Understanding

what is happening in ICT in Botswana

A supply- and demand-side analysis of the ICT sector

Steve Esselaar and
Sebusang Sebusang

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Research ICT Africa

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Executive summary

Botswana has experienced radical changes in its information and communication technology (ICT) institutional and regulatory framework since the year 2006 when the market was liberalised to allow internet service providers (ISPs) to provide voice over internet protocol (VoIP), the mobile operators to build their own infrastructure and the international voice gateway to be opened to competition. This happened in tandem with the announcement of the intention to privatise the national fixed-line incumbent Botswana Telecommunications Corporation (BTC). Soon thereafter, BTC and the two mobile operators Mascom and Orange were awarded service-neutral public telecommunications operator (PTO) licences allowing them to offer services across the spectrum using whatever technology they choose.

Whilst there have been impressive changes, Botswana's networked readiness index ranking continues to deteriorate

Whilst there have been impressive changes in the regulatory environment, in liberalisation of the market, and in investment in bandwidth capacity (via connections to two undersea cables: the Eastern African Submarine Cable System [EASSy] and the West African Cable Sytem [WACS]), Botswana's networked readiness ranking has been deteriorating in recent years. It is now worse than that of comparable lower-middle income countries such as South Africa, Mauritius, Kenya and Ghana (in spite of higher income per capita than in Kenya, Ghana and South Africa).

During the period 2005-2007, the incumbent BTC was required to undergo a tariff rebalancing exercise, which resulted in lower international call charges while local call charges increased. As part of a regulatory market study in 2008, BTC was judged to be wielding significant market power (SMP) in three areas – internet service provision, international data provision and leased line provision – primarily because there was no differential pricing between wholesale and retail.

In 2012, the Government split the BTC into two entities, BTC (the PTO for retail, and due for privatisation) and Botswana Fibre Networks (BoFiNet) a wholly-government-owned entity taking over backbone fibre infrastructure access (to be offered to all operators on equal-access wholesale terms). Also in 2012, the Communications Regulatory Authority Act merged the two regulators in telecommunications and broadcasting respectively, the Botswana Telecommunications Authority (BTA) and the National Broadcasting Board (NBB), into a single authority, the Botswana Communications Regulatory Authority (BOCRA).

The market remains structured around three vertically integrated operators

The rapid evolution of the regulatory environment, of telecommunications technology, and of the structure of demand for telecommunication services have made it possible for all the operators to provide both fixed and mobile services to businesses and consumers. Although the service-neutral licensing regime was intended to increase competition, the market remains structured around three vertically integrated operators Mascom Wireless, Orange Botswana and BTC, with BTC, for example, playing the dual role of an ISP and also a bandwidth supplier to ISPs. The introduction of BoFiNet is intended to provide open access to backhaul infrastructure at lower prices.

Perceptions of the regulatory environment, as surveyed by a RIA Telecom Regulatory Environment (TRE) assessment, are generally negative, with the TRE exercise looking at stakeholder perceptions of regulation across three sectors (fixed, mobile, value-added network services (VANS)) and seven dimensions: universal service obligations (USO), anti-competitive practices, tariff regulation (basically affordability), access to resources (such as spectrum), quality of service (QoS), interconnection rates and market entry (ease of entry to the market for service providers).

Part of this negative perception of the regulatory environment is explained by high retail prices, caused by a vertically integrated market with high termination rates. High-speed internet access and data services penetration are lagging. The 2012 RIA Botswana ICT Survey found that only 9% of respondents use the internet. Most internet users are found in urban areas while in the rest of the country people for the most part do not have access to internet, let alone a broadband connection. High broadband prices are limiting access to, and use of, the internet.

The 2012 RIA ICT Survey found that 71% of Batswana who use the internet accessed it for the first time via computer and 51% accessed it at work, while 52% of Batswana state that price is the main reason for limited use of the internet.

The Botswana Government's Nteletsa II programme, focussed on increasing rural access to mobile ICTs, has, broadly speaking, been a success and it is the major reason that BTC's beMobile service, the newest mobile entrant, has been able to compete against the incumbents Orange and Mascom. (A significant portion of beMobile's subscriber growth has been in Nteletsa II areas, where it has good network coverage.)

Infrastructure-sharing, imposed via regulatory intervention in 2011, has been a major success, with regulation enhancing an already-existing industry practice whereby all the three PTOs share infrastructure significantly.

However, pricing is one of the best measures of the competitiveness of markets, and all signs are that consumers in Botswana are not seeing the benefits of dynamically competitive markets, though there is some evidence of mobile pricing pressure by BTC's mobile service beMobile.

Part of the negative regulatory environment perception is explained by high retail prices and termination rates

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Acronyms and abbreviations

ADSL	asymmetric digital subscriber line
ARPU	average revenue per user
BCWIS	Botswana Core Welfare Indicators Survey
BOCRA	Botswana Communications Regulatory Authority
BoFiNet	Botswana Fibre Networks
BTA	Botswana Telecommunications Authority
BTC	Botswana Telecommunications Corporation
BTV	Botswana TV
BWP	Botswana Pula
CAC	community access centres
CAGR	compound annual growth rate
ccTLD	country code top-level domain
CDMA	code division multiple access
CSO	Central Statistics Office
DBS	Department of Broadcasting Services
DIT	Department of Information Technology
DTPS	Department of Telecommunications and Postal Services
EASSy	Eastern African Submarine Cable System
GDP	gross domestic product
GSM	global system for mobile communications
ICANN	Internet Cooperation for Assigned Names and Numbers
ICT	information and communication technology
ILL	international leased lines

ISDN	integrated services digital network
ISP	internet service providers
ITU	International Telecommunication Union
LTE	long-term evolution
MTC	Ministry of Transport and Communications
MVNO	mobile virtual network operator
NBB	National Broadcasting Board
NDP	National Development Plan
PPP	purchasing power parity
PTN	Private Telecommunications Networks
PTO	public telecommunications operator
QoS	quality of service
RB	Radio Botswana
RIA	Research ICT Africa
SAT-3	South Atlantic 3
SMP	significant market power
TAC	technical advisory committee
TRE	Telecom Regulatory Environment
USD	US dollar
USO	universal service obligations
VANS	value-added network services
WACS	West Africa Cable System
WEF	World Economic Forum
WiMAX	worldwide interoperability for microwave access

Introduction

Socio-economic overview

Botswana is a sparsely populated country covering a land area of 581 730 km squared. The 2011 Botswana Housing and Population Census put Botswana's population at 2 024 787 (Central Statistics Organisation, 2011). Most of the population is concentrated in the eastern part of the country. Although Botswana's economy is growing, it has of late been growing at a declining rate, with 7% growth in 2010, 5.1% in 2011, and 4.2% in 2012. This declining growth rate can be attributed to a number of factors, including the global economic recession since 2008 and the structure of the country's economy (which has struggled to diversify away from its diamond-mining dependence). Botswana has, accordingly, also been experiencing declining rates of GDP growth.

Mining, the largest contributor to GDP, contributes 19.9% (see Table 1), followed by general government at 15% and services at 14.5%. Presently, the contribution of transportation, telecommunications and postal services to GDP is calculated at 5.6%.

The mining sector still contributes the most to Botswana's GDP

Table 1: Botswana's socio-economic indicators

GDP growth	7.0% (2010) 5.1% (2011) 4.2% (2012)
GDP per capita at current international USD PPP	USD14 696.00 (2012)
GDP composition by key sectors (2012)	Mining 19.9 % General government 15% Banks, insurance and business services 14.5% Building and construction 6.7 % Transport, telecommunications and post 5.6% Agriculture 2.7%
Urbanisation	62%

Source: Bank of Botswana (2013), World Bank (2013), Central Statistics Office (2012)

The country's 2012 GDP per capita is USD14 696 at current international USD purchasing-power parity (PPP) rates, making it an upper-middle income country. The majority of households reside in cities and urban settlements (62% of the population). The Central Statistics Office published the Botswana Core Welfare Indicators Survey (BCWIS) in 2010, which found incomes in urban areas to be much higher than in rural areas. The average monthly income in cities and towns was BWP11 475.4 (USD1 337) compared to BWP5 815.8 (USD678) and BWP2 345.9 (USD273) in semi-urban villages and rural areas respectively. In 2010, the portion of the population living below USD1 a day was 3.3% in cities/towns while it was 6.1% and 8.3% in semi-urban villages and rural areas respectively (CSO, 2010).

Botswana's above-average GDP per capita makes it an upper-middle income country

Table 2 below shows that Botswana has an overall World Economic Forum (WEF) Networked Readiness Index (NRI) score of 3.58, ranking the country in 89th place globally (WEF, 2012). Botswana has now dropped below Kenya and

Botswana's NRI ranking has been overtaken by both Kenya and Ghana

Ghana, both of which it was ahead of in 2012. With the exception of Mozambique, all the other comparator countries show an improving network readiness even if the relative rank may have gone down for some such as Namibia, Mauritius and Nigeria. The one key indicator of Botswana's failure is the fact that its readiness is lagging in spite of its higher GDP per capita than most of the countries in this table. Comparable income countries, such as South Africa, Mauritius and Namibia, show marked improvements in their network readiness.

Table 2: NRI rankings and scores for 8 RIA ICT Survey countries

	Date	Botswana	Ghana	Kenya	Mozambique	Namibia	Nigeria	South Africa	Mauritius
NRI ranking (score)	2012	**89 (3.58)**	97 (3.44)	93 (3.51)	120 (2.99)	105 (3.35)	112 (3.22)	72 (3.87)	53 (4.06)

Source: WEF (2012)

ICT sector review

ICT policy

In 2007, the Government finalised an ICT policy called the Maitlamo National ICT Policy to guide all ICT initiatives in Botswana (Republic of Botswana, 2007). The National ICT Policy aims to create an enabling environment for growth of an ICT industry in Botswana and for provision of universal service and access to ICT facilities, with the ultimate objective of Botswana becoming a regional ICT hub. The Policy aims at supporting an efficient and cost-effective ICT infrastructure, establishing universal access to local and relevant information, instituting an ICT legal framework, and enhancing government services and healthcare through the use of ICTs.

A timely new development in the ICT space will be the passing into law of the Electronic Communications and Transactions Bill, 2013 (No. 25 of 2013). In the words of the Minister of Trade and Industry, this will allow "*electronic transactions to be recognised in the same manner as paper based transactions, the promotion of a legal framework to support electronic commercial practices and the promotion and adoption of information technologies in relation to electronic transactions.*" This means all electronic signatures will for the first time be given the legal equivalence of handwritten signatures. This change will give legal protection to domestic and international electronic transactions, thus increasing the value of ICTs in economic trade.

Another important development, though delayed in its execution since being proposed in 2010 and subjected to consultations concluded in 2011, is the intention of the Ministry of Transport and Communications (MTC) to develop internal networking regulations for government and commercial buildings. When these regulations are finalised, certain national standards related to telecommunications infrastructure, earthing, bonding and generic cabling will be mandatory. This will make all such new buildings' ICT infrastructure and connectivity ready on completion rather than the current practice whereby buildings are planned, built and commissioned with minimal provision for ICTs and connectivity (some commercial and government buildings remain without communications infrastructure or have had to be retro-fitted as an afterthought).

The Ministry of Transport and Communications intends to provide an ICT internal network for government and commercial buildings

In 2012, the Botswana Telecommunications Corporation (BTC) was split into retail and wholesale companies, with the retail arm retaining the name BTC and the wholesale company called Botswana Fibre Networks Limited (BoFiNet). BTC is to become a partially privatised entity by the end of 2014, and BoFiNet will remain 100% state-owned. BoFiNet's purpose will be to manage, and provide wholesale access to, the national fibre backbone network in order to reduce the prohibitively high cost of connectivity in the market, to increase uptake of services and to make better use of the existing fibre infrastructure (thus deriving economic value from the investments made by the Botswana Government in laying the network). Thus, the fibre backbone is being kept government-owned as a national asset that can be used to reduce communications costs through non-discriminatory access and low wholesale prices (the intention is to cut wholesale prices in half). With broadband prices in Botswana amongst the highest in Africa (see "ICT pricing" section below) this intervention in support of low-cost, equitable, wholesale access to fibre is an important one.

The fibre backbone is going to be government-owned to reduce communications costs

The National Broadband Strategy being drafted at the time of writing by the Government of Botswana "aims at increasing the accessibility of broadband services throughout the country and improving its affordability" (BOCRA, 2013). The Strategy explicitly recognises that the mechanism to achieve greater access to and affordability of broadband services is through increased competition. Before the Broadband Strategy is finalised, earlier indicators of the benefits of structurally separating the BTC have been BoFiNet's reduction of wholesale internet prices by 40% and the intention to extend the fibre loop to reach the Namibian border at Ngoma.

This would further enhance opportunities for cross-border connectivity. Given Botswana's sparseness, certain low-density settlements are unlikely to be directly connected to the fibre network due to cost constraints. The Government of Botswana has procured alternative, radio-based, point-to-multipoint broadband connectivity from BTC for more than 430 government institutions amongst which are more than 30 public libraries.

The Botswana National e-Government Strategy 2011-2016 was launched in 2010 (Republic of Botswana, 2010b) but e-Government adoption has been slow, with the only real change being that people can now download forms to be printed, filled in by hand and physically submitted to an office. The prospect of Government's portal being truly interactive is still some way off, meaning that the e-Government Strategy has yet to affect citizens' transactions costs and access to government services. The enabling legislation for electronic communications and transactions will be in place in 2014 and the Government will have no excuse for not supporting electronic payments for online services.

The Maitlamo National ICT Policy of 2007 outlines over 100 programmes and projects designed to offer broad and tangible benefits to all segments of society in Botswana through the effective deployment of ICT and e-Government services. Two of the major Maitlamo initiatives are the Kitsong Centres and the Nteletsa II project.

The Kitsong Centres are community access centres (CACs) initiated in 2006-07 to serve as a gateway to internet and access and other ICT services in rural areas. The Kitsong Centres provide government information and services including school registrations, birth certificates, passports and livestock-tracking.

The Nteletsa II project is also aimed at providing telecommunications services to rural communities, with the Kitsong Centres forming part of Nteletsa delivery. Altogether, a total of 197 villages/communities have been identified to participate in the Nteletsa II programme, which supplies, operates and maintains network infrastructure, particularly mobile infrastructure, in rural areas. For implementation of Nteletsa II, both Mascom and BTC have signed contracts to service communities in partnership with the MTC. The Kitsong Centres are a key deliverable for each community targeted by Nteletsa, and each Centre must provide voice services and internet access, with data speeds faster than 256 kbps. Nteletsa II's implementation process was completed in October 2011.

In addition to the Kitsong Centres (at post offices and Nteletsa II target communities), public ICT access has also been provided to Botswana's network of public libraries via the Sesigo project, a public access project funded by the Bill and Melinda Gates Foundation. This project has provided connectivity to 63 public libraries and training for more than 60 000 users in ICTs in the process. Libraries are now the e-Government access points and will be expected to play an even bigger role once e-Government becomes interactive. Government sees libraries as central to e-Government because library use and access are free and libraries can train users in the use of computers and the internet (thus eliminating knowledge, or lack thereof, as a barrier).

However, the positioning of libraries as locations for the provision of e-Government services has not been a successful model in other countries, especially in countries where mobile is the predominant form of internet access. It remains to be seen whether the addition of interactive e-Government services will result in Botswana's libraries becoming a primary form of access.

Institutional arrangements

After the 2009 elections, a core government objective was to improve service delivery and efficiency in the ICT sector. To achieve this, the Government reconfigured the Ministry of Science and Technology to form the new ministry, the aforementioned MTC. As part of the restructuring, the Department of Broadcasting Services (DBS) became responsible for government broadcasters, namely Radio Botswana (RB) and Botswana Television (BTV), and was moved to the

The Kitsong community access centres serve as a gateway to ICT services in rural areas

Libraries are now the e-Government access points and will be expected to play an even bigger role once e-Government becomes interactive

Office of the President. To further develop the ICT sector, some new departments, more focussed on and specific to ICTs, were generated: the Department of Telecommunications and Postal Services (DTPS) and the Department of Information and Technology (DIT) (formerly the Government Computer Bureau, which also has the mandate to deal with universal service and access issues).
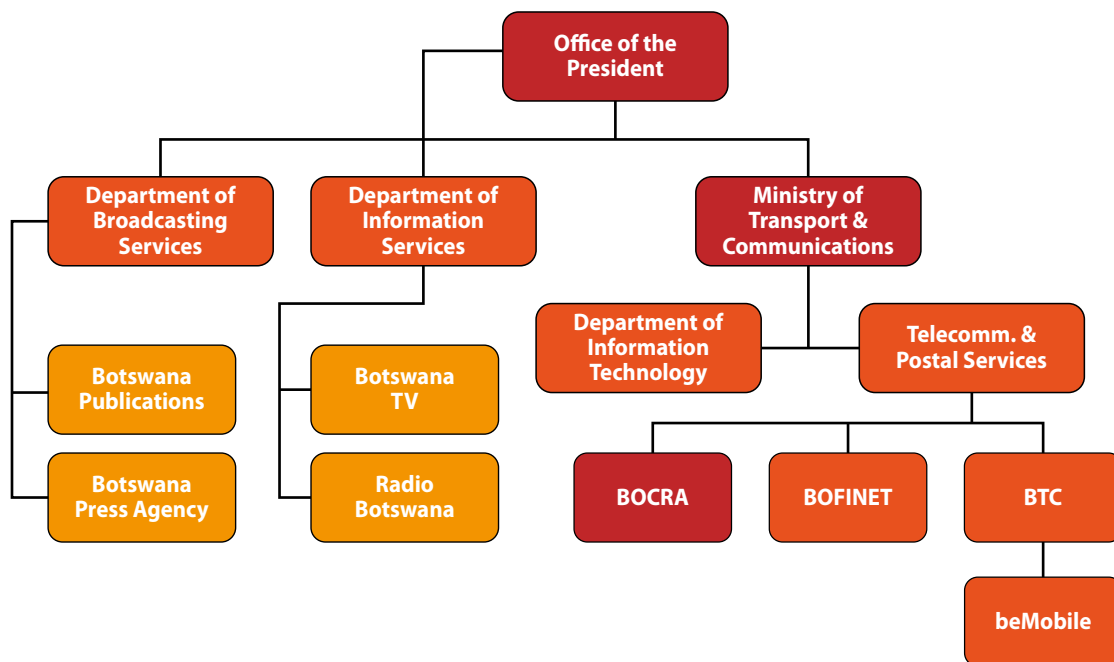
Figure 1: ICT institutional organogram
Figure constructed by author for the purposes of this paper (2013)

The Botswana Telecommunications Authority (BTA) was established in December 1996 with a mandate to regulate telecommunications and to settle disputes among operators. It at the same time played the role of advisor (secretariat) on broadcasting. From 2006 onwards, the BTA had to report to the Minister, who had the power to appoint and disqualify members and in some cases nullify the decisions made by the BTA, making the regulator's effectiveness and independence questionable and impacting negatively on regulation of the sector.

In November 2012, new legislation, the Communications Regulatory Authority Act of 2012, was passed to form a converged regulatory authority, replacing the BTA and NBB with the Botswana Communications Regulatory Authority (BOCRA). The legislation gives BOCRA the mandate to regulate telecommunication, broadcasting and postal services.

The new MTC, through the Department of TPS and DIT, is responsible for formulating ICT policies. One of the responsibilities of the Minister of Transport and Communications is to appoint the Board of the regulator BOCRA. (The Minister has the prerogative to appoint and disqualify anyone who wishes to be on the BOCRA Board.) And senior appointments to BOCRA are performed by the Board based on recommendations from the BOCRA Chief Executive

The Botswana Communications Regulatory Authority (BOCRA) has replaced the BTA and NBB

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Officer (CEO) with all staff below this layer appointed by the CEO of BOCRA. This has brought about state control over the converged telecommunications and broadcasting space, and in the process the country lost the minimal independence that the broadcasting sector previously had from the state when broadcasting fell largely under the National Broadcasting Board (NBB). The government broadcasters, previously registered as public broadcasters, are now called state broadcasters and effectively fall under the Office of the President. The possibility of community radio – a possibility that existed, however remotely, in the previous arrangement under the NBB – has now fallen away.

The establishment of BOCRA is meant to improve provision of communications services and allow for a more a robust regulatory framework that is accountable, transparent and efficient. Among the benefits of the creation of BOCRA is its ability to apply administrative sanctions, including punitive surcharges, for non-compliance by regulated entities – though the same powers could have been achieved through promulgation of regulations under the previous regulatory dispensation.

BOCRA has the power to regulate operators, but this power is potentially undermined by the fact that the regulator is beholden to political control since there is no clear separation between the powers of the state and the powers of BOCRA. Regulatory powers need to sit squarely with an independent BOCRA if regulation is to be effective. An example of state regulatory power is the fact that the Minister has the power, without following any prescribed provision or process, to exempt entities from the requirement of obtaining a radio licence.

Recent regulatory developments

Licensing

In 2007, the BTA introduced a service-neutral licensing regime. This licensing framework consists of three licence categories: (1) Public Telecommunications Operators (PTOs), (2) Value-Added Network Services (VANS) and (3) Private Telecommunications Networks (PTNs). This service- and technology-neutral approach has made it possible for the parastatal fixed-line operator BTC (now also a mobile service provider, via its beMobile service) and private mobile providers Mascom and Orange to be granted (on application) service-neutral licences. These licences authorise the operators to provide converged services in all forms of telecommunications services to a defined level of functionality, over fixed or mobile (and wired or wireless) network links, using any available technology, and to provide international telecommunications, including the operation of international gateways.

The introduction of the service-neutral licensing regime brought to an end the BTC fixed-line monopoly, which had been in place since 1980, while also opening up an avenue for BTC to compete in the mobile space. While not much competition takes place in the fixed market, as marked by the constant 8% teledensity for the past decade, competition and innovation in the mobile market have been enhanced, with the third operator, BTC's beMobile, controlling about 13% of the market (having started 10 years after the other operators).

The new licensing regime has meant that VANS operators, who provide internet and data services, are also receiving technology-neutral licenses, covering all forms of value-added telecommunications service provision, including VoIP or internet telephony at national and international levels. However, only the mobile and fixed-line operators have been allowed to apply for the PTO licences. The exclusion of VANS from PTO licences means that the regulator has not adopted a fully service-neutral approach to licensing. As of the end of 2012, the regulator had issued three PTO licences, 58 VANS licences and 31 PTN licences (BTA, 2012), and no company is compelled to use the BTC infrastructure, or the BTC international gateway, to route calls.

Spectrum

A requirement of the Communications Regulatory Authority Act of 2012, in terms of Section 47(a), is for BOCRA to "ensure the rational use of the radio frequency spectrum in Botswana by establishing and maintaining a national radio frequency plan" (Republic of Botswana, 2012). The existing Radio Frequency Plan was established in 2004, and a review of the Plan is required in order to align it to international plans, to design allocation policies for various radio services envisaged in the liberalisation roadmap, and to develop a licensing and pricing policy. However, a revised Plan has yet to be completed, delaying the rollout of advanced spectrum services (such as long-term evolution [LTE]) as well as the allocation of high-efficiency spectrum such as the 700MHz frequency (ITU, 2012).

Interconnection

Interconnection between networks and between service providers is a matter of commercial negotiation between the parties, subject to regulatory intervention in the case of dispute. The guiding principles on which any dispute will be settled are to be consistent with the regulator's interconnection guidelines. In August 2012, the BTA instructed mobile operators to reduce their termination rates according to a glide path. (BOCRA, 2012) At the same time, the BTA revised fixed-line termination rates upwards.

The BTA instructed mobile operators in August 2012 to reduce their termination rates according to a glide path

Fibre optic systems

The Government of Botswana is the major driver of development of IT and communication systems in the country. The recognition of the importance of ICTs in national development is demonstrated by growing government expenditure on ICT since adoption of the National Development Plan 7 (NDP7) in 1992 and through to NDP9, which ran until 2009. In Pula (BWP) value, investments in government IT rose from BWP19million (about USD2.72million) in NDP7 (1992 to 1997) to BWP487million (USD69.75million) in NDP8 (1997 to 2003) and then to BWP602million (USD86.21) during NDP9 (2003 to 2009) (Mutula *et al.*, 2010).

A number of factors give impetus to Botswana as a country. The recognition of the importance of:

- globalisation, economic restructuring and reforms which have threatened the key industries that generate wealth, thus making information and ICTs important ingredients for competitiveness and survival;

- the opening up of a competitive environment, allowing new market entrants to compete for provision of infrastructure, networks and value-added services;

- Government's deregulation and restructuring of computer operations, enabling individual ministries and departments to forge their own partnerships and contracts with the private sector; and

- the need to use modern technology as articulated in Vision 2016 (Republic of Botswana, 2010a).

Botswana today has links to two undersea fibre optic cable systems (EASSy and WACS), after being at the mercy, between 2004 and 2008, of the South Atlantic 3 (SAT3) cable monopoly operated by Telkom South Africa. The East Africa Submarine System (EASSy) connects countries along the east coast of Africa (Sudan, Djibouti, Somalia, Kenya, Tanzania, Mozambique and South Africa). EASSy was developed to provide high-quality and high-capacity fibre networks to interconnect African countries among themselves and with the rest of the world. The Botswana Government's investment in, and connection with, this submarine cable is designed to bring high-quality broadband

Botswana now has links to two undersea fibre optic cable systems

capacity to the country and therefore make business transactions faster and cheaper for the country. Connecting to the West African Cable System (WACS) complements the capacity acquired in EASSy by providing additional capacity and alternative connectivity to Europe.

However, the impact of connecting to these two cables is yet to be felt on broadband pricing, availability and services in Botswana, as prices remain high and use low.

Infrastructure-sharing

Infrastructure-sharing is now widespread among operators

In 2011, the BTA passed the Guidelines for sharing of Passive Communications Infrastructure (BOCRA, 2011). Infrastructure-sharing had already been relatively common on a commercial basis between the operators, and thus the Guidelines formalised an already-existing process, but now with light-touch regulatory oversight. Infrastructure-sharing is now widespread among operators (BOCRA, 2011):

- BTC has leased out space on 53% of its towers (316 of its 600 total) and is leasing a further 84 towers from either Orange or Mascom (representing 14% of its tower base).

- Mascom leases 155 towers and has 230 of its own towers (of which 60 [26%] are leased to other operators).

- Orange leases more towers (188) than it owns (174), while leasing out space on 26 (15%) of its own towers.

Unfortunately, the success of infrastructure-sharing has yet to be felt in retail prices. Mobile voice prices remain high and mobile broadband remains prohibitively expensive.

Country code top-level domain (ccTLD)

The BOCRA will be allowed to register and sell .bw domain names when it takes over the .bw domain from BTC

The Botswana Government made a policy change in 2009 to move the regulation and management of the .bw domain from BTC to the regulator. In April 2010, an industry-led technical advisory committee (TAC) was formed to guide the process. A three-year action plan was then developed, to end in 2013 with the Internet Cooperation for Assigned Names and Numbers (ICANN) re-delegation of the .bw domain from BTC to the regulator. The process has further liberalised the retail side, as ISPs will now be allowed to register and sell .bw domain names. A dedicated website[1] has been developed for the registry, where the public can learn about the process of registering under the .bw domain and check whether or not their intended domain name exists before contacting a registrar (an ISP) to complete the process of domain name registration.

Market structure

The Botswana telecommunications market consists of four main players: Mascom Wireless, Orange Botswana, beMobile (owned by BTC) and BTC:

- Mascom Wireless was licensed to offer a mobile communication service in Botswana in February 1998 alongside Vista (now Orange Botswana). Five weeks after acquiring the licence to offer services, Mascom Wireless launched its network, and has remained the market leader in mobile phone communications in the country. Mascom coverage extends to almost the entire population.

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[1] See: www.nic.net.bw

- Orange Botswana was launched in 1998 as Vista Cellular before becoming Orange Botswana in March 2003, following Orange's acquisition of a 51% stake in Vista Cellular (ICT4D Country Report, 2010).

- BeMobile, the mobile subsidiary of BTC, started operating in May 2008.

- BTC was, up until 2006, the sole provider of backbone services for the ICT sector in Botswana. (As mentioned above, after 2006, the market was liberalised, introducing a new licensing system that allowed other companies to have their own backbone and provide their own gateway routes.)

Botswana has made significant progress in liberalising its telecommunication services, resulting in integrated network platforms and the deployment of advanced fixed and mobile communications for voice and data, including VoIP, WiFi and worldwide interoperability for microwave access (WiMAX). Local operators support 3G and 3.5G mobile data.

Botswana has made significant progress in liberalising its telecommuni- cations services

In the mobile sector, Mascom is the dominant player with a market share of 53%, followed by Orange (34%) and then beMobile at 13% (see Figure 2).
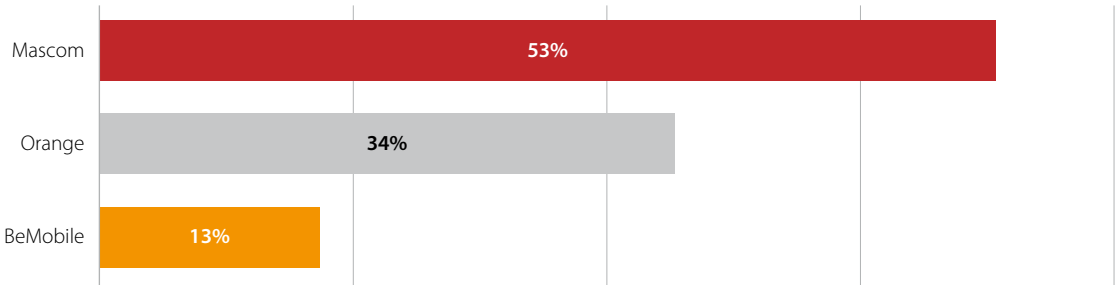
Figure 2: Mobile operator market shares

Source: Intelecon (2013)

Late entrant beMobile predictably has the smallest market share, but this has grown to 13% in only five years, between 2008 and 2012. A significant portion of beMobile's coverage is in Nteletsa II areas (see next section for more information). Nteletsa II areas are amongst the poorest regions in Botswana, and thus it would be expected that beMobile's average revenue per user (ARPU) would be lower than that for the two other mobile operators. However, this is not the case (see Table 3), with beMobile having higher ARPUs than both Mascom and Orange. One interpretation can be that Nteletsa II areas are not as commercially unviable as operators have previously claimed.

beMobile grew is market share from zero to 13% between 2008 and 2012

Table 3: Mobile operators' average revenue per user (ARPU)

	Mascom	Orange	beMobile
National ARPU (BWP)	66	65	69

Source: Intelecon (2013)

Despite beMobile being the latest entrant into the market, it has the same population coverage as Mascom. The rapid growth in coverage for beMobile was aided by the fact that it could co-locate its towers with its parent, BTC, and by its participation in the Nteletsa II programme, through which its expansion was partially subsidised by Government.

Table 4: Mobile operators' population coverage

	Mascom	Orange	beMobile
Population coverage	95%	85%	95%

Source: Intelecon (2013)

The fact that the operator with the smallest market share, beMobile, has the same population coverage as the dominant operator is an interesting characteristic of the Botswana telecommunications environment. In many other jurisdictions, the newest entrants have the poorest population coverage.

Telecom Regulatory Environment (TRE) assessment

In order to understand perceptions of Botswana's regulatory environment, 44 experts on the ICT sector, and specifically on policy and regulatory issues, were surveyed using the LIRNEasia TRE methodology (LIRNEasia, 2008). The respondents were identified based on either their expertise in the sector or their participation in the sector as a consumer, wholesaler or retailer. TRE respondents were asked to rate the Botswana telecommunications policy and regulatory environment across three sectors – fixed, mobile and VANS – according to the following seven dimensions:

- universal service obligations (USO);

- anti-competitive practices;

- tariff regulation (i.e. affordability);

- access to scarce resources (such as spectrum);

- quality of service (QoS);

- interconnection; and

- market entry (i.e. ease of entry to the market for service providers).

Botswana's overall score for the 2012 TRE assessment (combining scores for each of the seven aspects across the three sectors [fixed, mobile and VANS]) is negative, at -0.6. (It is important to note that this is not an assessment of the regulator *per se* but the entire policy and regulatory environment, particularly as the regulator is only the implementer of national policy. The regulator's ability to intervene is determined to a great degree by policies, which together with wider political and economic factors create the conditions under which investment, development and regulation of the ICT sector function.)

Botswana's overall TRE score put it in eighth position

The 2012 TRE assessment was conducted in 11 other RIA study countries, including neighbouring South Africa, Mozambique and Namibia. Among the 12 countries, Botswana's overall TRE score puts it in eighth position (Figure 3).
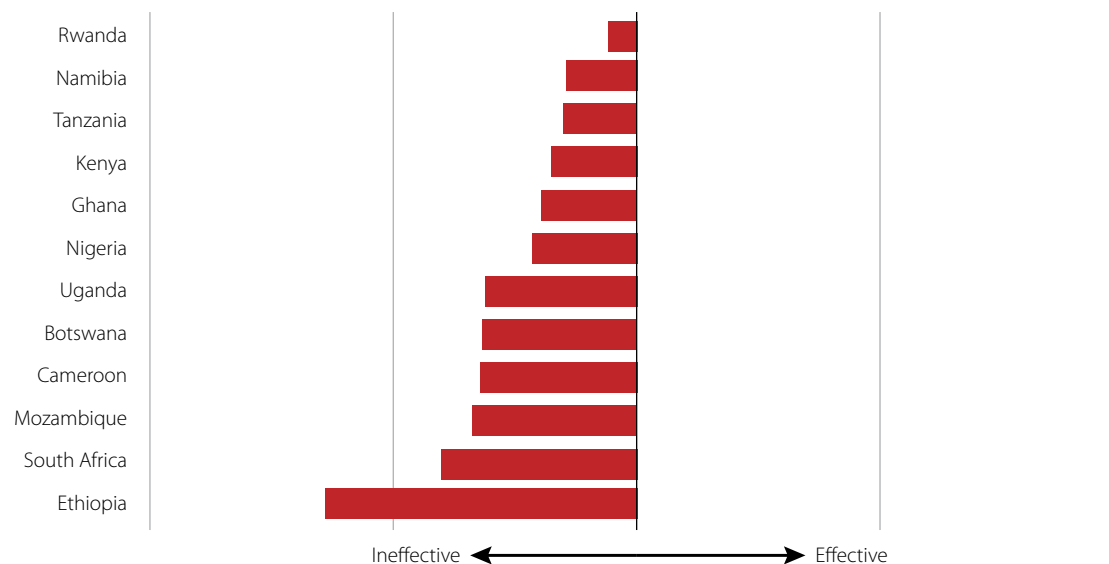
Figure 3: Overall TRE scores in 12 RIA study countries
Source: RIA TRE assessment data 2011-12

In Botswana, all seven regulatory dimensions are perceived as being ineffectively handled (see Figure 4), with regulation of USO, anti-competitive practices and tariffs seen as the least effective regulatory dimensions.


Figure 4: Botswana's TRE scores across seven dimensions
Source: RIA TRE assessment data 2011-12

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The BTC monopoly and its low fixed-line penetration give the sector a poor TRE rating

Among the TRE results for the fixed-line sector (Figure 5 below), regulation of USO and regulation of anti-competitive practices are scored very negatively – which is understandable, given that the fixed sector has only a monopoly provider, BTC, and low penetration. Regulation of access to scarce resources is also scored quite negatively for the fixed sector, and this will need to be an area of focus for the regulator BOCRA. Also, regulation of QoS for the fixed-line sector gets an even lower score than it does for the mobile sector – which is somewhat surprising, as usually it is the mobile sector that attracts the most QoS concerns in TRE assessments.
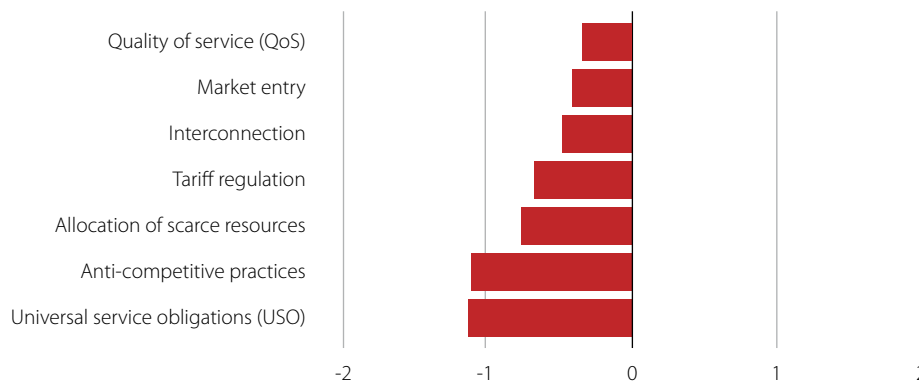
Figure 5: Botswana's TRE scores for regulation of the fixed sector
Source: RIA TRE assessment data 2011-12

The entrance of beMobile and Nteletsa II implementation seem to have generated favourable mobile market regulation perceptions

In the mobile sector (Figure 6 below), regulation of market entry is rated positively, the only positive score across all sectors and dimensions. The entrance of beMobile and implementation of Nteletsa II programme (as outlined earlier) seem clearly to have generated favourable perceptions of the mobile market. The next-best, but negative, score for regulation of the mobile sector is for regulation of interconnection – apparently reflecting a perception that while the regulator is implementing a termination rate glide path, termination rates are still too high.
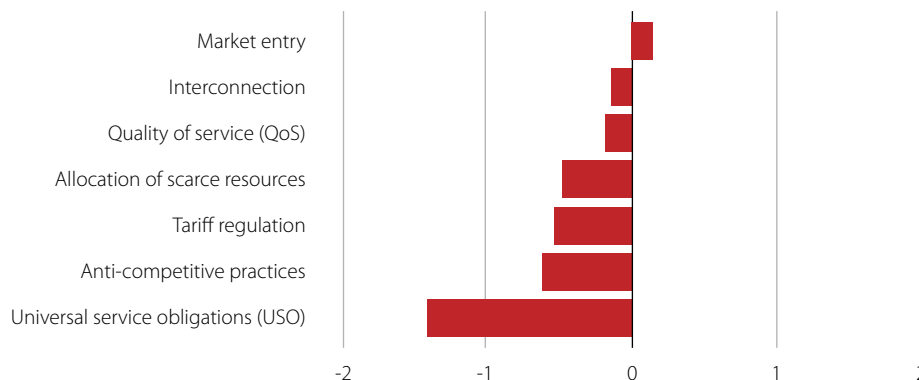
Figure 6: Botswana's TRE scores for regulation of the mobile sector
Source: RIA TRE assessment data 2011-12

Regulation of access to scarce resources is rated quite poorly for the mobile sector, most likely due to the problems with spectrum allocation for uses outside of the operations of the mobile operators. Tariff regulation is also perceived negatively. As the termination glide path is implemented, tariffs are likely to come down, and thus this assessment is likely to change in future TRE assessments.

The lowest score for regulation of anti-competitive practices is in the mobile sector. It is difficult to determine a primary cause for this low rating, but it seems clear that when one operator (Mascom) has 53% market share, it may abuse this position unless effective regulation is put in place. Finally, the lowest-rated regulatory dimension for the mobile sector is regulation of USO. A possible explanation is that the impact of beMobile on Nteletsa II areas had not yet been felt when the TRE was conducted.

The lowest TRE score for regulation of anti-competitive practices is in the mobile sector

For regulation of the VANS sector (Figure 7 below), the scores are more negative than those for the other two sectors.

Figure 7: Botswana's TRE scores for regulation of the VANS sector
Source: RIA TRE assessment data 2011-12

Regulation of market entry gets the best score in VANS sector regulation but the score is still negative, and the regulatory environments around USO, anti-competitive practices and tariff regulation get particularly negative scores.

Among the reasons for the negative scores across all dimensions of VANS sector regulation are presumably the facts that technologically neutral licences have not yet been fully issued in the VANS sector and mobile and fixed operators still dominate delivery of value-added network services. BTC, for example, operates at the both the fixed-line and VANS levels, potentially leading to perceptions of anti-competitive behaviour.

Technologically neutral licences have not yet been fully issued in the VANS sector

The VANS sector clearly needs the regulator to play a stronger role in addressing existing concerns.

ICT penetration

Fixed lines

The fixed-line sector has continued to grow over the past 16 years, but only slowly. The compound annual growth rate (CAGR) between 1997 and 2012 was 5.5%, and fixed-line penetration increased from 4% in 1997 to 8% in 2012 – a penetration percentage assisted by slow population growth (the population grew at an annual rate of roughly 1% between 1997 and 2012).

Fixed-line penetration remained unchanged at 7% between 2000 and 2011 (see Table 5 below), and increased only slightly, to 8%, in 2012.

The fixed-line penetration rate remained unchanged at 7% between 2000 and 2011

Table 5: Fixed-line penetration

	Fixed lines	Population	Penetration
1997	72 189	1 661 000	4%
1998	85 592	1 696 000	5%
1999	102 016	1 728 000	6%
2000	123 819	1 758 000	7%
2001	135 900	1 784 000	8%
2002	148 155	1 808 000	8%
2003	131 699	1 830 000	7%
2004	131 774	1 852 000	7%
2005	136 463	1 876 000	7%
2006	135 505	1 901 000	7%
2007	140 951	1 928 000	7%
2008	142 282	1 955 000	7%
2009	136 593	1 982 000	7%
2010	137 422	2 007 000	7%
2011	148 098	2 031 000	7%
2012	160 488	2 053 000	8%

Source: Central Statistics Office (2012)

Mobile (GSM and CDMA)

In contrast to the fixed sector, the mobile sector has seen a strong compound annual growth rate (CAGR) of 53% between 1998 and 2012 (Central Statistics Office, 2012). Mobile penetration, based on SIM card numbers, currently sits at over 150% (because many users have multiple SIMs).

The mobile sector has seen strong compound annual growth rates between 1998 and 2012

Table 6: Mobile penetration

	Mobile SIMs	Population	Penetration
1998	3 301	1 696 000	0.2%
1999	23 062	1 728 000	1.3%
2000	106 029	1 758 000	6.0%
2001	222 190	1 784 000	12.5%
2002	332 264	1 808 000	18.4%
2003	444 978	1 830 000	24.3%
2004	522 840	1 852 000	28.2%
2005	563 782	1 876 000	30.1%
2006	1 088 238	1 901 000	57.2%
2007	1 425 584	1 928 000	73.9%
2008	1 722 486	1 955 000	88.1%
2009	2 339 029	1 982 000	118.0%
2010	2 644 282	2 007 000	131.8%
2011	2 797 056	2 031 000	137.7%
2012	3 081 726	2 053 000	150.1%

Source: Central Statistics Office (2012)

One of the main motivations for multiple-SIM ownership is to take advantage of discounts and promotions offered by operators on a weekly basis. beMobile, for example, offers free weekend on-net calling (i.e. between beMobile subscribers).

The 2012 RIA Botswana ICT Survey found a mobile phone ownership penetration of 80%, the second highest penetration percentage among the 12 RIA ICT Survey countries, behind only South Africa (see Table 7 below).

One of the main motivations for multiple-SIM ownership is to take advantage of discounts and promotions on different networks

Table 7: Mobile phone ownership penetration in 12 RIA ICT Survey countries

	Individuals (age 15 or older) who own a mobile phone
South Africa	84%
Botswana	**80%**
Kenya	74%
Nigeria	66%
Ghana	60%
Namibia	56%
Uganda	47%
Cameroon	45%
Mozambique	43%
Tanzania	36%
Rwanda	24%
Ethiopia	18%

Source: RIA ICT Survey data 2011-12

Internet/broadband

Broadband services are available in Botswana in the form of fixed-line ADSL and various wireless mobile technologies, including a city-wide WiMAX network in the capital Gaborone that was launched in mid-2008.

Table 8: Internet penetration, fixed and mobile

		Fixed ADSL internet	Mobile internet	Population	Fixed internet penetration	Mobile internet penetration
2011	Q4	15 707	238 942	2 031 000	0.8%	11.8%
2012	Q3	18 166	339 926	2 053 000	0.9%	16.6%

Source: BOCRA (2012)

Investment in access to the two undersea cables has increased mobile internet penetration in Botswana

Investment in the WACS and EASSy cables (outlined above) has increased mobile internet penetration in Botswana by improving operator access to international bandwidth. Also enhancing uptake of internet services is the increase in smart phones and tablets which are able to access the internet through 3G applications. In 2011, mobile internet uptake was recorded at 238 942 subscribers and this has increased to 339 926 in 2013 (BTA, 2012).

Ninety-five per cent (95%) of internet subscribers are connecting via wireless mobile services, while only 5% are connecting via fixed-line ADSL (BOCRA, 2013)

ICT pricing

Prepaid mobile

Mobile pricing in Botswana has the appearance of being very simple, with a small number of prepaid pricing plans (see Table 9 below). As with any effective duopoly, price-setting is common, with Mascom and Orange on-net peak tariffs being identical, off-off peak tariffs being very similar, and only a small difference existing between the two operators' off-net tariffs. The smallest player, beMobile, charges one tariff across peak, off-peak and off-off peak times.

Table 9: Prepaid mobile tariffs

|	On-net (in BWP)			Off-net (in BWP)		
	Peak	Off-peak	Off-off peak	Peak	Off-peak	Off-off peak
Mascom	1.35	0.85	0.45	1.7	0.85	0.65
Orange	1.35	0.875	0.875	1.65	0.875	0.875
beMobile	1.32	1.32	1.32	1.32	1.32	1.32

Source: beMobile (n.d.), Mascom (n.d.), Orange (n.d.)

However, the information that is publicly available does not capture the true tariffs available in Botswana. Discounting is frequent and promotions change by the week and sometimes by the day – to the extent that it is impossible for consumers to make informed choices as to which mobile operator pricing plan is most suited to their needs. The range and abstruseness of prepaid tariffs are what cause the high level of duplicate SIM ownership. Even in locations where there is only one operator (Nteletsa II areas for example), people routinely have more than one SIM card so that they can take advantage of specials and promotions when they travel to other parts of the country.

While operators argue that the discounts and promotions make mobile tariffs much cheaper than they appear if one checks the operators' websites, the complexity and opaqueness of the pricing regime prevents transparency. This lack of transparency means that the regulator is less likely to intervene in the market on the basis of market failure.

RIA pricing comparisons based on the OECD low-user price basket (OECD, 2010) show that Botswana's mobile tariffs are significantly higher than several other RIA study countries (Figure 8 below).

Regular discounts and promotions have made operator pricing opaque and confusing
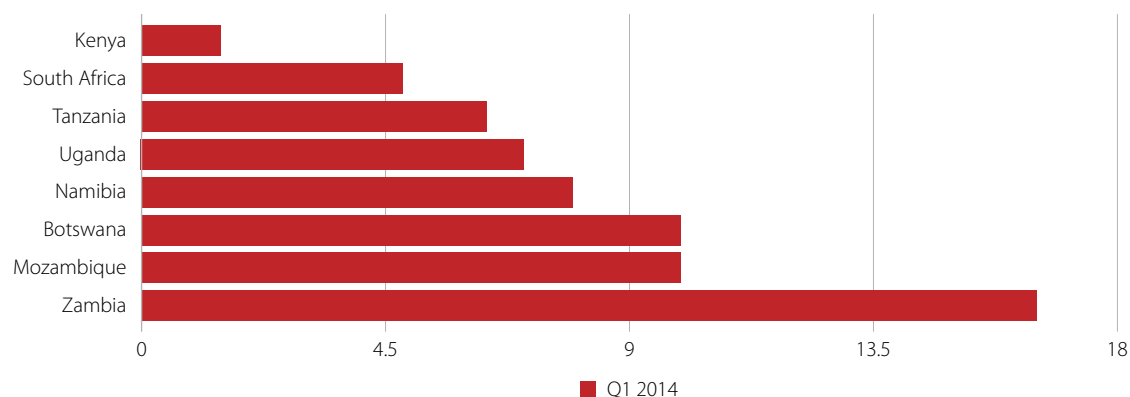
Figure 8: Price comparison of OECD's 40-minute basket of voice calls
Source: RIA (n.d.1)

Mobile broadband

The vertically integrated market structure and persistent high wholesale prices continue to make Botswana expensive

The splitting of BTC into retail and wholesale service providers is intended to reduce the cost of wholesale access. Similarly, BTC's introduction of beMobile was intended to increase competition in the market and reduce prices. However, the vertically integrated market structure and persistent high wholesale prices continue to make Botswana one of the most expensive countries in Africa for mobile broadband, as shown in Table 10 below.

Table 10: Cost of cheapest 1GB prepaid data bundle, RIA study countries, April 2013

	1GB prepaid data	
	Rank	**USD**
Ghana	1	3.72
Kenya	2	8.52
Tanzania	3	10.17
South Africa	4	11.23
Rwanda	5	13.92
Mozambique	6	23.68
Namibia	7	31.89
Uganda	8	40.12
Cameroon	9	40.67
Nigeria	10	50.99
Botswana	**11**	**73.48**

Source: RIA (2013)

Leased lines

In April 2011, the BTA directed the BTC to reduce leased-line tariffs by up to 43%, and then also directed operators to reduce wholesale international leased lines (ILL) prices by between 21% and 46%.

Interconnection rates

In a bid to foster competition in the market, to ensure availability of appropriate incentives for long-term investment in ICTs in Botswana, to increase the uptake and use of telecommunications services, and to improve affordability, the regulator has adopted a glide path for a reduction in mobile termination rates. Mobile operators are required to reduce their termination rate by BWP0.05 each year until the rate reaches BWP0.30 in 2014 (Table 11 below). For the fixed-line termination rate, the regulator has mandated an increase of BWP0.01 per year until the target price of BWP0.20 is reached in 2014 (Table 11 below).

The regulator has adopted a glide path for a reduction in mobile termination rates

Table 11: Termination rate glide path

	2011	2012	2013	2014
Fixed termination rate	0.17	0.18	0.19	0.20
Mobile termination rate	0.45	0.40	0.35	0.30

Source: BOCRA (2012)

Even with this glide path, the mobile termination rate in Botswana is higher than comparable countries in Africa (Table 12 below).

Table 12: Mobile termination rates in seven RIA ICT Survey countries

Country	Rate in local currency	Currency	USD FX*	USD
Kenya	1.44	KES	0.01151	0.0166
Tanzania	34.92	TZS	0.0006	0.021
Ghana	0.045	GHS	0.51259	0.0231
Nigeria	4.9	NGN	0.00624	0.0306
Namibia	0.3	NAD	0.10625	0.0319
Botswana	**0.35**	**BWP**	**0.11921**	**0.0417**
South Africa	0.4	ZAR	0.10726	0.0429

Source: CCK (2012), TCRA (2013), NCA (2011), BOCRA (2012), ICASA (2010), NCC (2013), CRAN (2013)

High termination rates hurt smaller operators' profitability and their ability to invest. beMobile, with a market share of only 13%, presumably has to terminate a much higher volume of its traffic off-net than the off-net termination volume of Mascom or Orange. And when termination rates are high, a dominant operator (i.e. Mascom in Botswana) can use the high rate as a tool to encourage subscribers to stay on their network by offering attractive on-net specials and promotions. The net effect is the undermining of smaller operators' efforts to become competitive with dominant operators.

High termination rates hurt smaller operators' profitability and their ability to invest

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ICT access and use

Fixed lines

The most popular reason for not owning a fixed line is due to the use of a mobile phone instead

Although the number of fixed lines continues to rise year-on-year, the increments are small. The 2012 RIA Botswana ICT Survey found that the main reason why fixed-line adoption has been slow is the practice of fixed-mobile substitution, with 89% of people saying the reason they do not have a fixed line is that they use a mobile phone instead.
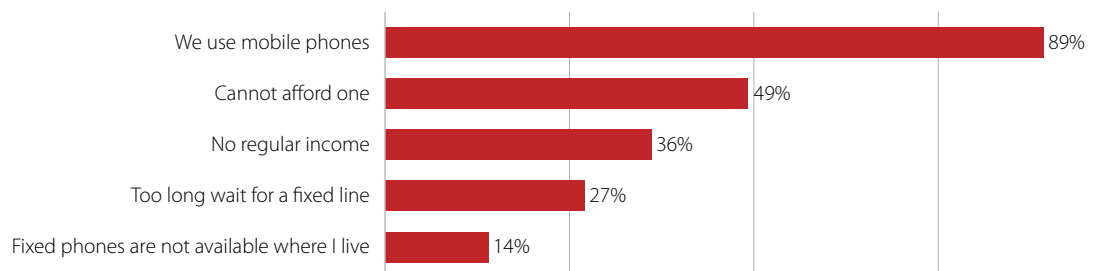
**Figure 9: Reasons for not having a fixed-line phone (multiple responses)**
Source: RIA ICT Survey data 2011-12

Affordability also remains a key challenge to fixed-line use, with 49% stating that they cannot afford a fixed-line and an additional 36% stating that they do not have the regular income necessary for a fixed-line contract.

Mobile telephony

The RIA Survey found that 93.5% of the population has access to mobile telephony, and only 6.5% say they do not want mobile access.

Botswana's wide range of mobile phone uses are outlined in Figure 10 below.
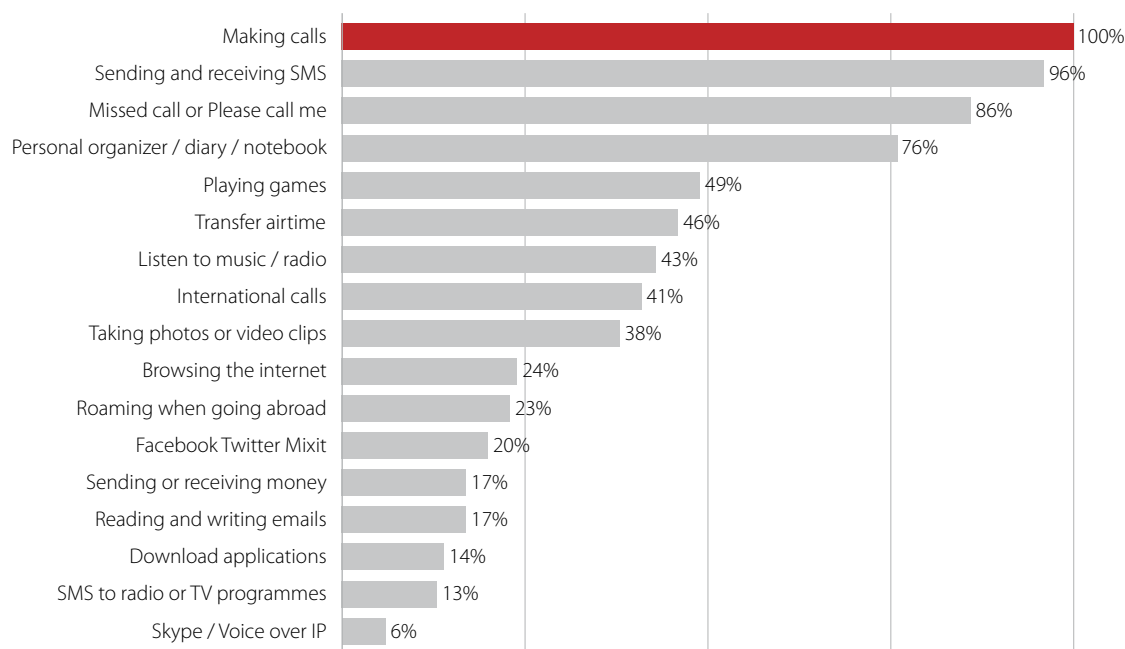
Figure 10: Purposes of mobile phone use (multiple responses)
Source: RIA ICT Survey data 2011-12

Internet/broadband

Despite the Botswana Government's significant investments in ICT infrastructure, penetration of internet and broadband penetrations remains low. According to the findings of the 2012 RIA Botswana ICT Survey, only 9% of Batswana use the internet. Most internet users are found in urban areas, while most people outside the cities do not have access to internet, let alone a broadband connection. Among the few households with an internet connection, the most-used type of internet connection is mobile 3G (44.4%), followed by ISDN dial-up (23.5%) and wireless broadband (17.3%). ADSL is used by only 6.2% of households who have an internet connection.

Internet use is very low in Botswana and increasingly mobile

Among Botswana's internet users, 71% first accessed the internet via a computer, and only 29% first used internet via a mobile phone. But when asked how they had accessed the internet in the last 12 months, 64% said they had used a mobile phone handset and 24% had used another mobile device such as a 3G dongle.

Table 13: Mode of first internet use

Computer	70.6%
Mobile phone	29.4%

Source: RIA ICT Survey data 2011-12

There are several explanations for the problem of low internet penetration:

- affordability: 35.5% of RIA ICT Survey respondents say they cannot afford to access the internet;

- availability: 12.2% say they do not have an internet connection in their area; and

- knowledge: 23.5% say they do not know how to use the internet.

Public payphones

One of the effects of high mobile phone penetration is the dramatic decline in public payphone use

One of impact of high mobile phone penetration is the dramatic decline in public payphone use. In the 2008 RIA ICT Survey, it was found that over a quarter (27.4%) of all Batswana had used a payphone in the previous three months. Just five years later, in the 2012 Survey, that percentage dropped to 6.5%, as shown in Table 14 below.

Table 14: Payphone use in the last 3 months, in 12 RIA study countries

	2012	2008
Tanzania	1.1%	97.3%
Namibia	1.3%	14.5%
Kenya	5.4%	24.1%
Rwanda	5.7%	73%
Botswana	**6.5%**	**27.4%**
Mozambique	9.4%	3%
Ethiopia	9.6%	14.7%
Ghana	12.8%	6%
Uganda	14.8%	39.5%
Nigeria	21%	No data
South Africa	28.7%	42.2%
Cameroon	49.4%	44.1%

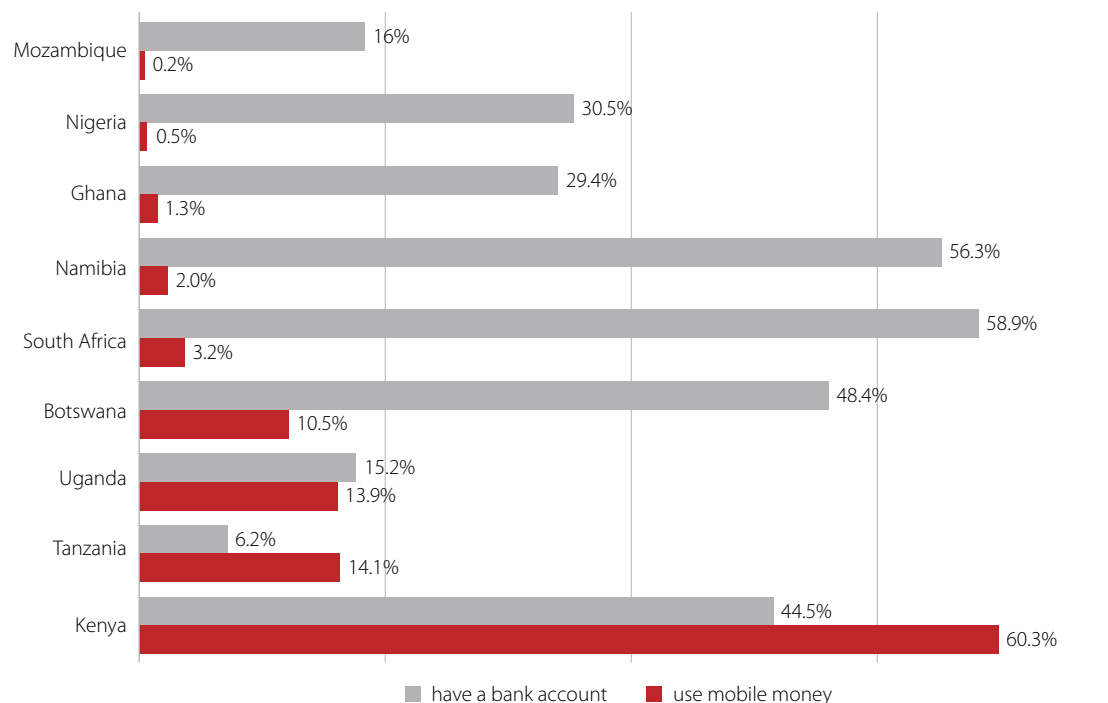*Source: RIA ICT Survey data 2011-12 and 2007-08*

Broadcasting

Among the households surveyed by RIA, 87% have radios, 80% have television sets, 58% have TV satellite decoders and 23% have computers.

The 2012 RIA ICT Survey also found that Botswana Television (BTV) is watched by 67.9% of Batswana, followed by the South African television stations SABC 1, SABC 2 and SABC 3 (watched by 29%, 23% and 22% respectively).[2]

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[2] The SABC TV signals are supposed to be scrambled in the country but many satellite decoders can decode it for free-to-air satellite reception.
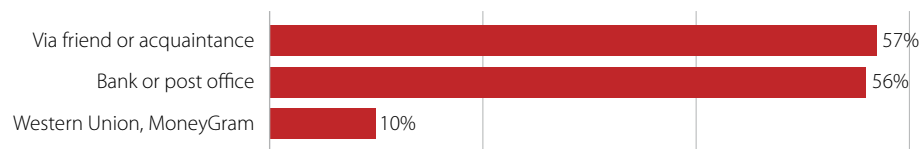
Mobile money

The 2012 RIA Survey found that mobile money is used by 11% of Batswana, while 48% have bank accounts. Figure 11 below compares Botswana's mobile money and bank account use with that in other RIA study countries.

	have a bank account	use mobile money
Mozambique	16%	0.2%
Nigeria	30.5%	0.5%
Ghana	29.4%	1.3%
Namibia	56.3%	2.0%
South Africa	58.9%	3.2%
Botswana	48.4%	10.5%
Uganda	15.2%	13.9%
Tanzania	6.2%	14.1%
Kenya	44.5%	60.3%

Figure 11: Bank account use v. mobile money use
Source: RIA ICT Survey data 2011-12

There would appear to be significant scope for growth in mobile money use, since 57% of respondents say they transfer money physically via a friend or acquaintance – a kind of transferring that mobile money platforms tend to replace (Figure 12).

Via friend or acquaintance	57%
Bank or post office	56%
Western Union, MoneyGram	10%

Figure 12: Methods of sending and receiving money (multiple responses)
Source: RIA ICT Survey data 2011-12

There appears to be scope for more mobile money use since most Batswana transfer money physically

About 52% of respondents say they trust mobile money transfer more than other means of sending and receiving money, while just 12% of respondents say that it is less trustworthy and the remaining 36% say it was similar to other means of sending and receiving money. Meanwhile, 77% of respondents say that mobile money transfer is more convenient than other means of sending and receiving money, and only 7% say it is less convenient. And 91% say that sending or receiving money using a mobile phone is faster than other means.

Mobile money is seen as a cheaper means of transferring money

Mobile money transfer is seen as cheaper than other means by 70% of consumers, with only 12% saying that it is more expensive.

Only 15% of respondents have been using the mobile phone to transfer money for longer than a year, while the majority (85%) say they started using mobile money within the last 12 months.

Social networks

About 18% of Batswana access social networks via mobile phones, a relatively high percentage among RIA study countries (see Table 15 below).

Table 15: Use of social networks via mobile phone

	Use of social networks (e.g. Facebook) via mobile phone
South Africa	25%
Kenya	25%
Botswana	**18%**
Namibia	17%
Nigeria	16%
Rwanda	14%
Mozambique	12%
Ghana	11%
Cameroon	8%
Uganda	7%
Tanzania	5%
Ethiopia	2%

Source: RIA ICT Survey data 2011-12

Informal businesses

Informal business is very important to African economies because of its role in employment creation and poverty reduction. Accordingly, the 2012 RIA ICT Surveys included surveying of ICT access and use among informal businesses.
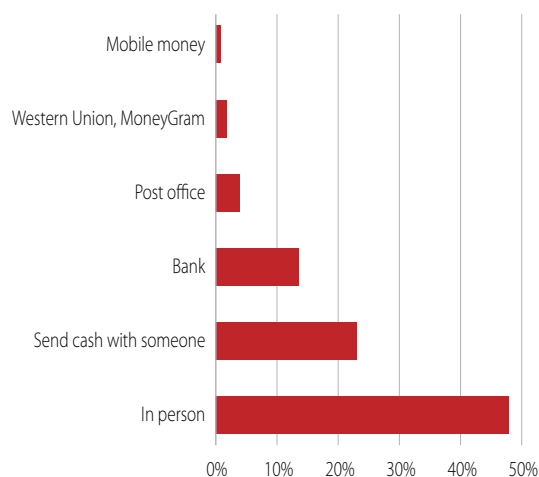
As Table 16 shows, electricity access remains a major obstacle to Botswana's informal business sector (with only 40% having electricity), while the number of informal businesses with a website is tiny.

Electricity access remains a major obstacle in Botswana's informal business sector

Table 16: Informal business resources

Business has electricity	40%
Business with a website	0.4%

Source: RIA ICT Survey data 2011-12

Since nearly 50% of Botswana's informal businesses send and receive money physically via personal contact, and nearly 30% transfer money using trusted people as intermediaries (Figure 13 below). Therefore, there is an opportunity for mobile money operators to target the informal sector and make it more efficient and reliable. However, the benefits of mobile money to informal businesses (in terms of increasing efficiency and reducing the costs of sending and receiving money) are probably some time away, because over 40% of informal businesses surveyed state that one reason for not using mobile money is that mobile money cash-in and cash-out agents are at present too far away (Figure 14 below). Botswana's mobile money service providers will thus need to invest resources in increasing the reach of their agent networks before its adoption can accelerate in the informal sector.

There is an opportunity for mobile money operators to target the informal business market and make it more efficient and reliable

Figure 13: Informal business methods of sending and receiving money
Source: RIA ICT Survey data 2011-12
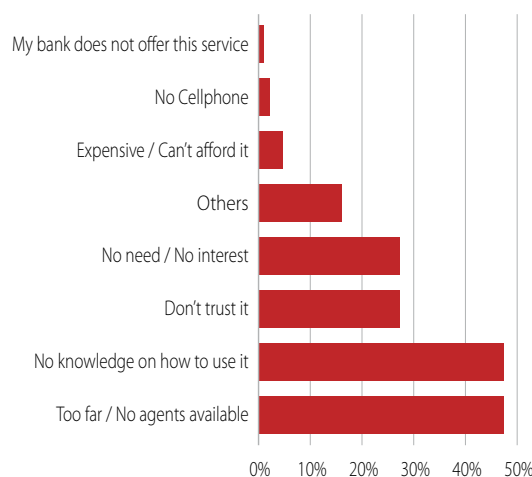
Figure 14: Informal business reasons for not using mobile money
Source: RIA ICT Survey data 2011-12

Mobile money service providers will need to investigate methods for educating informal businesses as to the benefits of mobile money. Over 20% of the informal businesses surveyed reported that they have no knowledge of mobile money, 18% stated that they do not trust mobile money and 14% said they see no need for it.

Botswana's informal businesses are more likely to advertise via a newspaper than via SMS

ICTs also offer opportunities, through platforms such as SMS, for informal businesses to reach more customers and increase sales. But at present, Botswana's informal businesses are more likely to advertise via a newspaper than via SMS (see Table 17 below).

Table 17: Informal business modes of advertising (multiple responses)

Advertising	
Radio	0.3%
TV	0.7%
Social networks	2.9%
Mobile phone SMS	3.1%
Newspaper	4.7%

Source: RIA ICT Survey data 2011-12

Conclusions and recommendations

Botswana has formed a converged regulator (joining others such as ICASA and TRCA in the region) and it has split the incumbent fixed line operator, BTC, into two separate organisations: one focussing on retail services and the other focussing on wholesale services. The latter development, which potentially opens up equal access to the fibre backbone for all operators, comes when the leading mobile operator, MASCOM, simultaneously installed a competing wholesale infrastructure. The Government policy initiative to develop fibre infrastructure in order to lower wholesale bandwidth prices has ignored commercial needs, replicated infrastructure and become an economic cost to the country. As a result, the Government's return on investment is negative and it has not achieved the objectives of providing open access backbone infrastructure, such as increasing broadband penetration and use.

Aside from wholesale infrastructure, there are two additional problems in Botswana: firstly, interconnection rates remain high, leading to relatively high mobile retail prices. To deal with criticisms, mobile operators have engaged in a pricing system of discounts that is purposefully opaque and nearly impossible to understand. While it may sound good for consumers to be receiving weekly and even daily promotions, it has become common practice in several countries. Therefore, the net result is the same: prices are relatively high in Botswana and other countries are enjoying faster and more dramatic price reductions. This can only affect Botswana's future competitiveness.

Interconnection prices are too high in Botswana and retail prices cover up the cost with daily promotions and discounts

The second problem is the high price of mobile broadband. Botswana ranks last amongst 11 African countries surveyed by RIA in its Broadband Pricing Index. Access to the internet is usually via work, limiting access and use to those that are employed. High broadband prices have other knock-on effects: mobile money, for example, is being adopted slowly. Informal businesses, especially, are not able to utilise mobile money effectively in order to reduce costs and increase efficiency. Mobile money service providers are not sufficiently widespread and have not engaged in a clear marketing campaign extolling its benefits. The e-Government policy of encouraging access to government services via the use of public libraries has failed internationally and there is nothing to suggest that the same fate will not occur in Botswana.

At the same time, there has also been some progress.

Infrastructure sharing has been a significant success with all three mobile operators using it extensively. Infrastructure guidelines that were passed in 2011 have affirmed infrastructure sharing as an environmental and economic imperative. Nteletsa II has succeeded in extending mobile coverage to poor and underserved areas of the population. In fact, Nteletsa II is the primary reason that beMobile remains competitive and has coverage equal to or even greater than the largest operator. Nearly 20% of beMobile subscribers in 2012 were based in Nteletsa areas. However, the impact of Nteletsa has yet to be felt outside of the underserved areas with most of them being served by one operator.

The impact of the Nteletsa II programme has yet to be felt outside of the underserved areas

The following are recommendations for how the regulator can address the ICT challenges facing Botswana:

- Reduce termination rates further – the current glide path does not bring them close to cost; they remain considerably higher than the leading East African countries such as Kenya, Tanzania and Uganda. The reduction of termination rates could have an affect on the current opaque pricing regime by reducing the ability of operators to hide the exact price that consumers are actually paying. With increased levels of competition at the retail level, pricing should become more transparent and consumers will be able to make an informed choice about which operator best serves their needs.

- Implement a transparent universal service programme: the Nteletsa project, while a success, was not conducted in a transparent manner. A competition-based approach that clearly lays out the costs and potential benefits for moving into underserved areas would be as likely to succeed and at a lower cost to Government. This is especially pertinent because the increasing need for broadband and its uptake suggests that a large subsidy from Government may not have been necessary.

- Consider opening up some more spectrum to service providers, MVNOs and resellers to allow them to build capacity and increase competition with incumbents for both voice and data. Thus full exploitation of their technology-neutral licences would enable them to offer VoIP in addition to data services.

- Open up lower frequency spectrum such as the 700MHz band to new entrants: the high cost of mobile broadband can be ameliorated by introducing competition to the sector and reducing the cost of building infrastructure.

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