Mozambique

Introduction

The Information Technology revolution changes everything. Under the current parameters of international division of labour, poor countries and regions are threatened with structural irrelevance associated with their technological obsolescence. On the other hand, if properly used, the Information and Technology revolution could spur a model of informational development that would allow developing countries to leapfrog beyond the industrial stage in their process of development. (Castells, 2000: 10)

There is a 'silent revolution' in Mozambican higher education. A sense of this silent revolution is captured by a variety of studies reporting on the 'changing landscape' of Mozambican higher education in the last two decades (Mário, Fry & Chilundo, 2003; Brito, 2003; Beverwijk, 2005). At independence, Mozambique had one higher education institution, the Estudos Gerais e Universitários de Moçambique (EGUM), which translates into English as General and University Studies of Mozambique. Today, there are more than 26 governmental and non-governmental higher education institutions countrywide (Langa, 2006). To put it differently, from one tertiary education institution in 1962 to 26 in 2006, Mozambique has witnessed rapid growth, expansion and diversification in higher education.

According to the Task Force on Higher Education and Society (TFHE), the differentiation of higher education institutions is not a new phenomenon, as different types of colleges and universities have existed for centuries. What is new, however, is the strength of the forces driving differentiation, the pace at which it is occurring and the variety of institutions being created (TFHE, 2000).

New information and communication technologies (ICTs) in higher education appear to be one of the driving factors of the differentiation. The application of technologies, particularly in information and communications, has taken different forms and is transforming higher education service-delivery, teaching and learning in Mozambique.

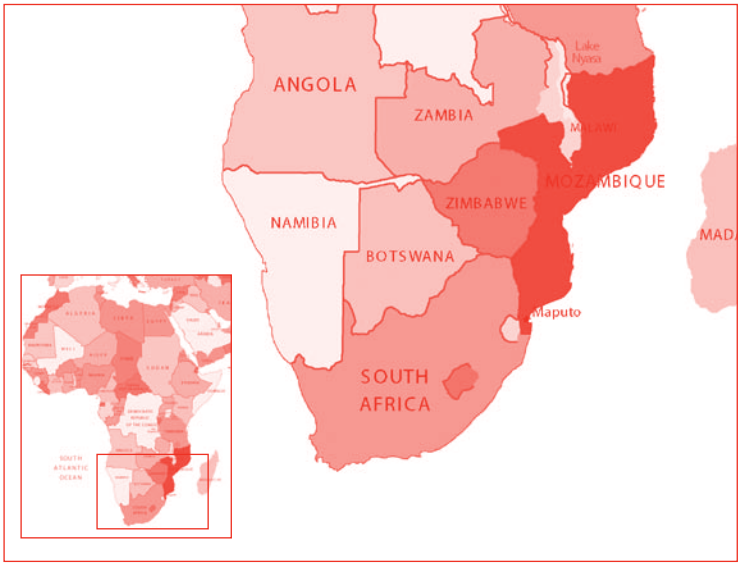
Methodologically, this chapter is based on desk research information and covers a variety of sources browsed from the Internet. The main sources, therefore, are studies, reports, government policy documents and web sites on higher education ICTs and e-learning in Mozambique.

Country background

The Republic of Mozambique is located in south-eastern Africa and is bordered by the Indian Ocean to the east, Tanzania to the north, Malawi and Zambia to the north-west, Zimbabwe to the west and Swaziland and South Africa to the south-west. It has 11 provinces: Cabo Delgado, Niassa, Nampula, Tete, Zambezia, Manica, Sofala, Inhambane, Gaza, Maputo Province and Maputo City. The population of 20 366 795 (estimated in 2007) inhabit a surface area of 799 380 km^2. Most of the population (71 per cent) live in rural areas and the remaining 29 per cent in urban areas (Instituto Nacional de Estatística, 2007).

Portuguese was adopted as the official language and is also the medium of instruction. Like most African countries, Mozambique is multilingual and multicultural. Apart from Portuguese and Asian languages, all other languages spoken in Mozambique belong to the Bantu group (Lopes, 1998).

Map 4.1: Location of Mozambique



Source: Based on World map from http://www.reisenett.no/map_collection/world_maps/World_ref802632_1999.pdf

Under the 1990 Constitution, Mozambique is a multiparty democracy. The country held its first multiparty democratic election in 1994, and Joaquim Alberto Chissano was elected president with 53 per cent of the vote. His government comprised a 250-member national assembly with 129 FRELIMO (Liberation Front of Mozambique) and 112 RENAMO (National Resistance of Mozambique) deputies, and nine representatives of three smaller parties that formed the UD (Democratic Union) (Hanlon, 2004). Since 1994, democratisation has resulted in an ongoing decentralisation process, with local municipal elections taking place in 1998 and 2003. In 2004, a third round of presidential and national assembly elections resulted in FRELIMO candidate, Armando Guebuza being inaugurated as the president of Mozambique (Hanlon, 2004).

Economy

The official currency is the new metical, which replaced old meticals at the rate of a thousand to one on 1 January 2007 (US$1 is equivalent to approximately 25 new meticals). The Bank of Mozambique will continue to redeem the old currency until the end of 2012. US dollars, South African rands and the euro are also widely accepted and used in business transactions. The minimum legal wage is around US$60 per month.

Mozambique is a member of the Southern African Development Community (SADC), the free trade protocol of which is aimed at making the region more competitive by eliminating tariffs and other trade barriers.

Mozambique's 2006–2009 Poverty Reduction Strategy Paper (PRSP), known as PARPA II, identifies ICT as a cross-cutting issue with the potential to affect outcomes in many aspects of poverty reduction. Although not specific in its applications, this is an almost revolutionary position for a PRSP to take, and implies that innovative uses of ICTs will begin to appear in targeted poverty alleviation programmes.

Poverty situation

According to its PRSP, Mozambique achieved impressive results under PARPA I (the first poverty reduction plan), sustaining economic growth of 8 per cent per year on average, and reducing the poverty headcount index from 69 per cent in 1997 to 54 per cent in 2003, supported by prudent macroeconomic policies, far-reaching structural reforms and substantial donor assistance. Growth has been 'pro-poor', meaning that the consumption rate of people below the poverty line has been strongly positive, due to agricultural expansion, greater non-farm activities in rural areas and a rise in employment income. The decline in headline inflation has also helped, as it tends to hit the poorest the hardest (JSAN-PRSP, 2006).

Telecommunication and Internet infrastructure background

Telecommunication infrastructure

In 1981, the Mozambique National Telecom Enterprise (Telecomunicações de Moçambique – TDM), the major public operator, emerged from a split between posts (Correios de Moçambique) and telecommunications. Telecommunication in Mozambique is in a state of change. The Telecommunications Act of 1999 began a process of deregulating and privatising TDM. While the process is ongoing, the government still owns a large share of TDM, which remains a parastatal with limited financial autonomy.

TDM was reorganised in 1991 and emerged with a new, commercial board of directors. TDM's first annual report

was released in 1993. The Ministry of Transport and Communications, in consultation with the Ministry of Finance, must approve capital expenditure by TDM, which otherwise enjoys autonomy within the framework of its universal coverage obligation.

Although Mozambique is one of the world's poorest countries, the telecommunications market is vigorous, although not without problems. The vast majority of medium- to long-distance local communications and most international communications use satellite rather than terrestrial cable, fibre optics or radio.

New mobile phone providers

Mcel

Mozambique Cellular (Mcel) was the first mobile phone provider in Mozambique. It began as a subsidiary of TDM in 1997. Originally, there was a German partner, which was bought out in 2000. In 2003, Mcel was officially split from TDM and is now an autonomous company, with TDM owning 74 per cent and the Mozambican government owning the remaining 26 per cent. While the initial user base was impressive, the introduction of a prepaid service in 2000 allowed for phenomenal growth, with an annual increase of 67 per cent in recent years (Greenberg, 2006).

Box 1: The telecommunications sector

The telecommunications sector in Mozambique is thriving, but, with few exceptions, costs are extremely high. The high prices are due, at least partly, to many internal and most international communications relying on expensive satellite links.

Even where terrestrial links are available, they tend to be priced comparably to satellite. The prime exception is mobile telephones, where true competition and a very rapidly growing market have resulted in acceptable pricing. Internet access is moderately priced, but performance is often poor, due to high bandwidth costs.

Residential and business broadband Internet access is now available from several sources. Deregulation is proceeding and, within two years, the traditional telephone company will no longer have a monopoly over voice traffic. By most standards, the regulator is enlightened, but relatively weak, and there is some confusion over what is legal and what is not.

Source: Greenberg (2006)

Box 2: Telecommunications infrastructure

The Mozambique telecommunications infrastructure consists of a national backbone, covering all provinces up to the district level. This network is a combination of different technologies – VSAT, wireless loop, copper cable and, most recently, a 5 Gbps marine fibre-optic cable along the coast, linking the coastal cities of Maputo, Xai-Xai, Inhambane, Vilanculos and Beira in the first phase. In the next five years, the project will reach Quelimane, Angoche, Nacala and Pemba; it will also include links to the hinterland cities of Chimoio, Tete, Nampula, Lichinga and Cuamba.

Within the main cities, telephone exchanges are linked via fibre-optic networks; copper is used to connect users to the secondary network. There is only one mobile operator, but competition is anticipated as other companies join the market in the coming years.

The national telecommunications network infrastructure is managed and operated by Telecomunicações de Moçambique (TDM). In 1992, a telecommunications law was passed which established TDM as the monopoly service provider of basic services, exchanges and transmission. Complementary and value-added services, however, as well as data communications, are open to competition, subject to licensing by the regulatory body, the Instituto Nacional das Comunicações de Moçambique (INCM), which was established in 1992. There is no restriction on resale of TDM circuits to third parties, provided they are not used for voice traffic. The government plans to privatise the telecommunications sector, but TDM continues to invest heavily in infrastructure modernisation. The government justifies this position as a way of strengthening TDM in preparation for competition in a liberalised market.

Mozambique approved a national ICT policy in December 2000, and an implementation strategy in June 2002, in which six priority areas were identified, among them education.

Source: http://www.foundationpartnership.org

Box 3: Vodacom in Mozambique

Vodacom Group is a pan-African cellular communications company providing a world-class GSM (global system for mobile communications) service to over 14.4 million customers in South Africa, Mozambique, Tanzania, Lesotho and the Democratic Republic of the Congo. Vodacom Group's shareholders include Telkom SA Ltd (50 per cent), VenFin (15 per cent) and Vodafone Group (35 per cent).

Vodacom Group has the majority stake in Vodacom Mozambique with local partners Emotel, a consortium of local business people and public figures. Dr Hermenegildo Gamito of Emotel serves as the chairman of Vodacom Mozambique. Vodacom Mozambique offers the latest value-added services and products in order to ensure that customers are up to date with cellular trends. Vodacom's coverage in Mozambique includes all major cities and provincial capitals and many other smaller towns, as well as main roads.

Note: The registered name of Vodacom's Mozambican subsidiary is 'VM, S.A.R.L.' (trading as Vodacom Mozambique)
Source: http://www.vm.co.mz/en/perfil_da_empresa/sobre_a_vodacom [2007, March 13]

Vodacom

Vodacom Mozambique is the second mobile communication company operating in the country. It is part of the Vodacom Group, which is present also in South Africa, Tanzania, Lesotho and Congo. In addition to its core mobile telephony business, Vodacom provides e-mail services to its clients. Vodamail is a new e-mail provider; with high mobility, high capacity and stability in the market, it allows clients to receive e-mails via a cell phone.

Mobile phone technologies in higher education

There is no readily available evidence of the use of mobile phone technologies in teaching and learning activities in Mozambican higher education. However, personal mobile phone usage is commonly observed amongst both teachers and students.

Electricity

Electricity is a key issue for a successful ICT expansion strategy. Certainly, without electricity, no strategy for expanding ICT would be successful. According to the Economic and Social Plan for 2005, the electricity sector grew by 6.1 per cent over the course of that year, a notable result considering that no increase in the production of energy in megawatts/hour was planned for the period, because of the rehabilitation, modernisation and automation work being carried out at the country's major dam, Cahora Bassa (Republic of Mozambique, 2005).

Table 4.1: Electrical power produced by EDM by region

Region	Electrical power (Gwh)			Variation (%)
	2001	2002	2003	2002/03
North	**33.7**	**35.5**	**38.2**	**7.6**
Pemba	20.3	23.2	23.5	1.3
Lichinga	9.1	8.5	10.4	22.4
Cuamba	3.6	3.5	3.3	-5.7
Nacala	0.2	0.1	0.3	200
Nampula	0.4	0.2	0.5	150
Angola	0.1	0	0.2	0
Centre	**226.2**	**256.5**	**237.8**	**-7.3**
Gurue	0	0	0	0
Mocuba	0	0	0	0
Quelimane	0.2	0.2	0.2	0
Corumana	0.1	32.6	13.7	-58
Chicamba	225.6	57.5	55.4	-3.7
Beira	0.3	0.1	0.3	200
Mavuzi	0	166.1	168.2	1.3
South	**40.1**	**4.4**	**1.6**	**-63.6**
Inhambane	14	4.1	1.1	-73.2

Region	Electrical power (Gwh)			Variation (%)
Lionde	0.2	0	0	0
Massingir	0	0.2	0.2	0
Xai - Xai	0	0	0.3	0
Total	**300**	**296.4**	**277.6**	

Source: EDM (n.d.)

Radio stations

Table 4.2: Local and foreign radio stations

Radio station	Location/Coverage
Local	
Rádio Moçambique	Beira, Chimoio, Dondo, Inhambane, Lichinga, Maputo, Matola, Nampula, Pemba, Quelimane, Tete
Rádio e Televisão Klint – RTK	Maputo
Rádio Miramar	Beira, Maputo, Nampula
Rádio Maria	Maputo
Rádio RTV	Maputo
Rádio Terra Verde	Maputo
Rádio Trans Mundial	Maputo, Mocuba
Rádio Cidade	Beira
Foreign	
RDP Africa	Maputo
Voice of America	Maputo
BBC	Maputo
RFI	Maputo

Source: Scan-ICT (2002)

Table 4.3: Community radio and television stations

Number	Name	Location	Owner	Status	Year of registration
1	Rádio Comunitária Moamba	Moamba	Instituto de Comunicação Social (Public)	Operational	1998
2	Rádio Comunitária Mocuba	Mocuba	Instituto de Comunicação Social (Public)	Operational	1998
3	Rádio Comunitária Zona Verde	Maputo	Instituto de Comunicação Social (Public)	Non-operational	1998
4	Rádio Comunitária Manhiça	Manhiça	Instituto de Comunicação Social (Public)	Non-operational	1998
5	Rádio Comunitária Ulongue	Tete	Instituto de Comunicação Social (Public)	Operational	1998
6	Rádio Comunitária Mutarara	Tete	Instituto de Comunicação Social (Public)	Operational	1998
7	Rádio Comunitária Xai-Xai	Gaza	Instituto de Comunicação Social (Public)	Operational	1998
8	Rádio Televisão Rural Vilanculos	Vilanculos	Instituto de Comunicação Social (Public)	Operational	2001
9	Rádio Televisão Rural de Chiúre	Chiúre	Instituto de Comunicação Social (Public)	Operational	2001
10	Rádio Televisão Rural de Namialo	Namialo	Instituto de Comunicação Social (Public)	Operational	2001

Number	Name	Location	Owner	Status	Year of registration
11	Rádio Televisão Rural de Mandimba	Mandimba	Instituto de Comunicação Social (Public)	Operational	2001
12	Rádio Televisão Rural de Marromeu	Marromeu	Instituto de Comunicação Social (Public)	Operational	2001
13	Rádio Rural de Alto Molocué	Alto Molocué	Instituto de Comunicação Social (Public)	Operational	2001
14	Rádio Rural de Chimoio	Chimoio	Instituto de Comunicação Social (Public)	Operational	2001
15	Rádio Rural de Ulongue	Angonia	Instituto de Comunicação Social (Public)	Operational	2001
16	Rádio Comunitária de Sussundenga	Manica	Instituto de Comunicação Social (Public)	Operational	2002
17	Rádio Comunitária de Morrumbala	Zambézia	Instituto de Comunicação Social (Public)	Non-operational	2002
18	Rádio Comunitária de Bawa	Tete	Instituto de Comunicação Social (Public)	Operational	2002
19	Nova Rádio Paz	Quelimane	Diocese de Quelimane	Operational	1998
20	Rádio S.Francisco Assis	Pemba	Missão Católica doSag.Coração de Jesus – Nangololo (Mission)	Operational	1998
21	Rádio Búzi	Sofala	Vila de Búzi Sofala (Private)	Operational	1998
22	Rádio Comunitária de Homoine	Inhambane	Associação da Rádio Comunitária de Homoine	Non-operational	2001
23	Rádio Comunitária de Cuamba – RCC	Niassa	Associação da Rádio Comunitária de Cuamba 'UNESCO' (Private)	Non-operational	2001
24	Rádio Comunitária GESOM	Chimoio	Grupo de Educação Social de Manica 'UNESCO' (Private)	Non-operational	2001
25	Rádio Comunitária Escuta	Matola	Liga dos Escuteiros da Rádio Comunitária do Lago 'UNESCO' (Private)	Non-operational	2002
26	Rádio Comunitária do Lago	Niassa	Associação da Rádio Comunitária do Lago 'UNESCO' (Private)	Non-operational	2002
27	Rádio Comunitária Thumbine-Milanqe	Zambézia	Associação p/Decenvolvimento Thumbine-Milanqe 'UNESCO' (Private)	Non-operational	2002
28	Rádio Comunitária Mbumba	Sofala	Associação p/Decenvolvimento Dondo 'UNESCO' (Private)	Non-operational	2002
29	Rádio Comunitária Voz da Cooperativa	Maputo	União Geral de Cooperativas 'UNESCO' (Private)	Non-operational	2002

Source: SCAN-ICT (2002: 26)

Television in Mozambique

TVM (Televisão de Moçambique), the first national TV station in Mozambique, was established in 1980 as an experimental broadcast channel. It remained a monopoly for almost ten years, until Radio Televisão Klint (RTK) was founded as the first private TV broadcasting channel. The market is now open to a variety of suppliers, including Televisão Miramar, STV, RTP Africa and TV Mana. Some of the new TV stations are owned by Pentecostal religious denominations.

TVM is a public company that benefits from a government budget for institutional capacity-building and network expansion. While the other TV stations generally are limited to Maputo and Beira, TVM has a presence in all ten provinces, with different broadcast ranges. However, overall,

the national TV broadcaster serves only 15–17 per cent of the population (SACN-ICT, 2002).

Satellite TV is available all over the country, but due to the costs, the number of subscribers, who are concentrated in the main cities, is low. Cable TV is available only in Maputo (City) through a metropolitan network owned by TVCabo, one of TDM's subsidiaries. The company uses the same infrastructure to provide Internet access to TV subscribers. The price of TV sets has dropped in the last five years, but for the majority of the population they continue to be luxury items. A brand name 20-inch TV set costs an average of US$250. A comparative study shows that out of 121 interviewees 52 per cent have radios at home, while 46 per cent have TV sets (SCAN-ICT, 2002).

Table 4.4: National TV stations and coverage

TV station	Location and coverage
Televisão de Moçambique (TVM)	Maputo, Beira, Nampula, Quelimane, Pemba, Ilha de Moçambique,Lichinga, Mandimba, Maxixe, Xai-Xai, Tete, Songo, Vilanculos, Marromeu, Namialo, Chiúre, Ulongue, Chimoio.
RTK	Maputo
Miramar	Maputo
STV	Maputo, Xai-Xai, Beira, Inhambane
Foreign channels	Maputo
RTP-Africa	Maputo
Tvcabo	National
DSTV	National

Comparative national ICT statistics

This section is dedicated to providing ICT statistics in tabular form. Information provided ranges from human development indicators to comparative connectivity costs across the African continent. The data in the tables are explored more fully in the following section on Internet infrastructure.

Country background information

Table 4.5: National human development indicators

Mozambique	2002	2004
Population (millions)	18.10	18.96
Adult literacy rates (15 years and older)	56.7% (2000/01)	53.6% (2003)
Gross national income (GNI) per capita	Not available	US$2 708
Gross domestic product (GDP) per capita	Not available	US$ 3 203
Number of scientists and engineers in R&D	468	Not available
Expenditure on R&D (budget)	20 899 000	Not available

Source: Manhiça et al. (2006)

ICT infrastructure and access

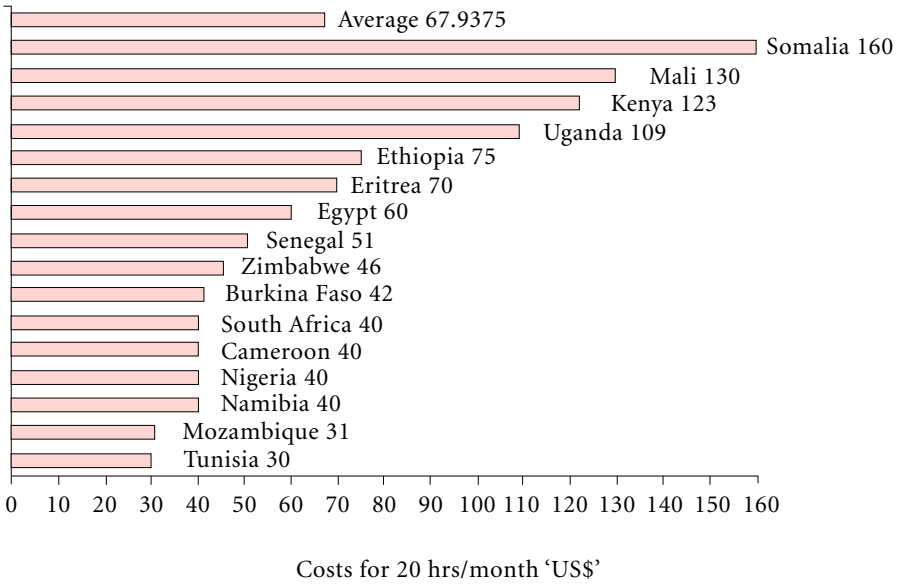
Table 4.6: Penetration of ICTs

Mozambique	2002	2004
Telephone mainlines (per 1 000 people)	0.46	0.31
Mobile phones (per 1 000 people)	254 000	950 000
Radios (per 1 000 people)	49.5 (2001)	Not available
TV sets (per 1 000 people)	5.1 (2001)	Not available

Source: Manhiça et al. (2006)

ICT expenditure

Figure 4.1: Comparative dial-up access costs in Africa



Source: Jensen (2001)

Number of Internet users in 2005

Table 4.7: Internet users in Mozambique

Year	Number of users	Percentage change
2003	22 500	
2004	50 000	122.22%
2005	50 000	0.00%
2006	138 000	179.00%

Source: CIA (2005)

Internet infrastructure (service providers)

The Eduardo Mondlane University (UEM), through its informatics centre (CIEUM), introduced the Internet to Mozambique in 1993. At that time, the main service was e-mail. Full Internet usage was reached in 1995. UEM now operates the largest Internet service in the country, with its own independent VSAT link to the USA. The national telecommunications operator, TDM, also operates an international VSAT-based gateway for Internet service providers (ISPs). The following ISPs have established services using the TDM link: Virtual Connection, Computer Solutions, MicroNet-Tropical Alliance, EMIL, Sort and GARP. The other major provider of Internet connectivity in Mozambique is Teledata, a joint venture company between TDM and Marconi Portugal (Telecom de Portugal), which provides dial-up facilities in four cities via its X.25 service (Balancingact-Africa.com, 2007).

Today, there are four main links to the Internet:

- a 128 Kbps satellite link at the Eduardo Mondlane University;
- a 576 Kbps link located at TDM, which was sponsored by USAID;
- a 256 Kbps link located at Teledata; and
- Virtual Connection's 128 Kbps service.

It is expected that both bandwidth and coverage will expand to include other cities such as Beira and Nampula. Apart from those users who access the Internet from their local networks (Intranets), there are six operational ISPs, with about 6 000 dial-up users. Most of them are located in the provincial capitals. The main services offered are e-mail,

Web access, FTP (file transfer protocol) and Netnews. Data communications systems are now finding use in areas such as telemedicine, e-commerce and videoconferencing (Balancingact-Africa.com, 2007).

As the number of ISPs increased, the capacity initially allocated by TDM was far below the demand; consequently, the Internet was very slow. The SYANDA service, introduced in early 2000, which consisted of dial-up access combined with the capabilities of DSTV, helped to improve the service. With this option, users employed the dial-up access for search functions and the satellite for browsing, making access less expensive and reducing congestion during peak hours.

Table 4.8: Mozambique – ICTs at a glance

ICT sector performance	2000	2005
Access		
Telephone main lines (per 1 000 people)	5	4
International voice traffic (minutes per person)	37	17
Mobile subscribers (per 1 000 people)	3	62
Population covered by mobile telephony (%)	n/a	95
Internet users (per 1 000 people)	1	7
Personal computers (per 1 000 people)	3	6
Households with television (%)	4	6
Quality		
Telephone faults (per 100 main lines per year)	80.0	66.0
Broadband subscribers (per 1 000 people)	0.0	0.0
International Internet bandwidth (bits per person)	0	1
Affordability		
Price basket for fixed line (US$ per month, residential)	14.6	17.6
Price basket for mobile (US$ per month, 2006)	n/a	10.3
Price basket for Internet (US$ per month)	n/a	32.9

Note: n/a = data not available

Source: Adapted from World Bank (n.d.)

CIUEM: the first ISP

CIUEM has been at the forefront of Internet activities in Mozambique since the early 1990s, when it began to offer nationwide e-mail services (Mário et al., 2003). In 1996, Mozambique became the second country in sub-Saharan Africa (after South Africa) to achieve full Internet connectivity through a dial-up connection between CIUEM and Rhodes University in South Africa. Although there are now several commercial ISPs in Mozambique, UEM remains the leader in Internet development and information society initiatives in the country (APC, n.d.).

CIUEM, a technical unit responsible for the development of ICT policies and operations at UEM, was established in 1979. In 1982, it became a formal computer centre, but also explored research issues around soft computer science and informatics. The centre also functions commercially, providing Internet services, training, software, analysis and design, web design and hosting for private clients as well as the university (Ismail, 2001). CIUEM provides access to a variety of stakeholders – students, academic staff, the government and business.

Second-generation providers

Internet usage in Mozambique has increased considerably and promises to double yearly for the foreseeable future. With the improvement of bandwidth and telecommunications infrastructure and the expansion of ISPs throughout the country, it is expected that such usage will explode. However, the available bandwidth no longer satisfies the needs of individual users, businesses or any other entities in Maputo that receive services from the ISPs. While efforts should be made to improve the bandwidth to at least a 1 Mbps full-duplex link (i.e. 1 Mbps for uplink and downlink), most ISPs are able to provide stable uplinks at only 64 Kbps, with similar downlink speeds.

The number of leased lines is also on an upward trend; but, even with innovative telecommunications pricing and Internet policies, the price of access calls is still prohibitive throughout Mozambique.

When the provision of e-mail and Internet services was initiated by CIUEM, this was the result of two years of intensive research activity on appropriate technologies and staff training, as well as the establishment of partnership agreements in the region. In 1997, through the Leland Initiative, USAID supported the establishment of five new ISPs, sharing a 128 Kbps gateway hosted by TDM.

There are currently more than ten ISPs in Mozambique, but only Teledata and TDM have a point of presence (PoP)

outside Maputo. The total number of e-mail users in the country is estimated at about 60 000, with more than 50 per cent based in Maputo. It would appear that the high subscription fees limit the number of e-mail subscribers. On average, most ISPs charge between US$30 and US$40 per month. At US$25 per month, CIUEM offers one of the cheapest rates in the country. CIUEM is the administrator of the country's top-level domain, 'mz'. There are about 2 000 registered domains in the different categories (SCAN-ICT, 2002).

ICTs and higher education

ICTs in public higher education institutions

Universidade Eduardo Mondlane (UEM)

For a broad picture of the use of ICT facilities by the different UEM faculties, see http://www.foundation-partnership.org/pubs/mozambique/index.php?chap=chap6&sub=c6a. The site also provides general information on the ICT status of other higher education institutions. However, the experience of the reopened Faculty of Education at UEM, in introducing a new approach of blended online and face-to-face learning, is worth specific mention (see Muianga, 2005). The faculty also started a larger project for the development of new teaching and learning methods for itself and for the university as whole.

ICTs in private higher education institutions

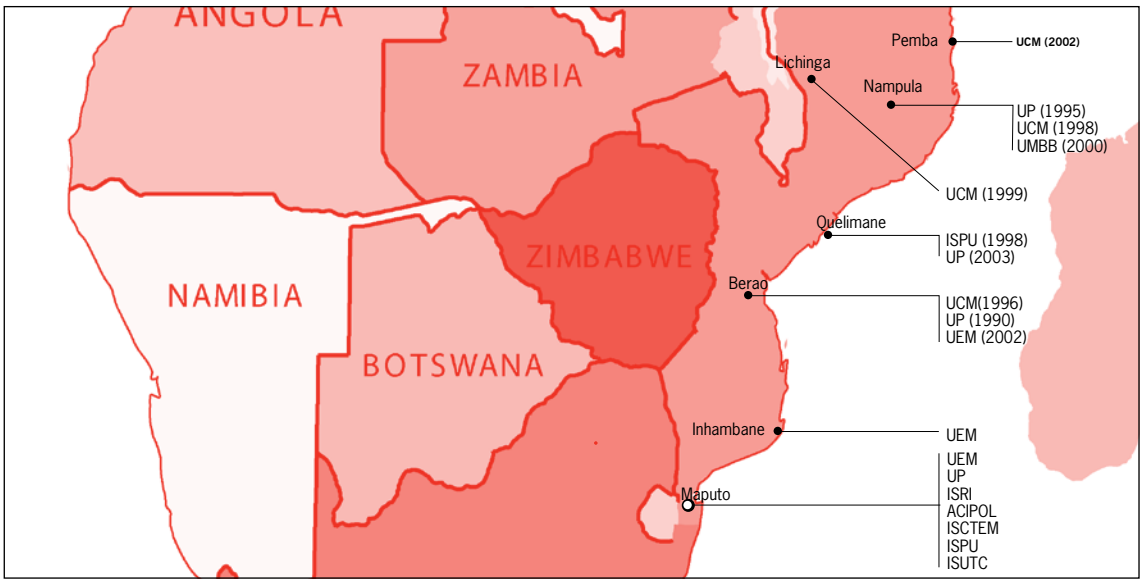
Universidade Católica de Moçambique (UCM)

UCM was one of the first private higher education institutions to open its doors to the public. Although the UCM focus was on health sciences, it was nonetheless one of the first institutions to introduce ICTs and distance education. In 2003, UCM opened its Centre of Distance Education, initiating the first distance education project in a Mozambican private higher education institution. The Centre is located at the Faculty of Medicine in Beira. The method of teaching is often a blend of face-to-face instruction and distance education. While the main learning component is self-study, either at home or at work, students can attend lessons during their holidays. An organised system of distributing materials and collecting students' work has been set up: a 4X4 car visits the study centres in the rural areas almost every week. For further information, see UCM's web site (http://www.ucm.ac.mz/).

Instituto Superior de Ciências e Tecnologias de Moçambique (ISCTEM)

Through its web site (www.isctem.com), ISCTEM runs courses in computer engineering, and maintains an excellent laboratory with 30 networked computers. The library is fully computerised and there is considerable awareness of the importance of ICT. ISCTEM is also considered the best private post-secondary ICT institution in Mozambique. It is currently revising its computer science programme to provide the skills that will accommodate the needs of the labour market in this area (ICT4Africa n.d.). ISCTEM is a

Map 4.2: Location of public higher education institutions



Source: Map based on World map from http://www.reisenett.no/map_collection/world_maps/World_ref802632_1999.pdf

Cisco Advanced Technology Academy, certified by the Cisco Networking Academy Programme for training specialised technicians in network security (see www.isctem.com).

Instituto Superior de Transportes e Comunicação (ISUTC)

ISUTC, another higher education institution running courses in 'informatics engineering' (computer engineering), took in its first 'zero year' students in 2000, and plans to specialise in computer studies with applications throughout the fields of engineering and transport (see www.transcom.co.mz/isutc).

Other

The majority of the new higher education institutions (see Appendix 1) are not using ICT facilities. Even Internet and e-mail facilities continue to be a luxury, particularly for those institutions located in the provinces.

Box 4: National policy mission

Mozambique's national ICT policy objectives are to:

- contribute to the fight against poverty and the improvement of the conditions of life for all Mozambicans;
- ensure its citizens' access to the benefits of worldwide knowledge;
- raise the efficacy and efficiency of state institutions and their value to the public through the provision of services;
- improve governance and public administration;
- make Mozambique a producer and not a mere consumer of ICTs; and
- raise Mozambique to the level of a fitting and competitive partner in the global information society.

Source: Republic of Mozambique (n.d.)

ICTs and policy

The ICT Policy Commission

The ICT Policy Commission was created by Presidential Decree 2/98 on 27 May 1998. Its main objective was to propose an Information and Communication Technology Policy to the Council of Ministers, as well as to assess the necessary accompanying institutional mechanisms for the policy's implementation in all sectors and institutions. Efforts in this regard needed to be integrated with the country's different developmental concerns, such as programmes for the reduction of dire poverty, improving basic living conditions for the citizenry, enhancing education and knowledge development, improving the quality of services in public and private institutions, and increasing the participation of citizens in democratic and political life (Macome, 2002).

A brief history of ICT policy

The Mozambican government has been forward-looking in designing an ICT policy formulation process. The Information Society and Development Conference (ISAD), the first of

Table 4.9: Milestones in the development of the national ICT policy

Date	Milestone
1995	Information Society and Development Conference
1996	International Symposium on Informatics
1997	Global Information Society Workshop
1998	ICT Commission formed (May)
1999	First national ICT policy seminar
2000	First draft of ICT policy submitted and approved Second national ICT policy seminar
2001	Presentation of Mozambique's ICT policy implementation strategy at international symposium
2002	ICT policy implementation strategy approved by the government
2007	IST-Africa 2007 Conference & Exhibition, Maputo (May)

Source: Ismail (2001)

its kind in Africa, took place in South Africa in May 1995 (Ismail, 2001). One of ISAD's achievements, through the African Information Society Initiative (AISI), was to bring to the African continent's attention the need for IT as a tool for development.

The government of Mozambique returned from this conference convinced of the strategic necessity to devote national attention to information technology. The World Bank and the International Development Research Centre (IDRC) together organised the International Symposium on Informatics the following year in Maputo, which led to the creation of a task force to elaborate an ICT policy for Mozambique. The ICT Policy Commission was established shortly thereafter.

The following sub-sectors are covered by the ICT policy:

- *Agriculture* – land conservation and preparation, natural resource management and global information system (GIS) technologies.
- *Art and culture* – preservation of national art and culture, networking, intellectual property rights and national and international cultural exchange.
- *Civil society* – community development programmes, communication, community partnerships with international organisations, universal access and public access points.
- *Economy* – sustainable development, private sector, poverty alleviation and investment, human resources development and gender equality.
- *Education* – higher education, research, infrastructure, illiteracy, financial and technical resources, learning materials, distance education, information networks, community access points, informal education, human resources development and gender equality.
- *Government* – efficiency, effectiveness, municipal training, departmental networks and electronic voting.
- *Health* – administration, telemedicine, accessibility, electronic health networks, pharmaceutical networks and human resources development.
- *Infrastructure* – national infrastructure and architecture, juridical legal framework, national electricity supply infrastructure, road network and international investment.

Policy implementation

There was clear recognition that the adoption of the ICT policy was not the end of the process. Rather, it had to be translated into an action plan that could orient implementation. Hence, in early 2001, efforts turned to drafting an implementation strategy. A technical implementation unit (UTICT) was established within the ICT Policy Commission to oversee the implementation of strategic projects (Republic of Mozambique, 2002).

In order to produce the implementation strategy, a group of multidisciplinary experts from several societal sectors and government departments was constituted as the Group for the Design of the Implementation Strategy. Members of this group were invited from a wide variety of institutions to guarantee diversity in membership and type of contribution and input. The group started working on the production of the implementation strategy in March 2001. Members were divided into smaller sub-groups and given specific tasks to perform, the results of which were to be incorporated into the strategy document.

The implementation strategy was approved by the Council of Ministers in June 2002. It is a key tool and reference point for people and organisations interested in the use of ICTs for development in Mozambique. It provides a history of what has been done, introduces the policy framework and identifies projects that may be used as entry points for support (Republic of Mozambique, 2002).

Institutions of higher education and e-learning

Definitions

Electronic learning, or e-learning, is a general term used to refer to computer-enhanced learning. It is used in different ways in so many contexts that it is critical to be clear about what one means by e-learning. Many technologies can be used in e-learning, including the following: palm pilots, MP3 players, web-based teaching materials, hypermedia in general, multimedia CD-ROMs, web sites, discussion boards, e-mail, blogs, wikis, text chat, computer-aided assessment, educational animation and collaborative software.

Telecentres and e-learning policies

Community Multimedia Centres (CMCs)

In Mozambique, CMCs were established and are supported by UNESCO. They resulted from mergers between telecentres and community radio stations, which have led to the establishment of eight CMCs in Mozambique, with more planned for the future.

Telecentres Networking and Services Development (TNSD)

Based at CIEUM, TNSD is a project, started in May 2002, aimed at consolidating the existing and planned telecentre initiatives led by CIUEM into a coherent and technically supported public access system to further the objectives of the ICT Policy Implementation Strategy. A telecentre is an integrated information and communication facility that houses a combination of new and not-so-new ICTs (e.g. television, video, facsimile, telephone, computers with Internet connectivity and, sometimes, books), offering a variety of services. This type of facility, in which several different ICTs are housed and used in an integrated manner, is called a multipurpose telecentre.

There is variety in the facilities and functions available at telecentres, from the simple telecentre with only one or two telephones and no link to the worldwide Web, to a centre with numerous telephones, facsimile machines, printers and computers connected to the Internet. Ownership and management patterns, in addition to primary motives, confer other layers of differentiation on telecentres. Activities of the Mozambican telecentre project included the preparation of premises, buying and installing equipment, and managing the telecentre services over a four-year period. The telecentre staff were recruited locally and trained by CIUEM (www.acacia.org.za).

A comparative report by IST Africa identifies the e-learning and ICT skills development initiatives of the Mozambican government. In close collaboration with its various partners, the government will adopt actions to address the following challenges and recommendations based on the ICT policy priorities defined for the sector:

- define professional profiles for ICTs;
- standardise the curriculum and training process of training centres in this area;
- encourage adoption and provision of universally recognised certification systems for ICT professionals;
- create centres of excellence to train computer professionals in how to implement ICT solutions;
- establish a certification process to recognise foreign and domestic ICT qualifications;
- define basic computer training programmes for government officials, management and community leaders;
- promote competitions that recognise and reward individuals and organisations applying ICT solutions to successfully address national problems; and
- introduce and promote the use of distance learning and e-learning techniques for IT training. (Manhiça et al. 2005)

E-learning centres

Box 6: Launch of community multimedia centre

President Armando Guebuza of Mozambique will cut the ribbon at the new Community Multimedia Centre (CMC) in Chokwe later today as part of UNESCO's CMC scale-up initiative for 20 such centres across the country, combining community radio and telecentre facilities. Also present at the opening ceremony will be the head of the UNESCO Maputo office, Mr Benoit Sossou.

UNESCO and the Informatics Centre of Eduardo Mondlane University (CIUEM), Maputo, are implementing the scale-up in Mozambique with funding from the Swiss Agency for Development and Co-operation (SDC). There were initially three pilot CMCs in Mozambique, in Manicha, Namaacha and Dondo. The Chokwe CMC is the second site of the scale-up initiative to open its doors this month. The Xinavane CMC was opened on 9 May 2005. On 1 June, the third new CMC will be inaugurated in Moamba in the presence of the governor of Maputo Province. The next three sites to open their doors to the public will be in Ribauè, Chiure and Alto Molócuè.

The CMC scale-up initiative is taking place in Mozambique, Mali and Senegal, and was launched during the World Summit on the Information Society (WSIS) in Geneva in December 2003. The initiative, aims to move beyond isolated pilot projects to lay the basis for national networks of community-based centres that place the tools of information and communication technologies in the hands of the poor and marginalised communities.

Source: UNESCO (2005)

The MICTI E-learning Centre

The Mozambique Information and Communication Technology Institute (MICTI) is a priority programme and plan of action for the country's ICT implementation strategy. According to Sotomane (2005), MICTI applied for Spider ICT Project funding in November 2004 in order to develop the MICTI E-learning Centre as a part of the MICTI research and learning component.

Sotomane considers there to be a great demand for education in Mozambique. However, e-learning technologies are still to be introduced in line with the national implementation strategy. He argues that, in comparison with the First World, many students lack access to appropriate tools and a proper learning environment.

In establishing an e-learning centre, MICTI intends to:

- facilitate flexible e-learning solutions and access to new learning technologies;
- offer a structured and professional study environment;
- stimulate interest in software application and development through computer games;
- facilitate LAN gaming and access to educational games;
- facilitate access to the Internet; and
- create an environment that stimulates innovation and entrepreneurship within the area of ICT. (Sotomane, 2005)

Active research organisations

According to the IST Africa report (Manhiça et al. 2006), the key stakeholders responsible for ICT strategy at a policy level in Mozambique are the ICT Policy Commission and the ICT Policy Implementation Technical Unit. The key stakeholder responsible for research development is the Ministry of Science and Technology. Several universities and research centres are active in the areas of e-government, e-health, e-learning and ICT skills development in Mozambique. These include:

- Agrarian Research Institute of Mozambique;
- Catholic University;
- Centre of Medicines and Medical Equipment of the Ministry of Health;
- Eduardo Mondlane University;
- Eduardo Mondlane University Informatics Centre;
- Higher Institute of Health Science;
- Higher Institute of International Relations;
- Higher Institute of Public Administration;
- Higher Institute of Transport and Communication;
- Higher Polytechnic and University Institute;
- Mozambican Higher Institute of Science and Technology;
- Mozambican ICT Institute;
- National Health Institute;
- National Institute of Education Development;
- Pedagogical University; and
- São Tomás University.

It is difficult to establish what learning environments are being used and how effective the e-learning tools are at these institutions. Empirical research would be appropriate to produce that kind of information. However, there is experience of a blended online and face-to-face environment at UEM's Faculty of Education, especially for master's students.

Higher education ICT challenges

Table 4.10 provides an overview of the current stage of development of ICTs in education in Mozambique.

Table 4.10: Variables affecting ICT-enabled education

Variables	Enabling	Constraining
Policy framework & implementation	Mozambique has a national ICT policy that incorporates the education sector; a dedicated national ICT Policy Commission; and an implementation strategy.	
Advocacy leadership	The ICT Policy Commission played an instrumental role in facilitating the development of the national ICT policy and its implementation strategy, and constituted a core team of ICT champions in Mozambique.	

Variables	Enabling	Constraining
Gender equity & access to ICTs	National ICT policy explicitly recognises the role ICTs can play in promoting gender equality and women's empowerment. The implementation plan included support for dedicated women's empowerment organisations such as Forhum Muller.	
Infrastructure & access	Infrastructure and access has improved since the adoption of the national policy.	Infrastructure and access remains weak and largely confined to Maputo.
Collaborating mechanisms	The ICT Policy Commission's role is to encourage collaboration across the different ministries as well as with the private, civil society and donor sectors.	
Human resources capacity	The establishment of MICTI serves to address the long-term and strategic development of human resources capacity in ICTs in Mozambique.	There remains a very limited layer of skilled personnel and champions at national level, concentrated around a network of skilled engineers and personnel developed at the CIEUM.
Fiscal resources		The budget for the implementation of ICT programmes in Mozambique remains largely dependent on donor and private sector funds.
Learning content		Local, contextually relevant learning content is currently lacking, although there have been attempts at localising content produced in Brazil. The e-learning environment and use of ICT in teaching and learning is still far from desirable.
Procurement regulations		The duties and taxes currently levied on ICT products make them too expensive.
Attitudes	Within government leadership, there is a strong and positive attitude in favour of the promotion of ICTs for development, in general, and in education, in particular.	

Source: Maganlal (2007)

Appendix 1: List of higher education institutions in Mozambique, 2006

Acronym	Name	Year of creation
Public institutions		
ACIPOL	Police Academy	1999
AM	Military Academy	2003
ESCN	Higher School of Nautical Sciences	2004
ISCISA	Higher Institute of Heath Sciences	2003
ISRI	Higher Institute of International Relations	1986
UEM	Eduardo Mondlane University	1962
UP	Pedagogic University	1985
ISCAM	Higher Institute of Accounting and Audit of Mozambique	2005
ISPG	Higher Polytechnic Institute of Gaza (Agrarian)	2005
ISPM	Higher Polytechnic Institute of Manica (Agrarian)	2005
ISPT	Higher Polytechnic Institute of Tete (Mining)	2005
Private institutions		
ISCTEM	Higher Institute of Science and Technology of Mozambique	1996
ISPU	Higher Polytechnic Institute and University	1995
ISUTC	Higher Institute of Transport and Communications	1999
UCM	Catholic University of Mozambique	1995
UDM	Technical University of Mozambique	2002
UMMB	Mussa Bin Bique University	1998
USTM	St. Thomas University of Mozambique	2004
UJPM	Jean Piaget University of Mozambique	2004
ISET	Higher Institute of Education and Technology	2005
ISC	Christian Higher Institute	2005
ESEG	Higher School of Economy and Management	2005
ISFIG	Higher Institute for Training, Investigation and Science	2005

Source: Langa (2006)

References

APC (Association for Progressive Communications). (n.d.) African Internet connectivity home page, Mozambican national profile. [Online]. Available: http://www2.sn.apc.org/africa/countdet.CFM?countriesISO_Code=MZ

Balancingact-Africa.com (2007) *Mozambique country profile.* [Online]. Available: http://www.balancingact-africa.com/country_profile.php?id=54 [2007, March 15].

Beverwijk, R.M.J. (2005) *The genesis of a system: Coalition formation in Mozambican higher education, 1993–2003.* [Online]. Available: http://doc.utwente.nl/50757/ [2007, February 28].

Brito, L. (2003) The Mozambique experience: Initiating and sustaining tertiary education reform. A case study prepared for a regional training conference, Improving Tertiary Education in sub-Saharan Africa: Things That Work, Accra, Ghana, 23–25 September.

CIA (Central Intelligence Agency) (2005) *World Factbook.* [Online]. Available: http://www.indexmundi.com/pt/mocambique/numero_de_usuarios_do_internet.html [2007, March 17].

EDM (Electricidade de Moçambique) Planning Office (n.d.) *Electrical power produced by EDM by region.* [Online]. Available: http://www.ine.gov.mz/Ingles/sectorias_dir/energia

Greenberg, A. (2006) *A country ICT survey for Mozambique.* [Online]. Available: http://www.sida.se/shared/jsp/download.jsp?f=SIDA2608en_ICT+Moz+2006+web.pdf&a=2742 [2007, February 28].

Hanlon, J. (2004) *Mozambique political process bulletin.* European Parliamentarians for Africa. [Online] Available: http://www.open.ac.uk/technology/mozambique/pics/d53725.doc and http://www.worldbank.org/afr/teia/conf_0903/lidia_brito.pdf

ICT4Africa (n.d.) *Country report.* [Online]. Available: http://www.isctem.com/

Instituto Nacional de Estatística (2007) [Online]. Available: www.ine.gov.mz [2007, March 18].

Ismail, M. (2001) Mozambique e-ready? Unpublished report. Information Technologies Group.

Jensen, M. (2001) *African Internet connectivity.* [Online]. Available: http://www3.sn.apc.org/africa/afrmain.htm#six [2007, March 10].

JSAN-PRSP (2006) *Poverty Reduction Strategy Paper – Joint Staff Advisory Note.* [Online]. Available: http://siteresources.worldbank.org/INTPRS1/Resources/Mozambique_JSAN-PRSP(Nov14-2006).pdf

Langa, P. (2006) The constitution of the field of higher education in Mozambique. Master's dissertation, University of Cape Town.

Lopes, A.J. (1998) The language situation in Mozambique. *Journal of Multilingual and Multicultural Development,* 19(5/6): 440–486.

Macome, E. (2002) The dynamics of the adoption and use of ICT-based initiatives for development: Results of a field study in Mozambique. Doctoral dissertation, University of Pretoria. [Online]. Available: http://upetd.up.ac.za/thesis/available/etd-02192003-161649/ [2007, March 18].

Maganlal, K. (2007) *ICT4Africa/Country Report Mozambique.* [Online]. Available: http://www.wikieducator.org/ICT4Africa/Country_Report_Mozambique#ENABLING_AND_CONSTRAINING_FACTORS. [2007, March 18].

Manhiça, S. et al. (2006) *IST Africa: Comparative report, 2005.* International Information Management Corporation. [Online]. Available: http://www.ist-africa.org/2005/files/ISTAfrica_ComparativeReport_v1.0.pdf. [2007, March 18].

Mário, M., Fry, P. & Chilundo, A. (2003) *Higher education in Mozambique: A case study.* Oxford: James Currey.

MESTC (Ministério de Ciências e Tecnologia de Moçambique) (2003) *Indicadores de Ciência e Tecnologia.* Maputo: Republic of Mozambique.

Muianga, X. (2005) Blended online and face-to-face learning: A pilot project in the Faculty of Education, Eduardo Mondlane University. *International Journal of Education and Development using ICT,* 1(2). [Online]. Available: http://ijedict.dec.uwi.edu/viewarticle.php?id=85&layout=html [2007, March 19].

Republic of Mozambique (2002) *Estratégia de implementação da política de informática: Rumo a sociedade global de informação.* Maputo: ICT Policy Commission.

Republic of Mozambique (2005) *Review of the economic and social plan of 2004.* PRSP. [Online]. Available: http://siteresources.worldbank.org/INTPRS1/Resources/Mozambique_APR2-PRSP.pdf [2007, February 28].

Republic of Mozambique (n.d.) *Information and communication technology policy implementation strategy: Toward the global information society.* [Online]. Available: http://www.infopol.gov.mz/pdf/estrg_eng.pdf

SCAN-ICT (2002) *Final report.* [Online]. Available: http://www.uneca.org/aisi/ScanGhana/Documents/3.%20SCAN%20ICT%20MOZAMBIQUE.pdf. [2007, March 18].

Sotomane, C. (2005) *MICTI E-learning Centre: Progress report.* Centro de Informática, Universidade Eduardo Mondlane, Maputo. [Online]. Available: http://www.spidercenter.org/upl/filer/516.pdf. [2007, March 16].

TFHE (Task Force on Higher Education and Society) (2000) *Higher education in developing countries: Peril and promise.* Washington DC: World Bank.

UNESCO (United Nations Educational, Scientific and Cultural Organisation) (2002) *Mozambican president opens new community multimedia centre in Chokwe.* [Online]. Available: http://portal.unesco.org/ci/en/ev.php-URL_ID=19209&URL_DO=DO_TOPIC&URL_SECTION=201.html [2007, March 17].

World Bank (n.d.) *ICT at a glance, Mozambique.* [Online]. Available: http://devdata.worldbank.org/ict/moz_ict.pdf