

ICT Development in Botswana: Connectivity for Rural Communities

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Abstract

The paper motivates for the need for rural communities in Botswana to gain access to information and communication technologies (ICTs). It generally acknowledges the excellent telecommunications infrastructure in the country, and the stated policy of the government and the Botswana Telecommunications Authority (BTA) to provide universal access to ICTs. The paper then explores why the policy and the infrastructural endowments have not combined to make Botswana an "information society" according to the timeframe envisaged in the national vision document, Vision 2016. Citing the phenomenal growth of the mobile phone in the Botswana telecommunications market, the paper proposes that a nascent information society could be upon Botswana, if only the mobile cellular platform and Internet connectivity could be fully harnessed to give people a foothold into the vast ICT field. The paper outlines the technological, institutional and policy issues that need to be tackled to ensure that Botswana's rural communities get the benefits of new ICTs, with particular emphasis on the need for integrated public access centres and a new legal framework guaranteeing access to information.

Introduction

Information and communication technologies (ICTs) have become critical tools of business, governance and information exchange globally over the last few years. The advent of the Internet, the World Wide Web (WWW) and electronic mail (e-mail) has greatly expanded the availability and sophistication of ICT tools and media. ICTs have now expanded beyond radio, phone, fax and television to the Internet, eliminating physical barriers between locations and users, further consolidating an already-globalising world. But this has not happened without a cost. The so-called "digital divide" (UNDP, 2001) exists between the rich North (OECD countries, mostly) and the South (the "Third World"), wherein the former, because of access to the Internet and related technologies, is guaranteed benefits accruing from the competitive advantages attached to usage, whilst the latter is becoming more impoverished and less likely to catch up. The divide is even worse in the urban-rural nexus of the developing world, where resources and potential for employment are increasingly associated with urban centres (UNDP, 2001).

The major question this paper poses is: What is being done, or can be done, to provide rural communities in Botswana with access to ICT technologies? In answering this question, which on its own is a huge task to accomplish -- especially in a country such as Botswana where the public has no clearly articulated right to (government) information -- the paper will pose related questions, and in answering these, perhaps provide insights as to why it is important that ICTs are accessible to rural communities. This paper also concerns itself with the need to educate the public (rural and urban) about the use and benefit of sourcing information on-line, and the need to set up public access centres for the purpose. Another concern is the democratic culture, or the democratic ideal, in Botswana. What perceptions and expectations do citizens have with regard to the kind and detail of information government must make available to them? In the same light, what are the instincts and practices of government in terms of the public's right to information, in relation to the government's national vision of an informed nation as articulated in the Vision 2016

document? If some misalignment between practice and policy exists, the question that then arises is whether there is any benefit in talking about access to this wonderful technology, if no worthwhile information (content) exists?

With reference to what other countries have done, the paper proposes ways in which Botswana should go about diffusing the latest ICT technologies to rural areas, and then predicts the impact this would have on rural communities, extrapolating this to the national vision of an informed, educated populace in an open, democratic and accountable society (Government of Botswana, 1997) that will increasingly rely on science and technology (Botswana Ministry of Finance, 1998) for economic diversification (Botswana Ministry of Finance, 1997 and 2003).

The paper ends by way of enumeration of the policy implications for the country, before synthesising critical recommendations which, if taken up for further study, could perhaps go some way to making rural life more sustainable and addressing the urban-rural development divide -- a divide that has impoverished Botswana's rural communities through the population drift to urban areas, whilst creating infrastructural shortages in towns and cities (Botswana Ministry of Finance, 1997, p 44).

What are the ICT Issues?

The major issue with ICTs in a people-centred development process is one of inclusion. It has become universally accepted that societies and nations where technologies have been diffused generally command a superior human development record (UNDP, 2001). ICTs, especially the Internet and e-mail, are increasingly being recognised as possessing the potency for reducing the digital divide (and, in parallel, the information divide) between the rich North and the poor South (UNDP, 2001). This clear division between those who have technology tools (in the North) and those who have not, is also manifest in disheartening fashion within developing countries, between the urban-based haves and the rural/village-based have-nots, with Botswana being no exception (Ntsatsi, 2002; Sebusang, 2001).

Because rural communities lack certain necessary skills (technical and otherwise), and are on average less (formally) educated than urban communities, they miss out on the empowerment that comes with having information.

Meanwhile, the mostly urban communities with access to the Internet are now advocating for an "information society," meaning a "globalising, knowledge- and communication-based world society and economy" (Abu-Ghazaleh, 2003), or, in the words of Irish Assistant Secretary of Public Enterprises Brendan Tuohy, a situation where "public bodies are obliged to publish the rules, procedures, practices, guidelines and interpretations" they use, with "sufficient detail to facilitate the public right of access, including details of the arrangements to obtain access to records" (Tuohy, 1997). The issue for those who already enjoy some level of ICT access is no longer about access; it is about content, and the necessary processes to allow for digital governance or e-governance (UNDP, 2002). Advocates are convinced that e-government will make governance less bureaucratic and hence more responsive and relevant to the needs of the governed (Tuohy, 1997). The urban elite is also concerned about e-commerce issues, i.e., the ease of transacting business electronically.

Focussing solely on rural communities, the communities without access -- or the necessary skills, even if access were availed -- what issues arise? It seems that new ICTs should be able to give rural people newer options of communicating and thus extending their information-sourcing and sharing avenues. Unlike the urban dwellers who to some extent can be regarded as information-

rich,¹ the rural people are far from all the major news and information sources, and if they need any government policy or information, they are not able to visit an office to seek that information. The information needs of rural Botswana are distinct from those of the urban centres. In most cases, the issue of interest to rural areas is information on government schemes (BOTEC, 2000, p. 1). Government, through the national public radio service, is the major source of information in the rural areas. As the Botswana Technology Centre (BOTEC) feasibility study for a Community User Information System found, out of the 393 rural respondents with some form of employment, 194 (or 49.4%) used radio as their major source of information (BOTEC, 2000).

Another issue in rural areas is technology itself – not just ICTs, but technology in general, including electricity. What form must technology take in order to provide these communities with access to new ICTs (whilst even old ones such as TV and radio are still not universally accessible)? If rural Botswana still lacks fully-diffused grid electricity, problems of access to new ICTs (such as the computer) take on a much broader socio-economic dimension in terms of the cost-effectiveness of any solution proffered. If a community lacks electricity, and if the people in the community could benefit from access to the Internet or public TV broadcasting for their learning needs, can they have the grid extended to them once this need has been established? At what cost? Would it be economically viable? If a lack of grid electricity means alternative sources of energy must be provided, will the alternative means (e.g., solar power) meet the economic sustainability test?

A further problem, which equally impacts on a sizeable number of low-skilled town dwellers as well, is the question of content on the Internet. How many web pages carry information in a (local) language understood by an average citizen? What about the literacy rates in the rural areas? Are the literacy rates at a sufficient level to allow unassisted surfing for information?

Status Report on ICTs in Botswana²

Botswana, in spite of its declared aim of being an informed nation, still lacks a coherent legislative framework for ICTs. This dearth of policy – needed to give direction, focus and priorities for the sector -- has somewhat robbed the country of the benefits that could have accrued from the excellent ICT assets at its disposal.

The national telecommunications operator, Botswana Telecommunications Corporation (BTC), owns a fully-digital backbone infrastructure linking all major population centres (Jensen, 2003). This backbone is one of the most extensive in Africa, linking 50 automatic exchanges and providing connections to South Africa, Zambia and Zimbabwe (Jensen, 1999). This telecommunications infrastructure is used by both BTC (for its telephony and communications services) as well as by Botswana's mobile telephone operators and Internet Service Providers (ISPs), for voice traffic and data services respectively.

The excellent infrastructure allows for telecommunications data services with rates of up to 2 megabits (2 million bits) per second (Mbps) for ISPs connected directly to the backbone, with lower access speeds of up to 56 kilobits (56 thousand bits) per second (Kbps) for standard dial-up access. BTC also offers high-speed leased lines with data speeds of 64, 128 and 256 Kbps, and wireless connections of 128 Kbps (UNDP, 2002, p 14).

¹ The urban dwellers have access to television (public and private), radio (public, and commercial for the capital, Gaborone), newspapers (private and government-owned).

² This section relies on Ntsatsi's 2002 concept paper for the UNDP's Botswana Human Development Report (HDR) 2002/03.

A number of usage options have been made available to consumers (individuals and businesses). Leased lines are used mostly by corporate entities for data transmission and Internet access, while dial-up services are used by small business and home users. High-bandwidth Integrated Services Digital Network (ISDN) connections are also available over regular phone lines, but at a very steep cost.

But the diffusion and uptake of new ICTs in Botswana is critically dependent on grid electricity. Although potentially more than 70% of Botswana's population is within accessible range of grid electricity, only 25% of these households have electricity accounts (UNDP, 2002). Since most ICTs (tools and processes) need power to work, the lack of diffusion of electricity is a hindrance to the diffusion of ICTs.

In contrast, growth in basic telephony diffusion is strong. Deregulation of the telecommunications sector and the setting up of the Botswana Telecommunications Authority (BTA) in 1996 seem to have spurred the national telecommunications operator, BTC, to increase phone connections from 85,590 in 1998 to 150,068 in 2002, a 75% increase over four years. The corresponding increase in cellular phone subscribers between 1998 and 2002 was from 32,644 to 332,314 (a more than 10-fold increase) (Ntsatsi, 2002).

In terms of access to computers, the International Telecommunication Union (ITU) estimated that there were 65,000 personal computers (PCs) in Botswana in the year 2001 (residential and business combined) (ITU, 2003). The Botswana Central Statistics Office (CSO) reported 15,795 PCs in households across the country in 2002, of which 66% were located in urban centres (CSO, 2002, Ntsatsi, 2002). This latter statistic again illustrates the skewed access to ICT technologies between urban and rural dwellers. The Botswana Technology Centre study revealed that 91.5% of the sample rural population had never used a computer, yet 70.3% of the same sample had a desire to learn about computers (BOTEC, 2000).

In another contrast, government workers have good access to computers. Through the Government Data Network³ (GDN), the Botswana Government owns one of the most extensive computer networks in the country, covering nearly 100 villages and towns, and connecting over 7,000 civil servants. The GDN is a high-performance TCP/IP-based network using frame-relay technology and a fibre-optic wide area network (WAN) to link key government servers. Departments typically connect to the network at data rates ranging from 32 to 128 Kbps.

But the government's web presence is still basic. The majority of government web sites are of the "brochure" type, with no opportunity for interactivity.

Radio is by far the most diffused of all ICTs in Botswana, with 68% of households owning a radio set (CSO, 2002). With Botswana's two national public radio stations, and with two commercial radio stations broadcasting in Gaborone, radio retains its importance as a medium of information exchange.

There is one national public television channel, available free of charge through the standard set-top terrestrial TV antenna. There is also national availability of the South African-based direct-to-home satellite TV bouquet, DSTV, available on a private subscription basis through a receiver dish.

³ The GDN backbone is independent from the BTC backbone.

The Mobile Phone Phenomenon: Formative Stages of an Information Society for Botswana?

The rapid growth of the mobile phone in Botswana over the last five years, since the deregulation of the telecommunications sector, has run true to the observation by Kotler, Armstrong, Saunders and Wong (1996) that not all people regarded as “have-nots” are really that. They may in fact be “near-haves” who because of “rapid economic development” are able to “leapfrog intermediate technologies” such as “people progressing from having no telephone direct to a cellular phone [our emphasis added], or from no radio to a hi-fi system with a compact disc.” This rapid change of fortunes and access can make have-nots into haves. This observation is affirmed by the story of the mobile phone in Botswana: the country moved from no cellular phones (prior to deregulation) in 1997, to, as indicated above, 32,644 in 1998, and then a more than 1000% increase in four years, to 332,314, by the year 2002.

This wireless technology platform, which pervades rural areas as much as urban centres, is, if properly utilised, the first major vehicle that rural communities can exploit to get access to the ICT/information society that Botswana strives for. The cellular phones represent, in the words of Ntsatsi, “...330,000 computers out there in the guise of telephones” (Ntsatsi, 2002).

There already exists some integration of the cellular phone and radio -- e.g., between Mascom, one of the two mobile phone operators, and GabzFM, one of the commercial radio stations in Gaborone -- whereby Mascom subscribers can access the radio station’s news bulletins by dialling a Mascom cellular number. More such services should be explored and encouraged. Such services could allow for the presentation of information in a form and language accessible to all, including semi- and illiterate members of the population -- through the cellular short message service (SMS) in local languages and dialects, or in audio and visual forms receivable on cellular handsets. Government (and the cellular phone providers and their collaborators) could perhaps encourage the development of new cell-phone content services by subsidising them. That way people would gain access to information, allowing government to fulfil its aims. The service providers would get more usage of their networks. As network usage expands, the economies of scale, and service possibilities, also grow.

But, for the time being, mobile cellular systems are not effective for delivery of full Internet connectivity.

To provide Internet connectivity in rural areas not yet connected to the fixed-line telephone infrastructure, other options need to be explored.

And even where the fixed network can be extended, there are still other barriers to the ownership, uptake and usage of new ICT platforms. One barrier is affordability, as services are priced beyond the reach of average households. Other issues, such as electricity supply, skill levels and appropriateness of content, have already been touched upon, and are elucidated further in later sections of this paper.

Internet, and the Information Needs of Rural Botswana

Information, the precursor to knowledge, is a critical value-adding need for all humans in order to give meaning to their lives. As Drucker (1995) has stated, knowledge is the “primary resource” for individuals and economies alike, and hence rural communities must have access to information to allow them to become important drivers, and not drainers, of Botswana’s national economy. In keeping with the Botswana Government’s desire for an informed, tolerant, democratic nation by

2016, it is only through the medium of information that all citizens can exhibit the national ideal and become useful and valued members of society, instead of a burden to the fiscus through reliance on social security.

Access to appropriate information, through instruments such as the Internet, which is “an unprecedented form of educational delivery because it is interactive and responsive to the individual needs and provides multimedia information on demand” (Tennessee, PonTell, Romine and Motheral, 1997a), stands out as a core need in the rural areas. Through the medium of the Internet, members of the community could tap into resources available through the WWW, thus gaining timely, “just-in-time” information that “will improve individual and community competitiveness in a technological world” (Tennessee *et al.*, 1997a).

The Tennessee study also highlights another dimension of the information needs of communities: “improved competitiveness in the midst of globalisation” (Tennessee *et al.*, 1997a). This implies that for Botswana to get out of poverty, and to exploit opportunities presented by programmes such as AGOA⁴, CEDA⁵, NAMPAAADD⁶ and others, they must have access to the tools (information) that will allow them to be informed and become aware of these opportunities and best practices the world over.

ICTs are needed as agents of development of communities and individuals, because ICTs “expand people’s freedoms, both as the principal means to an end, and as the constitutive end” (Letshabo, 2002). ICTs can result in what Sen (1999) calls “the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency.”

Guaranteeing Rural Communities Meaningful Access to New ICTs

The reasons why rural communities in Botswana have virtually no meaningful access to ICTs other than radio and, in some cases, TV and the mobile phone, can be summarised as:

1. Lack of resources (financial) to sustainably use them
2. Lack of knowledge and skills to exploit the new ICTs
3. No (relevant) local language content
4. Lack of interactivity of government websites, meaning users do not get any feedback when they have queries – even some theoretically downloadable files cannot be accessed (e.g. the NAMPAAADD document)
5. Lack of electricity for a lot of the rural settlements, thus rendering most ICT tools un-usable
6. The telecommunications network is not universally accessible countrywide

A number of interventions are necessary if Botswana in the rural areas are to gain meaningful access to new ICTs and to the information these technologies can carry. Three such areas of intervention are:

1. Technology

⁴ U.S. Africa Growth and Opportunity Act, which allows products from identified (developing) African countries duty free access into the American market.

⁵ Botswana’s Citizen Entrepreneurial Development Agency, a scheme that provides subsidised loans to citizens.

⁶ Botswana’s National Master Plan for Arable Agriculture and Dairy Development, an agricultural support scheme.

2. Institutional Arrangements
3. Policy Initiatives

Technology

Cost: Where the technology is not accessible due to the high cost of PCs, perhaps alternative ones -- e.g., the Simputer⁷ -- could be the solution, as attempted in India (Simputer Trust, 2000). But the Simputer has limitations as a stand-alone Internet terminal.

Lack of grid electricity: This one is difficult to resolve. The data transmission technology of choice for rural areas where fixed-line telephones have not yet reached would be the use of wireless devices to access the Internet and e-mail. For localities without grid electricity, there is, however, the problem of how these devices are to be powered. The Simputer does not need mains electricity to run, instead running on three AAA batteries (Millar, 2001), but, as already stated, it is not designed as a stand-alone Internet access device (particularly in rural contexts where wireless Internet connectivity is needed). Would this mean everyone would have to use sophisticated, wireless-transmission-enabled laptops powered by large stand-alone batteries? When the batteries become flat, how would access be guaranteed, and the batteries recharged? The only alternative source of power where no grid electricity exists is solar (photovoltaic-PV). But the capital costs of setting these units up are such that individuals or households cannot easily afford them, meaning that this technological solution would not work at an individual or household level, but perhaps at an institutional level. Thus, where solar energy becomes the only power source, it would make economic sense to have a centralised access point for the community.

This brings us to the idea of community-sharing of ICT access: where village extension services exist, they should be grouped under one roof and tasked with delivering in a multi-mode fashion to the communities they already serve, including advising on ICT and information access. In terms of cost, even where grid electricity exists, the pooling of resources might still be the only sustainable model for the foreseeable future, since it facilitates “synergistic alliances within local communities” and, by having a consortium to set up the local server, it improves the “quality and speed of Internet activity” (Tennessen *et al.*, 1997b).

Institutional Arrangements

Innovative models abound of ways in which developing and developed nations have tried to increase citizen access to information technology and electronic media. In Portugal, motivated in part by the desire to change the way the public service worked, the government introduced the concept of “citizen shops,” which combined disparate public sector units/departments into a single information and service resource, following a “client-based approach” to public sector delivery of services (Araújo, 2001).

Senegal and South Africa have experimented with community access centres and telecentres to pool resources into single facilities and reduce household costs of access. Whereas the Senegalese centres are private-sector-led, with entrepreneurs collaborating with the national telecommunications operator to set them up, the South African telecentres and Multipurpose Community Centres (MPCCs) have mostly been driven by government (Fuchs, 1998; UNDP, 2001).

⁷ A low-cost portable alternative to the PC. It is a shared device that allows simple and a natural user interface based on sight, touch and audio (using a smart card feature so that each user can customise and store her/his information on the card).

Botswana must develop a concept of ICT access centres adopted and adapted from the Portuguese, Senegalese and South African examples. The country should begin the process of developing public access centres either in public areas (where they exist) such as primary schools and clinics, or at any other extension office. The existing Village Extension Teams (VETs), representing different ministries and departments of government in rural communities, should be made unitary, integrated teams that can provide the backbone of the access centres. The public would then gain confidence in using the resources, because the resource people would be people already interacting with communities through the service extension processes.

Policy Initiatives

On the policy front, some work has already been done, with the development of a Science and Technology (S&T) Policy (Botswana Ministry of Finance, 1998) and the set-up of the National Commission for Science and Technology (NCST), which plays the role of overall policy advisor to government on S&T matters. Other complementary institutions such as the Botswana Research Science and Technology Investment Agency (BRSTIA), the funding agency for research, are to be operational in the near future. A new Ministry of Communications, Science and Technology (MCST), grouping together all communications, science and technology functions, was set up in 2002. The ministry sees its role as encompassing three broad areas:

1. Promoting research on the use of locally available natural resources to achieve international competitiveness
2. Information and communications technology (ICT) and communications; and
3. Information and media for purposes of promoting universal access to information countrywide (Botswana Ministry of Communications, 2002)

The ministry aims towards “turning Botswana into an ‘information-based economy,’” in which “the production of information goods and services dominates wealth and job creation, and is underpinned by the use of information and communications technologies (ICTs) and the global information infrastructure.” In terms of ICTs, the ministry sees one of its major functions as the promotion of “affordable and ubiquitous access to ICT by all sectors of the population (including rural areas) in addition to overall policy and infrastructure development” (Botswana Ministry of Communications, 2002).

The commitment to universal (tele)communications access found favour with the country’s telecommunications regulator, the BTA, even before the ministry came into existence. The BTA is currently working on the operationalisation of this policy stance, after a detailed consultative process with stakeholders.

As stated under “Institutional Arrangements” above, government must make a policy decision to integrate the process of delivering extension services to rural areas in consonance with government’s stated aim of proving affordable access to high quality Internet and other ICTs to Botswana, as per the national vision. The BTA, BTC and local authorities should then be engaged by government to come aboard the project of providing new ICTs to rural Botswana via public access centres. Certainly, multilateral agencies such as those in the UN system and other international organisations could then be expected to buy in, after seeing that the government is seriously engaging in a rural empowerment initiative. The government could incubate these access centres for a few years and then graduate them to stand on their own (if privately-run), while still providing technical assistance via the integrated government extension services. This way, communities could collaborate with entrepreneurs to maintain the facilities, customise services and

extend services, and hopefully be in a position to sustainably run the operations. This could act as the launching pad for similar initiatives to emerge in towns, led by entrepreneurs.

Impact & Access to Information

By getting access to more information, through the mediation of Internet, the mobile phone and other new ICT technologies, people's expectations, self-confidence and esteem will be increased. With this increase in expectations, two possible outcomes might result -- one positive, the other negative. The entry into the information arena might prompt some people (and hopefully most) to explore further, and to demand information that contributes to their welfare and competitiveness, including information from government.

The outcome for others, however, might be frustration, if their expectations are not fulfilled. This lack of fulfilment will result if government policy on access to information does not change in step with increased access to, and demand for, information by citizens who have hitherto been information-starved. If people cannot access government information that they regard as critical to their livelihoods and the sustenance of their enterprises, then the people will grow disillusioned with both (access) policy and the medium of access (the ICTs that were meant to deliver them from ignorance and impotence). Government must be aware of this eventuality and ensure that it moves at speed to enact freedom of information legislation and set in place systems that will ensure those seeking information can get it.

Access to information will lead rural communities to take their civic responsibilities more seriously and will allow them the confidence to begin questioning the process of government. A new interest group whose interests policy makers will be forced to take on board will emerge, with the tools to articulate their issues and concerns.

Conclusions

Taking the view that access to technology, especially new ICTs, is a development imperative, this paper paints a picture of the infrastructural endowment Botswana has in ICT generally, and then outlines the problems that have hindered the exploitation of this enabling environment in order to usher in an information society. The growth in use of the cellular phone, which turned telephone have-nots into haves in a flash, is cited as an example of a possible vehicle that can be harnessed in partially closing the information and (digital) divide between urban and rural communities.

The paper identifies the impediments blocking rural Botswana from accessing meaningful information and new ICT services as: lack of resources (by the communities); lack of knowledge and skills to utilise new ICTs; no local language content in the Internet; lack of fixed-line telecommunications infrastructure and/or electricity in some localities; and finally, static government websites (information resources).

The paper advocates the resolution of these problems along three strands: technological, institutional and policy-based.

Technological interventions in the form of cheaper equipment, (e.g., the Simputer) and the provision of photovoltaic solar energy are suggested. An institutional proposal is the rearrangement of government extension service in rural areas, into singular integrated resource/ICT access centres. At the policy level, the proposal is for policies to enable the integration of rural extension services, and policies to allow for state sponsorship of community access centres.

Finally, the paper emphasises the citizens' inalienable right to access (public) information – a right that no government should pay lip service to. The paper firmly maintains that, in order for Botswana to attain an "information society" within the remaining 13 years of the national Vision 2016 plan, information - that empowering intangible – must be the first and only guarantor of the dream. All citizens must thus be guaranteed access to that information by the time of the country's golden jubilee in 2016.

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