



Key issues in the development of mobile telephony in Botswana (1998–2011): An empirical investigation

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Abstract

This article explored the key issues in the development of mobile telephony in Botswana from 1998 to 2011. The study has shown that as a developing country, Botswana has done well to develop and structurally position the mobile telephony sector for the benefit of its citizens. This is evidenced by the high rate of subscription of mobile telephony countrywide and continuous attempts by the government to network under-served communities. However, the sector has been left in the hands of a quasi-governmental corporation and private individual businessmen. In addition, there is serious competition for subscribers amongst network operators, uneven diffusion of network technologies and inadequate communication signal in some remote areas. Therefore, this study argues for additional reforms, with a view to strengthening and positioning the sector for effective use in order to deliver social services and increase diversification of the economy.

Keywords

Botswana, competition, management, mobile telephony, network operators, ownership, regulations, technology

Introduction

Since the introduction of the mobile phone, researchers who have studied the development of the mobile telephony sector worldwide have been mostly concerned about the political and economic issues that weigh on the growth of the sector in each country.

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According to these researchers, due to progressive political and economic developments, the mobile telephony sector in several countries has grown to produce good results. This is highlighted by Arminen (2007), who points out that citizens in various countries are effectively and efficiently served through modern mobile communication technologies, including mobile phones. Brewer et al. (2005) also note that mobile phone usage in many countries allows many new opportunities for healthcare, e-governance, education, e-business and economic efficiency.

Gruber and Verboven (2001) considered that further innovations in technology, improved licensing and regulatory frameworks for operators and competition between networks have helped to grow mobile telecommunications services. Rouvinen (2006) also pointed out that it is sometimes the competition among mobile network operators and the slow rate of diffusion of technologies that are the main determinants. In a study conducted by Gamboa and Otero (2009: 613) in Colombia, it was reported that strategic mobile telephony operational policies guided the licensing of network operators and contexts for competition in 1991, such that there were provisions for 'private ownerships' and 'public-private ownerships'. These policies were fundamental in helping to position the mobile telephony sector countrywide. According to Gamboa and Otero (2009), this was followed by regulatory frameworks which ensured that two different networks, between Celumovil, Celumovil Costa, Comcel, Ocel, Cotelco and Celcaribe, operated in each one of the three regions in Colombia. Although Gamboa and Otero (2009) did not mention the effectiveness of the Colombian situation in this regard, one would conceive that each of the three regions in Columbia was efficiently served, hence the diffusion of mobile telephony and related services increased dramatically. In Vietnam, for instance, the mobile telephony market is said to have boomed once the Vietnamese government introduced the 'market-opening policy' to allow more operators into the market, thereby promoting market competition, and set up 'pricing control regulations which helped to control the monopoly in pricing plans' (Hwang et al., 2009: 535). According to Hwang et al. (2009: 541), fixed telephones, which existed in Vietnam before mobiles were introduced, were also considered an important factor. This is because during the early stages of mobile telecommunications in Vietnam, mobile telephony benefited from the technologies already installed (for fixed telephones) which enabled voice communications.

With regard to the situation in some developing countries, Fink et al. (2003: 443) raise concern that although privatization and competition are necessary to help develop the telecommunications sector, governments should also introduce 'comprehensive reforms' that necessitate further developments in the sector. Also in agreement with this is Biancini (2011) who, after studying the growth of telecommunications in India, concluded that competition between networks guarantees investment returns in developed than in developing countries.

Nonetheless, while an extensive literature search yielded many results about the development of mobile telephony in various regions worldwide, similar literature from the sub-Saharan African region has been hard to come by. Therefore, through a political economy of communication framework and with a focus on Botswana in sub-Saharan Africa, this study aims to contribute to the debate. This involves identifying and discussing the key political and economic issues that affected the development of the mobile

telephony industry in Botswana between 1998 and 2011, with 1998 marking the year that mobile telephony was first introduced in Botswana. This article sought to answer the following research questions:

RQ1: What has been done to structurally position the roles played by mobile telephony for the socio-economic benefit of the lives of citizens in Botswana?

RQ2: What are the key political and economic issues that are associated with the development of mobile telephony in Botswana from 1998 to 2011?

Political economy of communication

In addition to exploring the history of mobile telephony in Botswana from 1998 to 2011, this study also considered, through a political economy of communication framework, the important structural issues that weigh on the development of mobile telephony in Botswana. Political economy is a concept based on the ways in which the political and economic factors that help enhance social life affect each other (McChesney, 2008: 151). Stilwell (2006) observed that a political economy perspective is applicable to help understand the issues in any sector and contributes towards determining how to intellectually or practically solve them. With regard to media and communication, many scholars who have studied political economy have been concerned about how communication and the related frameworks are shaped in society (Calabrese and Sparks, 2004; Graham, 2007; Hiebert and Gibbons, 2000). Correspondingly, Flew (2008: 55) states that these can include:

... access to investment capital to participate in new media ventures, access to political influence on the basis of economic power and significance as a decision-maker, and access to the technologies themselves on the part of potential users, with the focus on inequalities of access across all of these levels, which are seen as mapping on various indicators of social inequality, such as class, gender, race, ethnicity, and other markets of disadvantage.

According to Graham (2007), the political economy of communication framework is significant in clearly understanding the political and economic issues in the sector, especially in order to know what the issues are and how they came about. Therefore, the political economy of communication framework is relevant in this study to identify the political and economic issues associated with the development of mobile telephony in Botswana and also to examine how these factors have shaped the sector nationally.

Methodology

The approach to this study was qualitative, employing semi-structured interviews and analysis of secondary sources of data. Whereas interviews are effective for obtaining verbal discussions that are not directly possible through other sources of data (Neuman, 2011), secondary sources of information are useful to provide accounts, comparative facts and the evidence necessary to analyse the data (Seale, 2004). Therefore, as part of this study, semi-structured interviews were useful in providing key data about mobile

telephony in Botswana and analysis of secondary sources of data became useful in further examining the information provided by the interviewees.

Semi-structured interviews

Interviews were held with seven personnel working in the following Government of Botswana departments: two from the Ministry of Transport and Communications (MTC); two from the Botswana Telecommunications Authority (BTA); and three others from the Department of Telecommunications and Postal Services (DTPS). While the MTC is responsible for the general management of the telecommunications sector in Botswana, including mobile telephony, the BTA issues licences and manages the roll-out of the associated services and structural operations nationally and the DTPS ensures that the platforms for the operation of mobile telephony in Botswana are structurally feasible. The selection process for recruiting these interviewees involved sending letters with sample questionnaires to the heads of department who, in turn, identified and recommended to the researchers suitable candidates that could be interviewed as part of this study. After suitable informants were identified, appointments were made with them, and this was followed by interviews at their respective workplaces. Specifically, the interviews sought to identify and discuss structural issues, such as mobile telephony business platforms in Botswana, ownership patterns, associated policy issues and regulatory frameworks and the related technologies used in the sector.

Analysis of secondary sources of data

The secondary sources of data related to mobile telephony in Botswana reviewed as part of this study included the BTA's annual reports (from 2009 to 2011), the Botswana telecommunications policy and the Botswana Telecommunications Act of 2006. Other sources considered included local newspapers, the websites of the three mobile telephony operators in Botswana and the websites of the MTC and BTA. In fact, some of these sources of data were recommended for consideration as part of this study by the interviewees. The process of reviewing these documents entailed identifying them, reading to understand them and re-reading them several times in order to engage with the range of data about the development of mobile telephony in Botswana, such as the related policies, regulatory frameworks, business operations and mobile telephony services offered in the country.

Telecommunications in Botswana (from 1966 until 1997)

Telecommunications, including mobile telephony, remains critical to aid social life and help improve the economic development of any country. In Botswana, the establishment and expansion of telecommunications has spanned more than four decades of continuous development. Telecommunications first became eminent in the country during and after independence in 1966, and indications are that four key factors propelled this growth. First, there were urgent demands to improve the communication sector to help cater for increases in the agriculture and mining industries which, according to Marobela (2008),

were then regarded as the 'cash cows' of Botswana's growing economy. Landline telephones were the first discernible efforts in this regard, especially in towns and large villages. Mainly, telephones were useful to connect arable and pastoral farmers with agricultural officers and the markets where they sold their cattle, and also to link miners in mining towns with the families whom they had left in their home villages.

Second, within the first two decades of Botswana's independence, the pace of urbanization had also gained momentum and more industries were established in towns, to which many people migrated seeking employment (Stephens, 1975). To intensify this development, the government of Botswana established the BTC, a quasi-governmental corporation, to facilitate and manage all telecommunication services nationally (Botswana Telecommunications Corporation, 2007; Sebusang et al., 2005). Specific products and services provided by the BTC included the provision of public payphones, fixed landline telephones in homes and offices, telephone instruments and the management of core network and technology strategies in Botswana's telecommunications sector (Bloomberg Businessweek, 2011).

Third, the rise in literacy levels among the people in Botswana over the first two decades after Botswana's independence in 1966 also prompted demands to expand information and communication systems across the country (Rantao, 1996). In the early 1990s, a number of homes in Botswana's main towns and the majority of government and private organizational offices across the country had fixed landline telephones installed. In 1996 the Botswana Government introduced a framework for the long-term vision of Botswana named 'Vision 2016', which also called for further improvement to telecommunication systems with a view to enhancing the lives of citizens (Botswana Vision 2016 Council, 2010). According to the Vision 2016 Council (2010), this framework also provided for the incessant installation of communication infrastructures throughout the country as Botswana aimed to be innovative, educated and informed by 2016 (the target year). As a result, the expansion of telecommunications services is currently being evidenced in Botswana through increased mobile telephone use and other related information and communication technologies (ICTs), such as radio, digital networks, facsimile and the Internet.

Last, following the introduction of the Botswana telecommunications policy, which was developed in 1995, the government of Botswana established the Botswana Telecommunications Act in 1996, through which the BTA was founded (Nyelesi, 2012, personal communication). Since that time, the BTA has been responsible for issuing licences to telecommunication operators in Botswana; monitoring licensees for compliance with licence conditions; regulating all associated telecommunication service provisions countrywide and carrying out its mandate to ensure consumer protection (Botswana Telecommunications Authority, 2010b). It was immediately after the inauguration of the BTA that the first privately owned mobile phone operators were licensed to operate in Botswana.

Diffusion of mobile telephony in Botswana (from 1998 to 2011)

Specifically, mobile telephony in Botswana dates back to 1998, when both Mascom Wireless and Vista Cellular (now Orange Botswana) were introduced. These two network operators were the first to go mobile in a telecommunications industry that was for

some years dominated by a fixed landline telephone service under the monopoly of the BTC. Apparently, the licensing was provided for in the Botswana telecommunications policy, which included recommendations that other local telecommunication service providers be licensed to ensure competition with the BTC (Nyelesi, 2012, personal communication). However, in the first three years after Mascom Wireless and Vista Cellular were introduced, the mobile telephony market in Botswana experienced slow growth. Three explanations are suggested for the limited uptake during this period. Initially, many people in Botswana did not consider mobile phones as 'must-have' technology, since at that time the devices were expensive and appeared complicated to use. Also, potential customers were reluctant to acquire mobile phones because fixed landline telephone services and public pay phones, which were provided by the BTC in many of Botswana's villages, were a guaranteed alternative. Furthermore, at that time, as well as the expense of acquiring a mobile phone device, mobile telephony services were costly, whereas fixed landline telephones were comparatively cheaper.

With the average proportion of the working class – especially those who could afford to purchase mobile phones – only making up a fifth of the general population of Botswana at that time, a figure which stood at around 1.5 million in 1998 (Statistics Botswana, 2011), the market was obviously considered small. Nevertheless, the small market for mobile telephones did not discourage Mascom Wireless and Vista Cellular, as evidenced by their continual service provision in the years since 1998. By the first quarter of 2005, the mobile telephony industry in Botswana had presented remarkable growth, with many entrepreneurs already selling new and advanced mobile phone models, accessories and other related services (Urbach, 2012). Also, compared with previous years, many people in Botswana had developed an interest in using mobile phones. In 2008, the BTC introduced BeMobile, the third mobile telephony operator in Botswana (Botswana Telecommunications Corporation, 2009), and by 2009, many people in Botswana had adopted and come to use mobile phones. Compared with the rest of Africa, the percentage of the population who use mobile phones in Botswana is only surpassed by that in Nigeria, South Africa and Ghana (International Telecommunication Union (ITU), 2011).

A recent study undertaken by the BTA indicates that the mobile telephony market has been doing well, with signs of strong penetration and signal coverage, especially in urban areas and major rural villages in Botswana (Botswana Telecommunications Authority, 2010a). As indicated from the BTA study, an increase in the mobile phone subscription rate was recorded, from 33% in 2005 to 131% in 2010, reaching a total of about 2,363,411 subscribers among a population of fewer than two million (see Table 1). Mascom Wireless had over 1,200,000 million subscribers, Orange Botswana about 730,000 and BeMobile around 200,000.

This large number of subscribers is an indication that some customers have subscribed to more than one mobile operator (Botswana Telecommunications Authority, 2010a). Due to this growth, mobile phones and their related services are sold through local mobile operators to any person in Botswana who can afford to buy and use the devices. Mascom Wireless has more subscribers than the other operators because it was the first of the three mobile telephony operators to be licensed and has extended its services to many places in Botswana. However, as the Botswana government supports BTC's

Table 1. The mobile phone market penetration in Botswana over the past six years (fixed versus mobile).

Market	Penetration rate %					
	2005	2006	2007	2008	2009	2010
Mobile	571,437 (33%)	823,070 (48%)	1,151,761 (97%)	1,485,791 (98%)	1,874,101 (105%)	2,363,411 (131%)
Fixed	136,423 (8%)	132,034 (8%)	136,946 (8%)	142,282 (8%)	144,195 (8%)	137,422 (7.6%)

Source: Botswana Telecommunications Act (2010a) Annual Report.

BeMobile financially, this operator is quickly developing in many sites in Botswana and the possibility exists that it will soon gain more customers countrywide.

As evidenced by the rate of adoption and use of mobile phones, the development of mobile telephony in Botswana since 1998 has been a remarkable achievement. According to Calandro et al. (2010), Botswana remains a country with a high mobile telephony penetration rate among its population. Undoubtedly, this rate of mobile phone subscription in Botswana has helped bridge the digital divide across the country (Analysys Mason, 2009). The majority of the population of Botswana are able to easily use mobile phones to make and receive calls and send and receive text messages. Other people, especially youth and businesspersons, have put the latest smartphones to a broader range of uses, such as to perform money transfers, e-banking and business transactions, make telephone calls, send text messages, surf the Internet, take photographs and play games. For instance, mobile phone operators in Botswana have introduced money transfer opportunities using mobile phones for citizens who do not have bank accounts with the local commercial banks (Kebadiretse, 2011; Tshukudu, 2011). In addition, young people in Botswana engage with social networks, such as Facebook, through mobile phones (Mascom Wireless, 2012) and many others, including students in tertiary education who live in towns and large villages, use mobile phones to access the Internet (Orange Botswana, 2012). It has also been reported that the mobile phone helps to promote health in Botswana by affording medical practitioners the opportunity to communicate with each other and extending tele-medicine care services to citizens in rural and remote areas (Bhattacharyya, 2010).

However, despite these uses, this study has identified five political and economic issues that have somewhat impacted on the development of the sector countrywide. These issues are associated with ownership of the local mobile telephony network operators, competition among networks, the management of the sector nationally, the diffusion of network technology across the country and the mobile telephony regulatory frameworks in Botswana.

Ownership and licensing of the network operators

Despite having been introduced in Botswana in 1998, the ownership of mobile telephony service operator businesses has remained in the hands of a few individual businessmen

and the government of Botswana. Both Mascom Wireless and Orange Botswana are privately owned, while BTC's BeMobile is a quasi-governmental corporation. Indications are that it will take some time before any changes are made to increase the number of local mobile phone operators and extend ownership opportunities amongst the people of Botswana. As stated in the annual report of the Botswana Telecommunications Authority (2010b), the introduction of BTC's BeMobile in 2008 has intensified competition between the operators, and therefore the market needs to stabilize before any changes designed to increase the number of mobile network operators can take place. According to the BTA, due to the limited number of customers in Botswana (including potential subscribers), the current market structure does not allow for further licensing of other mobile network operators. In view of this, some people, including legislatures in the opposition parties, have called upon the Botswana government to transfer BTC from state to public ownership so that interested individuals among the public can buy shares in the company (Mosinyi, 2009). They also argue that public shareholding will freely open mobile telephony businesses to as many people as possible, and this will result in autonomous economic growth for the citizens of Botswana (Balancing Act, 2011). Moreover, public ownership of the BTC will lessen the government's control of the network operator and, perhaps, help to reduce the advantage that BTC has over other mobile operators.

All three mobile phone operators have been issued with a 'technology service neutral licence' that allows them to provide mobile telephony, fixed telephony and data and Internet services in Botswana (Botswana Telecommunications Authority, 2010a). Interestingly, signs are that this current structure of mobile telephony licensing in Botswana is inclined to empower the operators more than the subscribers, especially those in remote areas and settlements across the country. For instance, although the local mobile network operators, particularly Mascom and Orange, have been licensed to operate nationally, customarily they first took their business to places in Botswana which they considered profitable. This included towns and largely populated villages where there was adequate infrastructure, such as electricity, and where the BTC had already installed voice transmission equipment. Consequently, the less populated places in Botswana have deficient network signals or no connection at all. In view of this setback, and in an effort to bridge the digital divide and promote public access to e-governance services countrywide, the government of Botswana, through the BTC, commissioned the 'Nteletsa' project in 2004, followed by 'Nteletsa 2' in 2011 (Mbaiwa, 2012, personal communication; Molefhi, 2012, personal communication). Due to poor management of the infrastructure installed as part of this project, communication signal in some remote places still remains insufficient; however, indications are that the government, through MTC, is working round the clock to network these places.

Competition amongst mobile operators

Despite variation in their ownership styles and business operations, the three mobile network operators in Botswana have been competing for audiences since being licensed. Each network operator continues to advertise its products and services countrywide, with a view to attracting new subscribers and keeping the existing ones. Differences in call charges confirm this competition. As indicated in the BTA Annual Report, it is fairly costly to make a mobile phone call in Botswana (Botswana Telecommunications

Table 2. Mobile telephony charges in Botswana.

Mobile network operators	Local call charges
Mascom	P1.80
Orange	P1.75
BeMobile	P1.30

Source: Botswana Telecommunications Act (2010a) Annual Report.

P1.00 = \$0.143.

Authority, 2010a). However, while all mobile telephony charge tariffs are set and managed by the BTA (Nyelesi, 2012, personal communication), Mascom Wireless, Orange Botswana and BTC's BeMobile are expected to provide competitive charges within these set tariffs (see Table 2).

As shown in Table 2 above, BTC's BeMobile charges comparably lower tariffs than both Mascom Wireless and Orange Botswana. Perceptibly, the low charges from BeMobile validates that although it is a profit making company, the Botswana government financially guarantees its operations. As a result, the BTC has been able to extend its services to many places in Botswana, thereby accumulating a large number of subscribers within a short period of time. If this continues to happen, both Mascom Wireless and Orange Botswana might eventually lose many of their subscribers to BTC's BeMobile.

Another issue related to competition amongst network operators in Botswana is the recurrent launches and advertising of new and unique products by BTC, Mascom and Orange to attract both existing and potential new subscribers. These include introducing the newest and most attractive mobile phone handset devices in the market and introducing new contract plans and unique services such as *nzabela airtime* (sharing of airtime from one mobile to another within a Mascom subscription), *call-me-back* (requesting a call from another customer within either Mascom and Orange subscription) and *direct top-up* (using bank debit and credit cards to buy airtime at any time within Botswana). Perhaps public education about these services and the associated costs could foster responsible use of mobile phones.

Management of the mobile telephony sector

The management of the mobile telephony sector in Botswana remains the responsibility of the Botswana government under the MTC and the private quasi-governmental organizations, including the BTC and BTA. As stated in the previous sections, the MTC provides leadership and guidance with regard to telecommunication developments in Botswana, the BTC provided the first technological infrastructures that enabled voice communication, some of which are still utilized countrywide, and the BTA is an authority that monitors the licensed operators' compliance with the licence conditions and also manages the diffusion of mobile telephony countrywide. Since the government of Botswana owns the BTC, one would expect the major decisions regarding the management of mobile telephony in Botswana to be relaxed towards the state-owned BTC and

strict with regard to the other, privately owned operators. For instance, when the private mobile network operators first started up, the Botswana government stated that they were not allowed to build their own transmission networks. They were expected to use the BTC networks, through rental agreements. According to Nyelesi (2012, personal communication), this is because the government felt that it had put in a large amount of capital during the development of telecommunications infrastructure for the BTC; consequently, if operators were to install their own infrastructure, the government's efforts would be rendered useless and it could possibly kill the BTC. However, it was only in 2006 that the then Minister of Communications, Science and Technology made an announcement that liberated the mobile telephony market in Botswana much further, by allowing new developments such as the self-provision of transmission equipment by network operators, permitting network operators to find their own international gateway, and also providing voice over Internet protocol. Through these developments, mobile operators have been able to extend their transmission scope and acquire a lot of subscribers in return.

The conditions for operating mobile telephony in Botswana also deal with a number of other issues, including, among others, network performance and ensuring consumer protection (Botswana Telecommunications Authority, 2010a). Through these conditions, expectations are that the licensees should keep to the accepted levels of network performance set internationally and report to the BTA on a monthly basis (Nyelesi, 2012, personal communication). With regard to consumer protection, if any mobile subscriber in Botswana is not satisfied with the level of service they receive from the operators they can refer them to the managers of the mobile network operators, and if such issues remain unsolved they should be passed on to the BTA (Botswana Telecommunications Authority, 2010a). However, it is unclear how many mobile phone subscribers in Botswana are aware of this.

Each local network operator is also expected to facilitate interconnection agreements across both the local and international networks. Nyelesi (2012, personal communication) mentioned two advantages of this:

Firstly, a mobile network inter-connection agreement between any two operators enables an individual subscriber to easily originate a call from one network and terminate at another. In addition, inter-connected mobile networks are expected to easily manage the costs for connecting calls by agreeably sharing all associated overheads.

Expectations would be that such calls are cheaper than calls when an interconnection agreement between networks has not been established. This means that the local network operators have secured interconnection agreement with few international network operators, rather than with many. Hence, access to other networks outside this arrangement is sometimes difficult, and wherever possible, the mobile operators ensure subscribers pay high fees.

The diffusion of mobile technologies countrywide

Licensing mobile network operators in Botswana entails processing licence applications; once licensed, each mobile network operator is allocated a telecommunications spectrum through which radio frequencies are transmitted to enable signal connections. The

current licensing framework also sets out that after getting a licence, each of the local mobile network operators should be responsible for installing its own infrastructure, formulating its own business model and providing any mobile communication services nationally in Botswana. The only prescribed mobile telephone technology in use in Botswana is Global System for Mobile Communications (GSM) technology, which is also used in Europe and the entire Southern African Development Community (SADC) region (Botswana Telecommunications Authority, 2010a). GSM is a useful technology since it uses Subscriber Identity Modules (SIM cards) that are given to subscribers to install in their mobile phone devices, to act as a digital identity and to enable signal connection. In addition, GSM technologies have wider international roaming capacities, and are utilized to connect mobile telephony networks. Specifically, all network connectivity is obtained mainly through fibre-optic cables and radio technology. These are supported by installed infrastructures, such as telecommunication towers that enable signal connection across many regions within Botswana. The government of Botswana has supplied most of these technologies.

Although the local mobile operators continue to try to extend network coverage to potential customers in many places in Botswana, their efforts are impeded by the lack of electricity in some homes across the country. That is, due to the high costs of electricity connection and usage in Botswana, some potential mobile phone customers, especially in less populated settlements and small villages, do not have electricity in their homes. Therefore, charging mobile phone batteries remains a serious problem in these places. Consequently, mobile phone network connectivity differs across the country, with some communities experiencing strong network coverage and others having none.

The local mobile network operators are free to bring any GSM technology into Botswana, such as the latest smartphones. Smartphones have become attractive to many young people, especially in towns and large villages, yet they are expensive to purchase. Some people in Botswana have resorted to stealing these devices from others, usually to re-sell them at cheaper prices (Newel, 2011). There is also an issue of counterfeit and second-hand mobile phones imported from China that have flooded Botswana's mobile phone markets. Although most of these devices sell at cheaper prices compared to the originals sold by local mobile operators, indications are that they are not durable and are dependable for only a couple of months. While BTA has repeatedly tested all larger mobile-related technologies and equipment entering the country to ensure befitting compliance, not much has been done with regard to mobile phone handsets.

Associated regulatory frameworks

The telecommunications sector in Botswana is regulated under the Botswana Telecommunications Act of 2005, which is specifically an amendment to the original Telecommunications Act of 1996. Key provisions in the original Act provided for the establishment of the BTA and the licensing of new telecommunications operators to lessen the BTC monopoly (Botswana Telecommunications Act of 1996). The Act of 1996 also allowed the BTA to make decisions on the licensing of operators without seeking the authority of the minister responsible, and stated that the BTA Chief Executive was to preside over the Botswana Telecommunications Board as Chairman. Through the

Botswana Telecommunications Act of 1996, the BTA was also expected to raise its own funding through licensing telecommunications operators and then use the money for the management and development of telecommunications in Botswana.

The 1996 Act was amended in 2004 after several parties within governance argued that it was not in accordance with modern corporate governance issues, especially those associated with the management of a broad telecommunication sector in developing countries, and as a result the new Botswana Telecommunications Act of 2005 was introduced. An analysis of the new Telecommunications Act of 2005 reveals that most of the provisions, especially those that dealt with the management of the telecommunications sector in Botswana, were revoked from the first Telecommunications Act of 1996. However, despite these amendments, the Telecommunications Act of 2005 dealt richly with issues of management of the telecommunications sector in Botswana and does not provide anything specific to mobile telephony. The related management issues in the Telecommunications Act of 2005 include the monitoring of competition in the sector, the provision and management of the associated technologies, liability of service providers, confidentiality of transmitted messages and monitoring of authorities.

In December 2008, the Botswana government introduced national registration of mobile telephone numbers. This was compulsory for all mobile phone users country-wide, and was initiated through mobile operators (Makalata, 2008). In this exercise, all mobile telephony users are required to register their mobile phone numbers, with failure to do so leading to customers being barred from mobile connectivity. Media reports indicated that many young people in Botswana were not in support of this registration process (*Afrol News*, 2009). They alleged that the system was an attempt by the state government to provide national security organs with access to conversations that any registered user has on a mobile phone. It is still unclear how this will eventually impact upon mobile phone businesses, operators and individual subscribers.

Discussion

Analysis of the mobile telephony sector in Botswana, a developing country in the sub-Saharan African region, has shown that the country has done well to structurally position the mobile telephony sector for the benefit of its citizens. This study has explored the introduction of the mobile telephone in Botswana built from its predecessor, landline telephony, which was significantly useful during the development of the country after it gained independence from Britain in 1966. This is similar to findings from Vietnam by Hwang et al. (2009) – that mobile communication rides on voice communication technologies that are already in use for fixed landline telephones, thereby increasing the spread of the mobile telephony.

With regard to the licensing and ownership of mobile network operators in Botswana, one would consider that, as in the Vietnamese situation (Hwang et al., 2009), the market-opening policy that led to the introduction of private mobile phone operators in Botswana also helped to increase the diffusion of mobile telephones. This study's findings also concur with the point made by Gruber and Verboven (2001) that competition for audiences also impacts on the growth of the mobile telephony sector. This is because, since

they compete for audiences, the three mobile operators in Botswana are forced to extend their businesses to many places countrywide, and also to advertise new products and services to attract more subscribers. Because of this, one would expect them to gain more subscribers, and the spread of mobile phones to increase.

Nevertheless, despite these positive developments, this study has also found that there remain some political and economic issues that weigh on the growth of the sector. These are associated with ownership of the operators, competition for audience, management of the sector, diffusion of the technologies that enable signal connection and the regulatory frameworks. Therefore, this study argues for additional reforms to improve Botswana's mobile telephony landscape with a view to strengthening loose ties and appropriately positioning the sector for effective use in order to continue narrowing the digital divide. These reforms include delivering public services, increasing diversification of the economy and ensuring the appropriate use of mobile phone services countrywide. For instance, the framework for regulating and licensing mobile telephony operation in Botswana should coerce all local operators to broaden their networks across all towns and villages countrywide, regardless of the size of the population. The BTA should also make sure that all mobile telephony handsets imported for sale in Botswana are of high quality and are not counterfeit.

Also, considering that the majority of the population in Botswana is poor and mobile phone charges are high, the BTA, MTC and local mobile network operators should ensure that subscribers are made aware of the local mobile phone usage tariffs. This will ensure that subscribers budget proficiently. In addition, mobile operators should not only sell products and services to potential subscribers but, together with the BTA, should extensively educate the public on mobile telephony-related matters and also guard against the overuse or inappropriate use of mobile phones. Further reduction of mobile phone charges and low-cost handsets could promote more use of mobile phones countrywide.

A few provisions that deal specifically with mobile telephony in Botswana should also be introduced in the Botswana Telecommunications Act to help provide appropriate guidance on issues related to mobile phone use, the roles of the network operators and the involvement of all other related stakeholders. This, together with mobile telephony monitoring exercises, should be established to benefit not only the state government and the operators, but also mobile phone users. Although these recommendations are specifically relevant to the Botswana situation, they may also be applicable in other developing countries where the growth of mobile telephony remains insignificant.

Conclusions

This study has explored how, due to discernible efforts made by the government of Botswana over the past 10 years – such as the roll-out of mobile telephony technologies countrywide, the sound management of the mobile telephony sector guided by the Telecommunications Act of 2005 and the privatization and licensing of the current mobile network operators – the popularity of the mobile telephony sector has been rising steadily since its inception in 1998. As a result, mobile telephony is expected to help efficiently bridge the digital divide in Botswana. Conceivably, other developing

countries, especially those in sub-Saharan Africa, could copy Botswana's example in this regard, as the government's actions have to some extent led to the acceptance, appropriation and use of mobile telephones countrywide. Furthermore, as pointed out by Fink et al. (2003), each country should introduce comprehensive reforms that necessitate continuous development of the mobile telephony sector for the benefit of all citizens.

Last, it is worth mentioning that this study was limited to identifying the structural issues associated with the development of mobile technology. More empirical studies are needed to further examine the magnitude of the impact from these issues, and also to explore further how the diffusion of mobile telephony has bridged the digital divide in sub-Saharan Africa, including Botswana.

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