

ICT4D: Challenges & Opportunities in Zambia

John Munsaka

COMDEV / JSM Business Consultants

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Country Research Partner:

John Slaughter Munsaka

JSM Business Consultants, COMDEV

Tel: +260 966 752507/ E-mail: jmunksaka@zamnet.zm/ jmunksaka_20@yahoo.co.uk

Project Coordination:

David Barnard

Southern African NGO Network (SANGONeT)

Tel: +27 11 403 4935 / E-mail: dbarnard@sangonet.org.za

Editing and Research Coordination:

Tina James

icteum consulting

Tel: +27 12 346 8264 / E-mail: tjames@intekom.co.za

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FOREWORD

The utilisation of ICTs has been a major government concern in Zambia and the Government fully appreciates and recognises the role that ICTs can play in national development. The Government of the Republic of Zambia, through the line Ministry of Transport and communication, is therefore determined to fully utilise ICTs in the social and as well as economic sectors of development.

The implementation of ICTs has never been, and will continue not to be, an easy task without the involvement of all key stakeholders - from the individual user, the Government, market players and those that are charged with regulating such services. ***However it is not as complicated as rocket science.*** There are challenges and opportunities that need to be understood by all. These should then be carefully tackled to get a lasting solution for the benefit of all players such that there is a win-win situation for stakeholders.

This research attempts to highlight some of the major challenges being faced by stakeholders and it also looks at available opportunities. It is therefore open to stakeholders to identify their respective roles such that the country can embark on a path to use ICTs as an enabler for both social and economic development in Zambia.

This research is a starting point on ways and means of utilising the full potential of ICT for the Republic of Zambia. The Government of Zambia is a willing participant and indeed partner in the implementation process of what has been identified in this research.

More issues will be identified and the researcher should be able to include these as time goes by, such that a fully annotated report is availed to the Zambia people

The Government of Zambia, through the Ministry of Communication and Transport, has a pivotal role to play in spearheading the utilisation of ICTs for Development (ICT4D) in this country and it will do its utmost to ensure that these recommendations are carried through. As highlighted in the report, collaborative efforts will be required to fulfill the potential outlined in this research.

Hon G Lungwangwa, MP, PhD

Minister of Transport and Communication

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In the first instance I would like to thank all those who actively participated in the research process in various ways - by answering questions on the questionnaire, having direct talks with me or through active participation in the online discussions.

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My thanks go to the Ministry of transport and Communication for the various forms of assistance that they gave me on the status of ICTs in Zambia. The same applies to the Communication Authority of Zambia and various market players in Zambia.

I would like to pay special thanks to Tina James for her editing efforts, and Murali Shanmugavelan at the PANOS Institute (London) for his input into the report.

I would be failing if I did not make special mention of SANGONeT (through David Bernard) for this initiative that allowed my country Zambia to be part of a process that will achieve regional collaboration in such matters as ICT4D, which are cardinal for developmental efforts in the region. This project comes at a crucial time for Zambia as it is about to legislate the ICT Bill which will, in the final analysis, change the way ICT is used and perceived in Zambia.

I would like to thank my family for their support during the process of carrying out the assignment.

Finally, special thanks go to the sponsors of the project, the Open Society Initiative for Southern Africa (OSISA) and the Embassy of Finland in South Africa for their financial support of the research, this publication and indeed the launch of this report.

John Slaughte Munsaka

ICT and Business Management Consultant
Lusaka, Zambia

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ACRONYMS

CAZ	Communications Authority of Zambia
CBU	Copperbelt University
CEC	Copperbelt Energy Corporation
CEEC	Citizens Economic Empowerment Commission
COMDEV	Communication Development Institute
CSZ	Computer Society of Zambia
CTO	Commonwealth Telecommunication Organization
DOPE	Development Organization for People Empowerment
ESNet	Educational Support Network Project
GSM	Global Systems for Mobile Communication
ICTs	Information and Communication Technologies
ICT4D	ICTs for Development
IICD	International Institute for Communication Development
ISP	Internet Service Provider
ISPAZ	Internet t Service Providers Association of Zambia
MCT	Multipurpose Community Telecentres
MCT	Ministry of Communication and Transport
MDG	Millennium Development Goals
NGOCC	Non Governmental Organization Coordination Committee
PPPs	Public-Private Partnerships
PSTN	Public Switched Telecommunication Network
SMS	Short Messaging System
UNZA	University of Zambia
ZAMTEL	Zambia Telecommunication Company Ltd
ZAOU	Zambian Open University
ZESCO	Zambia Electricity Supply Corporation
ZNBC	Zambia National Broadcasting Corporation
ZNFU	Zambia National Farmers Union

EXECUTIVE SUMMARY

Information and Communications Technology for Development (ICT4D) has become a truly global undertaking, bringing together north and south, rich and not so rich (poor), those who live in urban areas as well as those who live in rural environments. It has also brought together researchers and ICT practitioners, technologists and social scientists to strive and work towards a better life for the least privileged.

On a planet where there are well over one billion users of the internet, there are still more than one billion people living on a dollar a day. The same technology that has transformed the lives of the privileged has remained out of reach and irrelevant for those who are less privileged.

In a typical rural economy on the African continent, most of the focus is on basic requirements for living such as clean drinking water, basic health systems and improved education systems. While there are many ways of communication using traditional media such as radio and newspapers in local languages, newer technologies such as computers and the internet are finding their way into people's homes and community-based centres at a very slow pace.

ICT4D involves multiple sectors - government, academia, small, medium and micro-enterprises, large corporates and NGOs - and draws interest from multiple disciplines that include the likes of anthropology, political science, sociology, economics, engineering design and computer science to name but a few. As with many multidisciplinary fields the boundaries are amorphous and the goals are many, but there is need to identify core components that define the field.

This research looks at various aspects that can bring about an impact on development using the appropriate application of ICT to accelerate or even jumpstart progress. ICTs on their own are not a panacea for economic problems but once properly harnessed and used can easily enhance developmental efforts.

Chapter 1 introduces aspects required to attain development using various attributes of ICT that include human resources as well as technology. It also addresses the trends in implementation, from the focus on ICT access issues to the adoption of appropriate technologies for development for all market segments. The inclusion of society, in its broadest sense, in deploying ICT as a true tool for enhanced development is also presented, as is the role ICT will play as a crosscutting tool for the attainment of the United Nations' Millennium Development Goals (MDGs). This is followed by a scan of the current ICT environment in Zambia, including the work done thus far on the ICT policy and whether it addresses ICT4D. ICT indicators for the country show that, while strides have been made in the mobile sector, growth in the fixed line market has stagnated and broader internet access has not been achieved.

Barriers that are currently affecting the uptake and use of the internet are addressed. These range from the high costs associated with the provision of broadband through satellite and fibre-optic cable, taking into account that the country is landlocked and will have to depend on other countries to provide broadband through fibre.

The current regulatory regime and the barriers that market players face are assessed, including their impact on the growth of the sector. A key issue in infrastructure development is the lack of collaboration between key market players, the result being the development of a national fibre backbone by three different players. Further, the lack of collaboration by the two state-owned institutions is a major concern for both service providers and ICT practitioners.

The role of the Non Government Organisations Coordination Committee (NGOCC) and other advocacy groups is discussed. While it is noted that the NGOCC has largely focused its attention on political and poverty reduction issues, a few interest groups such as eBRAIN and PANOS Southern Africa, have taken ICT issues on board. The Computer Society of Zambia has also played a key role in advocacy, although its role has been mainly through professional gatherings. The NGOCC has influence and this influence could attain similar results if ICT-related issues were added to their agenda. There is need for collaboration between all advocacy agencies with NGOCC taking the lead role.

Access and usage of ICT is a critical issue requiring attention, particularly since access is limited to the rail and major road networks corridors, leaving much of the country underserved. ICT usage does not necessarily lead to an improvement in livelihoods and specific attention is needed to ensure that efforts are focused on the application of ICT4D in areas that will have an impact on people's lives.

Chapter 2 presents the methodology which was used to draw conclusions for this study. About 15 face-to-face interviews were conducted, in addition to a questionnaire survey which was sent to 10 key market players, both end-users and service providers. Online debates were conducted with interest groups such as eBRAIN and the Computer Society of Zambia. Over 40 participant responses were analysed. Interviews were carried out in Southern, Northern and Western Lusaka, as well as in the Copperbelt, where interviews were held with ICT consumers in areas such as health, education, business, agriculture and broadcasting as well with ICT service providers. Interviews and discussions were also held with government end-users and ICT professionals in government agencies.

Chapter 3 presents the research findings as drawn from various sectors such as infrastructure, agriculture, education and health. End-user experiences of ICTs are also reflected.

Chapter 4 provides an overview of the challenges, as perceived by a range of key stakeholders, which extend from competitive markets to the costs they incur for bringing such services to market. Other issues include: the high costs of access and equipment; the capacity to take ICT to target markets; the erratic or non-existent power supply in some parts of the country; and the high cost of alternative energy sources which particularly affects the less privileged.

Chapter 5 presents the opportunities, priorities and possible actions that exist for the enhanced use of ICT4D, as identified by business, civil society and ICT service providers. These include a wide range of actions, from the deployment of appropriate technologies for selected market segments to the need for consolidated efforts in partnering between government and the private sector. Recommendations that are made take into account the actions that have been identified as well as existing opportunities. Without synergy between all stakeholders not much can be achieved to attain the full potential of ICT4D in the country as well as the region. Strategies and time frames have to be agreed by all in order to achieve the desired results.

The Appendices include a list of available literature, a list of respondents who were consulted during the course of this research study, and the questionnaire which was distributed in paper or electronic format and which was used in the interviews and discussions. In addition, *Appendix 5* presents seven examples of ICT projects currently ongoing in Zambia. A timeline for communications progress (*Appendix 6*) provides a snapshot of Zambia's development since 1994.

1. ASSESSMENT AND ANALYSIS OF ICT4D IN ZAMBIA

1.1 INTRODUCTION

The role of Information and Communication Technologies (ICT) in human development has received growing attention among development practitioners, policy makers, government and civil society in recent years. This has been attributed to the growing proliferation of the internet, convergence in IT and telecommunications technologies and increasingly the globalisation of society. While the issues of access and adoption of new technological trends in ICT have tended to focus on themes such as empowerment and the developmental potential of ICT, it has raised the issue of digital divide and the challenges for developing countries to participate in the global information society.

The goals of many ICT policies in developing countries have until recently focused on access. This has however changed and there is now a growing movement towards social inclusion and an emphasis on developing human resource capacity.

ICT for Development (ICT4D) is therefore characterised by a range of human, infrastructural, institutional and technological challenges which are determined by the socio-economic context in which ICTs are introduced. The extent to which ICT-enabled projects are successful often depends on people behave - either as conduits or as obstructive agents of change. This is important to understand in the ICT tripartite relationship between Information, Communication and Technology. Technology has usually overshadowed the other two as it deals with infrastructure, connectivity, networks and equipment. It is understood that technology plays an integral role in ICT4D, but should not be mistaken as a panacea but rather an enabler. The human factor which involves the participation of people and their motivation to adopt ICT-enabled development is still fundamental.

ICT has to be a priority if developing countries are to achieve developmental goals, such as the UN Millennium Development Goals (MDGs). ICTs play a crosscutting role in developmental issues and only once they are included in the broader national development goals, will countries attain their broader goals. To achieve the necessary impact, the emphasis has to be on development, with ICT as one of many enablers.

1.2 NATIONAL CONTEXT FOR ICT4D

The Government of the Republic of Zambia has set development priorities in the National Development Plan for the period 2008 to 2012. These include education, agriculture (food security), wealth creation and the elimination of pandemics such as HIV/AIDS and malaria.

While there is no direct integration of ICT in these areas it is at least mentioned, unlike previous plans where there was no reference at all to ICTs. This is no different from other countries in the region with similar economic and social scenarios. The difference will however arise when one looks at the ICT and national indicators and the priority areas the country has identified that will improve the livelihoods of its citizens.

Table 1. ICT Indicators for Zambia

ICT Indicators	2004	2005	2006	2007	2008 ¹
Mobile Subscribers	413,129	949,558	1,663,051	2,639,026	3,200,000
Fixed line subscribers	86,000	94,665	93,427	91,789	90,951
Mobile teledensity (%)	3.725	8.299	14.369	22.539	-
Fixed teledensity (%)	0.818	0.827	0.807	0.784	-
Internet subscribers	16,288	10,882	11,996	17,946	18,078
Internet teledensity	0.147	0.095	0.104	0.144	-
Internet users ²	-	-	54,000	500,000	-
Cybercafés and telecentres ³	-	-	500	700	-

Source: Communications Authority of Zambia;
RIA! : Telecommunications Performance indicators, 2007

Table 2. ICT Players in Zambia

ICT Players in Zambia			
Mobile operators	Zain	MTN	CelZ
(subscribers per operator)	2,600,00	800,000	170,000
Fixed line operator	ZAMTEL		
Internet Service Providers (ISPs)	Zamnet, ZAMTEL, Microlink, AfriConnect, UUNet, Coppernet, Pronet, Zain, MTN		
Large ISPs	Zamnet, ZAMTEL Online, Coppernet, AfriConnect		

Source: Communications Authority of Zambia;
RIA! : Telecommunications Performance indicators, 2007

From the data presented above it is quite clear that internet penetration is low, while that of mobile telephony has risen dramatically since its introduction. The current mobile penetration is however still very low and could be improved.

¹ The 2008 statistics reflect data from the Communications Authority of Zambia for the first quarter of 2008.

² The jump in internet users could be attributed to the increase in the number of cybercafés as well the reduction in the cost of access. The other attribute could be the use of such services by students in the increased number of colleges that have mushroomed across the country.

³ Most telecentres have not renewed their licenses and are now operating as cybercafés that do not require licenses to operate; there is little difference between the two types of ICT access points.

1.3 THE POLICY AND REGULATORY LANDSCAPE SUPPORTING ICT4D

1.3.1 ICT POLICY

The Zambian ICT Policy was formulated and developed from 2001 till 2004, finalised in 2005 and only launched by Government in 2006. Civil society and academia were extensively involved during the policy formulation process, but have not been contacted to participate in the implementation process thus far.

While it is agreed that the Government has done some work in getting the process underway, it is very clear that the pace of doing so is very slow and there has been no engagement with the private sector in the implementation process - the sooner they are engaged, the better for all players in the market.

The content of the policy at the time of formulation and launching is quite clear in its intent. However, due to the time that has elapsed since the policy was drafted and its launch a year later, a number of issues require urgent attention as they have been overtaken by technological advancements and the strategies set up at the time. These will need to be revised and possibly rewritten before the implementation process can commence. This will require a thorough review of the policies, strategies and objectives now in place to assess which are still applicable and which need to be changed. One specific issue relates to the role of mobile telephony; for example, telecentres will need to be redesigned in line with the possibilities presented by rapidly changing applications in the mobile arena.

The regulatory regime is supportive of ICT4D. Markets have been opened and the regulator has been working with players and consumers to improve service delivery and gain critical mass so that ICT can play a more defined role in the development of the country. License fees have been reduced to allow more market players into the sector, a decision taken after reviewing the low ICT indicators in the country.

However, the perception from market players is that the regulatory authority may not have the power to deal with technological issues e.g. the international gateway and Voice over Internet Telephony (VOIP), as it should. The lack of technology neutrality has been identified as an area of weakness by the private sector and has been brought to the attention of the regulator. However, the regulator is perceived as protecting the profitability of ZAMTEL, the sole state-owned operator. A lobbying action is underway through a combined effort of the GSM association of Zambia (GSMA) and the Internet Service Providers Association of Zambia (ISPAZ) to address some of the issues that have been raised regarding the liberalisation of the International gateway and the neutrality in the deploying of new technologies as they are released on markets.

1.3.2 STRATEGIES AND IMPLEMENTATION PLANS

The Zambia ICT Policy identified thirteen pillars of activity as outlined in **Table 3** below. Each pillar has a policy goal, commitments from stakeholders, objectives and implementation strategies.

Table 3: Thirteen Pillars in the ICT Policy

Pillar	Objectives
Human Resource Development	To attain sufficient and world-class human resource capacity in critical and relevant ICT skills required for developing and driving Zambia’s Information and knowledge based society
Agriculture	To improve productivity as well as competitiveness of the agricultural sector through the use of ICT in planning, implementation and monitoring and the information delivery process
Education	To integrate ICTs in the education systems and develop the nations’ research and development (R&D) capacity to support, facilitate and contribute to the development of key sectors of the economy including the development of appropriate local ICT products and services
Health	To improve access to quality healthcare as close to the family as possible through the deployment and exploitation of ICTs and other modern and relevant technologies
Youth and Women	To use ICT as an instrument to mainstream youth and women issues in all activities of the economy and society as well as empower youths and women through opportunities created by the implementation of ICT projects and programmes in the country
Tourism	To integrate ICTs in the development of the tourism industry and facilitate the conservation of Zambia’s natural resources and heritage as well as protect the environment
Telecommunication Infrastructure	To increase access and promote widespread deployment of ICT services through the expansion of the national telecommunication backbone covering the whole country
e-Government	To improve public sector management as well as efficient and effective delivery of public goods and services through the implementation of e-Government systems
e-Commerce	To promote Zambia’s full and effective participation in national, regional and global trade through e-Commerce services and facilities
Legal and Regulatory Framework	To develop appropriate institutional, legal and regulatory systems in order to support the development of a competitive local ICT sector based on convergence principles: supported by fair, predictable, and transparent legal and regulatory frameworks
Security in Information Society	To safeguard national, institutional and individual security concerns to support the development, deployment and effective use of ICT within the Zambian economy and society at large
Access Media, Content and Culture Heritage	To promote public access to information through appropriate traditional and new technology solutions based on relevant local content while promoting cultural heritage
ICT Services	To develop a competitive local ICT industry supported by a clear policy roadmap: fair and transparent regulatory framework and pro-investor market conditions resulting in the effective participation of the private sector in value-adding, export-oriented services: serving as the main engine for accelerating the development of the local economy

Five areas were prioritised as ones that could have an impact on society and ICT4D - these form the focus of this document:

- Human capacity development
- Agriculture
- Education
- Health
- ICT Services.

This was done after consultations with key stakeholders and decision makers in government, the private sector and civil society. In each of the pillars key activities have been elaborated. The process of identifying stakeholders who will take part in the implementation process is being carried out by the Ministry of Transport and Communication. While it is understood that the process is in place, the pace is not acceptable.

1.3.3 ICT INFRASTRUCTURE

Zambia has moved from a monopolistic telecommunications regime to a liberalised market which has allowed the entry of interested investors and increased competition in the market. This has resulted in very rapid deployment of the mobile service infrastructure with most players covering large parts of the country.⁴ This has occurred despite erratic power supply and a reliance on alternative energy sources such as fuel-powered generators and solar panels.

Growth in the fixed line sector has however been slow. The deployment of fixed lines still remains in the hands of the incumbent telecommunications operator ZAMTEL. There are plans to open up the fixed line market by 2010. How this will be attained is still under discussion within government.

Efforts are underway to establish a national fibre-backbone network. One of the key players, the Copperbelt Energy Company (CEC), which is based in the Copperbelt Province, has a fibre network that covers the entire province. The major power utility, Zambia Electricity Supply Company (ZESCO), has installed fibre-optic cable along the power grid and installed fibre along newly developed lines, as shown in **Figure 2** below. ZESCO has plans to extend the network along the power network; however, there are still areas without electricity and these will not be included in the fibre network. ZAMTEL has also embarked on installing a national fibre-optic network and there are ongoing works in most parts of the country.

Unfortunately the areas that are covered are mainly those that run along the railway lines and areas with heavy industrial activity. The country is still not covered entirely and the rollout is being phased. Rollout has been unacceptably slow.

⁴ Zain covers the entire country while MTN covers at least 70 % and the third player, CelZ, a wholly owned subsidiary of ZAMTEL, covers about 57%.

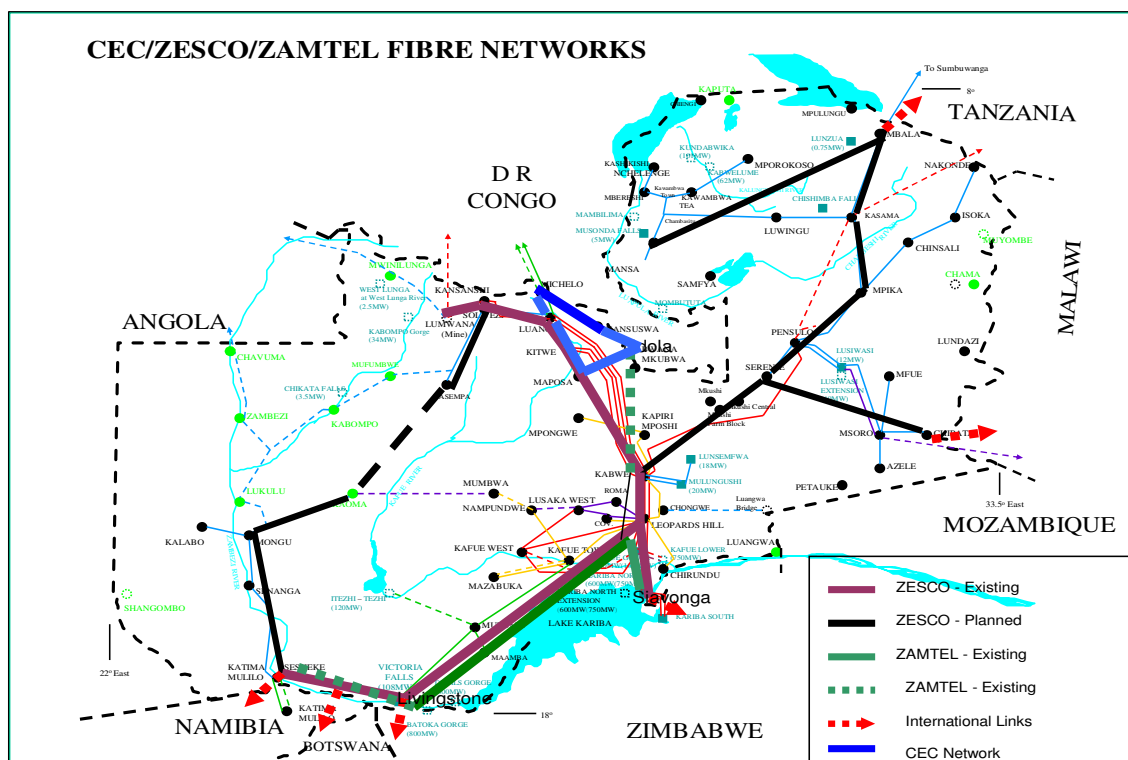


Figure 2. Fibre-optic networks in Zambia

While the ZESCO network includes border posts such as Kazungula (Angola) and Kariba (Zimbabwe), there is no mention of connectivity to the submarine cable networks on the Atlantic (SAT-3) and Indian Oceans (EASSy) (**Figure 3** below).

ZAMTEL is a signatory to the EASSy project, but progress on the project has been slow and the ownership debate has not been resolved in terms of whether ZAMTEL will own the line or whether they are acting on behalf of Government on the NEPAD-driven project.

ZAMTEL, in partnership with a foreign investor, has plans for its fibre network to cover the whole country, a project to be completed in the next five years. Market analysts have questioned why ZAMTEL and ZESCO, both parastatals, have been unable to collaborate with likely cost savings. To date no responses have been forthcoming from Government.

On the internet front, most operators purchase bandwidth from their preferred satellite suppliers. Terrestrial networks are then used to deliver services to their clients. There has been a recent increase in the deployment of VSAT links in most remote areas.

Most of the new technologies deployed on international markets such as WiFi and WIMAX are now deployed in Zambia. The international Gateway (IG) for the moment remains in the hands of ZAMTEL. However plans are underway to liberalise it in the very near future.

1.3.4 ICT ACCESS AND USE

The global definition of ICT includes a mix of old and new media - fixed-line and mobile telephony, fax machines, postal services, computers, printed and online digital media and access to the internet. While the tradition of having individual post office boxes has been overtaken by the use of email, the postal service still remains the means of maintaining contact in the remote parts of the country where the reach of emerging technologies has not yet taken its grip. In rural and underserved areas the post office is still very much in use by all generations, young and old.

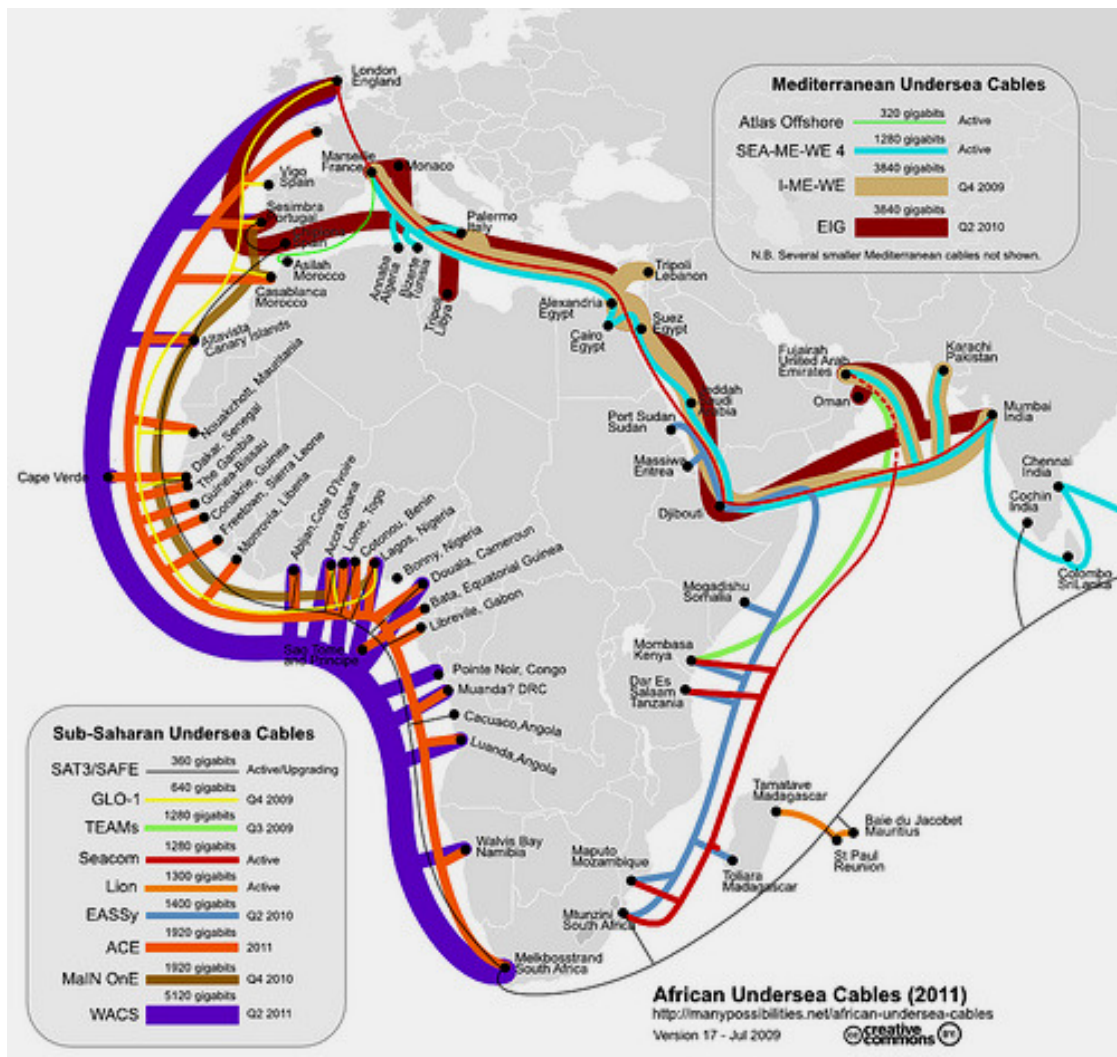


Figure 3. African Undersea cables⁵

There are about 25 several community radio stations across the country, most of which offer services in local languages. Most cover only a province while some are restricted to a particular district. The regulatory framework for community radio is very open as long as required procedures

⁵ <http://manypossibilities.net/african-undersea-cables/>

are followed for obtaining a license. However, there have been cases where the government has threatened to close stations which broadcast negative information about the incumbent government. There have been two cases where radio producers were arrested for this reason.

Most citizens in urban and peri-urban areas have access to newspapers, although the rainy season can cause delays in delivery. Newspapers are still the main source of information for most people.

Digital media such as CD-ROMS and flash drives are used largely by learning institutions and research centres, with flash drives becoming the preferred means of data storage.

Mobile telephony is easily accessible to the majority of the country and estimates are that about 25% of the population has mobile access, with penetration rapidly increasing. The use of mobile internet is gaining momentum although this is restricted to receiving email rather than browsing as costs are relatively high when one compares with the rates that are charged for dial up access, still the cheapest internet service on offer. There have been developments where operators have introduced hand-held gadgets such as Blackberry's to offer a wider range of mobile internet services.

PC penetration is low, as evidenced from the ICT indicators listed in **Table 1** above.

In most local communities, telecentres and internet cafés have become the key means for public ICT access. Those who cannot afford to buy ICT access for their personal use can do so by buying such services, through membership fees at a telecentre, or by using internet access in the work environment. Online material is largely accessed by those who have internet connectivity through their mobiles or computers.

Telecentres worldwide offer a similar range of services - photocopying, telephone calls, faxes, word processing, document management, internet and email access. The telephone has proved the most popular service while internet and email are the least in demand.

The telecentre concept has been implemented across many countries, with varying results. In Zambia, most telecentres are privately owned or are operated by NGOs supported by donor funding. Most started as projects which, when they ended, were used for income generation by beneficiaries.

The government has not shown any initiative to establish such telecentres and there is no evidence of this changing in the near future. The government has however set up an empowerment facility where citizens may borrow money for such ventures.

The telecentre movement faces many challenges:

- Policies tend to take long to implement so that by the time they are put in place a number of issues have been overtaken by events;
- The lack of human resource capacity to operate telecentres as profitable businesses is another issue and a significant effort is needed in capacity building if real value is to be gained from the installed infrastructure. This should include capacity building for sourcing funds to extend their infrastructure;

- Few telecentre managers know how to write bankable business plans, thus making it difficult for them to prepare viable documentation to apply for funding. With the advent of the Citizens Economic Empowerment Commission (CEEC), this will have to be addressed.
- High ICT access costs for end users at telecentres also present a challenge;
- Technical skills have to be developed so that telecentre managers can deal with first-line technical problems.
- The lack of available infrastructure in the rural areas continues to be a major challenge.

One possible sustainable model is that of Macha Works (See **Appendix 4**) which could be adopted in most rural areas of Zambia.

1.3.5 NATIONAL ADVOCACY INITIATIVES

While the government has made some effort in sensitising people to ICTs, this has been largely a once-off intervention during the policy formulation process. Since that time there has been no visible effort to reach out to the people. Hopefully these efforts will be intensified when the implementation process begins.

Most ICT advocacy efforts have focused on raising ICT awareness and have been undertaken by the private sector, NGOs and Fora such as eBRAIN (an ICT advocacy forum), the Computer Society of Zambia, and the Media and ICT's Network Development (MIND). These have had some impact in that the government and the regulator have taken action to reduce taxes and duties on telecommunications equipment. This has not however resulted in an obvious increase in ICT penetration and this effort has mainly assisted the market players rather than the underserved people who are still not benefiting from what ICT has to offer. One of the reasons for this is the high cost of peripherals and high access rates.

The Computer Society of Zambia has assisted the government in developing guidelines for ICT roll out, both at the policy and application levels. They also assisted in drafting the Computer Fraud Act of 2007. As in the case of eBRAIN, the positive impact has largely been on the business sector and not necessarily the underprivileged.

MIND, a media interest group, has been active in ICT advocacy through projects where ICTs were used on a pilot basis. They have used media reporting to raise awareness of these experiences and their impacts, one such case being the cost-savings associated with the setting up of the Zambian Internet exchange (XIP) point for local ISPs. MIND has not been very active recently, but efforts are underway to collaborate with eBRAIN and the Computer Society of Zambia.

There is no NGO within the framework of NGOCC, the National NGO Coordination Committee, which has an ICT focus. NGOCC's energies are largely geared towards gender issues, women empowerment and political activities. However, NGOCC could play a key role in ICT4D advocacy, given its target audience of women and youth. This could be a possible action for future follow-up.

Box 2: NGO Experiences in Zambia – What Has Worked

Use Volunteers: volunteerism works well for a country such as Zambia. It reduces labour costs and provides opportunities for those with no experience as well as for professionals. Most volunteers are either currently employed or are retirees who wish to benefit others.

Start small: community projects should be focused and serve the specific needs of the community. For most projects it is better to start small and use the positive outcomes to attract attention and possibly more funding. Small projects are more manageable and failures can be contained better to avoid negative impacts, if any.

Create multi-stakeholder partnerships: such partnerships, for example in training and awareness-raising, will contribute more towards development than one in which a funder allows an entrepreneur take over the operations once the business stabilises. The Kwacha women's clubs in Macha are a good example.

Focus on community-specific problems and solutions: implementation should take place at the village level and through learning by doing. Training should combine traditional and new methods and should use a bilingual approach (local language and English). This has been successfully applied in educating mothers on childcare.

Charge a nominal fee for usage: Find funding for the initial costs of ICT equipment and then sustain operations through charging a nominal fee to cover power, rental costs and other sundries. This is being pioneered by PANOS in two remote sites - Itezhi Tezhi (Southern Province) and Kasempa (North Western Province). Initial capital for start-up equipment is being provided. Ownership of the centres will then be transferred to local communities to allow them to grow the business. .

Box 2 (contd): NGO Experiences in Zambia – What Has Failed

Large computer labs: such facilities are expensive to set up and maintain, leading to high maintenance costs and sustainability problems. For example, through funding aid from the British Government, a number of schools have received computers. However no attention was paid to maintenance aspects and the lack of skills to provide technical support has resulted in unused and non-functioning equipment.

Top-down, centralised project management: top-down approaches have not been successful in determining the real needs of communities.

Providing information, training, and awareness only in the English language: Most rural communities do not speak English or do not have a good enough grasp of English to understand what is being communicated. It is advisable to have information translated into local languages spoken in such areas. The impact of using Swahili in East Africa has assisted in contributing to more successful development projects.

2. METHODOLOGY

The methodology adopted for this study included a review of existing literature available in the country, based on previous work done by the author and other researchers.

About 40 Interviews were conducted with key players from selected provinces in the country:

- Lusaka key players from the private sector, state-owned entities, donor agencies and government ministries;
- Copperbelt Province - Copperbelt Energy, ZAMTEL, ZAMPOST and ICT end-users in corporate, community-based centres as well as selected individuals;
- Southern Province – small-scale farmers, teachers, nurses and some small business owners; and
- Northern, Western and Eastern Provinces - ICT end-users in health, agriculture, education, and radio operators. The groups were from both the private and public sectors.

In some cases, a questionnaire (**Appendix 2**) was sent by fax or email to potential recipients and responses were received by the same means. There was minimal use of phones except for follow-up purposes.

Discussions were held with key stakeholders to test their perceptions on the status of ICT4D and what could possibly be done to improve awareness and establish ICT as a real tool for enhanced development.

Online debates were also used to obtain cross-sectoral inputs on contentious issues such as the Draft ICT bill which came before Parliament in August 2009. The ICT Bill has since been passed after intensive consultation between government and key stakeholders at a round table conference in June in Lusaka.

Interviewees were drawn from various sectors: - agriculture, education, health and infrastructure. There were also other general users who were interviewed in the process. A breakdown of participants is given in **Appendix 3**.

3. KEY FINDINGS

The research findings are presented according to the priority areas of focus: the existing ICT policy and regulatory framework; ICT infrastructure; and ICT access and use. Specific responses on the challenges and opportunities identified by research respondents are discussed in detail in **Chapters 4 and 5**.

3.1 POLICY AND REGULATORY FRAMEWORK

ICT POLICY

The ICT policy which was launched by the government in 2006 has yet to be implemented. The implementation process, still in progress, is taking too long to come to fruition. This will lead to the need for constant reviewing of the existing draft policy as rapid technological advances overtake the pace at which the policy is implemented. This could have been avoided had the implementation process been initiated soon after its launch.

ICT IMPLEMENTATION STRATEGIES

The policy that was put in place has implementation strategies for each area of focus and these were developed in consultation with relevant stakeholders. A key issue has been the creation of a universal access fund, developed in collaboration with the International Telecommunication Institute (ITU) and commercial service providers who will be contributing to the fund. This fund was to have been launched in 2009.

Some line ministries such as agriculture, education and health do have strategies and policies on ICT but these have not been implemented and may therefore be overtaken by technological developments.

3.2 ICT INFRASTRUCTURE

SUBMARINE CABLE NETWORKS

Zambia is a landlocked country and has no direct access to either of the submarine cables along the African coastlines. Access can only be gained via neighbouring countries. Zambia is a signatory to the EASSy project in East Africa through ZAMTEL. It is unclear whether ZAMTEL will act on behalf of Zambia or only in their own interests with on-selling capacity to other providers. This is an issue of concern to market players and has been taken up by the operators with the line ministry. Recently access to the marine cable SAT3 has been available to Zambian markets and already some ISPs are offering service through fibre-optic access. The roll out of the EASSy project is scheduled for late 2010.

FIXED / MOBILE NETWORKS

Of the three mobile market players, two are privately owned (MTN and Zain) and the third is a subsidiary of ZAMTEL. ZAMTEL remains the sole provider of fixed line services and of the international gateway. Efforts to liberalise the latter have proved too difficult with a prohibitive cost of US\$ 12 million.

INTERNET

There are close to 20 Internet Service Providers (ISPs) offering services that include dial-up, broadband and mobile internet. Although the number of providers has risen in recent years the number of subscribers has not risen to match the number of operators. Most of the service providers offer their services along the rail corridor and the major road networks.

PUBLIC ICT ACCESS POINTS

Access to information is mainly by way of physical means such as libraries, postal communications and print media, with radio and TV being the most popular means. While there have been strides in the mobile arena, internet access is still largely focused in the urban and peri-urban areas, leaving most underserved areas without access points. The deployment of satellite service is one of the most common ways of providing access; however this becomes somewhat difficult, especially in the rainy season, when some roads are impassable. Government is working on the road networks countrywide and this barrier may soon be removed.

3.3 ICT ACCESS AND USE

TRADITIONAL AND NEW MEDIA

Traditional print media such as newspapers are still the most readily accessed, particularly those written in local languages. The use of community radio is also growing in most districts. Email use is active in town centres and suburbs of the larger cities. Due to high costs, mobile phones are limited to corporate users or employees of mobile service providers. The digital divide is illustrated through the use of traditional postal services by rural communities, whereas the use of email is popular among the urbanites.

USE

Literacy levels in the country have improved due to well-designed programmes instituted through the Ministry of Education. Literacy levels have increased from about 45% in the early nineties to around 87% during the last two years. More people are able to read in the local languages, but literacy in English, which is the national official language, needs to be improved across the country. Since most of the literacy centres are open during the day and evenings, they could be a very efficient mechanism to introduce ICT literacy programmes.

The challenge for Zambia, as for many African countries, is to determine how to deal with the priorities of broader developmental issues and to place ICTs in that context so that, first and foremost, ICTs can be used as a tool to support development. This remains a sore point in Zambia.

4. CHALLENGES

There are a number of challenges facing the deployment of ICT4D, with differing perspectives depending on who is facing them - the operators, users, or even the regulatory authorities.

According to a World Bank Survey of 2005⁶, the experience of African Internet Service providers (ISPs) suggests that countries with highly liberalised telecommunications markets had internet access costs eight or more times lower than those with a closed market. The retail segment of the market needs to be liberalised with the non-prohibition of reseller activity, at least when it comes to phones. At the same time, it is worth noting that liberalisation does not always increase household access to telephones (African e-Index study, 2005). A wider policy reform is therefore required, that includes pro-poor ICT policy together with reforms in investment policy, education and special support to ICT provision in rural areas.

4.1 SERVICE PROVIDER CHALLENGES

The biggest challenge faced by service providers is the high cost of broadband, largely due to limited access available through satellite communications, the only means of accessing broadband. The delivery of broadband by providers to other sites is through terrestrial systems owned by party partners, since most service providers do not own their own infrastructure. This increases their costs which are in turn passed onto their clients.

The fibre networks that have been built in the country are owned by third parties and the service providers have to buy space on the cables. The cables are currently owned by CEC on the Copperbelt. ZESCO and ZAMTEL have plans to install nationwide fibre networks at a very high cost, which will result in them on-selling at the same high costs in order to recoup their investments. There may therefore be little financial advantage in opting for the fibre option as compared to using the private satellite networks. Access to the EASSy cable will still require delivery via neighbouring countries which will once again increase the landed cost of the capacity and lead to increased costs for those who will need to buy bandwidth from ZAMTEL.

The market is largely limited to the rail corridor and major road networks, with few or no major markets outside these corridors. Most clients are based in Lusaka and the Copperbelt, as are most industries, with some clients in towns such as Livingstone in the Southern Province. Large-scale farmers are found in areas such as Mkushi and the southern region of Zambia. Tour operators have recently emerged as a potential market but this is still in its infancy.

The regulatory regime has been a major stumbling block, particularly the issue of technology neutrality. The long lag times before certain technologies are allowed e.g. VOIP, have resulted in a stalemate situation. To offer it one has to have a Public Switch Telecommunication Network (PSTN) license which costs about US\$ 12 million. It should be noted that most communication equipment that comes into the country has VOIP capabilities.

⁶ World bank report of 2005 on ICT for the Developing Countries

A second issue is the annual 5% commission operators have to pay to the regulator on their annual gross income, which sometimes overshoots the dividends that shareholders receive. To date there is still no evidence that any of this funding has been released to realise universal access in rural areas. The regulator has indicated that the fund will be implemented in 2009 and tenders have been requested to apply for the fund. How this will be managed remains to be seen.

The third issue that was raised was whether there is enough market demand to warrant the number of service providers currently operating in the country. There are questions about whether the regulator should put a hold on the issuing of licenses. Zambia has more than 20 ISPs, but it is questionable whether there is sufficient market demand to generate profits for themselves as well as shareholders and still be able to provide quality services.

Most of the local service providers do not have the capacity to take up major multimillion dollar projects to roll out infrastructure and are dependent on third party services for such operations. The danger they face is that they may be unable to compete against multinationals such as MTN and Zain. There is pressure on the regulator to protect local companies from hostile take-overs by the multinationals. It is hoped that the lobbying by local operators will result in this being addressed in the new ICT Bill.

The development of a national fibre backbone is underway but the pace is slow and there is little collaboration between stakeholders resulting in the same areas being covered rather than a broader rollout plan which would see most of the country covered.

4.2 CONSUMER CHALLENGES

The biggest challenge that consumers face is the high cost of broadband and peripherals required to gain access to the internet. At about US\$ 100 per month personal broadband services in the home are beyond the reach of most clients (compare this to the same services costing about US\$ 20 in Europe and the USA). The high costs have meant that only the wealthy have access through their homes and office environments. The initial cost of Customer Premises Equipment (CPE) is also high. The cheapest modem on the market averages about US\$ 500 and does not include the monthly subscription fees which range from about US\$100 for an individual user to US\$ 5 000 for corporate users. The high costs have led most customers to opting for dial-up services and the excessive costs for using ZAMTEL lines.

Computers cost on average about US\$ 1 000, a figure beyond the reach of the average Zambian and which would require a loan to purchase such equipment for home use.

The consumer is not protected by the regulatory regime as no ISP has as yet been punished for shoddy or unsatisfactory service. Corporate clients have recently started signing Service Level Agreements (SLAs) with service providers - this was based on a gentleman's agreement in the past. The issue of direct consumer protection is now being addressed by the regulator who has set up consumer protection groups in several cities. The service providers are protected by the regulator through their license and service agreements.

There is little consumer awareness regarding acceptable quality of service. This area requires serious attention as most customers have been duped into paying vast amounts of money for a substandard

service. An independent body is required which can monitor the quality of service delivery to customers.

Mobile connectivity is not yet an option as the average Zambian cannot afford a mobile phone which has the required functionality. Only a few wealthy farmers and individuals can afford this service. However this is a potential growth market that should be revisited in the future as mobile rollout in rural communities is mushrooming.

4.3 REGULATORY CHALLENGES

INDEPENDENCE OF THE REGULATOR

The regulatory authority operates under an act of parliament and falls under the same line ministry as that responsible for the national telecommunications incumbent ZAMTEL, which provides internet, mobile and fixed line services. The ICT Policy document proposed that an independent regulator be created, with reporting lines to parliament. The present situation is perceived as protectionist towards the state-owned entity, questioning the neutrality of the regulator.

UNIVERSAL ACCESS

The accepted definition for universal access in Zambia is defined much as it has been elsewhere, namely that all people should have access to information and telecommunication which is affordable and available, within reach and with a minimum effort of travel to access such services.

The issue of universal access is an important regulatory challenge in terms of how broadband services are made available to underserved communities.

RESOURCE SHARING

The issue of resource sharing has been debated for some time but has not yet been promulgated into law. Issues under debate include the need for compulsory resource sharing, spectrum management and standardisation in service delivery. The norm has been to have a gentlemen's agreement, with fees and other related issues agreed between players without necessarily involving the regulator. Dispute resolution has been difficult in the absence of arbitration.

MONITORING

The regulator has no capacity to monitor the performance of operators, and no mechanism to gather information beyond what it can obtain from consumers. This is addressed by the regulator and hopefully this situation will improve.

TECHNOLOGY NEUTRALITY

The regulatory regime has started moving towards technology neutrality, with market players no longer needing permission from the regulator to roll out new technologies. This was not previously the case where the regulator was seen to be acting in a protectionist manner towards ZAMTEL to protect it from what was seen as loss of income.

INTERNET GOVERNANCE

Issues under discussion include the degree of control required by the regulator for internet content so as to protect ISPs and their customers. Given the global nature of the internet, this becomes problematic in terms of controlling content locally.

CONVERGENCE

The new ICT Bill addresses the issue of converged services. It is envisaged that there will be only one regulator for all services that deal with communication. The debates have focused on whether equivalent services should be regulated equally, irrespective of the medium of delivery, and whether it is necessary to set up a converged regulatory structure in order to ensure balanced regulation for converged technologies. This raises further questions in terms of whether the current licensing regime is still relevant, whether a more flexible approach is needed, and whether there should be separation of voice, data and video services even if offered through the same medium.

LACK OF AN ICT MINISTRY

There is no identified champion within the higher levels of Government to drive forward ICT4D. The line ministry responsible for ICT issues lacks the required capacity to carry out its work effectively. This has led to the delayed implementation of the ICT policy which was launched five years ago and for which there are still no visible signs of implementation.

POWER SUPPLY

Most of the country does not have access to electricity, which makes it very difficult to roll out ICT services. Alternative energy sources such as solar panels are beyond the reach of rural communities. The World Bank has supported solar installations at schools but this is purely for the use of the schools. Without any sustainability measures in place, it is likely that this will eventually grind to a halt.

Wind energy is harnessed mainly to supply water and not on a commercial basis. This form of energy could be used in areas with high winds but is not feasible throughout the country.

AN ENABLING NATIONAL CLIMATE

An enabling national climate is seen as a critical success factor in moving forward on ICT4D. The government will have to open its doors to the private sector while the private sector should be willing to work with government. It is only through such Public-Private Partnerships (PPPs) that the necessary leverage can be obtained for utilising ICTs in the country.

4.4 HUMAN RESOURCE CAPACITY BUILDING

Computer science degrees are offered through the University of Zambia (UNZA), Copperbelt University (CBU) and Zambia Centre for Accountancy studies (ZCAS); several colleges offer Diploma and Certificate programmes e.g. New Horizon, Evelyn Hone College and the Zambia Insurance Business College. The common problem among all these institutions is the lack of qualified staff to teach such programmes, leaving them to depend increasingly on part-time staff. Some institutions have had to abolish programmes. The graduands who come out of these institutions very rarely go into teaching and are more likely to opt for a well-remunerated job in industry. A strategy should be developed with the line ministry to attract people who will take the teaching of ICTs into the primary, secondary and tertiary levels. This will however require a policy which builds in incentives.

5. OPPORTUNITIES, PRIORITIES AND POSSIBLE ACTIONS

Zambia has the fortune of being one of the most peaceful in the region, with a stable political environment and no conflicts in recent times. This needs to be used to move forward on attaining developmental goals and using ICT to achieve them. Opportunities for the deployment of ICT4D in Zambia are vast. What is required is a strategic planning mechanism which is holistic, systematic and includes all stakeholders - government, the private sector, civil society and ICT practitioners.

5.1 MARKET OPPORTUNITIES

The current ICT market has focused its efforts on the rail corridors, industrialised areas, and white and blue collar workers in urban communities, leaving the majority of the population without ICT access. Small and Medium Enterprises (SMEs) are beginning to play a key role in the economic development of the country and as such, they will need to be a key target for operators. The Government has also put in place some support measures for SMEs such as the introduction of the Citizens Economic Empowerment Commission (CEEC) where SMEs will have access to finances to create new business startups or improve their existing businesses.

The client base for operators is currently focused on individual users using dial-up facilities; corporate clients using available broadband services; and government ministries which are still using dial-up connectivity. In some ministries, internet access is limited to a few offices, thus the need for broadband is never justified.

The rural market is largely untapped and creates opportunities for PPPs to play a role. Government has an obligation to provide services to the people; investors have an obligation to generate profits for shareholders. The Government could therefore put in place conditions that are attractive for rural investment. PPPs have yielded good results in South America as well as in countries such as Malaysia and India.

The SME market has largely been ignored by service providers with little attention to the types of service offerings they require to market their products and services online. Most SMEs are unaware of the benefits of ICTs and are usually deterred by the high costs. This opportunity can be addressed through collaboration between service providers and bodies working with SMEs.

Potential markets in rural and peri-urban areas are:

- Women entrepreneurs in rural and peri-urban areas who own market stalls; and
- Peasant farmers who need affordable ICTs to market their crops as well as to improve their yields.

There are numerous examples from other developing countries that could usefully be adapted to address needs in Zambia. To mention a few, the Grameen Bank experience in Bangladesh where

women entrepreneurs were given loans to purchase mobile phones to provide services to their communities; and the Tara Haat system in India which provides information on healthcare, education and government Information to communities, initially free but then for a nominal fee;

5.2 REGULATORY OPPORTUNITIES

Zambian operators are fortunate in that there has been good cooperation with the regulator and there has never been a case where a firm was shut down. The regulator has gone out of its way to consult with market operators on how to improve services while growing the sector.

The licensing process has been improved through the removal of bureaucracy, the introduction of streamlined processes and improved investor friendly measures such as the removal of commissions for those who want to invest in the rural markets. Previously the licensing process could take more than a year but this has now been reduced to about three weeks. Most of the functions which were previously performed by the ministry have been moved to the regulator.

5.3 TECHNOLOGICAL OPPORTUNITIES

There are a number of hardware and software products and services which are being developed elsewhere for pro-poor applications, and which take constraints such as unreliable power supply into consideration. Relevant examples include the use of icon-based data capturing systems e.g. the AED-Satellite project in Mozambique where handheld devices are used by health workers to record clinic data; the use of wireless networks to set up community networks operated and maintained by local communities e.g. the Nepal Wireless Networking Project and the Huaral Agrarian information Project in Peru where farmers manage local networks and provide water information to farmers and local authorities to control irrigation channels for local farming communities. There are several ongoing initiatives to develop low-cost computers which are being undertaken in various parts of the world e.g. the Indian Simputer and the US\$ 100 OPLC computer (One Laptop per Child) which is undergoing testing in Nigeria, India, Brazil, Thailand and Niger and which has developed software for illiterate users. For such endeavours initial public financing is required.

5.4 PRIORITIES AND POSSIBLE ACTIONS

Several priority issues and possible actions were identified during the research interviews and discussions. These are listed below and should be considered when taking forward any ICT4D actions.

- i. Multi-stakeholder processes should be put in place to allow inputs from all key stakeholders into the ICT policy process, particularly regarding implementation. Setting priorities is no easy task and should involve everyone if the process is to work.
- ii. The lack of coordination in rolling out the national fibre-optic backbone is a priority issue if Zambia is to provide ICTs to a larger part of the population. Public-private partnerships could play a major role in bringing this to fruition. Current efforts by key players such as ZESCO, CEC and ZAMTEL need to be coordinated to ensure that installations are not duplicated while other areas are left uncovered.

- iii. ICTs should be harnessed for the benefit of ordinary people who live in underserved areas. This can be achieved by assessing the needs of communities, and incorporating them into the ICT policy and mapping strategies for rolling out ICT services into underserved areas. This will require a concerted effort within government to educate other line ministries about the role of ICTs in development and to ensure that ICTs are incorporated into sectoral policies such as healthcare, nutrition, clean water and civil rights.
- iv. Government needs to undertake an ICT awareness campaign in collaboration with civil society through organisations such as NGOCC, eBRAIN, regional chambers of commerce and school ICT centres. A joint strategy could be developed to undertake ICT advocacy in the underserved areas of the country. Using both private and public media such as television and community radio, an awareness campaign could be delivered in various local languages throughout the country,
- v. The Ministry of Education should address the inclusion of ICT in schools as well as the lack of ICT skills among teachers when the education policy and strategy are revisited. There should be joint Ministerial efforts from both Education and Communication and Transport to ensure that this is done within their respective frameworks.
- vi. The current tax regime is one of the highest in the region, making Zambia the most expensive country with respect to ICT services. While most countries have reduced taxes considerably on the importation of ICT equipment and software, the same cannot be said of Zambia where duties range from 37.5% to 62%. While it is agreed that there needs to be some form of taxation, benchmarks should be set and tax breaks introduced to accelerate the penetration of ICT.
- vii. Government has to encourage local software developers to develop packages suitable for the local market. The software packages could include inventory management, accounting packages based on local accounting regulations, and human resource management systems to mention a few. Small-scale applications developments have already been initiated but should be stimulated to target larger markets. Such development could do much to accelerate the spread of ICTs across the country.
- viii. Rural populations should be educated on how to access and use ICTs to benefit their lives, e.g. the use of the internet for marketing their products. This should be done in discussion with communities. Firstly however ICT access mechanisms need to be established, together with a mass ICT literacy training programme.
- ix. Telecentres should be established in rural areas to provide public ICT access points and ICT training. This could be done in collaboration with the private sector. Zambia could learn from experiences elsewhere, including the many failures on the African continent which it will hopefully not repeat.
- x. Through the use of ICTs as a development tool, the flow of knowledge to and from rural communities can be improved, resulting in improved quality of life and closing the economic and knowledge gap between urban and rural societies.

6. CONCLUSION

The various scenarios discussed above are possible only if the ICT infrastructure and an enabling policy environment have been put in place. It has been proposed that strong linkages need to be established between direct ICT interventions and national level programmes that deploy ICT as an enabler in development. At the same time a strategic model needs to be built based on old and new partnerships to define roles and responsibilities at the global, national and local levels. The global network economy demonstrates that development strategies can no longer be pursued in isolation, but must be placed within the global context, while simultaneously addressing the needs and opportunities merging from the local context.

An enabling regulatory and policy environment is required for the ICT sector, including coherent national plans that integrate ICT-enabled development. They should help to build national and regional internet backbones and community ICT access points, adopt enabling policies for telecommunications and electronic commerce; encourage the creation and dissemination of locally relevant content and applications that fit within the local cultural and social context; reflect linguistic diversity; and significantly expand general education and training programmes and ICTs in particular. They should help to create a facilitative environment and access to ICT for civil society, the private sector and government. The ICT policy needs to address connectivity, ICT governance, privacy, security, intellectual property and resource mobilisation issues.

Although Zambia would need to tailor its strategy to best suit its conditions, there are common principles that need to be included, such as effective separation of policy and regulatory functions.

Care should be taken to see that the ICT programmes are not just technology-driven but respond to the needs of the poor when it comes to content, language, skills, design and price. It is important to address sectors that are directly relevant to poverty reduction and where the use of ICT can make a difference. Local communities should be involved in the design of universal access programmes through consultation, surveys and demand studies.

In the long run, it is necessary to develop financing frameworks that attract private investors. Models should be defined that suit market segments and this will lead to mobile call rates and ISP charges going down which will enable service providers to cater for all markets, including the poor.

National governments should create an enabling environment through appropriate policies and policy instruments. Laws should be supportive of appropriate technology development, import duties and taxes on information equipment should be reasonable. Operator licenses should be easy to obtain and difficult to revoke, and low cost services such as Voice Over Internet Protocol (VOIP), WiFi and WiMAX should be encouraged and not seen as income grabbers from the incumbent telecommunications operator.

Efforts should be made to improve or develop infrastructures such that service providers can easily reach the rural markets without having to pay large amounts of money to back haul services which will result in large service charges to the customer.

The government and development agencies have to design projects that will encourage skills transfer which will equip the community with the necessary skills, and transform the telecentres into viable businesses for the service providers as well as rural community groups or individual entrepreneurs.

The private sector should partner with each other and the government thereby creating affordable products that will respond to the needs of the community. The issues of local content should be addressed. Telecentres should be suitably located to take into account a large number of factors that affect their use, including security and accessibility.

Awareness and sensitisation should be enhanced to make people aware of what is available with ICTs, especially the internet. Simpler management models should be encouraged at the start-up stage and then be made more complex once the concepts have been absorbed and integrated into daily living by the users of such services.

It will be difficult to predict the future, not only regarding the types of technologies that will emerge and how quickly, but also consumer reactions in terms of what will be adopted (or not) and for what purpose. Increasingly, the technology needs to be developed in close consultation with the people, including the poor. There is a huge market to be tapped among the poor if the design, content and price is right. There is a market niche for ICT while simultaneously reducing poverty.

APPENDIX 1: USEFUL RESOURCE MATERIALS

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APPENDIX 2: ZAMBIA RESEARCH QUESTIONS

The following questions were selected to guide the interviews undertaken as part of this research study. Not all questions were used in each interview and the line of questioning varied according to the interviewee, depending on their line of business.

1. What are the developmental issues that are currently being addressed and what initiatives are being undertaken to address them?
2. What is planned in the next 5 – 10 years to address these issues?
3. What will the impact be on society (need not be more specific – what parts of society?) Have these developmental aspects been addressed before? If so, what were the successes and failures?
4. What were the barriers that were met and how were they overcome?
5. How much ICT was used in the developmental issues and what was the impact of ICT?
6. How aware are the participants of ICT?
7. How do you look at ICT as a tool for development?

APPENDIX 3: LIST OF KEY STAKEHOLDERS INTERVIEWED AND/OR PARTICIPATING IN THE ONLINE FORUM

Contact Person(s)	Organisation	Area of Focus	Province
Chairman	CEC	Energy and Telecommunications	Lusaka
Telecommunications Manager	CEC	Energy and Telecommunications	Copperbelt
Fiber Optic Cable network project leader	ZESCO	Energy and Carriers of Carriers	Lusaka
Technical manager	Coppernet	ISP	Lusaka
Gnarl manager	UUnet	ISP	Lusaka
Technical services	CAZ	Regulation	Lusaka
Licensing	CAZ	Regulation	Lusaka
Faculty and Students	University of Zambia, Copperbelt University and Zambian Open University	Academia	Lusaka and Copperbelt
Registrars Department	Copperbelt University and University of Zambia	Academia	Copperbelt and Lusaka
Technical Staff, Computer Centres	Copperbelt University, University of Zambia, Zambian Open University	Academia	Copperbelt
Director	Development Organization for People Empowerment(DOPE (NGO)	General	Northern
Teachers	Government and Private Secondary Schools	Education	Sothorn, Western and Lusaka Provinces
Director of Communication	Ministry of Communication and Transport	Telecommunications	Lusaka
IT manager	Ministry of Health	Health	Lusaka
Zambia National Farmers Union	Communications Officers	Agriculture	Lusaka and Mkushi
Director	Community Radio, Radio Musi O tunya	Broadcasting	Southern
Director	Community Radio, Sky FM	Broadcasting	Lusaka

Contact Person(s)	Organisation	Area of Focus	Province
Permanent Secretary - Education	Ministry of Education	Education	Lusaka
Project Leader	Ministry of Agriculture, Food Security and Fisheries	Agriculture	Lusaka
CEO	Cavmont Bank	Consumer	Lusaka
CEO	KNA Consultants	Consumer	Lusaka
Manager	ZamCarriers	Consumer	Lusaka and Western
CEO	Shawonga	Consumer	Copperbelt
Chief Engineer	Copperbelt Auto	Consumer	Copperbelt
Lecturers	Colleges	Education	Copperbelt , Lusaka and Southern
Member	ZACCI	Industry	Eastern
EBRAIN	EBRAIN	ICT	Mr Muzala
PANOS	PANOS	ICT and Media	Lusaka
IT Department	Zambia development Agency	Development	Lusaka
ZAMTEL	Staff in Fixed and Mobile sections	Communication	Copperbelt and Lusaka
Peasant farmers, Commercial farmers	Various Farmers	Agriculture	Western and Southern and central
Tour Operators	Various	Tourism	Southern
Association of SMEs	Small Scale Businessmen and Women	Business	Lusaka, Copperbelt, Western and southern
National Secretary	NGOCC	Advocacy	Lusaka
Nursing Staff	Government and Private Hospitals	Health	Southern and Western

APPENDIX 4: COMMUNICATIONS PROGRESS TIMELINE

Date	Event
1994	Telecommunication Act put in place: this led to the increase of private participation and subsequent liberalisation of the sector Internet introduced by Zamnet Communication system Ltd, a company owned by the University of Zambia
1995	Cellular Telephony introduced by Zamtel
1996	Coppernet Solutions starts operations
1997	Zamtel launches internet services
1998	Zamcell receives mobile license
1999	Telecel replaces CDMA with GSM
2000	Mobile subscribers surpass the number of fixed line subscribers for the first time
2001	Microlink and UUNet enter the ISP market
2002	Zamtel migrates GSM Technology
2003	Independent Broadcasting Association (IBA) Act: ZNBC amendment Act
2005	MTN acquires 100% shares of Telecel Africonnect launches MiMAX broadband services
2007	National ICT Policy launched by Government
2008	Celtel rebrands as Zain, subscribers number exceed 2.5 million
2009	ICT Bill launched CAZ Universal Access fund launched First International fiber network reached Zambia WiMAX reaches 9 provincial capitals

APPENDIX 5: NOTABLE ICT PROJECTS IN ZAMBIA

I. MACHA WORKS

Macha Works/ LinkNet is a collaboration between the Communication Authority of Zambia, the University of Zambia and others. It aims to inspire local talent in nine Zambian rural areas to support rural communities towards sustainable progress, realizing their collective and individual potential, being empowered and enabled by the targeted implementation of ICTs. LinkNet brings internet to the rural areas of Zambia via a purpose-built institute based in a rural area.



In rural Macha the community implemented locally-distributed internet connectivity and introduced an action-oriented way of learning focused on real-life community development in a rural context. To do this Macha Works built up a broad coalition of partnerships in Zambia, Southern Africa, Europe and USA to support its endeavours to provide state of the art and innovative ICT solutions. Macha focuses on sustainable rural development in a holistic and innovative perspective. This approach is built around

specific needs of the community and puts local rural people in the driving seat. Local talents drive Macha Works approach.

II. CONNECT AFRICA

Connect Africa is an innovative ICT initiative that combines entrepreneurship and social enterprise to bring communication, business and public service to deep rural communities in Africa.



Using a network of public phones and data terminals, working in tandem with a fleet of service vehicles that routinely visit these installations, Connect Africa provides an infrastructure and logistics network to facilitate the delivery of multiple services to deep rural communities.



In 2008 Connect Africa began conducting a trial of satellite-connected public payphones in deeper rural Zambia. With support from Thuraya and Iridium and funded by the Southern African Trust, with approval from the CAZ, Connect Africa deployed six public pay phones in and around the Mumbaw/Kafues region of Central Zambia

The voice and data supported networks provide a framework for rural multipurpose service networks to deliver public sector e-government, agriculture, health and education services and other business services into the rural economies.

It is envisaged that with the support of the Government of Zambia and private sector service providers, Connect Africa can begin to implement a phased rollout of their ICT-based rural service

network across Zambia. The Zambian rural networks can serve as a model for regional and as well as pan-African networks in selected countries by the year 2015.

III. ZNFU COMMODITY PRICE SYSTEM

The Zambia National Farmers Union operates an information service which is available by SMS to anyone who has access to a mobile phone. It provides details of commodity prices and is aimed at small scale farmers. Farmers who have produce for sale can find out the best price they are likely to get for their produce in their district. They get both the prices and the contact details for potential buyers. This saves the farmers from being at the mercy of transporters as well as third party agents who would offer farmers their prices, and not the ones ruling on the market. Prices are updated on a daily basis and more detailed information is available from ZNFU officers as well as the website. (www.farmprice.co.zm)



In a similar manner, Cropserve, an input vendor to the farming community, is piloting an SMS- and web-based service for providing pricing and guidance for inputs such as seeds. They are in the process of offering veterinary services through the same channels.

IV. AFRICONNECT ISCHOOL PROJECT

AfriConnect, in partnership with the Ministry of Education, have been piloting a project aimed at bringing web-based eLearning to schools in different parts of the country (rural, urban, high-density). Some 20 schools have been provided with free or low cost connectivity, plus teacher training and support. A large website of free learning materials has been built, based on the Zambian curriculum. The project is now moving to the next phase with more schools, a more detailed study of how teaching and learning can be improved and what inputs are needed. The objective is to move from the traditional chalk-and-board pedagogy to an enquiry-based learning, at the same time bringing the option of lifelong learning to people who have already left school. With collaboration from Intel, Cambridge University and the University of Zambia, this project will revolutionise the way students learn in Zambia.



V. AGRITRADE

Agritrade is a market information service that can be accessed via mobile phone and via the internet by smallholder framers and produce buyers. It is intended to facilitate transactions between buyers and sellers by providing updated market information, and also to facilitate transaction between suppliers of agricultural inputs to smallholder farmers. Agritrade also provides an SMS-based service for the provision of technical support, including agricultural extension services, product information and direct marketing. The service initially focuses on direct buyers and sellers of agri-produce in the horticulture and dairy subsectors. This includes those in the hospitality industry, dairy product processors, supermarkets, health and education institutions and small to large scale farmers who produce and sell vegetables and milk. The service links buyers and sellers in a fast convenient and affordable way. More information is available at www.agritrade.co.zm

VI. THE ZAMBIA CHAWAMA YOUTH PROJECT



The Chawama Youth Project is purposed to change the lives of youth once dormant into self-reliant and responsible people. Chawama is a large suburban compound in Lusaka, with a population of many thousands and a large proportion of youth. The Youth Project has trained over 500 youths in basic fields such as carpentry and joinery, tailoring and design, welding and metal fabrication. The centre has become ambitious in exploring new

ICTs and has recently put in place an ICT centre that would enable youth and other clients from the local communities to access the internet and other computer based secretarial services. The project has become popular amongst other age groups as well. According to the Project Director, their vision is to set up a centre for information which will connect them to similar initiatives in the world.



VII. ICT IN THE ZAMBIA CLASSROOM

The Ministry of Education has developed a strategic plan that works toward achieving Education for All (EFA). The International Institute for Communication Development (IICD) held a roundtable workshop on ICT in the Education Sector in May 2003. The idea was to bring together specialists from the Education sector and the ICT profession to discuss educational challenges and explore possibilities and opportunities for overcoming these with ICT. It was here that the Educational Support Network (ESNet) was formed, inspired by the knowledge that teachers in all schools have their own notes and teaching materials. ESNet uses existing structures for teaching and enhances them with ICT to improve quality or presentation and make them reusable across other platforms. ESNet helps teachers to generate, package, share and use supplementary teaching notes. The project focuses on the following

- Improve the quality of teaching notes in eight poorly-resourced high schools in Zambia by harnessing ICT;
- Creating learning opportunities for teachers in pilot schools;
- Creating teachers' notes and making them available in electronic formats; and
- Establishing and promoting learning networks among teachers in the pilot schools.

The target group in this case was the teachers and these have formed their own focus group to determine how improvements can be made before a larger-scale rollout to other schools.

Some of the challenges they have faced include the issue of ownership, obtaining additional resources beyond that provided by the IICD.

APPENDIX 6: AUTHOR PROFILE

John Slaughter Munsaka

John has close to 30 years of experience in the ICT industry. He has worked in the industry since graduating from the University of Zambia in 1976 with a Bachelor of Science Degree majoring in Physics and Mathematics. He joined the then mining giant in Zambia, Zambia Consolidates Copper Mines, once rated in the Fortune 500 top companies. John has worked in the ICT function where tasks ranged from designing, developing and maintaining systems in engineering, inventory management and control, energy management, agriculture and manufacturing applications. Some of the major tasks included setting up ICT departments from scratch. He left the mining industry in 1998 and joined the University of Zambia as Director of the Computer Centre.

He has served as Chief Executive Officer of Zamnet Communications Systems, the pioneer of internet services in Zambia and the leading ISP in Zambia.

John is now an ICT and Business Management Consultant where he has focused on issues that relate to the development of telecommunication in Zambia, with emphasis on the rural market where there is vast potential for growth.

He has authored reports on ICT policy in Zambia, was a member of the National Technical Team that formulated and finalised the ICT policy in Zambia. He is a member of the Research ICT Africa (RIA) network and the African Telecommunication Policy Studies Network (ATPS). He was a member of the Presidential Task Force to examine ICT as an enabler of economic and social development for Zambia in 2005.

John has produced documents ranging from ICT and internet business in the underserved areas in Zambia, ICT Governance in Zambia (soon to be published) and the role of ICT in poverty reduction.

His ambition is to see the growth of the ICT sector in Zambia and the continent so that Africa can compete with the best in the world. The rural penetration of ICT, its affordability and access to all remains a key priority in Africa.