 1:** A data-gathering phase to collect existing quantitative data on infrastructure, size of industry, socio-political environment, human resource parameters, existing policies and other input of relevance. Relevant data from the international arena concerning technological trends, developments on policy and regulation and case studies of developing country success stories were also gathered.
- Phase 2:** In-country visits, where a number of stakeholders were interviewed in each country and asked to give their perceptions of the overall environment supporting the use of ICT in that country. In addition, the consultants endeavoured to get as much 'hands-on' information as possible by visiting Internet cafes, talking to small businessmen and visiting computer businesses on an ad hoc basis.
- Phase 3:** An analysis phase leading to in-country workshops in Rwanda and Tanzania, and to the consultants attending a national conference on the ICT Policy Implementation Strategy in Mozambique. As a consistent way of comparing countries, selected stakeholders were consulted through workshops and elsewhere using a framework called the 'Readiness Guide for the Networked World.' All the data so obtained was integrated with that obtained in Phase 1 and a Draft Report produced, which included primary areas of potential intervention by Sida.
- Phase 4:** A verification phase where Sida commented on the draft reports and where missing information was collected, if possible. In the case of both Tanzania and Mozambique, additional in-country visits were made to obtain a deeper understanding of some key issues. This phase is to culminate with a visit to Sida in Sweden to discuss the results.

The study team consisted of four senior consultants who shared the fieldwork and the production of the in-country reports in the following manner:

Rwanda:	Jonathan Miller and Philip Esselaar
Mozambique:	Tina James and Olof Hesselmark
Tanzania:	Jonathan Miller and Philip Esselaar

Philip Esselaar was the overall Project leader was.

The in-country visits took place as follows:

Rwanda: 22nd April to 2nd May

Tanzania: 10th June to 21st June;
27th September to 5th October

Mozambique: 13th June to 19th June;
2nd October to 5th October.

Chapter 3: Key Findings for Mozambique, Rwanda and Tanzania

3.1 ICT Policy

All three countries have developed an ICT Policy or are in the throes of finalising one. In Mozambique development began in the mid-90's; in Rwanda in late 1998; and in Tanzania in the early 90's. A brief summary will be given here; more detail can be found in the individual country reports.

Mozambique established an ICT Policy Commission that published a report entitled 'Draft Policy for Information and Communication Technologies' in May 2000; the resulting final ICT Policy Document was formally tabled in Cabinet in December 2000. The Prime Minister's office is driving the process .

During 2001, the Commission has been leading the development of an implementation strategy based on the Policy document; this was presented at an ICT Implementation Strategy Symposium and Industry Exhibition in Maputo in October . A draft strategy document was presented to a large number of local and international stakeholders – this outlines the priority areas for action for the Mozambican government. These include health, governance, infrastructure and universal access, and education and human resource development. There is also presently a revision of the telecommunications policy that addresses issues such as privatisation, liberalisation and regulation. Mozambique does not have an independent Regulator .

Rwanda began the formal ICT Policy Process at a National Workshop in Kigali in 1998. Subsequently the policy process has been supported by the United Nations' Economic Commission for Africa (UNECA) with funding from various international organisations. This initiative led to a number of reports, the most recent being presented to the President of Rwanda in March 2001 entitled 'An Integrated ICT-led Socio-Economic Development Policy and Plan for Rwanda 2001-2005.'

Legislation is currently being prepared to establish an independent Regulator and to prepare the way for a liberalised and privatised Telecommunications Sector.

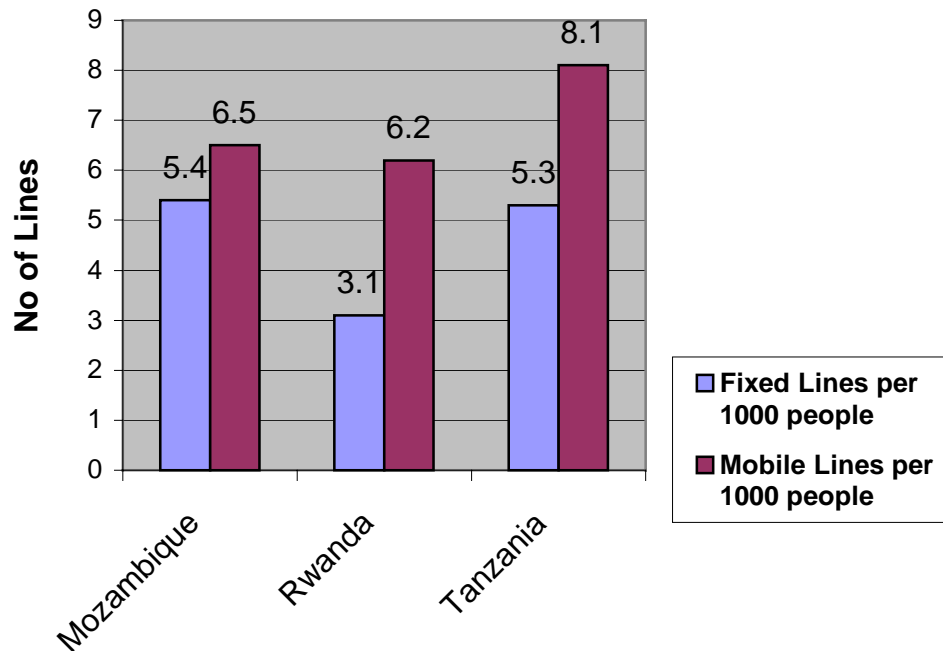
Tanzania split telecommunications and postal services and created a Regulatory Body in 1993 through the Tanzanian Communications Act of that year. The National Telecommunications Policy was released in 1998. There are two licensed fixed-line operators in Tanzania, although one (Zantel) is only licensed to operate in Zanzibar. The main operator (TTCL) was recently privatised through the sale of a 35% stake to a German/Dutch consortium. Six companies have been licensed to provide data services only, the ISP and cellular market have been opened to competition and Internet cafes are proliferating. An initiative to develop a broader ICT Policy has begun, largely through the efforts of a voluntary group called eThinkTankTz.

The recent rapid expansion of the mobile market in all three countries is indicative of a powerful latent demand that was unleashed with the advent of competition into that market. A similar expansion in Internet cafes has taken place in Tanzania through competitive pricing and the deregulated provision of data services.

3.2 Connectivity and Access

A table outlining the key ratios for the three countries is included in the Appendix. In all three countries, the number of mobile phones has overtaken the number of fixed lines.

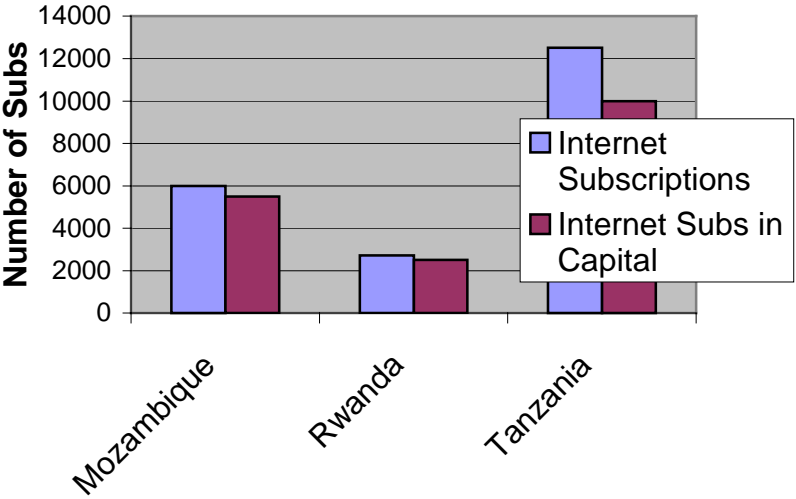
Figure 6: Number of Fixed and Mobile Phones per 1000 people⁷



The estimated number of Internet Subscribers in the country versus the number present in the main city (Maputo, Kigali or Dar Es Salaam) is shown next.⁸

⁷ Sida Country Reports on Mozambique, Rwanda and Tanzania

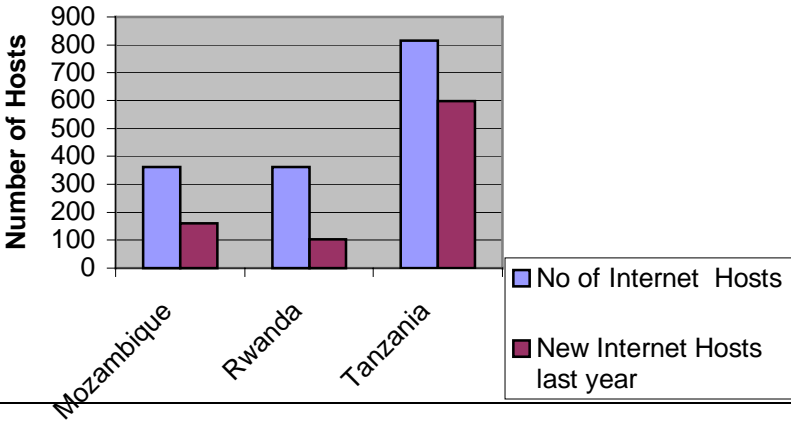
Figure 7: Number of Internet Subscriptions



There are eight ISP's in Mozambique, three in Rwanda (all associated with the Public Sector), and thirteen in Tanzania. The growth of Internet subscriptions in Tanzania has been fuelled essentially by a more liberal regulatory approach to the provision of data services.

Another, somewhat rough, measure of Internet activity and expansion is the number of Internet Hosts registered, compared to the Internet Hosts registered last year.

Figure 8: Number of Internet Hosts in total, and number installed - 2000



⁸ Ibid

Country

3.3 Human Resources

The human resource situation in all three countries is not very promising, both from the perspective of the education system in general and the availability of skilled ICT personnel.

3.3.1 Primary and Secondary School Education

The Table below illustrates the situation in the primary and secondary schools

Description	Mozambique	Rwanda	Tanzania
Population size (Millions- 1998)	18.9	6.6	32.1
Primary Schools	6 025	2 142	11 400
- Students	1 899 531		4 190 000
- Teachers	32 670		104 000
- Student/Teacher Ratio	58.14		40.3
Secondary Schools	75	363	826
- Students	51 554		247 600
- Teachers	1 555		12 800
- Student/Teacher Ratio	33.2		19.3
Total Schools	6 100	2 505	12226
- Students	1 951 085	1 500 000	4 437 600
- Teachers	34 225	29 000	116 800
- Student/Teacher Ratio	57.0	51.7	38.0
Primary School Students/Secondary School Students (%)	2.7	N/A	5.9

Table 1. Statistics on Schools and Teachers in Mozambique, Rwanda and Tanzania

This table illustrates that, at least statistically speaking, Tanzania appears to be better off than either Mozambique or Rwanda, with much better student/teacher ratios overall. What is particularly noteworthy in all three countries is the very high drop-off rate from primary school enrolment to secondary school enrolment. Once again, when compared to Mozambique (and probably Rwanda), Tanzania is markedly better off, although still extremely low.

This picture masks even greater discrepancies across sex, gender, income levels etc and is exacerbated by large shortages of basic equipment e.g. tables, chairs, toilets.

3.3.2 Tertiary Education

Each country has at least one University plus a number of other tertiary institutions (Technikons, Colleges). The major tertiary institutions are well-established and have student enrolments as shown below:

Mozambique

University Eduardo Mondlane 5 762 (1996/97)

Rwanda

National University of Rwanda 4 800 (2000)

Tanzania

University of Dar Es Salaam 6 084 (2000)

The Universities in all three countries have recognized the importance of ICT training and have instituted degrees in Computer Science and/or Computer Engineering, as well as encouraging students from other faculties to do basic computer literacy classes.

Although a shortage of computer equipment, bandwidth and the like is evident, the situation in the tertiary education environment appears to be far healthier than in either primary or secondary school education.

3.4 Structure of the ICT Industry and Major Users

The major growth in all three countries is taking place in the Telecommunications Sector, particularly in mobile telephony. In all three countries the great majority of ICT activity takes place around the largest city in the country, and although mobile telephony is spreading the use of ICT around the country, there remains very little capacity elsewhere. Growing use of the Internet is in evidence but only in Tanzania can this be said to be fairly widespread.

Mozambique

There is no manufacturing or assembly of hardware taking place in Mozambique although a few companies develop bespoke software. Between 15 000 and 20 000 computers are currently installed and there are estimated to be 6 000+ Internet users. The growth in the number of websites has been significant over the past few years, with a high incidence of these in Portuguese.

It is estimated that there are only 200 – 300 people in the private ICT Industry. Few companies with more than 50 staff are in evidence, and although the number of qualified ICT professionals is extremely small, an inability to absorb these skills within the industry means that a rapid increase in numbers would be inappropriate. Most of the major users of ICT are in the Public Sector (TDM, MCell, Banks), and donor funding often supports ICT projects.

Rwanda

As in Mozambique, ICT hardware and software is imported and distributed through agents of the major multinational brands. There are over 2700 Internet users and about 49 000 mobile subscribers, concentrated largely in Kigali. Many well-known brands are available (E.g. Microsoft, Hewlett-Packard, IBM, Compaq, Siemens).

Tanzania

The ICT sector in Tanzania is small, particularly so if one excludes the telecommunications operators and mobile phone companies. 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 about 80 companies listed in the Tanzanian Yellow pages that are involved in some aspect of the ICT Industry. There are a few private companies that have become well-established and that provide levels of skill and expertise not found in Rwanda or Mozambique. 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.

3.5 Country e-Readiness Assessments

Ratings for all three countries were performed using an assessment methodology developed by the Centre for International Development at Harvard University. In the case of Rwanda and Tanzania, these ratings took place at workshops of stakeholders; the Mozambique ratings were performed by the project team members concerned. Because there was little or no activity in the rural areas in any of the countries, the major city in each country was evaluated. The evaluations are shown in the Table below.

Aspect/Category	Key Performance Indicators	Maputo (Mozambique)	Kigali (Rwanda)	Dar es Salaam (Tanzania)
Network Access				
Information Infrastructure	Teledensity Mobile Penetration	3	2+	3
Internet Availability	Inhabitants/ISP Public Internet Access Competitive leased Line Providers Connection Reliability	2	3	3
Internet Affordability	Rates vs. Income Competition	2	3	2

Aspect/Category	Key Performance Indicators	Maputo (Mozambique)	Kigali (Rwanda)	Dar es Salaam (Tanzania)
Network Speed and Quality	Success Rate Dropped Connections Faults/10 Mainlines Xfer Speeds – Dial-up Xfer Speeds – Leased Line Backbone Capacity Packet Loss	3	3	3
Hardware and Software	Local Vs Imported Affordability	2	2-	2
Service and Support	Mainline Installation Time Problem Resolution ICT Personnel	2	3	3
Networked Learning				
Educational Access to ICT's	Access at Different Levels Computers/Student Availability of Computer Labs Latest technology Networking Access to Internet	2	2	2+
Enhancing Education with ICT's	Training of Teachers Use by Teachers/Pupils Sophistication of Use Included in Curricula	2	2+	2+
Developing the ICT Workforce	Opportunities for Training Scope of curricula On-Line Learning	3	2	3+
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	2	3+
Locally Relevant Content	Number and Dynamism of local websites Use of Local languages Sophistication of Use Web-Based Training Opportunities	3	2	2
ICT's in everyday Life	Telephone Access and Usage Household commerce use Public Internet Access Options	2	2	3
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	2	2

Aspect/Category	Key Performance Indicators	Maputo (Mozambique)	Kigali (Rwanda)	Dar es Salaam (Tanzania)
Networked Economy				
ICT Employment Opportunities	Requirement for Technical Skills Economy based on 'Knowledge Worker' ICT seen as Strategic by Organisations	2	1+	3
B2C Electronic Commerce	Use of Websites by Business Volume of online Retail	1	1	3
B2B Electronic Commerce	Efficiencies in B2B Electronic Commerce Incorporation of Web into Key Processes Order processing and delivery executed electronically Electronic B2Blarge and growing	1	1	2
E-Government	Ministries post key Information on Web Interactive Government websites Procurement/other interactions online	2	2	2
Network Policy				
Telecommunications	Liberalisation Universal Access Options for Services Incumbent networks open to competition Competition in mobile Value-Added Services	2	2	3+
ICT Trade	Tariffs on ICT equipment Trade in services liberalised No additional tariffs on e- commerce Foreign Direct Investment	2	2	3

Comments on these individual ratings and the reasons for them can be found in the individual country reports. A more general comment about the assessment tool itself is found in Chapter Five.

Chapter 4. Considerations when Replicating the Study

4.1 Social and Political Considerations

The three countries studied all had at least one aspect in common – a high level of awareness of the potential of ICT within the upper levels of Government. In the case of Rwanda, this extended to the President himself.

In many other respects the social and political environments of the countries differed. Although all three countries previously had political systems and/or circumstances (civil war) that were not conducive to the growth of the private sector, there nevertheless are significant differences as far as the empowerment of the private sector is concerned in the three countries.

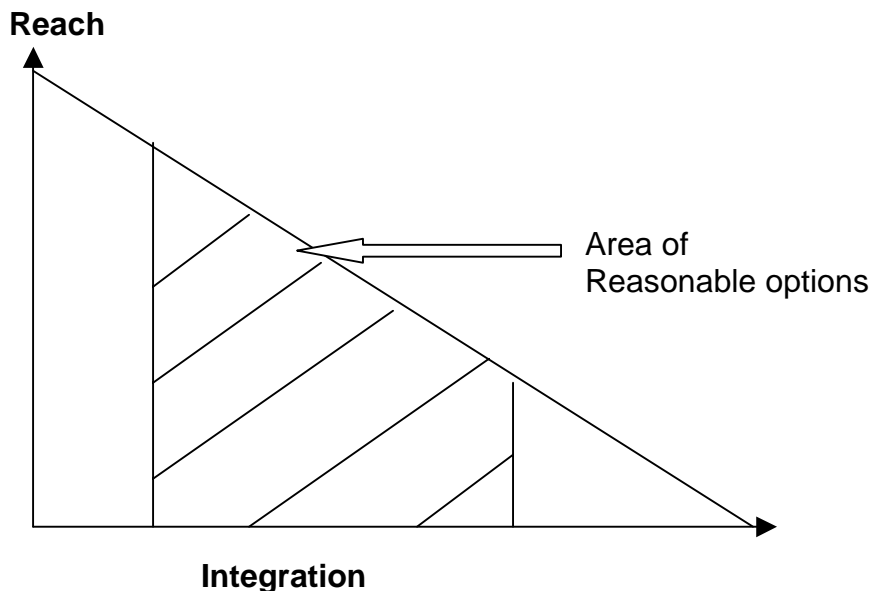
In all three countries, conditions for the growth of the ICT industry are relatively poor. In both Rwanda and Mozambique, the driving force will inevitably have to be the public sector since the private sector is too weak to participate as an equal partner. In Tanzania, however, the existence of a more vibrant private sector, albeit still very small by international standards, holds out the hope that business and government can form a partnership that will leverage the inherent strengths of these two sectors. This notion is supported by the presence of the active eThinkTank public/private sector discussion group.

Based on the premise that ‘ a nation’s standard of living is determined by the productivity with which it uses its human, capital and natural resources’⁹ and that the ICT firms that underpin the use of this technology are often multinationals, the fact that so few of these multinationals are directly represented in these countries points to an unsatisfactory business environment. This has been reinforced by conversations held recently where two multinationals indicated that they have withdrawn from almost all African countries due to what is seen to be the difficulty of doing business there.

Since the private sector represents the engine of growth in these economies, it would suggest that future studies should analyse the business environment in more detail to focus on the removal of impediments to economic growth. Also, there are almost limitless requirements for improved education, with serious shortfalls in the number of teachers, their training, basic facilities, ICT equipment and services and so on. At issue is simply how to most effectively deploy resources so as to maximise the return on skills development. A number of

⁹ **Michael E. Porter ‘The Microeconomic Foundations of Competitiveness’ lecture June 2000**

alternatives present themselves; these may be represented graphically (somewhat simplistically) below.



In other words, there is generally a trade-off between the scope (reach) of an intervention and its thoroughness (integration). One of the difficulties with all three countries is that, because of the almost complete lack of ICT use in the primary and secondary school systems, the time needed to introduce properly Integrated projects is not available.

To illustrate, a project with high 'reach' but minimal integration would involve installing five personal computers in each school in the country, but with no connection to the Internet, no teacher training, no new syllabus, no other infrastructure; whereas a project with high integration but minimal spread would involve installing fifty computers in one school, training the teachers at that school, preparing new material, connecting to the internet, having on-site maintenance, providing external instructors at that school. The range of sensible options falls in between these two extremes, with the advent of the Internet (arguably) making interventions possible with a lower degree of integration and more reach.

4.2 Availability of Data

Although various organisations are making increasing attempts to gather basic economic data, in all three countries this data is not easily available. Often the best sources are foreign or from one-off studies that are funded externally. The problem cannot easily be corrected because some of the important information required emanates from public companies such as the monopoly telecommunications operators. Generally the team found that annual reports

from public companies were late in being published and did not provide comprehensive information anyway.

The development of a competitive environment seems fundamental as otherwise there is not enough motivation to report accurately and timeously. For business purposes the official statistics produced by the government are adequate to obtain a macro-economic view of what is happening but are not detailed enough to use as a basis for investment.

Chapter 5. Proposal for Data Acquisition and Maintenance

5.1 Outline of Data to be captured

The data that is needed will obviously depend to a large extent on the intended recipients, who might be foreign businesses, aid agencies, local businesses, government departments, NGO's and universities. Within each country, and supported by institutions such as the ITU and the World Bank, certain data is already being collected. This report will concentrate on the statistics related to the ICT Sector, although it is taken as a given that a range of basic economic indicators must also be collected.

The data may be separated into:

i) Data that is already available or can generally easily be obtained.

This often consists of pure 'count' data where statistics relating to an easily understood fact need to be collected e.g. number of fixed lines installed. That is not to say that this data is always easy to obtain, or that it does not require further analysis, such as how many fixed lines are actually being used and/or paid for.

Basic ICT Data
Number of fixed line telecom operators
Number of mobile line telecom operators
Number of Internet Service Providers
Possible Alternative Suppliers of Bandwidth
Number of Internet Points of presence
International Bandwidth
Number of cities with local modem pools for dial-up
ICT Users
Number of Fixed Lines installed
Number of Fixed Lines per 1000 inhabitants
Temporarily inactive
Average waiting time
Public telephones
X.25 subscribers
Number of digital leased lines
Fixed line capacity
Expansion Rate: Number of new lines/year
Percentage of Digital Switchboards
Number of mobile phone subscribers
Geographical coverage of mobile networks
Number of mobile telephone subscribers per 1000 inhabitants
Expansion Rate: number of new subscriptions/year
Number of Internet Subscriptions
Number of Internet Subscriptions in the Capital

Number of Internet Subscriptions per 1000 inhabitants
Number of new Internet Subscriptions last year
Number of Internet Hosts
Number of Internet Hosts per 1000 inhabitants
Number of new Internet Hosts last year
Number of Internet Cafes
Number of Multipurpose Community Centres
Costs of Telecommunication Services
Fixed Residential Line
Leased Line
ISDN
Internet Monthly Subscription
Mobile Tariff Plans
Education Data
Primary Schools
- Number
- Number of pupils
- Number of Teachers
Secondary Schools
- Number
- Number of pupils
- Number of Teachers
Universities
- Number
- Number of Students
- Number of Lecturers

ii) Information requiring some analysis

If one accepts the e-readiness framework as a model of the different categories of indicators, it soon becomes apparent that the indicators themselves are very general (i.e. they lack granularity) and that data to properly assess the Stage of development of a country against those indicators is often missing. This leads to a 'gut-feel' assessment of the state of e-readiness which is probably fine for the initial stages of planning but is inadequate as ICT becomes more widespread and as comparisons need to be made. In some cases a survey or some research will need to be done to obtain the required data. Examples of useful information not captured in the basic data outlined in the Table above are given in each of the e-readiness groups of categories.

Network Access:

- Geographic spread of infrastructure availability, including a map of broadband links installed and planned
- Survey of public Internet access providers (Internet Cafes, Community

Centres, etc), including an analysis of their costs, types of access of the ISP to the backbone (Leased line, ISDN, dial-up), typical business model for the ISP

- Analysis of faults on fixed lines, percentage of dropped calls, dial-up transfer speeds by geographic area, availability of leased lines around the country, packet loss percentage. These statistics should be captured by the incumbent Telco, but often are not publicly available
- Installation times for new services, problem resolution times

Networked Learning

Here the collection of information pertaining to the use of ICT in schools is often easy, there is almost none! However, basic infrastructure statistics that are needed include:

- Schools with electricity, telephones, on a good road
- Schools with teachers qualified in Maths, Science and to what level
- Schools with alternate power sources
- Availability of instructional material in local languages

Networked Society

Market Research would need to be conducted to assess aspects such as:

- Gender of Users
- Advertising in traditional Media
- Use of local languages

Other aspects such as 'efficiency gains through the use of ICT' are complex and have presented measurement problems in Developed countries. It is probably better to focus on a 'best practices' approach in order to evaluate to what extent the latest technology is being used.

Networked Economy:

Here again a number of the ratings are 'soft' and are very subjective:

- To what extent is the Economy based on 'knowledge workers'
- To what is ICT seen as strategic by organisations

More quantitative data that could be collected includes:

- Existence of Value-Added Network Services, use of Electronic Data Interchange
- Enterprise Resource Planning Systems with internet interfaces
- Frequency of update of Websites

Network Policy:

The means of assessing the progress towards liberalisation that has been made is generally available in laws and statutes. In a reasonably objective way, the restrictions and tariffs set out provide a means of comparison between countries in similar situations. Once again, however, the actual success of implementation of these policies can only be determined by close interaction with stakeholders in the industry.

5.2 Suggested Responsibility

The responsibility for providing accurate information for use by outside parties rests with a number of organisations. There is merit in funding an initial “Baseline Study” but only if the regular updating of the material can be sustained. As with the ICT Sector in Developed countries, the objective should be to have sufficient demand and interest so that private business can profitably collect and disseminate the information needed. This will only occur once the ICT Sector has reached a ‘critical mass’; in all three countries there is some way to go. In the meantime, the following steps should be taken:

- 1) There should be better reporting by existing public bodies (e.g. the Telecommunications operator, Electric Utility) and industry associations need to be strengthened (e.g. Computer Society, Internet Service Providers, Trade Associations) and encouraged to obtain statistics from their members. Where these associations/bodies do not exist or are not active, a relatively small injection of funds would probably make a big difference.
- 2) A more detailed ‘Baseline Study’ than is contained in the country reports should be conducted which could serve as the basis for future updates. At this stage, it may be appropriate to have one of the tertiary institutions, assisted by consultants where necessary, perform the initial study and then take responsibility for updating it on a yearly basis. The scope of this study needs to be carefully defined to prevent it becoming too broad and/or complicated.
- 3) In common with most countries, the existing ‘official’ coding systems (e.g. International Standard Industry Codes (ISIC) or the North American Industrial Classification System (NAICS) do not adequately address the ‘new economy’, particularly as far as services are concerned. A great deal of work has taken place and is currently taking place to update these classification systems; the necessary resources need to be found to keep all three countries abreast of these developments.

Chapter Six: Conclusions

Each individual country report has identified particular areas of possible intervention. These will not be replicated here but some general comments concerning the potential for ICT to positively influence the development of all three countries follow.

6.1 Useful Technologies

It is vital, in the fast-moving ICT field, not to be trapped into believing that an approach which did not work in the past will not work today. There is a qualitative difference between installing computers in schools or in rural clinics now as compared to ten or even five years ago. Today, the need for well-qualified guidance is much diminished because the computer/user interface is greatly simplified and access to the internet means that a wealth of information is inexpensively available.

Similarly, the development of multimedia support, language translators and three dimensional graphics has meant that a lower degree of literacy is required to have useful interaction with the technology. The steady production of cheaper devices of all kinds, some specifically targeted for the developing world, is cause for optimism.

6.2 Potential Areas for Co-ordinated Intervention

There is no doubt that most of the development problems faced by Mozambique, Rwanda and Tanzania are similar. What differs is the socio-political environment. While there is no substitute for on-the-ground knowledge of particular country circumstances, it should be possible to identify programmes that can be replicated across these countries.

Three of the Sectors which seem particularly susceptible to such replication are **Education, Health** and **Agriculture**; all have been mentioned in the individual country reports. They are Sectors which effect the great majority of citizens in each country and incremental improvements can make a substantial difference to many people. The use of ICT within these Sectors is, for the most part, in its infancy and it is the intention of the project team to explore co-ordinated actions in these sectors at the Project Seminar in Stockholm in January.

