

ICT guide – Zimbabwe

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March 20, 2009

Information and Communications Technology (ICT) is an umbrella term that includes all technologies for the manipulation and communication of information.

Recently the Minister of ICT, Hon Nelson Chamisa announced a need for a national website, in order to put Zimbabwe back on the global map. He was speaking to ICT stake holders in Harare recently. It was an important stance by the Hon Minister in so far as top level awareness that something needs to be done to bridge the digital divide in Zimbabwe.

Zimbabwe already has thousands of websites that are either hosted locally in Zimbabwe or outside the country. So it's not so much about the need of a national website per se but rather a broader surgical approach to the ICT challenges that we face.

The digital divide or gap is set to widen even further if we don't take it upon ourselves to come up with specific solutions for our specific challenges.

Problem resolution at this level, calls for a sober, firm and accurate understanding the variance between what is on the ground and what needs to be achieved. Any half baked attempts to address the digital divide or gap will not only waste resources and opportunities but literally take the nation a few decades backwards in terms of development.

A sound ICT policy impacts all sectors of the country from the economy through health right up to mining and farming.

In this article I will offer a bird's eye view of key issues that impact and affect digitalization efforts. Hopefully this will help the ICT leadership clarify, categorize and prioritize delivery mechanisms.

Zimbabwe just like most African countries basically faces a number of hurdles in order to roll out effective computing technologies to the general population. Rollout issues and challenges do include but not limited to;

- cost of computers and equipment
- inadequate access technologies (data & voice)
- inadequate electricity
- poor national & international bandwidth
- regulation and licensing
- Censorship and control
- brain drain & lack skilled manpower & I.T. certifications
- poorly designed and optimized websites
- egov

In this article I address some key elements that affect internet penetration and telephone usage. You will note that the main factors that affect telephony also affect data communications. ICT has challenges in both the data and voice arenas. When we talk about bridging the digital divide we seek to reduce or eliminate entry barriers that the people face in both data and voice. A number of terms will be used loosely in both areas.

It is important however, for the ICT ministry to be able to dissect and separate common issues and independent issues that affect data and voice. This approach is necessary so that the issues are addressed at a root cause level. We seek to deal with the root problem like inadequate infrastructure manifested symptomatically as congestion or slow connections. Voice and data networks are fast converging and this calls for a smart unified communications approach whose success hinges on reliable, fast and robust network infrastructure.

Internet Access

In Zimbabwe just like most African countries most people who access the internet do so via Cyber cafes, colleges, varsities, work place and some at home. The limiting factors are basically cost and unavailability. Most urban dwellers either can't afford it or the ISPs serving them are out of capacity as discussed further below. There are people who own farms who could easily afford it, but can not do so from where they are because there is no network coverage of one form or the other in their area.

As a result internet penetration is very low due to a number of issues. One of ICT's core tasks is to help present operators unclog their stuffed networks and also adopting the concept of cyber cafes for many communities whose chance of using a computer or accessing the internet are next to none.

Donating computers to schools is great. More could be done in the form of setting up computer centers at libraries, district offices, ALL colleges using the cyber café approach. This has the advantage of also spinning some business to the struggling ISPs.

Hopes are hinged on the 3G data access. All I can say for now is that we hope Econet will not make it an elite service for the business brass. Last year when I was in J'oburg I was pretty impressed about how easy it is to connect to the internet MTN's 3G using a USB dongle with a 3G capable SIM card. Because right now in Zimbabwe before we even have 3G, is it possible to walk to a distribution shop and buy a SIM card?

Telephone Access

Teledensity is a metric that is used to broadly estimate the number telephone lines per 100 individuals. Presently Zimbabwe has a teledensity of about 3 This means that there are about 3 telephone lines per 100 people. This figure heavily depends on the accuracy of the actual number of telephone lines divided by the total population.

Now this is a very tricky estimation as millions of Zimbabweans have left the country while mobile operators have availed more lines. The teledensity metric has been used as an indicator of economic development or governance.

Current voice providers include Telone , NetOne , Econet , Telecel. Now wireless usage in Zimbabwe has indeed enabled many people a means of communication. Wireless growth rate is highest in Africa because cellular phones offer any one within coverage range an equal opportunity to communicate. At this stage Zimbabwe has serious complications that basically point to a collapsed economy. Cellular operators have managed just to stay afloat in a very un-business like environment. This has made it impossible for the operators to increase both capacity and coverage at a time when spares and maintenance were made in hard currency whilst end users were paying in a currency that long lost its value.

Stabilization of the economy should allow cellular companies to increase their coverage to more areas.

Cost of computers, equipment and software

Computer and internet penetration is very low in Zimbabwe due to the cost of owning a PC or MAC and the cost of having an internet connection .What is needed in this area is for the stake holders to identify equipment manufactures that can supply Zimbabwean market PCs in bulk and at competitive rates. Secondly in most developed nations people throw away their PCs just to get a new one. Most of these PCs are recyclable easily and the Ministry can setup collection centers in the US and UK to pick these PCs – clean them up and store them in a container before shipping them to Zimbabwe. This is already being done in Kenya and Ghana.

Thirdly the ministry should encourage local companies to team up with PC manufactures and open up assembly plants in Zimbabwe. This should be one of ICT's long term plan and has bankable off shoot benefits like job creation , local availability of PCs , generation of forex through exports and generation of revenue for the state via the taxman. The more people have access to PCs whether publicly via schools , libraries or internet cafes the better. One way of doing this is availing mobile digital libraries.

Take an old ZUPCO bus. Refurbish it , install like 30 computers in the bus and pull a diesel powered generator at the back. These mobile libraries are used in Rwanda to visit remote areas with no PC access.

Windows based software is generally pricy because of licensing fees. The ICT ministry must encourage and even fund open source software initiatives in Zimbabwe. This literally means that refurbished computers that are shipped into Zimbabwe can run on free BUT extremely loaded Linux based like uBuntu. Ubuntu is a community developed operating system that is perfect for laptops, desktops and servers. uBuntu comes loaded with thousands of FREE open software applications like word processing , spreadsheets , presentations , databases , web servers , email servers , fax servers , call centers , phone billing , internet café billing , hotel reservation , project management , programming tools , educational and scientific software and many more.

Cost of software as a stumbling block in ICT development can not be used as an excuse.

Electricity

All ICT gadgets use electricity to function. Inadequate power generation and unreliable transmission and distribution capacity has a direct impact on ICT development strategies. This means that there can be no meaningful digital revolution if there is no electricity full stop. This calls for an elevated sense of urgency to resuscitate and improve power generation, transmission and distribution capacity. It is too obvious that Zimbabwe has to look explore and improve the present forms of power generation methods that may include but NOT limited to water , solar , wind , biogas and even nuclear energy.

Mail servers , web servers , routers , switches , base stations etc all need electricity to operate. So before we even worry about creation of a national website , it is necessary that we have adequate electricity to power the servers that will serve the web pages !

If people can not access the website because the hosting ISP has experienced a power outage, then our problems are a lot wider and complex to be solved by having a national website.

Now erratic power supplies has made life horrible for ALL telcos or ISPs as they are forced to install alternative power sources mainly diesel powered generators. This has pushed operation costs for all companies to go up. Not with standing that the diesel in question was at one stage scarce and only available via the black market. This is one of the many problems that have pushed the price of the service as soon as use of forex was officially approved.

Access technologies

Lack or unavailability of telecommunications infrastructure makes it difficult for remote areas to access e-services like the internet or even basic email. Some farmers can afford PCs but how are they can not access the internet because either the telephone infrastructure is inexistent, broken down or unreliable in their areas. This points back directly to telco providers ComeOne ,Telone, Econet, NetOne, Telecel, Transmedia, Powertel, Africom, Ecoweb, ZOL, Mweb and Telecontract just to mention the main players. It is very tough for these fellows to maintain their network infrastructure because of overheads like electricity for plants and base stations.

That aside , there is need for Zimbabwe to pursue more rigorous wireless last mile connection technologies like Wi-Max , Wi-Fi , 3G , CDMA etc. Already Powertel and Telone are involved in CDMA rollouts in and around Harare. The access technologies are further discusses under sub heading Broadband below.

National & International Bandwidth

Not withstanding the limited access technologies available by remote stations to access e-resources , there is the question of available national and international bandwidth.

Your connection speed to you ISP might be 56k but the speed with which you access local and international websites will solely depend on the available capacity on the network you are connecting

to. It means that to pull a page from Harare ISP will depend on the traffic congestion between your access point to the web server which heavily relies on the number of connections made to that site. Failure to connect to you ISP might be caused by total capacity of the access network to handle your call. This is a national bandwidth issue. Zimbabwe has limited access points and this literally means a lot of people are competing to gain access to a thin pipe. I am sure you know how frustrating it is to try and drive your new BMW in a very congested road with pot holes!

To access emails from the web you will send a request via your ISP who will in turn forward your request to your email hosting service. Now the issue of contentions comes into the picture again with internationally hosted sites. You have to compete with other users from your ISP and other ISPs to access websites via the international gateway that maybe a satellite dish in Mazowe! So international access bottleneck add to the other national bandwidth whores caused by few POPs (point of presence).

What is needed then is an increase in access points and using thicker bandwidth pipes between these POPs. Between main centers Zimbabwe uses fibre optics as the back bone. Also satellite alone can not meet Zimbabwe bandwidth needs.

ICT must look into ways of connecting via fibre to the undersea cable in the Indian Ocean. The cables at the sea connect to the rest of the world at lightning speed. Why fibre? Fibre has a higher carrying capacity. A fair comparison between using copper wires and fibre would be comparing a wheel barrow to a "gonyeti" to carry 100 tons of sand.

In a nutshell ICT needs to do some audit of both the national and international bandwidth info. This audit will point out major bottlenecks that choke Internet usage in Zimbabwe. The solution after the audit should include amongst other things the following fibre network links:

- Harare to Mutare to provide a link the Indian Ocean under sea cables in Beira. I am reliably informed that AfriCom is doing this project already.
- Bulawayo to Beitbridge to provide high speed link to SA fibre network. South Africa is Zimbabwe's largest trading partner

Having multiple gateways will assure and ensure that Zimbabwe does not experience total black out associated with network failure. Investing in fibre optics today is not an option but a must/

Broadband Access

To address the slow speed and low bandwidth challenges that Zimbabwe faces , all efforts MUST point into the availing of broadband access.

The term broadband commonly refers to high-speed Internet access. Technically this refers to data transmission rates of at least 200 kilobits per second. When you connect to your ISP you have to values that you deal with , download speed (down stream) and upload speed (up stream).As the names suggest , down streams refers to the data transfer rate when you are pulling resources from the internet to you PC like downloading email, downloading software , listening to music or watching a video from Youtube.

Up stream refers to the data transfer rates when you are pushing or publishing content from you PC to the Internet. Examples here including sending email , posting your profile to Facebook and publishing your website.

Pull and push. In general most internet users pull that push to the internet and as a result the rates of downstream rates are higher than up stream rates.

Broadband allows a higher data transfer rates than dial up rates .An interesting comparison would be that of trying to empty a 200L drum full of water using a hosepipe or a drinking straw!

Types of broadband technologies

The term broadband describes the data transfer rates but does not describe the underlying technology (physical and data link layer) used to achieve high data transfer rates. The main broadband technologies are briefly summarized below.

- DSL (Digital Subscriber Line) is a wireline transmission technology that transmits data faster over traditional copper telephone lines already installed to homes and businesses.
- Coaxial cable make use of cable modem service enables cable operators to provide broadband using the same coaxial cables that provide cable TV
- Fibre optic technology converts electrical signals carrying data to light and sends the light through transparent glass fibres about the diameter of a human hair.
- Wi-Max , Worldwide Inter-operability for Microwave Access, is a telecommunications technology that provides wireless transmission of data using a variety of transmission modes, from point-to-multipoint links to portable and fully mobile internet access. The technology provides up to 72 Mbit/s symmetric broadband speeds without the need for cables. This is the way to go especially for metropolitans. The technology is based on the IEEE 802.16 standard (also called Broadband Wireless Access).
- 3G networks are wide-area cellular telephone networks that evolved to incorporate high-speed Internet access. Theoretically data rates approach 14.4 Mbps down stream and 5.8Mbps up stream. Econet already has the 3G license in Zimbabwe and we await its delivery. The other 3G license was granted to Powertel using CDMA .This service is only limited to Harare/
- CDMA – Wireless land lines using Wireless Local Loop 450 MHz system used as last mile connection by Telone in the wake of copper cable thefts and shortage. Only available in Harare , Chitungwiza & Ruwa.
- Satellite broadband is another form of wireless broadband, also useful for serving remote or sparsely populated areas .This technology basically uses satellite dishes pointed to the sky to connect to a geo-stationary satellite orbiting above the earth.
- Broadband over Powerline (BPL) is the delivery of broadband over the existing low and medium voltage electric power distribution network.

Broadband is always on. Does not block phone lines and no need to reconnect to network after logging off.

Summarily connection bottlenecks exist at an access level , national bandwidth level before you even look at the international portion of the game. What we need is a bottom up approach and not top to bottom approach.

So after rolling broadband access architecture, the national network connecting to the international network MUST not act as a bottle neck.

A typical scenario in most African countries is that you can use Wi-Fi to connect your laptop to your access point at 54 Mbps ! WOW that's a lot ! Nope.If the connection from your ISP to the internet is 56kbps then your broadband connection speed to your access point is NULL & VOID.

Regulation /Monopoly/Licensing

Most African governments really put a tight lid when it comes to regulation of telecommunications and media. That alone is a major obstacle in reducing the digital divide. For some strange reason or another most African governments via the regulatory bodies tend to become an obstacle to innovation and development. Part of the fear is unfounded in that some authorities fear that opening up the telecommunications will either threaten government owned establishments or also fear of not being able to control information flow.

Of course this is insane. Only those who do evils stuff should be worried about a liberal telecommunications environment. Naturally national security is a top priority for the regulation body. I must mention that of late POTRAZ has indeed tried to catch up with reality as I am aware that a few more companies have been granted different licenses to operate different technologies in data, voice and wireless arenas like Econet doing 3G and AfriCom getting engaged in VoIP.

Considering that some of the operators who have monopolies have failed to meet their service obligations to provide reliable and affordable communications, ICT ministry should explore ways of allowing smart partnerships between ISPs with local authorities/communities to provide telco service for their areas. For instance if the wireless company can not afford to put a base station in my home area Jambezi or Lower Gweru, smaller operators must be allowed to run and own base station in an area and share the profit with the back bone operator. What I mean is at a district center, small operators will install a base station, a data link and a power generator if need be. Then connect to the big operators switch via Wi-Max or microwave. These small operators can't afford to do a national rollout so they can manage to setup their own base stations for their respective areas and then connect to the main carrier. How the revenue from that base station is shared can then be worked out. These are the ideas that ICT should be researching and establishing their viability potential.

Telone, Powertel and Transmedia

These 3 companies enjoy unmatched monopolies based on their origins or parenting company namely PTC, Zesa and ZBC. These 3 companies have a combined capacity to reach all corners of Zimbabwe by virtue of their infrastructural inheritance for both data and voice.

The ICT ministry must carry out very thorough performance audits these seasonal failures. It is an open secret that their failure is mainly due to political meddling and interference which makes them operate more like social clubs than companies.

Despite their failure for years to provide, adequate telephone services, electricity, radio and TV services these companies have moved into the Internet market with, remarkable speed.

It is clear why NRZ has not conceived a Telco business unit based on their own data network for the rail system? Well Transtel would be a great idea but likely to be plagued by the same virus that affects its other 3 cousins.

Licensing and external investment

The issue of regulation will not be complete if no mention is made of the prohibitive nature of the licensing fees in the range of several million US dollars. What makes it even more complicated is that should one wish to partner with a foreign investor, the imposition of fixed percentages for local ownership stake makes this really look like a circus. Which sane investor is interested in investing in an environment where he /she are expected to invest more dollars but get the minority share? 51 % local sounds really attractive and nationally correct since Indigenization is the core agenda of empowering locals.

That however does not mean replacing common sense with hollow pride which has so far worked negatively against Zimbabwe.

Pride alone has never fed any nation.

802.11 – Wi-Fi

It appears that the ruling in the 90s to ban or restrict use ISM frequencies 2.4 GHz and 5Hz was not meant to protect scientific equipment used in hospitals from interference but a strategic move to monopolize the bandwidth to Transmedia. It is the national broadcaster of television, radio and Internet access services in Zimbabwe on the afore mentioned frequencies. So one wonders what suddenly happened to hospital equipment protection.

Transmedia owns and operates all terrestrial broadcast infrastructures and as a new strategic business unit of ZBC it bridged VHF and IP so as to tap into wireless access.

Because of monopoly of this frequency band, wireless broadband has not grown as expected. I doubt if Transmedia has more than 800 customers with their tower located at Pockets Hill with no line of sight complication?

The ICT ministry together with POTRAZ must revisit the maximum power levels for Access Points to allow other players to beam data and voice over using 2.4 GHz and 5 GHz (Wi-Fi). This will go a long way in enabling ISPs to connect more people using wireless broadband. Right now ISPs are trapped between a rock and a hard place as their last mile connection solution is limited to mainly to twisted copper wires since both 2.4 GHz and 5 GHz are locked down to one provider Transmedia.

Voice over Internet Protocol (VoIP)

Voice over IP is still a grey area in Zimbabwe. Obviously its success depends on reliable network infrastructure. With 3G on its way, POTRAZ should allow people to connect over IP and make calls. Also a smart combination of wi-max and wi-fi can bring voice to many people that presently have NO hope of getting a Telone line via copper or wireless CDMA.

Businesses and organizations might be forced to install satellite dishes and then use their IP connectivity for both data and voice and by pass the national operators because they can't get service from them!

Besides the obvious use of VoIP for voice , other spin offs can be realized in Zimbabwe like the deployment of call centers This allows local companies to generate employment for the local community , generate scarce forex and revenue for the state in taxes. I used to think that this was common sense but it appears common sense is not so common. Presently most favored call center destination for call centers are India, Malaysia, Philipines and of late Kenya and South Africa – thanks to their open VoIP policy.

VoIP opens so many avenues of communication between end users. For instance through use of open source PBX like Freeswitch, one can easily provide free voicemail mail service. This is how it works. A Linux server running a PBX is a capability of creating infinite user extensions. So a particular user can sign up and be assigned an extension say 600244 and a PIN code – 9561. Now this user will have to call an access number say 011 800 600 to check and or send voicemails. If he does NOT have a personal phone this user can still use any phone just to retrieve his messages from the system. So in short this person can advertise whatever business he is in and then specify his details as “Please call me on 011 800 600 ext 600244”. Callers will be greeted by an interactive voice response system that will ask them if they want (1) to check messages or (2) to send a message to another user.

Brain Drain & Skilled Manpower

The effect of brain drain on the digital revolution is obvious. As the country continues to lose more and more skilled and trained personnel, it becomes difficult for the nation to move forward in an attempt to turn around the economy. This applies to all sectors of the economy and not just ICT. The GNU should be creative enough and try and lure skilled personnel back by coming up with a well thought out “come back home schemes”. I am talking about highly trained professionals from all walks of life. Trust me there thousands of Zimbabweans inside & outside the country prepared to help rebuild the country.

The question of patriotism comes up. “Ask what you can do for Zimbabwe and not what Zimbabwe can do for you?”

That's fair enough.

Trust me most skilled professionals would not mind an incentive in the form of some small piece of land somewhere in Mvurwi or Insiza. If we expect to lure patriotic professionals to leave their well paying jobs at Cisco or Microsoft or BT and join the ICT in Zimbabwe. Patriotism is a two headed beast.

ICT training & Certification

ICT training and development has not been spared the economic wrath that affects the whole country. As part of a long term plan Zimbabwe ICT must look into establishing more ICT based institutes and academies as part of the digital empowerment plan. Software programming is particularly one area in which ICT must look. Writing a computer code requires very few resources other than a computer and programming knowledge of certain languages like C++ , Java , Python , Perl etc.

What is needed is that the ministry of ICT at a government level must travel to India and strike deals to have Indian programmers to come and train students at various training academies mentioned.

Software is a great product that is easily exported. This is where the Hon Minister should be setting his eyes as a long term plan. There is need to promote establishment of MORE academies that can provide ICT certifications that include but NOT limited to A + , N+ , Security + , Linux + , Cisco etc.

Web Presence, Promotion and Optimization

Designing and placing a website on the internet is very simple and straight forward.

But what matters is whether the website has been designed properly and optimized well so that it is searchable on the internet. People use search engines to look for information, products and services. A poorly developed website will affect that website's visibility on the internet. Most search engines like Google , Yahoo , MSN and Dogpile use various algorithms to rank websites. But key making our website visible includes search engine optimization .This involves items like :

- using certain key words in your website title and header and also depends on the
- number and quality of links on your web page
- the actual content and relevance of your web pages
- registering your website with different search engines

Linking out to other websites and have them linked back to you is useful in making your website visible on the internet.

A good website must be able to retain visitors and even encourage future visits. A good website must not only disseminate information to its visitors but must be able to call the visitors to action .Like "click here to subscribe for free reports" or "click here to place a donation " or click here to get a call back from us" or "enter your cell phone here to receive promotional info via SMS" etc etc.This makes the website interactive and not static.

Website Standards

Zimbabweans are a very tech savvy people. You don't need to look far. Zimbabweans based both in Zimbabwe and outside run fairly successful websites ranging from news and media through money and shipping services right up to digital telephony services. News websites dominate the number of websites ran by Zimbabweans on the internet.

Since Zimbabwe government ministries and departments already have dozens of websites that are hardly searchable on the web, the ICT ministry must come up with a minimum standard guideline for website deployment.

Different ministries and departments do run their different websites, but some minimum quality standard or benchmark MUST be created by ICT ministry If you look at the different Zimbabwe government websites, you will see varying designs which are not up to scratch if I could be generous with my comments. What is needed is a compliance standard that is set up by ICT.

Hats off to the webmasters who have managed to setup these websites with little or NO training and resources. What needs to be done is to come up with a government website policy that clearly sets standards of design technique, layout, interactivity, promotion and optimization.

eGovernment

In 2005 an ICT Steering committee produced a detailed 124 page eReadiness report. This report sponsored by UNDP, covered almost all aspects of e-readiness like:

- eAgriculture
- eCommerce
- eEducation
- eMining
- eHealth
- eGovernance
- eGovernment
- eManufacturing
- eTourism

Summary

The ICT Ministry must start by studying the eReadiness survey report (2005) and use it as a spring board to kick start the digital dream. The report is detailed and thorough but might need to be updated in order to keep abreast with current ICT realities on the ground.

Then the ICT Ministry must put together a team/board by pooling together highly skilled, competent and experienced individuals just as the Education Minister did. The Hon Education Minister Mr. David Coltart is a lawyer by profession and made a smart decision of putting together board of education experts to execute the technical aspects of the challenges facing Education in Zimbabwe. This approach could be used by all GNU Ministers so that the best brains, hands and hearts are pooled together to achieve a common purpose.

I must mention here that I deliberately did NOT discuss previous efforts by the government to censor, control and intercept internet and voice traffic in the spirit of the inclusive government.

Comments, corrections, questions and requests most welcome.

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