INTERNATIONAL TELECOMMUNICATION UNION

Document 7
December 2002

REGULATORY IMPLICATIONS OF BROADBAND WORKSHOP

GENEVA — ITU NEW INITIATIVES PROGRAMME — 2-4 MAY 2001 – UPDATED DECEMBER 2002

CASE STUDY: BROADBAND THE CASE OF SOUTH AFRICA

This case study was prepared for the ITU Workshop on the Regulatory Implications of Broadband by Alison Gillwald, Director, LINK Centre, Graduate School of Public and Development Management, University of the Witwatersrand <Gillwald.A@pdm.wits.ac.za>. "Broadband: The case of South Aftica" forms part of a series of telecommunication case studies produced under the New Initiatives Programme of the Secretary-General of the International Telecommunication Union (ITU). The Telecommunication Case Studies Project is being carried out under the direction of Dr Ben A. Petrazzini <Ben.Petrazzini@itu.int>, Telecommunication Policy Adviser in the ITU Strategy and Policy Unit (SPU). Other case studies – including studies on Broadband in Australia, Italy and Malaysia,– may be found at the webpage <http://www.itu.int/broadband>. The views expressed in this paper are those of the authors and do not necessarily reflect the opinions of the ITU, its Membership or the Government of South Africa.

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

In the policy formulation context of South Africa, the term "broadband" is a general one, understood to be the ability to provide a multiplicity of services, whether data, voice or video, at any speed. The diverse needs and means of the South African population indicates that broadband policy formation needs to be broad in its approach to address a suite of services.

The utilisation of broadband and its practical capabilities of bridging the digital divide by providing robust Internet access with cost effective bandwidth has been the subject of much debate in South Africa and around the world. This case study focuses on some of the technical considerations of broadband, its current technical status in South Africa, its possible modes of implementation, and the potential for introducing new value-added services. Following discussion of the above, consideration is given to the policy and regulatory issues that arise for South Africa and that the policy makers will have to ponder.

2 SOCIO-POLITICAL AND ECONOMIC BACKGROUND

South Africa is 1,127 square kilometres consisting of nine geographical and political entities or provinces. South Africa's total estimated population stands at 44.5 million.[1] This represents approximately 5 per cent of the total African population, estimated to be around 800 million.

Political transformation to a constitutional democracy was effected in April 1994 following the election of the African National Congress into power and the establishment of a Government of National Unity. The second democratic elections took place in June 1999 - providing the African National Congress with an even greater majority than in 1994 - and was accompanied by the former President Nelson Mandela's succession by his deputy, Thabo Mbeki.

In 2001, South Africa's GDP was USD 113.3 billion, representing real growth of 2.2% from the previous year, and a GDP per capita of USD 2,549.[2] The economy is based primarily on mining, agriculture, and manufacturing. The telecommunications sector accounts for approximately 4 per cent of GDP – a relatively large percentage when compared to most developed European nations.

Despite being touted as a beacon to the rest of Africa, South Africa faces many challenges around unemployment, crime, education, delivery of health services, and housing. The country is relatively dependent on foreign investment and gears economic policy largely to that end.

While national policies over the last decade have been aimed at some levels of economic redistribution and poverty alleviation, the country continues to have one of the highest Gini coefficients in the world. The income gap is vast with household subsistence levels situated at less than USD 200 per month. The poorest 20 per cent of households (equivalent to 27 per cent of the population) account for less than 3 per cent of total income levels, whilst the richest 20 per cent of households (equivalent to less than 3 per cent of the population) account for 65 per cent of total income production.[3]

[1] South African Reserve Bank (SARB) (2002) *Economic and Financial Data for South Africa*, Updated 7 November 2002, <http://www.resbank.co.za>. This estimate is based on the 1996 population census that yielded an estimated population of 40.6 million people.

[2] SARB (2002), Quarterly Bulletin 2002, <http://www.resbank.co.za>

[3] Yankee Group (1999) < http://www.yankeegroup.com>

3 CHARACTERISTICS OF THE SOUTH AFRICAN TELECOMMUNICATIONS LANDSCAPE

3.1 Teledensity

Despite significant gains over the last five years, the distribution of telephony service in South Africa continues to reflect the highly uneven development of the infrastructure of the past - with 18 per cent of black households and 82 per cent of white households having telephony service. Similar distinctions in service can be seen between urban and rural households – with 64 per cent of urban households and only 9 per cent of rural households having telephony service. Importantly, the introduction of mobile cellular services (particularly prepaid, rather than on contract) has aided the provision of telephony service. Overall 42 percent of people in South Africa have fixed telephones and/or cell phones in their house (universal service). Universal access, measured as a 30 minute walk to the nearest phone, has increased dramatically with over 80 per cent of all households now having access, largely due to the network of over 100,000 public pay phones distributed nationally. Refer to Table 1 for a breakdown of universal service and access figures.

Table 1: Universal Service and access figures for South Africa

Percentage of households with service and access (fixed and cellular combined)		**ALL**	**AFRICAN**	**WHITE**
ALL	Universal service	42	18	82
	Universal access	80	74	93
URBAN	Universal service	64	32	82
	Universal access	94	93	94
NON-URBAN	Universal service	9	5	84
	Universal access	59	56	98

Note: Access measured as 30 minutes walk from a telephone
Source: Peter Benjamin on basis of South African Census October Household Survey 2000. See CommUnity at Projects <http://link.wits.ac.za>

The relatively low teledensity figures are a combined product of the skewed utility distribution policies of apartheid and other barriers to telephone penetration, such as geographical, low literacy levels, high costs of usage and poor last mile infrastructure. It is worth noting that line cancellation due to lack of affordability is estimated at 16 per cent. A study commission by the telecommunications regulator in 1997 indicated that, at that time over 40 per cent of the population would not even be able to afford the line rental of the incumbent operator, if one used a figure of two percent of income on telephone expenditure which is below the national average of over 3 per cent.[4] There is little to indicate that the situation is different today.

3.2 The legislative and regulatory environment

Prior to 1996, the South African telecommunications sector was centrally regulated via the Department of Posts and Telecommunications and Telkom - the sole public telephone operator and a state owned entity. Telkom had been incorporated as a public company in 1991 with the state being the sole shareholder. Telkom was both sole licence holder and regulator.

Significantly, prior to the first democratic elections, the Independent Broadcasting Authority (IBA) Act in 1993 created a total break from the past by establishing an independent and impartial regulator to regulate broadcast content and signal distribution. Later, the Telecommunications Act of 1996, established the South African Telecommunications Regulatory Authority (SATRA) which was mandated with regulating telecommunications in the public interest. This established a three-tier separation of policy, regulation and

[4] Stavrou and Mkize, Needy People Study, commissioned by the South African Telecommunications Authority (SATRA), Johannesburg, 1997, <http://satra.gov.za/>

implementation functions within the telecommunications service market. The Ministry of Communications retained various policy-making functions and, importantly, certain licensing functions and a veto on all regulations.

Due to mounting logistical pressures brought about by convergence of technologies and institutional resource restraints, the two regulatory authorities were merged into one. Under the Act of 2000 the Independent Communications Authority of South Africa (ICASA) was established as the sole regulator of the country's broadcasting and telecommunications sectors. ICASA, in implementing the statutory objectives, is guided by the former broadcasting and telecommunications legislation with the new ICASA Act only dealing with the organisational structure of the merged bodies and arising rights and obligations.

ICASA is headed by a Council, with Councillors being appointed by the president following public nomination and parliamentary hearing as to their suitability. ICASA's primary role is set out in the objects of the legislation establishing the IBA and SATRA, which enjoins them to promote a range of economic and social goals including the advancement of disadvantaged persons and communities. Other roles and functions of ICASA are in line with those of international regulators, and include issuing licenses for broadcasting and managing the frequency spectrum for optimal use. Figure 1 represents South Africa's telecommunications structure.

3.3 Fixed-line telephony

The 1996 Telecommunications Act afforded Telkom a legislated monopoly over public switched telephony. In terms of the Act and its Public Switched Telephone Network (PSTN) licence, Telkom had an exclusive right to provide national, international and local telephony services, including public pay phones, for a period of five years up to May 2002, when the sector was opened to new entrants.[5] During the exclusivity period, Telkom was required to install 2.8 million new lines (1.7 million of which were to be installed in under-serviced areas), including 120,000 payphones.

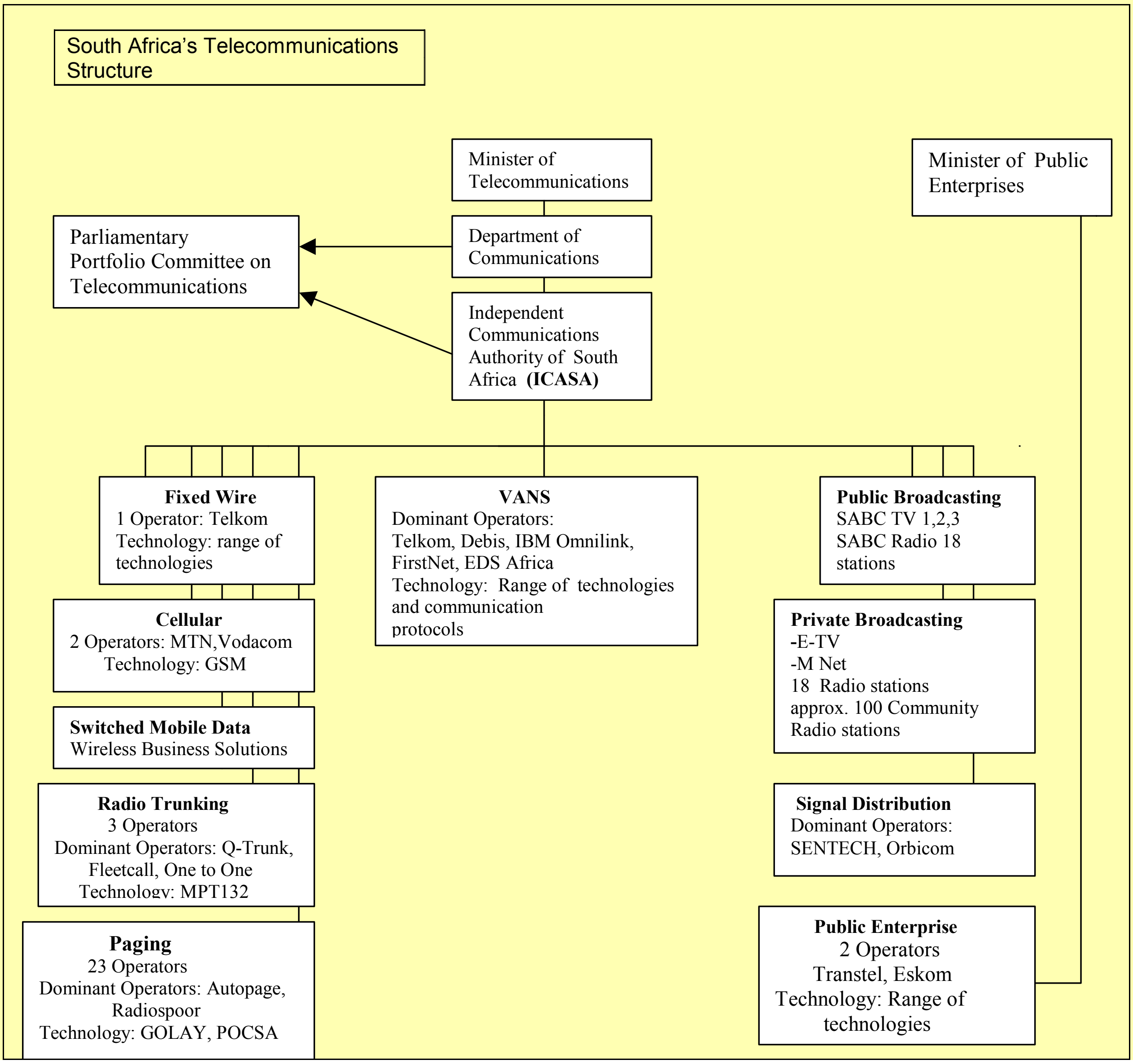
The switched network is currently 74 per cent digitalised, and the transmission network is full digitalised. Telkom is committed to increasing the percentage of digitalised lines. Furthermore, Telkom is committed to extending the coverage of narrowband ISDN (Integrated Services Digital Network) and by introducing broadband ISDN services (see below). This is possible largely because the core backbone of the ATM network has been fully operational since February 1999, linking Johannesburg, Durban, Bloemfontein, Port Elizabeth and Cape Town.[6]

As part of sector reform, Telkom took on a strategic equity partner (SEP) in April 1997 to assist in settling a high debt/equity ratio and preparing the company for competition. The capital raised from the ZAR 5.6 billion sale price was further needed in order to effect fixed line rollout. Thintana Communications, a consortium comprised of SBC Communications International Inc and Telekom Malaysia Berhad acquired a 30 per cent equity stake in Telkom, holding 18 per cent and 12 per cent respectively. A further 20% of Telkom is expected to be sold by an initial public offering (IPO) before the end of March 2003. This sale was originally set for 2001, but legislative delays and a weak telecommunications market forced a postponement.

[5] Telkom's monopoly also extended to the supply of all infrastructures for value-added networks (VANS) and to cellular networks. Telkom also holds a VANS and radio licence and has shares in three satellites namely, Intelsat, Inmarsat and ICO.

[6] *Communication Handbook 2000*, BMI TechKnowledge, Johannesburg, <http://www.bmi-t.co.za/>

Figure 1: South Africa's Telecommunications Structure



Source: BMI-TECH Knowledge 2000, LINK Centre 2000

3.4 Wireless market

GSM has changed the face of telecommunications in South Africa, and the country is becoming one of the most important GSM markets outside Europe. In 1993, two GSM public land mobile network (PLMN) licenses were issued to Mobile Telephone Networks Pty Ltd (MTN) and Vodacom Pty Ltd to provide cellular telephony on a national basis. Both networks operate at 900 MHz covering most urban areas and national roads — more than 70 per cent of population. In June 2001, a third licence was awarded to the Cell C Consortium, which went live in November 2001.

Cellular subscriber growth has been dramatic and far in excess of expectations, with almost 13 million subscribers in August 2002 (80% of which are active users), up from 2 million in March 1998, and now representing approximately 29 per cent of the population.[7] As of August 2002, Vodacom had 7 million subscribers (54% market share), MTN had 5 million subscribers (40% market share), and Cell C had 750,000 subscribers (6% market share). A major component of the subscriber base comes from the prepaid market,

[7] Cellular (2002). <http://www.cellular.co.za/stats/statistics_south_africa.htm>

with more than 90% of all new connections coming from prepaid customers. This can be attributed to factors including the convenience of the prepaid model and the difficulty in securing credit for contracts.[8]

3.5 Value added network services (VANS)

Under the 1996 regulatory framework, the VANS and equipment supply sectors are fully competitive.[9] ICASA has not finalized the licensing framework for either VANS or private telecommunications networks (PTNs) but interim licences are currently granted on application. Providers however are constrained by the legislative requirement to use Telkom facilities in the provision of VANS. There are currently about 60 issued VANS licenses (both deemed and interim) with total revenue generated in this sector estimated at ZAR 180 - 200 million. Collectively, they service a customer base of 12,000, with monthly income per customer ranging from ZAR 2000 to well over ZAR 1 million. The total estimated value of installed VANS equipment is between ZAR 50-60 million.

3.6 Private telecommunications networks (PTN)

There are currently seven interim PTN licenses in the sector, issued after the 1996 Act, in addition to the two national private networks operated by Transtel and Eskom. PTN licenses allow both voice and data services. However, the condition for issue is that the services allowed will be used by companies for internal purposes only, and will not bypass the PSTN. Collectively, Transtel and Eskom operate 150 exchanges, handling 72 million outgoing calls per annum. All other PTNs have to use Telkom facilities where the network is not contained on a single or two contiguous pieces of land, or where it interconnects to the PSTN.

3.7 Satellite

Satellite services operate in both the broadcasting and the telecommunications markets. Significantly, no regulatory policy exists on satellite, and the Ministry of Posts, Telecommunications and Broadcasting has only released a draft policy on GMPCS.

Within the broadcasting market, the dominant signal distributors are Orbicom (part of the M- Cell group) and Sentech, the government-owned common carrier signal distributor. Additionally, PanAmSat provides services to DTH broadcaster Multichoice, the South African Broadcasting Corporation and a VSAT communications service.

Inmarsat currently operates a global satellite system that is used by Telkom to offer a range of communications services for customers. Furthermore, Telkom utilizes the services of Intelsat satellites to provide voice satellite links for provisioning of PSTN voice and data services. Telkom itself is building new satellite earth stations to provide symmetrical as well as asymmetrical bandwidth. Teleports providing high-speed reliable connectivity are situated in the three main business areas of the country.

3.8 Undersea cable

Significant changes are on the horizon for the South African market as greater intra-continental and global connectivity are expected in Africa. SAT2, the biggest submarine cable serving Sub-Saharan Africa since 1993, will be complemented. SAFE (Southern Africa Far East) will connect Cape Town to Penang, Malaysia through an undersea (submarine) cable system. The WASC/SAT3 cable will connect Dakar, Senegal to Cape Town, while also connecting Cape Town to Portugal and Spain. The Africa ONE network, a 32'000 km undersea fibre optic telecommunication cable system, will ring the entire continent and have 20 - 30 landing points at key coastal cities in Africa (Cape Town being one), the Middle East and Europe, and is expected to be ready for service in 2002. This greater connectivity will go a long way to bridging the digital divide between Africa and the rest of the world, and increasing South Africa's importance as a hub.

3.9 Internet market

The South African Internet users can broadly be divided into three categories: home users accessing the Internet from home (largely via dial-up modems), corporate users gaining access through company networks, and academic users and educational institutions. In total, the number of South Africans with access to the

[8] *Development Research Africa (1999)* <*http://link.wits.ac.za/news/v3_3.html*>

[9] The Telecommunications Act does not define VANS services, but the Telkom license lists VANS as including, but not limited to: Electronic Data Interchange (EDI), protocol conversion, e-mail and access to a data base or managed data network service. The top three VANS operators have a collective market share of 75%.

Internet at the end of 2001 was 3,068,000.[10] This number is expected to grow only slightly to 3.1 million by the end of 2002.[11] Thus, approximately 1 in 14 South Africans currently has access to the Internet. This compares with at least 1 out of every 3 people in economies like the USA, Canada, South Korea, Singapore and Hong Kong.

The industry is dominated by five “first-tier” ISPs - those that buy part of their bandwidth from international suppliers or manage part of their bandwidth outside South Africa. These companies are Internet Solutions, UUNet SA, Telkom, DataPro and MTN Network Solutions. The remainder of the industry is made up of smaller “second-tier” ISPs, which purchase their bandwidth from the first-tier ISPs. The leased line Internet links of the “first-tier” ISPs are mostly carried through the SAT-2 fibre cable across the Atlantic to the USA, but there are also satellite providers. Most ISPs peer through the South African Internet Exchange (SAIX), with 55 points-of-presence around the country and two shared INX’s.

The number of ISPs in South Africa grew from an initial 7 ISPs operating in 1994, to a total of 150 ISPs operating at the end of 2002. However, this growth has not been of a consistent rate. In 1995, the annual increase in number of ISPs was 160 per cent and in 1997 the annual increase in number of ISPs was 133 per cent. However, since 1997, the rate of growth has slowed down significantly. With the emergence of a competitive telecommunications environment in 2003, the rate of growth is expected to begin increasing again.

3.10 Broadcasting

3.10.1 Radio

The South African Broadcasting Corporation (SABC) operates 19 radio stations reaching a combined average daily adult audience of about 14 million.[12] Its public service radio portfolio includes stations covering the 11 official languages and some minority cultural groups. It operates two national commercial stations, 5FM and Radio Metro. It also offers an external radio service in four languages: English, French, Portuguese and Swahili.

In addition there are 15 private radio stations, controlled by a variety of players and with a total listener-ship across all radio stations of around 20 million. There is also a vibrant community radio sector in South Africa, with over 80 stations licensed on a temporary basis. The ICASA is in the process of licensing 235 applicants for four-year community licences.

3.10.2 Television

The public broadcaster, the SABC, dominates television broadcasting with its three channels, commanding over 12 million viewers daily. It operates three full-spectrum channels, SABC1, SABC 2 and SABC 3. SABC 1 is broadcast predominantly in Zulu, Xhosa and English, while, SABC 2 is predominantly Sesotho, Afrikaans and English. SABC 3, which has the smallest but most lucrative audience share from an advertising point of view, is almost exclusively broadcast in English. Simulcasting is available on SABC1 and 2 permitting simultaneous transmission of dubbed material on television with the original soundtrack on radio. This allows viewers to watch, for example, a popular American show on SABC 1 in Zulu while those wishing to do so can tune in to the original sound-track on radio.

The public broadcaster is highly commercialised with around 80 per cent of its operating revenue derived from advertising and sponsorships and approximately 16 per cent from television licences. In the year ending March 2002, its revenue totalled ZAR 2.17 billion. This is slightly lower than the previous year, largely due to lower advertising and sponsorship.[13] The SABC estimates that of the 6.3 million households with television sets, only 70% have paid their television license fees.

The free-to-air market has recently been opened up for limited competition. The national television service, e-TV, which was granted a licence in 1998, is the only free-to-air competitor to the SABC. Its foreign partner, Times Warner, provides access to popular programming. The prevailing regulatory regime sets onerous requirements to meet public service obligations, including a full news service in a range of

[10] ITU (2002) <http://www.itu.int/ITU-D/ict/statistics/at_glance/Internet01.pdf>
[11] <http://www.theworx.biz/access02.htm>
[12] <http://www.sabc.co.za/profile.html>
[13] SABC Annual Report 2001-2002

languages and a range of local content programming. Despite these obligations, e-TV is competing successfully having doubled its viewership to 10.2 million in the first six months of 2001, enabling it to attract an impressive 20% of all advertising revenue.

Multi-choice, Africa's largest pay-tv operator, runs the country's only terrestrial pay television channel, M-Net. Multi-choice also operates DStv (digital satellite television), a bouquet of local and international video and audio channels available by subscription.

3.10.3 Signal Distribution

The signal distribution market is dominated by the national common carrier, Sentech, which provides terrestrial and satellite services to all the major broadcasters, excluding M-Net and DStv, who only draw partially on the extensive terrestrial network. Begun as a private subsidiary of the SABC, Sentech became a public company in 1996 with the State as the sole shareholder. While the Government indicated that legislation could be amended to permit Sentech's partial privatisation through the incorporation of a strategic equity partner, the Minister of the Department of Communication indicated in 2002 the Department has no immediate plans to introduce a strategic equity partner to augment Sentech.

MIH is the dominant satellite signal distributor primarily through provision of signal distribution and encryption services to its affiliated companies M-Net and DStv. Satellite transponder capacity and availability is increasing in South Africa, with several launches of the latest generation satellite planned over the next five years.

Optical fibre is regarded as the optimum technology for interactivity with its ability to deliver a variety of high quality audiovisual services on demand. The mix of optical fibre and coaxial cable that make up Telkom's infrastructure has the ability to deliver analogue and digital broadcast signals.

4 INTERNATIONAL AND REGIONAL POLICY STRUCTURES AFFECTING SOUTH AFRICA'S TELECOMMUNICATIONS MARKET

4.1 Southern Africa region

South Africa is a member of the Southern African Development Community (SADC). The SADC's primary focus is the regional integration of the politics and economies of its 14 Southern African member states. The SADC's competence in telecommunications is housed in a Ministerial Committee, the Southern Africa Transport and Communications - Technical Unit (SATCC-TU). This unit developed the SADC Protocol on Transport, Communications and Meteorology, which was adopted in March 1998. The agreement requires South Africa and other regional states to harmonise their telecommunications regulatory environments, and to create similar technical standards, network maintenance and provision, performance standards, regulatory structures and universal service policies, among other objectives[14]. Increasingly South Africa will have to consult and have regard to developments within the SADC when making decisions regarding its own telecommunications market. For example, the Telecommunications Regulators Association of Southern Africa (TRASA), an SADC association has been created to harmonise the region's regulatory approaches. Further evidence of this future scenario is the recent production of a Model Telecommunication Policy and Bill by the SATCC, a model that all SADC members' telecommunications legislation is follow substantively, if not precisely in structure.

4.2 African region

The African Telecommunications Union (ATU), of which South Africa is a member, Is the significant continental body with a bearing on South Africa's telecommunications sector. ATU membership does not require compliance with specific objectives. Rather, the ATU enjoins South Africa to participate in the vision of the Union, being a working partnership between the ICT industry and African governments. The objectives of the ATU are numerous. They include the promotion of funding and finance, developing appropriate policy and regulatory frameworks, promoting ICT human resources development[15]. These objectives are to be achieved through ATU organs, for example the Administrative Council, the General

[14] SADC Protocol on Transport, Communications and Meteorology. Article 10.2-10.11
[15] African Telecommunications Union (ATU) Mission statement, chapter on objectives.

Secretariat and the Conference on Plenipotentaries.[16] The focus at the ATU is on *capacity building* in various strategic areas, such as policy and human resources rather than on implementation. South Africa's continental obligations in the ATU, then, are more administrative in nature than procedural.

4.3 The world trade organisation (WTO)

South Africa is a member of the World Trade Organization, WTO. WTO membership binds South Africa to an open trade system with requirements to adhere to specific principles when trading with WTO member states. These principles are: freer trade through tariff reduction, non-discrimination against foreign players, market liberalization, increased competition and policy transparency.

Specific commitments affecting South Africa's telecommunications sector are contained in the General Agreement on Trade Services (GATS) Annex 1 of the Agreement establishing the WTO. It is important to note that Annex 1B does not apply to measures affecting the cable or broadcast distribution of radio or television programming. South Africa's WTO commitments under GATS can be generally understood as requiring a totally liberalized domestic telecommunications market, as per WTO principles. These commitments require among others: ensuring access to and use of public telecommunications transport networks or services offered within or across the borders of South Africa (including private leased circuits) by WTO members[17]; ensuring that relevant information on conditions affecting access to and use of public telecommunications transport networks and services (including tariffs and other terms and conditions of service) is publicly available; providing information on specifications of technical interfaces with such networks and services[18]; and affording access on reasonable and non-discriminatory terms and conditions of use. The only WTO restrictions on market players will be placed to protect the integrity of South Africa's networks, maintenance of state security, secrecy, or to frustrate efforts to circumvent WTO agreements.[19]

5 FUTURE DEVELOPMENTS

5.1 Digital broadcasting advisory body

The South African government has committed itself to preparing for the move to digital terrestrial television and radio broadcasting. This opportunity to leapfrog stages that other countries requires a massive commitment and, at around USD 200 million for major sites, a major cost. Digital Audio Broadcasting spectrum has already been set aside and is expected eventually to replace FM and AM broadcasting and to supplement short-wave.

---

[16] ibid. section 6

[17] Section 4. WTO: Final Agreement. General Agreement on Trade in Services. (GATS) Annex 1B Part 6. Annex on Telecommunications

[18] ibid Section 5

[19] ibid . General Agreement on Trade in Services. (GATS) Annex 1B Part 6. Annex on Telecommunications

5.2 New policy directives

In 2001 the South African Cabinet approved a number of policy proposals in relation to the telecommunications policy in the country which reflect the intentions of government. The decisions followed a national colloquium of stakeholders and interested parties.

The proposed policy decisions identify a number of touchstones; priority issues that will attract substantial focus in the new telecommunications policy. These have as their foci:

- black economic empowerment;
- domestic and foreign direct investment;
- stable predictable regulation;
- universal service and access;
- human resource development; and
- a reduced digital divide.

Alongside these highlights is the familiar general commitment by the South African government to development and economic growth.

A summary and itemised consideration of the policy directives, is instructive to evaluating the impact and possible implications of the purported policy stance of the government with regards to telecommunications.

5.2.1 Second National Operator (SNO)

In July 2001, the government invited applications for Public Switched Telecommunications Service (PSTS) licence to become the second national carrier. The PSTS includes VANS and long-distance service provided that it will be in the form of fixed-mobile services. Provision is made for the carrier to use Telkom facilities until May 2005. The second licence will be granted subject to universal service and access obligations. Provision is made for black empowerment ownership of 30 per cent in all new licences. Importantly, ESI-TEL (the new communication company of the electricity utility, Eskom) and Transtel are mandated inclusions in any new licensed operator, whilst foreign share holding in this new operator will be restricted to 49 per cent. The government originally aimed to have a SNO licensed by May 2002, when Telkom's official fixed-line monopoly expired. The deadline was pushed back due to delays in developing South Africa's new telecommunications regulations and may also have been due to a lack of response from investors. Two bidders submitted applications for the license in August 2002, after the deadline for submission of applications was extended twice. It is now expected that the license will be granted to the second national operator in March 2003.

5.2.2 Value Added Network Services (VANS)

VANS operators will still be prohibited from carry voice services including Voice over the Internet (VOIP), subject to a number of tight exceptions, and on pain of licence revocation. VANS operators shall have the right to provide full spectrum end-to-end e-commerce services.

5.2.3 Third Generation (3G) and 1800 MHz Radio Frequency Spectrum

Mobile operators Cell-C, MTN and Vodacom will all be granted 1800 MHz frequency spectrum as will the current PSTN incumbent Telkom and the SNO. In addition, these same parties shall be issued third generation service licences.

5.2.4 Universal Service and Access: reduction of the Digital Divide

Targets for universal service that have been stipulated in licenses are to be re-defined and will in future address the need for access to advanced internet services such as multi-media. Disabilities and the equitable geographic spread of services will be considered. The monitoring of compliance with universal service obligations will be made more efficient by the increase of institutional capacity at the Universal Service Agency (USA), which is to be restructured. Universal Service will also be aided by non-fee domain registration for public schools and a mandatory 50 per cent discount on all Internet access calls made by the latter.

5.2.5 Economic Empowerment of Historically Disadvantaged

All new major telecommunications licenses will set aside up to 30 per cent of shareholding for persons from previously disadvantaged groups. Regulations on social obligations to previously disadvantaged groups in the ICT sector shall be developed by ICASA with regards to service providers, equipment suppliers and vendors. These obligations are to be included in the licenses themselves.

5.2.6 Numbering, Public Emergency Communications and Directory Services

The number allocation system adopted is expected to ensure neutrality. The Independent Communications Authority of South Africa (ICASA) shall administer the functions of number allocation, including development of a costs-of-allocation model, maintenance and management of routing database systems. A central database is to be developed and maintained in future by ICASA. Public Emergency Communications Centres (PECCs) are to be established, and the single public emergency number is to be 112. These PECCs are expected to have voice, global positioning systems (GPS) and data capability. A single consolidated directory for all telecommunication is to be made available to every fixed line subscriber. Furthermore, a national directory information database is to be established and maintained by an operator assigned by ICASA; pre-paid numbers are to be included in this database. Directory services are to be available throughout the country and provision must be made thereto *gratis* from public pay phones.

5.2.7 Implications of the adopted telecommunications policy direction

Stakeholder responses to these announcements have been mixed. Early indications are that while empowerment groupings have welcomed the quotas stated for ownership of new operators, other industry sectors hoping for increased services based competition remain disappointed, especially over the continued restrictions on VOIP. Concerns have also been expressed about the commitment to a duopoly structure for the public switch national networks in the light of failures of duopolies elsewhere in the world in terms of extending services and reducing costs to users and consumers. Concerns have also been expressed around the required inclusion of state enterprises in the competitive licences and in their resultant dominance in the extended licences in the mobile segment of the market. It has been argued that while these enterprises should not have been excluded their inclusion should have been left to commercial negotiation to determine their real value.

6 BROADBAND: A TECHNICAL PERSPECTIVE ON CURRENT STATUS AND OPTIONS AND CHOICES DOWN THE LINE

Broadband networks can be understood in a number of ways. Technically they can be described as networks with "advanced telecommunications capability"[20]. However, many of the respondents interviewed in South Africa for the purposes of this case study, described them more in terms of underlying principles. A technical definition based on speed, or the shift from circuit-switching to packet-switching, is regarded by some persons interviewed for the purposes of this study as too narrow. Some respondents described broadband as "twice the capacity of what exists today". Other respondents focused on the convergence of fixed and mobile technologies in a broadband environment. Many equated broadband with IP-based infrastructure that would avoid the problems of working with layers of network, instead working through a single network with control functions to manage it. Other respondents described the broadband scenario as allowing for the incorporation of different technologies carrying data from any platform - a multi-lane highway with traffic moving at any speed with transparent use of infrastructure.

6.1 Current status

Broadband has been on the South African telecommunications agenda since it was identified as a vacuum in the policy framework that culminated in the 1997 Telecommunications Act. But it is only with increasing demands from bandwidth-strapped users and service providers that it has become a public issue. The strategic objectives of broadband networks in South Africa are the subject of a new policy process currently underway. Of particular interest in the policy process will be the consideration given to broadband

[20] The US Telecommunication Act of 1996, in Section 706(c)(1), defines "advance telecommunications capability" as the "high-speed [meaning upload and download speeds of over 200mbps], switched, broadband telecommunications facility that enables users to originate and receive high-quality voice, data, graphics and video telecommunications using any technology."

technologies that favour the developing country environment. These were not specifically mentioned in the cabinet approved policy directions.

In South Africa, its current implementation is limited with broadband applications on fibre-based technology being predominant. The most widespsread fixed broadband infrastructure in South Africa consists of the fibre optic backbone of the national telecommunications network operated by the monopoly incumbent, Telkom. However, other parastatals such as Transnet and Eskom have installed fibre across the electric grid and rail network in South Africa. Telkom intends to extend this broadband network through regional and primary access rings (PAN/SAN).

ADSL is being piloted on the copper based access networks owned by Telkom, with plans to rollout nationally on an incremental basis. In the metropolitan and campus environments it is envisaged that other copper based DSL technologies such as SDSL and VDSL will be implemented. However, there do not appear to be concrete plans for long-term DSL deployment. It is also unclear whether the incumbent and the new national operator will foster the technology or opt for emerging technology alternatives.

In the broadcasting terrain, broadband capability exists in the satellite network of the digital Direct-to-Home subscription broadcaster, Multichoice. With its partners, it has been piloting high bandwidth Internet access with rollout progressing slowly. Tests are also underway on Digital Audio Broadcasting (DAB) and the feasibility of Digital Terrestrial Television is also being examined. The Minister of Communications recently appointed a statutory Advisory Committee on Digital Broadcasting, in terms of the Broadcasting Act of 1999, to advise the Government on issues relevant to the introduction of digital broadcasting. It is necessary to determine the actions Government needs to take to become a global leader and to maintain competitiveness, quality and quantity in the digital environment.

6.2 DSL dilemma for South Africa

The incumbent telco, Telkom, began the commercial trial of its Asymmetrical Digital Subscriber Line (ADSL) service in Gauteng in August 2002. Telkom plans a staggered national rollout that will see an ADSL presence established in the Western Cape, KwaZulu-Natal, Eastern Cape and Free State by March 2003.

However, certain problems persist in the South African market that could delay the widespread implementation of DSL broadband. Firstly, the capital outlay for the equipment such as DSLAMs is costly and with a monopoly presence it would have to be deemed a priority in terms of governing capex costs. Meanwhile, existing investments in technology such as ISDN have not been fully recovered by the monopoly. The high cost of ISDN has resulted in a slow take up that has been restricted almost exclusively to the business sector. Importantly, over the past few years, Telkom has reduced the cost of an ISDN line by more than 35%. They continue to promote ISDN which seems to be in competition with their own recent efforts to promote DSL.

Secondly, due to rapid advances in technology, widespread usage of DSL could be pre-empted by an alternative technology such as wireless or digital television.

Thirdly, in urban centres where DSL will be rolled out in the initial stages, the copper infrastructure is fairly old. Replacing or reconditioning the copper infrastructure at current prices may not be feasible. Moreover, the high rate of copper theft in South Africa is already compelling Telkom to replace part of the old copper infrastructure but at considerable cost and in a reactive rather than in a planned way.

Another likely constraint is that the monopoly receives a fair amount of its income from domestic, national and international call tariffs. The online nature of DSL will certainly have an adverse effect on revenues and may therefore discourage DSL implementation. The cost of the local loop provision could be increased substantially by the telco with a view to offsetting loss of revenues from voice generated calls, thus negating the spread of DSL and its potential large-scale use.

The leased data line services also account for a large proportion of income for the local telco. As in the voice income stream, the telco will lose substantial revenue for data services as DSL will allow for direct PPP and VPN services, which have traditionally been fulfilled by leased data circuit access. The monopoly in the current environment, or the competitive player or players in a liberalised environment, may curtail DSL use or apply high value cost structures to DSL to ensure viable income streams.

With regard to the Internet, services in South Africa are provided largely by Internet Services Providers. Currently the law precludes the ISP’s from carrying voice traffic. Hence it is unlikely in the current scenario that ISP's will market DSL services to customers, unless there is relaxation of current policies. Bandwidth relief on the Internet is also subject to high bandwidth trunks into the Internet, and it is not clear whether the current monopoly, Telkom, will be able to supply the new links and cover the potential increase in bandwidth requirements for 'online' DSL connectivity.

With the liberalisation of the market, it is possible that a new operator will offer the DSL services. However, the current cost of new copper infrastructure installation, the spiralling costs of single mode fibre, the proliferation of wireless services, the projected time and capital/labour intensive spans of installing the new service, unbundling the local loop options and back end infrastructure expansion, may result in high cost to user for DSL services.

In South Africa, if the monopoly and current ISP's were to deploy the DSL service, addressing may not represent a major hurdle. However, with liberalisation and competition, the introduction of IP v.6 will be crucial to ensuring DSL success. As many new entrepreneurs and suppliers come on stream, online Internet-ready applications will demand valid addressing connectivity to the Internet, especially if real time VOIP end-to-end sessions between users and workgroups become a reality. Access infrastructure upgrades to PC's, networking infrastructure to both the user and the telco's will definitely take time and could prove to be cost prohibitive in the short to medium term.

The choices to be made and options taken will be highly dependent on the policy and regulatory environment in relation to competition and e-commerce, which is currently being determined.

6.3 Broadband wireless

The South African market has one of the most rapid take-ups of mobile cellular telephony in the world and within eight years has achieved a subscriber base of almost thirteen million between the three operators. The opportunities for mass Internet access via this medium is a reality. As a single mobile phone with WAP/WIP capability has the potential to allow the mass user base instant connectivity, as opposed to the high start up cost of access for traditional terrestrial services, there exists the possibility that, with the rapid adoption of mobile telephony and the subsidization of handsets by service operators, this type of Internet communication with higher bandwidth capability will be readily adopted rather than traditional broadband.

6.4 DSL vs ISDN vs Satellite vs Wireless vs Digital terrestrial in the access network in South Africa

ISDN attachment devices to allow for PC connectivity have only recently started to fall in price, but are far from becoming as ubiquitous as modems or network interface cards are in South Africa. As costs fall, users are able to experience higher quality Internet connectivity. In recent months, falling prices have stimulated demand for ISDN (BRI) connections, but within a very limited range of customers due to its high operational cost over a length of time. Government's view is that the economics of DSL will have to change, or it will be as prohibitive as ISDN has been and remain at the level of corporate use only.

Satellite Internet connectivity has been on the increase in South Africa over the last 2 years, being adopted primarily by privately owned digital satellite TV users. The technology has been marketed to this closed group of users who enjoy the new infrastructure at a nominal increase in their monthly subscriptions. The bandwidth increase on the downlink is substantial as compared with traditional land based copper attached V90 modem specifications, however with limitations on the uplink.

Again, the traditional market for DTH TV in South Africa is the very top end of the market, due to the high start-up costs.

The dilemma will be how widely to introduce DSL technology, and at what cost, or whether to continue flagging ISDN as the de facto choice for matching increased user bandwidth demands. The initial introduction of DSL by Telkom has been at a higher cost with a view to recover investment costs of both ISDN and DSL infrastructure. The monopolist as the entity controlling the local loop will be able to manage this process quite comfortably as the DSL Access Multiplexer would be based at their local switching centres, and the DSL modem user would have to access via this mode of connectivity.

With the opening up of competition in the local loop with the introduction of the second network operator, a different costing model will develop. The current restrictions of point-to-point communication for telecommunications limit the possibilities for high-speed broadband access in South Africa, while the fusion of mobile access options into seamless connectivity provides new opportunities in applications and access to services.

What is also evident is that while convergence will permit the use of a single platform to deliver traditionally distinct services, each platform will continue to have benefits for specific services over other platforms, depending on the needs of the consumer. Perhaps because of this, in the South African context, operators and broadcasters are still thinking more about providing “traditional” infrastructure more effectively and cheaply, rather than offering a range of truly converged services over their digital platform.

7 BROADBAND: LEGAL REVIEW AND REGULATORY CONSIDERATIONS

7.1 Introductory comments

As law and regulation tend to lag behind technology development and innovation, it is no surprise that a regulatory classification of broadband networks has yet to be developed in South Africa. The recently organised broadband policy process will have some interesting questions to address.

Current South African legislation concerning broadcasting and telecommunications, including the Telecommunications Act No. 103 of 1996 (hereinafter the "Telecom Act"), the Independent Broadcasting Authority Act No. 153 of 1993 (hereinafter the "IBA Act"), and the Broadcasting Act No. 4 of 1999 (hereinafter the "Broadcasting Act"), are largely silent on the issue of broadband technology and networks per se.

The Broadcasting Act, however, specifically tries to deal with multimedia and satellite broadcasting and signal distribution. Also silent on this issue are the various policy directives issued by the Minister of Posts, Telecommunications and Broadcasting, with the notable exception of the Policy Direction On Global Mobile Personal Communications By Satellite (hereinafter the "GMPCS Directive") issued in December 1998. In that document the word "broadband" is mentioned once, but is not defined anywhere in the GMPCS Directive. GMPCS nevertheless clearly fits some of the broadly understood criteria of a broadband service and these regulations can therefore be regarded as South Africa’s early attempts to pioneer broadband policy.

7.2 Real world context to regulation

As a revolutionary intervention in the telecommunications field, high-speed broadband technologies provide a radical opportunity to develop and advance South Africa’s communications infrastructure. Furthermore, the efficiencies associated with digital compression techniques will free up spectrum and place the government in a better position to achieve its social development goals using telecommunications. As with all new applications, broadband introduces opportunities for new market entrants, new products and enhanced competition. This scenario, if properly managed, presents possibilities that can only benefit South African customers.

New broadband technology introducing the fluidity of roles has implications for, and will test the administrative and legislative capacity of the South African government as it considers any reactive policy stance. Invariably, the South African government will be forced to consider whether it has a telecommunications policy that adequately regulates the drastically altered terrain that it now confronts. It is to this challenge that this legal review addresses itself.

7.3 Substantive law

As far as South African law, the telecommunications sector and incoming broadband technologies are concerned, there exists a set of specific pieces of legislation that are pertinent, namely:

- The Independent Broadcasting Authority Act, No 153 of 1993 (The "IBA" Act);
- The Telecommunications Act, No 103 of 1996 (The "Telecomms" Act);
- The Broadcasting Act, No 4 of 1999;
- The Independent Communications Authority of South Africa Act, No 13 of 2000 (The "ICASA" Act)[21];
- The Competition Act, No 89 of 1998.

A critical consideration of the South African telecommunications industry is that an independent regulator oversees the industry in all its aspects. Act 13 of 2000 establishes the Independent Communications Authority of South Africa, or ICASA. ICASA is the supreme regulatory body in South Africa as regards the telecommunications industry and spectrum issues. Its duties include the following: to ensure that market players comply with accepted technical standards, to ensure efficient use of radio frequency spectrum and to promote SMMEs in the telecommunications industry. The body also ascribes to a host of public interest objectives including attainment of universal service, protection of consumers and the promotion of ownership in the telecommunications industry by previously disadvantaged persons. ICASA acts through a council consisting of seven councillors appointed by the president on recommendation of the National Assembly. This process is in line with the regulatory objective envisaged by ICASA of impartiality in its activities. It is ICASA that will directly influence the structure of any emerging Broadband market as it implements the national Ministry of Communications policy. To retain its impartial stance as regards regulation, councillors are elected to serve for 4 years and numerous provisions make prescriptions regarding the disqualification of councillors from regulatory duties, including the evidence of bias.

Broadcast as defined under the *Broadcasting Act of 1999*, covers the new applications delivered by broadband. The Act refers to publicly viewed unidirectional telecommunications received over radio or any other telecommunications means or combination thereof[22]. A regime is set out for public, community and commercial broadcasting services. Interestingly, Chapter 1 of the Act excludes from its definition of broadcasting services, operators who make programs available on demand on a point to-point basis, including a dial up service[23]. In other words, an operator providing strictly video and audio streaming services through dial-up services over internet protocol does not require a license. This anomaly arises because, at the time that it was formulated, South Africa's broadcasting policy did not envisage an industry dominated by broadband or experiencing the present levels of technological convergence.

As regards broadband, the *Telecommunications Act of 1996* is notable for a licensing regime that conceives of telecommunications services as fixed, and compartmentalized. Chapter 5 of the Act allows operators to apply for licenses to provide public switched, mobile cellular, national long-distance services and VAN services. The placing into compartments of telecommunications services makes sense in an exclusivity period where Telkom is collecting revenues through a monopoly on the PSTN and distinct licensees engage Telkom for use of the PSTN. In a competitive market such categorizations will not work. The advent of broadband and multimedia portends alliances between different category players and the creation of new telecommunications players that provide a whole mix of services, straddling distinct technological and service categories as conventionally understood. The present emphasis in the Telecomms Act and ICASA procedures on distinct categories of telecommunications operators may no longer prove workable. An indication that the government is aware of this challenge comes in the recent Telecommunications Amendment Bill[24] of 1999, which proposes granting the Minister the discretion to combine a mobile with a fixed line license.

---

[21] The 1993 Act establishing the Independent Broadcasting Authority (the IBA) and the chapter in the 1996 Telecomms Act establishing the South African Telecommunications Regulatory Authority (SATRA) have been superceded by the ICASA Act. However the ICASA Act retains the regulatory objectives set out for SATRA and the IBA.

[22] Chapter 1 of the Broadcasting Act

[23] Ibid

[24] Telecommunications Amendment Bill 30, 1999

The Competition *Act* sets itself a number of objects, notably to promote efficiency, adaptability and development of the South African economy. The cornerstone of the country's competition policy addresses anti-competitive conduct, abuses of dominant market positions, and mergers and acquisitions. Competition policy is to be regulated by the Competition Commission and an appellate Competition Tribunal.

Importantly, the Act applies to all economic activity within, or having an effect within the borders of South Africa[25]. This definition introduces the "extraterritorial" operation of the country's competition regime. This means that actions undertaken outside the country's borders, but having an effect within the domestic market are subject to the Act and this will probably affect the South African operations of international telecommunications players. The Act prohibits restrictive practices between firms in a vertical relationship or horizontal relationship as competitors. Restrictive practices are agreements, co-operative or concerted actions between competing firms that reduce competition. This means that firms cannot fix prices or trading conditions. According to the Act, substantial shareholding is presumed to lead to such restrictive practices, but this presumption can be rebutted.

Under the Competition Act, a dominant firm is one that has market power to the extent that it can control prices, exclude competition or behave appreciably independently of its competitors. Certain practices are prohibited outright under the Act, while others are allowed where firms can show sufficient technology or efficiency gains. A firm that has a minimum of 45 per cent market share is regarded as dominant, while one with a 35-45 per cent market share is presumed to be dominant. There exists a further list of rebuttable categories of the dominant position. The Act does not prohibit companies being dominant, but rather prohibits the abuse of dominance. Falling within the prohibited categories is not fatal to companies' operations, and firms in certain instances may be granted exemptions where their actions are consistent with specific objectives such as promoting exports or supporting SMMEs[26].

Mergers and Acquisitions (M&As) are affected by the Act, and here a wide definition of M&A is used and companies will have to comply with relevant provisions. Share purchases and leasings, amalgamations and combinations with competitors fall under the definition. Different categories of mergers (large and intermediate) are identified through the use of threshold amounts. There is a notification regime that firms will have to comply with in order to get a response on the desirability of any merger undertaken. The overarching consideration in deciding whether or not to approve a merger is whether the action is likely to reduce competition substantially. The Competition Tribunal is vested with wide enforcement and punitive powers and these include imposing substantial administrative fines, annulling agreements wholly or in part and ordering parties to a merger to sell shares or assets acquired under a merger process.

7.4 Broadband and future regulation of South African telecommunications

The South African regulatory environment is changing in ways that are consistent with the global trends ushered in by the worldwide deregulation of telecommunications markets. For example, there is an independent regulator, and telecommunications service provision is not monopolized by the state. Another revolution in telecommunications has been ushered in by the advent of broadband. However, a perusal of legal sources regarding regulation and market structure shows that South Africa continues to operate with a regime oblivious to the complexities raised by broadband. The following outlines the possible regulatory contours of the South African telecommunications market as it responds to the broadband challenge.

The overarching question facing the government will be whether to adopt an ad-hoc policy and tinker with the present regulatory regime in response to broadband challenges as they arise, or to fundamentally restructure the regime and develop a policy base covering broadband and other new technologies. Regarding the first alternative, were the present licensing regime to be extended to broadband operators, broadband operators would need a license to provide any service. The fragmentation of services predicted by the new technology will likely introduce differentiations in categories of license holders in response to new services, granting either class or specific industry legitimation. With the expected explosion in content and services, class licenses would mean that the regulatory oversight would not translate into costly fine-combing through infinite operations. Content application services will likely be licensed individually as the country with its newly formed Broadcasting Complaints Commission manifests its sensitivity to the social impact of mass media on the country. Additionally, specific industry licenses may be required to operate network facilities,

[25] Section 3(1)
[26] Section 10

provide network services, applications and content. Such a fragmented regime would be the most efficient way to exercise tight control over telecommunications infrastructure, whether to retrieve revenue, regulate content or to impose penalties for non-compliance.

Apart from licensing, an issue likely to attract attention under broadband and new technologies will be interconnection. This is because broadband technologies are likely to be introduced over existing telecommunications infrastructure. ITU conventions on technological standards are likely to be adhered to for compatibility with regional and international links. ICASA will likely retain policy prerogative on interconnection fees and technology. The Telecomms Act regulates interconnection and its scope of application covers 'telecommunications systems'. This scope is sufficiently wide to cover broadband technologies. The present regime is in line with international standards, which sees interconnection agreements being reached though commercial negotiations between incumbent operators and new entrants, subject to intervention by the regulator.

South Africa's competition policy may prove to be an obstacle to some measure to broadband operators. Convergence of technologies sees varied infrastructure and service providers from news, entertainment houses, hardware and software companies engaging in joint ventures and forming alliances. The definitive threshold of 35-45 per cent in dominance abuse and the extraterritorial reach of applicable principles will have consequences for these alliances. Given global trends of converging markets and technological convergence, many international players may find that their ownership structures or alliances fall foul of South Africa's competition policies before or relatively soon after entry into the domestic market.

8 ARISING POLICY AND REGULATORY ISSUES FOR SOUTH AFRICA – COMMENTS FROM INDUSTRY PLAYERS AND GOVERNMENT

8.1 Policy formulation

The strategic objectives of broadband networks in South Africa are the subject of a new policy process currently underway. Some of the objectives being mooted include:

- The recognition by the South African government of the importance of a high-speed broadband technology to advance the communications infrastructure of the country;
- Broadband technology applications and services can realise government objectives of providing high bandwidth access to all people for voice, data and video services;
- Broad based Internet access and ICT usage culture among the populace are two of the prerequisites for widespread e-commerce adoption.

Current government debates to bridge the "digital divide" include the creation of a broadband satellite network connecting all schools, colleges, technikons and universities in the country. This network will be exempted from current regulatory and tariff restrictions and will provide community access points at the schools. This Public Information Infrastructure will also be accessible to SMMEs and communities outside of school hours. The new policy proposals approved by cabinet also propose an e-rate which would require all operators to provide services to educational institutions at a 50 per cent discount of normal costs.

This is seen by the Government as the only way to provide affordable access to broadband services. This would not exclude the demand driven development of other globally competitive, private sector broadband networks servicing the needs of those who can afford it.

Technical policy issues be considered for broadband policy include:

- To ensure technological neutrality as long as it is in line with international standards, protocols or conventions and compatibility with other licensed technologies in the country;
- To ensure that public network operators satisfy requests for interconnection from other licensed operators in an objective, transparent and non-discriminatory manner;
- The sharing of infrastructure and facilities whenever possible to avoid unnecessary duplications and to minimise the negative impact of the environment, network carriers are encouraged to share infrastructure and facilities;

- Facilitating the supply of terminal equipment, by ensuring that there are no restrictions, provided that approval is obtained from the regulator.

8.2 Current regulations and issues in South Africa that may impact on broadband development

8.2.1 Competition and Ownership

ICASA has issued regulations regarding limitations on ownership and control in respect of mobile cellular telecommunications services under Section 53 of the Telecommunications Act of 1996. These regulations place restrictions on ownership and control in a concentrated market (fewer than five telecommunications licences granted by the Minister or the Authority). Any person that holds an ownership or control interest in a telecommunication service licence cannot hold a similar interest in any other telecommunications network.

Another issue is restriction on a dominant telecommunication service licensee (more than 45 per cent of the market, or one who controls essential services) from acquiring an ownership or control interest in any other telecommunication service licence.

8.2.2 Foreign Ownership

There are no foreign ownership restrictions in the telecommunications sector, however they do exist in the broadcasting sector where no more than 20 per cent of a broadcast company can be foreign owned. While the cultural motivations for this are understandable and not unique to South Africa, the concerns that this may inhibit investment in cost intensive industries such as satellite and thereby stifle serious competition to monopoly providers is of concern. In relation to satellite, the concerns are similar to those about cable dominance in other countries. With television penetration in households above 50 per cent, there is the possibility that satellite television, while currently quite expensive, could provide the major interactive gateway to the home. There are doubts that there is sufficient local capital available for a major infrastructure investment of this kind, necessary to provide serious competition to the incumbent provider, DStv.

Many regimes, especially in developed economies, espouse market self-regulation as the catalyst for broadband services. Evidence from around the world strongly indicates that the introduction of competition and market access to broadband and other services, without regulation, is worth nothing. The historical domination of markets by monopoly operators in the telecommunications and broadcasting sectors and the overwhelming trend of advanced capitalism towards the concentration of ownership of markets requires regulation to create fair conditions for market access. In a case such as South Africa, where there is a legacy of social and statutory discrimination, to open up services for competition without some attention to issues of redress would simply perpetuate the status quo with regard to ownership and control within these sectors. In addition, while international organisations such as the World Trade Organisation place pressure on developing countries for open access to markets, developing markets may require additional regulation to ensure that local players are ensured some level of participation. Even mature markets that are being opened up for foreign ownership in terms of WTO rules are protective of their locally controlled industries, despite having had time to develop and consolidate them.

8.2.3 Affordability

Another issue that is critical for South Africa, as with other developing countries, is that of cost — the greatest factor inhibiting the take off of services is cost. New low cost broadband technologies have the potential to change this and at the same time provide high-end services with the potential to catalyse the sector in particular and the economy in general.

As stated previously, Telkom as the fixed line operator has primary rights to providing infrastructure. The planning of the infrastructure is the result of a complex and often-contradictory sets of demands and requirements. These range from demand for high-end services for the sophisticated business sector to the rural village requiring basic POTS access. The complexity of defining priorities for an institution of this nature, are immense. Balancing the rollout to under-serviced areas with rebalancing tariffs in order to prepare for competition, while at the same time preparing, for the first time, a regulatory chart of accounts in a monopoly operation with little accounting separation historically, is a challenging task. Among these drivers is the issue of delivering broadband services in the face of competition. While Telkom's monopoly is officially over, there is effectively no competition yet - the second national operator will only be licensed by

March 2003 at the earliest. It might be expected that the introduction of competition will see a flurry of new technological options available to consumers at considerably lower cost. However, as this process will only start in 2003 it places South Africa a good five years behind other markets, which will seriously hamper take off within the sector.

8.2.4 E-Government

E–Government initiatives are widely considered to be a key catalyst and stimulus of the transition towards a network economy. This ranges from government procurement to developing systems to allow the individual citizen to interact and transact online with government departments.

In addition, if infrastructure development and application selection in government is done in an integrated and coherent way, major issues relating to equitable service delivery, access to information and other developmental matters could be addressed.

The applications for governance on Broadband access would, *inter alia*, include:

- Public Sector Campus Access - e.g. hospitals, tertiary institutions, correctional services, etc,;
- Telemedicine to the clinic and home;
- Tele-education - access to schools both urban and remote;
- Intelligent Transport Systems - fibre and broadband to the kerb, or to the home;
- E-government services internally and externally - GTC, GTG, GTB;
- Information applications such as Government On-line;
- Communications access centres.

8.2.5 Culture and Content

Another issue not as frequently raised by those countries leading the policy debates on broadband and convergence, is that of developing a broader range of multimedia content, particularly in languages other than English. This presents a particularly strong challenge to regulators in the area of local content development.

South Africa has, over the last five years, developed a strong commitment to local content and promotion of indigenous languages. In 2002, new - and in many cases higher - local content requirements were set by the Independent Communications Authority of South Africa (ICASA) All South African broadcasters, including the SABC, have 18 months to comply fully with these regulations that replace those set in 1997 by the former Independent Broadcasting Authority (IBA). The new regulations set the overall quota for local content on public service television at 55% (up from the current 50%), and on commercial television at 35% (up from the current 20%). For radio, the quota of local music to be played on public service stations is set at 40% (double the previous amount) and for commercial stations at 25%, slightly up from the previous 20%.

Traditionally, local content requirements have only applied to conventional broadcasters. The question that arises is whether it is desirable, or even possible, to monitor and police domestic regulations for what is now essentially a global network and business?

8.3 Policy and regulatory implications of broadband

All these matters need special consideration against the backdrop of converging services made possible by broadband networks. The Special Project Unit in the office of the Secretary General of the International Telecommunications Union has identified a range of policy and regulatory issues pertinent to broadband. Following interviews with Government, the regulator, industry associations, suppliers and operators, we explore some of these in relation to South Africa**.** Table 2 lists the interviewees contacted as part of this study.

Table 2: List of Interviewees

Director-General, Department of Communications
Media Investment Holdings (MIH)
Mobile Telecommunications Network (MTN)
Independent Communications Authority of South Africa (ICASA)
3COM (SA)
South African Digital Broadcasting Association (SADIBA)
SENTECH (Common Carrier Signal Distributor)
Telkom (SA)
Vodacom

Source : Case study author.

8.3.1 New regulatory challenges and frameworks

Most respondents argued that broadband networks with their convergent services certainly raised new challenges, particularly if one believed that the spread of broadband could redefine or reshape the global economy over the coming years. Specifically, new regulatory frameworks would be necessary to deal with the convergence between broadcasting and telecommunications.

Within the telecommunications sector, there is still a strong belief that infrastructure or carriage regulation should be treated quite distinctly from content regulation.

This is one of the most controversial areas of regulation in the newly converged areas of broadcasting, telecommunications and IT. Traditionally telecommunications operators and regulators have not had to concern themselves with the cultural and political area of content regulation, which has been left to broadcasting regulators. Those coming from the historically unregulated area of IT generally struggle with both infrastructure and services regulation as well as with content regulation.

Some respondents argued that the challenges may, however, be less about "regulatory" issues and more about promoting competitiveness of one's country's industries, fostering the link between connectivity and job creation, and ensuring that the country is not left behind on the wrong side of the "digital divide".

One respondent suggested that: "Countries that impose stifling regulation on the telecommunications and broadband industry, or who strive to protect inefficient telco monopolies will be those that condemn themselves to the ranks of the information-poor. Countries with policies that foster a free-market approach and incentives for local broadband infrastructure and service providers are ensuring a place at the 'information economy' table."

Several respondents argued that, in South Africa under the current regulatory regime, the incumbent telco tends to view all media infrastructure as telecommunications facilities that are protected under its monopoly licence. The respondents felt that the governing regulatory regime was ambiguous on this question. They further argued that a case could be made that broadband was never contemplated to be part of the protected monopoly. It was believed to be critical that, to avoid any uncertainty, new delivery media were defined in such a way that they were not exclusively included in the scope of the monopoly.

8.3.2 Regulation of equivalent services irrespective of the medium of delivery

There was overwhelming support for the idea that in principle there should be equivalent treatment of equivalent services, regardless of the delivery medium. As far as possible a technologically neutral position should be adopted by the regulator, especially when services such as voice, data and video were indistinguishable at the level of bits.

With analogue, it was the very mode of delivery and, specifically, the use of the scarce public resource of spectrum associated with it that justified regulation of certain modes of delivery. It was precisely what was thought to be the finite nature of analogue spectrum that prompted regulation of radio services in the early part of the last century. The prospect of more or less unlimited spectrum offered by digitisation has profoundly undermined one of the major premises of radio regulations. Other issues nevertheless remain, such as ordered assignment and allocation of spectrum and regulating interference.

Regulating similar services differently on the basis of their mode of delivery undermines one of the central practices of best practice regulation, namely technological neutrality. Technology specific regulation has the potential to discriminate against different operators and result in unfair competition. Those in favour of different regulation for similar services on different platforms argue that it is the very medium of delivery that makes them distinctive. It is for this reason that they reach different audiences and, from a fair competition point of view, what differentiates their cost structure and therefore presumably their obligations. This was a minority view.

It may be worth noting, however, that in the short to medium term, the average consumer's access to media services will remain relatively unchanged in terms of medium of delivery. Thus, a regulatory regime that acts too soon to distinguish services by medium of delivery, may risk downstream difficulty in promoting investment in new technologies.

There may be times, however, when government policy seeks to encourage the deployment of broadband infrastructure, and may therefore grant incentives to those who invest in the deployment of broadband infrastructure, it was argued. The approach taken by Malaysia in promoting the "super-corridor" was cited as an example of a pro-active policy of promoting broadband connectivity.

In South Africa to date, the incumbent monopoly telco has benefited from asymmetric regulation in exchange for universal service obligations. Some respondents argued that while the reasons for this are well understood as a way of correcting the imbalances of the past, the incumbent has used it in a predatory manner to stifle all possible forms of competition in new business areas such as the provision of broadband infrastructure and services.

Protectionism, it was argued, served to hamper the penetration and adoption of new broadband services and to work against the goal of promoting an enabling environment for universal access. In attempting to give effect to the universal service policy of Government, some argued that the regulator has allowed the incumbent a far broader monopoly than what was necessary in terms of legislation and has done so contrary While agreeing with the idea that equivalent services should be regulated similarly, the broadcasting fraternity also argued that an entirely new approach to broadcasting would be necessary in the digital era, as services did not remain static. A multiplex for example, can shift from 10 services to four in drive-time. In such a complex environment, they proposed that regulation that removes the burden of monitoring compliance from the regulator should be favoured. The specific example cited was the requirement on Multiplex licences in the UK, where companies are required to do their frequency planning, which is then approved by the regulator.

The signal distributors and the telecom operators qualified their acceptance of the concept of symmetrical regulation with the proviso that transitional regulation would be needed to protect existing players and to deal with any bottlenecks that may occur during the transition. In this spirit, some respondents argued that services should not be regulated at all or should be given "class licences". It was infrastructure that required regulation, some argued, especially to avoid unnecessary duplication. Most importantly, the respondents felt that regulations must be enforceable, and should not negatively impact on business without there being some public interest imperative.

8.3.3 Merger of regulatory structures in order to ensure appropriate balance in the regulation of converged technologies

Most respondents agreed that the convergence of regulatory structures in order to deal effectively with a converging communications environment was inevitable. Many argued that while this had started in South Africa with the physical integration of the broadcasting and telecommunications regulators, the regulation of these traditional distinct sectors would need to be more evolutionary and develop in response to new issues as they came before the authority. This was not likely to happen by virtue of being in a single institution but would rather depend on changes in technology and consumer responses to these.

The levels of co-ordination and integration required for broadband services to operate certainly require a rethink of the historical separation of broadcasting and telecommunications structures. However, many respondents argued that content regulation requires a different set of skills from carriage regulation.

Perhaps more important and more challenging than the physical integration of these historically distinct agencies, however, is the philosophical development of a new regulatory approach that is much more all-encompassing than those of its predecessors. Effective regulation in the era of convergence will require greater flexibility and imagination than ever before, if the benefits of the new technologies are to ensure equity in service provision, yet not stifle innovation and investment.

Most respondents agreed that the establishment of a single institution made sense from an efficiency standpoint. However, it is vital to ensure that within the merged entity there exists a sufficient body of operational expertise for all relevant service types. Often the regulator will need to resolve conflicting demands on resources from different service types and it was felt to be critical that the merged entity should not be seen to favour one service type above another.

Merging regulators that come from incompatible or "old" paradigms was cited as a particular challenge. Some examples of old paradigms conflicts identified by Anders Henten[27] include:

- Infrastructure regulation is usually based upon the premise of some scarce or limited natural resources which are in public trust, and which have a value attached. This assumption becomes less true once broadband technologies are widely penetrated and bandwidth becomes far less of a scarce commodity;
- Content regulation is usually based upon protection of certain values - protection of democracy, protection of minors, and the wish to promote local culture or the local content industry. This is no less true in a broadband world, but content regulation on a medium like the world-wide web becomes far more difficult to apply in practice, and is much more influenced by voluntary codes of conduct and consumer pressure groups;
- Cross-media ownership regulation has been based upon trying to ensure that no individual amasses an overwhelming media ownership so as to exercise undue influence upon the populace. In the Web world, this function tends to be taken over by anti-trust regulation;
- Service regulation is usually targeted at ensuring equal and universal access to certain services regarded as basic. Access remains an important issue in broadband, in ensuring that no infrastructure owner (such as an incumbent telco or a "last-mile-service-provider") is able to exclude access by the customer to other service providers.

In contrast, the world of broadband, with its borderless nature, raises a whole host of new priority issues that may be far more relevant to address. Some of these are:

- The tracing and combating of cyber-crime in all its forms (hacking, virus propagation, denial of service attacks, credit card fraud, etc.);
- Commercial issues around e-commerce, such as non-repudiation of a transaction, dispute resolution, jurisdiction rules, taxation, authentication, electronic signatures, etc.;
- It is doubtful whether these issues would be or should be addressed by telecommunications regulators, as they fall into normal commercial, trade and criminal justice arenas.

8.3.4 Maintenance of effective competition

For many countries elsewhere in the world, the debates are somewhat different as they are introducing broadband services to already liberalised markets. The new challenges posed by broadband technologies will be compounded by the need to develop strong rules and practices on basic competition regulation that have not yet been adequately formulated. In addition to the social and economic regulatory challenges posed by converging networks and technology, South Africa has yet to provide the basics of a fair competitive regime that will reduce the barriers for new entrants to the telecommunications market and safeguard the interests of consumers.

---

[27] Henten, A (2000). Regulation in a Liberal, International and Converging Communications Market, in Cammaert and Brugelman, Beyond Competition: Broadening the Scope of Telecommunications Policy, VUB University, Belgium.

The key areas of such regulation include:

- Universal service and access financing;
- Tariff control;
- Prohibitions on cross-subsidy and discrimination;
- Accounting separation;
- Interconnection.

Competition can only be established and maintained if it is commercially viable to do so and the regulatory environment needs to encourage that. The viability of new broadband services will be determined by a number of factors i.e. the level of capital investment, cost of finance, the speed of take up of the services, the level of capacity use and the timely achievement of cash-flow. Secondary factors identified included capacity rollout, sharing of common physical infrastructure, the existence of other high cash generating operations, having critical mass in operation through synergy between services, the avoidance of over-segmentation of the market in the run-up phase and access to appropriate technology.

Competition will be promoted by ensuring a level playing field for all players and by ensuring that incumbent PSTS operators and mobile operators do not leverage their voice dominance into enhanced data services.

In the area of broadcasting, it was specifically argued that the focus on broadband regulation should be on enabling local industry to compete successfully in our market. This was also critical to becoming globally competitive. The longer DAB and DTT licensing was held up, the more difficult this would become.

8.3.5 Cross Ownership Between Different Networks

The issue of cross ownership, so central to the policy objective of ensuring democracy and diversity of information and opinion, is threatened by the realities of this new global industry. On the one hand, new technologies make possible the access to more information than ever before to those with the means to access it. On the other hand, there is the trend towards greater concentration of ownership among the biggest global players, with recent mergers towards establishing effective convergence-ready companies commanding the highest prices ever recorded in any sector. Some respondents argued that, provided there are adequate anti-trust regulations in place, this is not the jurisdiction of telecoms specific regulation.

Several respondents argued for diversity of ownership and acknowledged the need to regulate this in liberalised environments to avoid dominance or private monopolies.

From a policy perspective, while one may seek to enable the participation of multiple players, especially local players, the capital outlay required to build and operate broadband networks is substantial. The likely players with the resources to sink these substantial investments into the country will be those who can optimise and leverage their existing businesses across new platforms. Multimedia, almost by definition, will make strict cross media restriction very difficult. If such restrictions are strictly implemented, they are likely to stifle investment and business and indeed real competition. If serious infrastructural competition is a policy objective, cross ownership and foreign ownership limitation will need to be made more flexible, creative participation mechanisms for local business developed and opportunities for service competition increased. Not developing a careful framework to ensure these outcomes will simply allow the first to market in the broadcasting and telecommunications sectors to become the de facto monopoly gateway providers to the home.

8.3.6 Infrastructure sharing, standardising open standards for set top decoders, establishment of alternative infrastructures and use of spectrum

Infrastructure sharing requirements are appropriate where there is clear abuse of position by a monopoly. Some aspirant players believed infrastructure sharing and roaming was essential for at least a limited period of time to reduce the barriers to entry in markets that had very dominant incumbents, which is the case for both the fixed and mobile market in South Africa. Incumbents on the other hand argued that such matters should be left to commercial arrangement otherwise it was likely to push up costs.

The GSM operators particularly believe that standardisation had been the key to their success, particularly as it had created the necessary economies of scale that might not otherwise have been there in smaller markets.

In the broadcasting domain, the experience in this area lies with the subscription broadcaster. On the topic of efficient use of the spectrum, it was argued that the move to digital terrestrial TV and the achievement of sufficient penetration in order to achieve a switch-out of the older analogue services has had too ambitious a timetable elsewhere in the world. The projected switch-off date completely ignored the trajectory of the take-up of the new service/technology (the classic adoption curve for new services or technology).

On the issue of set-top decoders (STB's), the concept of open standards has been vigorously pursued by the DVB in Europe and OpenCable in the USA. A subscription management service provider that operates a DTH service noted that these are both industry-led and not government regulated or imposed standards.

Two lessons emerge:

- It is difficult if not impractical to achieve a truly inter-operable STB from the viewpoint of the middleware within the STB. The standardisation process has been so cumbersome and complex that it has been overtaken by market realities, and the goal of a truly "universal" STB is difficult to attain. (In Europe there is an agreed DVB specification for Java-based middleware, known as the Media Home Platform "MHP", but no significant deployments have yet occurred);
- In the arena of conditional access, security considerations lead to the conclusion that the interests of interoperability work against the integrity of the security. The best compromise that could be achieved was that of the so-called DVB common interface, and the "simulcrypt" interface. Operators will always have proprietary conditional access systems, without exceptions, in all markets, because of the importance of being first to market. It is likely that, if South Africa wishes to reduce the barriers for new entrants and ensure multiple players, at least initially, infrastructure-sharing requirements, such as roaming for new entrants on competitor networks, will be necessary.

However the South African Digital Broadcasting Association argued that there were political reasons to push migration from analogue to digital. A short migration period will provide quicker universal access to information they argue, as well as affordability through economies of scale and sharing broadcast costs because of the larger number of users on the same capital cost of network. The cost of the digital network would be one third the cost of the analogue network during the migration period, therefore the total cost during the migration would be one and one third the digital price.

Standardising open standards would improve viability if it is a widely supported standard and is not owned by an entity that is being competed against. Standardisation of receivers and decoders to avoid "lock-in" into dominant subscriber services is critical to protecting new entrants and consumers, as are limitations on the period of subscriber contracts. In this regard numbering portability becomes a major competition issue to make possible the movement of consumers between services without the loss of the number and the associated costs for business and inconvenience for individual consumers.

Alternative infrastructure can also support competitive viability if the entity involved is large enough with a wide range of services being utilised, or alternatively, if the infrastructure is shared in a consortium competing with others.

The growing cost of spectrum will affect the viability and competitive position if the pricing of spectrum is higher for a later entrant or higher frequencies have to be used to compete for the same service. Spectrum efficiency is only an indirect factor that will enhance profitability and will depend on the technology used to increase efficiency.

8.3.7 Unbundling the local loop

Several debates in the more developed economies place the unbundling of the local loop at the centre of delivering competition in the information age[28]. In the UK, the telecom regulator, Oftel, required British Telecom to make available its local loops to the other operators as the central mechanism to introduce competition into the provision of higher bandwidth access. The regulator describes this, not as an end in itself, but as the beginning of a "process to facilitate the delivery of high-speed information age services to consumers". It argued that while the dominant operator in the UK had gone to considerable length to develop broadband services, which was encouraged and welcomed, "BT alone providing access was not sufficient to ensure competitive prices and choice for consumers, nor to encourage innovation in the provision of access".

---

[28]OFTEL (1999) Access to Bandwidth: Delivering Competition for the Information Age, at <www.oftel.gov.uk>

While Britain with its high levels of services access and quality, high per capita income and strong economy provides a very different context than South Africa, several respondent argued that the principles driving the unbundling of the local loop pertain equally to South Africa. The development and growth of the new economy and information society, however they are defined and whatever national priorities overlay them, is dependent on access to bandwidth. Unbundling the local loop is an obvious mechanism for the creation and development of service competition and for making possible the engagement of consumers in that new economy and society.

Some respondents argued that it was especially appropriate for developing countries, because as much as possible should be done to provide delivery mechanisms to under-serviced areas or previously disadvantaged areas. This would also have the effect of driving down local call costs, which would mean affordable access to information. It was also argued that it would encourage innovation of services and applications and that this had a multiplier effect for e-commerce, tele-medicine, access to information and employment.

Technically, some respondents argued, due to the uncertainty of the quality of the existing copper infrastructure in South Africa, competition on wireless local loop may be a better option.

Other respondents also pointed out that the unbundling of the local loop where it existed should be distinguished from unbundling the right to provide the local loop from Telkom's exclusivity. This has been pushed by those wishing to provide services in under-serviced areas through co-operative ventures or in partnership with local authorities. The government has recently begun to entertain such notions with the proviso that this could only happen in areas with a teledensity below 2 or 3per cent. The response to this view has been positive, however, the threshold has been criticised as far too low, with suggestions that it should be in areas with teledensity anywhere below the national average of around 15per cent.

8.3.8 Universal Service Requirements for Broadband Services

It was widely agreed among the respondents, including government, that, given South African demographics and assuming that broadband services would be affordable largely in metropolitan centres, the focus of universal service delivery should be on the support of the nationwide delivery of government, education health and social services. A universal service approach should also encourage the support of small, medium and micro enterprises (SMME) in rural areas. Community access centres should be targeted, as should local authorities. Broadcasters argued that multimedia broadband delivery nationwide was possible to the general public through digital broadcasting.

That South Africa will need to pay special attention to ensuring that the introduction of broadband happens in ways that are equitable to all citizens, especially those that are not currently consumers of these services, is a given.

Given the constraints identified earlier, of licensing global networks and placing effective public service obligations or ownership limitations on them, the principle of "pay and play" would have to be adopted from a regulatory point of view. If such an approach was kept flexible and simple, it could be implemented effectively and efficiently to provide national agencies with the resources to ensure that the benefits of these enabling and lucrative sectors are enjoyed by all. The framework should be able to recognise and encourage those operators and companies delivering services or innovating technologies that redress past imbalances or provide developmental solutions.

Ways of making services affordable so that broadband infrastructures are optimally utilised was also a critical aspect of universal access identified by Government. This would require a whole new examination of costing, focusing on quantity of information transmitted rather than time spent to transmit.

Broadband, however, by its very nature, has the potential to alleviate current communication backlogs. The CU xDSL variants offer important breakthroughs in basic services provision and access. As international trends move to defining basic universal service in terms of a full range of services, including Internet, it is likely that Internet Protocol (IP) will become the de facto mainstream carrier of all types of traffic. The benefits of this from a policy and regulatory point of view are manifold. At a human level, the adoption of this approach provides practical ways of addressing the digital divide. This is made further possible at the technical level by leapfrogging traditional infrastructural developmental stages and is likely to spawn a range of multipliers including capital investment and service sector growth.

A GSM operator argued that mobile cellular lent itself to IP connectivity for e-government data hungry services such as hospitals or schools in under-serviced areas. There was the benefit of limited installation costs and the ability to cost effectively run a range of effective applications and these contributions should be considered in determining universal service obligations.

Some responses included calls for a more converged approach to universal access both at the regulatory and delivery ends. It was proposed that existing agencies and proposed agencies for meeting broadcasting and telecommunications needs, such as the Universal Service Agency and the proposed Media Diversity and Development Agency be housed and operated as one and that existing radio and telecentres be used a multimedia centers.

8.3.9 Domestic regulation of a global network.

Some respondents argued that it was neither feasible nor efficient to try and regulate the content on a global network such as the Internet. However, several respondents pointed out that domestic regulation would be possible and necessary due the dependence on basic telecommunications networks and to ensure compatibility and interoperability. The government position is in accordance with this. It points out that domestic regulation is appropriate, as long as there are international gateways for telecommunications providers and operators are licensed to build them. It was agreed that content regulation other than for ensuring social justice, even if possible, was an injudicious use of state resources.

Other respondents argued that the strongest role a local regulator can play is that of an enabler, to ensure that the interests of the country are looked after by means of pro-active and incentivised deployment of infrastructure and services.

8.3.10 Technical, institutional and financial barriers that could delay the provision and take up of broadband services

The technical barriers to take up were not considered significant, but financial barriers were, mainly due to the limitations of the South African economy and market size. Several respondents argued that Government could intervene to facilitate take up by minimising the impact of institutional barriers and maximising the use of broadband on a commercial basis by all state institutions.

Several people identified the shortage of skilled human capital as a major stumbling block to the expansion of the sector generally.

Barriers to take-up include:

- Affordability of the service which, in turn, is driven by the costs of investing in the infrastructure and its deployment;
- Availability of trained personnel to do the installation of the cable (or DSL / modem);
- Availability of compelling content (eg streaming media) and "killer" services for which people are prepared to pay.

The only appropriate intervention by government in this process would be by way of incentives to enable and encourage deployment of the infrastructure, some argued.

9 CONCLUSIONS

While not exhaustive, the study has identified a number of the current constraints and future conditions that will be required to facilitate and encourage the large-scale adoption and application of broadband.

What is apparent is that the development of broadband networks and application of the associated technologies is intrinsic to the development of the information and communication sectors specifically and the economy as a whole. With sound infrastructure planning and innovative regulation, broadband has the potential not only to provide high-end services to the business sectors but a range of lower cost, high quality services to all.

Critical to realising these opportunities is the design of a policy framework that encourages the vast amounts of local and foreign investment needed, together with a regulatory regime that provides certainty and transparency and guarantees fair competition and consumer protection. The basic elements of these, many of which are absent currently, include a fair interconnection rate and facilities leasing regime that encourages new business, tariff regulation that protects consumers and mechanisms to avoid predatory and discriminatory pricing by competitors. The importance of the accounting separation, in a situation where a monopoly operator has existed on the basis of extensive and often untransparent cross-subsidisation, is also critical. Until this is done, it will be impossible to apply cost based mechanisms that encourage competition, such as interconnection and local loop unbundling, and that are essential to broadband growth.

Finally, from a more overarching perspective, the need to integrate various policy initiatives and implementation of projects into a single coherent strategy has become imperative for the success, indeed survival, of the country in the information era. It will no longer suffice to develop national broadcasting or e-commerce policies distinct form IT trade strategies or health and educational policies separate from communication and information policies. The time has come for policies to be part of a broad national information and communication policy and infrastructure that is well integrated and co-ordinated. The more things change, the more they stay the same. At least that's what it looks like on South Africa's telecommunications landscape right now.