A critical analysis of media discourse on the South African Broadband Policy

A Dissertation

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By

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Abstract

Broadband Internet access promises a number of socio-economic benefits to citizens of developing countries like South Africa (SA). However poor policy outcomes of Information and Communication Technology (ICT), particularly in the area of poverty alleviation are evident in SA. This study utilizes Citation Analysis and Habermasien Critical Discourse Analysis (CDA) for understanding media discourse on the SA Broadband Policy formulation process and focuses on the impact and implications of the discourse. Highlighting distortions in these discourses will enable the general public and decision makers to formulate a better informed opinion and should facilitate better understanding and decision making on the costs, need and relevance of broadband access. SA media reporting on broadband policy is non-existent before April 2009. The study finds that reporting closely follows government led initiatives. The CDA reveals that the discourse is legitimized by government rhetoric and opinions from industry experts. Civil society, initially vocal disappear from the discourse. The association and disassociation of various groupings cast doubt over the viability of the SA Broadband Policy.

KEYWORDS: Media discourse, Broadband Policy, Habermas, critical discourse analysis

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Glossary – People in the South African broadband debate

This glossary only lists people that are mentioned in the discourse analysis of this study, and is not fully representative.

Name	Role or function
Ambrose, Steve	MD of Strategy at research firm World Wide Worx (WWW)
Baloyi, Basani	Head of HR at DoC: - Nov 2009
Cull, Dominic	Telecommunications lawyer from Ellipsis Regulatory Solutions
Gillwald, Alison	Executive director of Research ICT Africa and Adjunct Professor at the University of Cape Town Graduate School of Business, Management of Infrastructure Reform and Regulation Programme.
Goldstuck, Arthur	MD of research firm World Wide Worx (WWW)
Hurst, Richard	Independent analyst
Ivy Matsepe-Casaburri	SA Minister of Communications 1999 – Apr 2009
Mohlala, Mamodupi	DG at the DoC: Aug 2009 – Oct 2010 (Effectively dismissed in July 2010)
Nyanda, Siphiwe	SA Minister of Communications May 2009 - Oct 2010
Padayachie, Roy	SA Minister of Communications: Oct 2010 - date
Pule, Dina	SA Deputy Minister of Communications May 2009 – Oct 2010
Smit, Denis	MD of research firm BMI-TechKnowledge
Song, Steve	Holds a fellowship with the Shuttleworth Foundation working on telecommunications and access issues in South Africa.
van den Berg, Niekie	Democratic Alliance MP serving on the parliamentary portfolio committee for communications.
van Zyl, Jannie	MD iBurst
Venter, Craig	CEO at Altech
Wesso, Harold	Acting DG at DoC: Aug 2010 - date
Zuma, Jacob	President of South Africa: May 2009 - date

Glossary

Source BMI-T (2009)

2G	second generation
3G	third generation
ADSL	Asymmetric Digital Subscriber Line
AMOU	Average Minutes of Use
ARPU	Average Revenue per User
ASP	Average Selling Price
bn	Billion
BTS	Base Transceiver Stations
CDMA	Code Division Multiple Access
CEO	Chief Executive Officer
CRM	Customer Relationship Management
D-AMPS	Digital-Advanced Mobile Phone Service
DLD	Domestic Long-Distance
DMB	Digital Multimedia Broadcasting
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DSU	Digital Subscriber Unit
DTH	Direct-To-Home
DVB-H	Digital Video Broadcasting-Handheld
DVB-SH	Digital Video Broadcasting-Satellite Handheld
e/f	estimate/forecast
EBITDA	Earnings before Interest, Taxes, Depreciation and Amortization
MVNO	Mobile Virtual Network Operator
EC	European Commission
EMEA	Europe, Middle East & Africa
EV-DO	Evolution-Data Optimised
FDI	Foreign Direct Investment
FTTB	Fibre-To-The-Building
FTTH	Fibre-To-The-Home
FTP	File Transfer Protocol
Gbps	gigabits per second
GDP	Gross Domestic Product
GPRS	Global Packet Radio Service
GSM	Global System for Mobile Communications
HDSL	High-bit-rate Digital Subscriber Line
HSDPA	High-Speed Downlink Packet Access
HPSA	High-Speed Packet Access
HSUPA	High-Speed Uplink Packet Access
HTML	HyperText Markup Language
Hz	Hertz
IDD	International Direct Dialling
ILD	International Long-Distance
IPO	Initial Public Offering
IP	Internet Protocol
IPTV	Internet Protocol
ISDN	Integrated Services Digital Networks
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union
JV	joint venture
Kbps	kilobits per second
KHz	kilohertz
km	kilometres
LANs	Local Area Networks
LEC	Local Exchange Carrier
LTE	Long-Term Evolution
m	metres
mn	million
MEA	Middle East & Africa
NGN	Next Generation Network
Mbps	megabits per second
MHz	megahertz
MNP	Mobile Number Portability
m-o-m	month-on-month
MoU	Memorandum of Understanding
MPLS	Multiprotocol Label Switching
MSC	Mobile Switching Centre
na	not available
OIBDA	Operating Income before Depreciation and Amortization
POP	Point of Presence
q-o-q	quarter-on-quarter
R&D	research and development
SDSL	Symmetric Digital Subscriber Line
SIM	Subscriber Identity Module
SMS	Short Messaging Service
TDMA	Time Division Multiple Access
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
trn	trillion
TV	Television
UMTS	Universal Mobile Telecommunications System
VOD	Video On Demand
VoIP	Voice over Internet Protocol
VLAN	Virtual Local Area Network
WAP	Wireless Application Protocol
W-CDMA	Wideband CDMA
WiBro	Wireless Broadband
WiMAX	Worldwide Interoperability for Microwave Access
WLL	Wireless Local Loop
WTO	World Trade Organisation
TV	y-o-y year-on-year

1 Introduction

In his budget speech to parliament on the 20th of April 2010, the then Minister of Communications, Siphiwe Nyanda made the bold statement that by 2019, South Africans would enjoy universal access to broadband.

> We have finalised the broadband policy whose vision is to ensure that South Africans have universal access and services to broadband by 2019. The benefits accruing from the policy will include the provision of multimedia and e-government throughout the country.
>
> The implementation of the broadband policy will impact on the growth of the economy through expanding markets, increasing business efficiency and promoting competition. South Africans will be able to see a single face of government and be able to connect with all levels of government and different departments using a single platform. ICT offers a possibility of e-government where government offers a seamless and integrated platform for interaction. (Nyanda, 2010)

The Broadband Policy referred to above was first presented in draft format in the South African Government Gazette dated 18 September 2009, No. 32578. After a process of public consultation and deliberation by parliament, the finalized version was published on the 13th of July 2010 in Government Gazette, No. 33377.

This initiative seems to be well timed as internationally there is a growing focus on the developmental promise that broadband offers. In May 2010, the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) launched The Broadband Commission for Digital Development. This commission comprises government leaders from around the world, as well as highly placed representatives of relevant industries, international agencies, and organisations concerned with development (The Broadband Commission, 2010b). The commission presented two documents to the United Nations (UN) Secretary-General Ban Ki-moon ahead of the UN Millennium Development Goals (MDG) Summit, held in New York in September 2010. These submissions entitled, “A 2010 Declaration of Broadband Inclusion for All” and “A 2010 Leadership Imperative: Towards a Future Built on Broadband” contain recommendations and a plan of action on creating a so called “broadband

development dynamic" and highlight the interdependence and interlinking of broadband with the MDG Agenda (The Broadband Commission, 2010a).

As the formulation of a Broadband Policy for South Africa is highly topical at this time, it is important to note concerns raised about the generally poor policy outcomes of Information and Communication Technology (ICT) in Africa. Gillwald (2010) attributes these poor outcomes, particularly in the area of poverty alleviation, to the paucity of critical research that recognizes the political dimensions of policy reform and economic regulation. Gillwald argues that examining the interaction of the state and the market could go some way towards explaining why the reform paradigm of competition has failed in Africa. To contribute towards this understanding, this study will trace the South African media reporting (both print and electronic) and the response of civil society (often via dedicated Web based environments) on the rhetoric of "Broadband" and in particular focus on its role during the South African Broadband Policy formulation process. The guiding research questions are:

- What is the shape and nature of the discourse on "Broadband Policy"?
- What impact might media distortions have on the success of broadband policy?

The theoretical foundation used in this dissertation is Habermas' theory of communicative action (Habermas, 1984), which focuses on the *impact* and *implications* of a discourse. Habermas posit that the conceptual category of the *public sphere* is essential to the evolution and maintenance of democratic society. This *public sphere* consists of politicians and their political parties, lobbyists, non government organizations (NGO's) and other pressure groups as well as mass media professionals with their networks of electronic and print media. In a democratic society, the media, as part of the public sphere, plays a central role in shaping public discourses (Cukier, Ngwenyama, Bauer & Middleton, 2009b, p. 177). The media thus provides a primary source of information – "an information commons for society" (Melody, 2006). As the media has an influence on what we think about and how we think about it, it is important to highlight distortions in these discourses (Chigona & Chigona, 2008, p. 43). Guardino (2009) notes that a central concern in modern democratic politics today is understanding how citizens come to know - and express their interests, arguing that scholarship from both an empirical and theoretical perspective suggests that media discourse on policy is generally "ideologically cramped and information-poor". The identification of distorted media discourses,

especially those dealing with policy formulation are important as the possibility exists for political elites and privileged groups to deflect citizens' individual and collective interests (Guardino, 2009, p. 1). Quail and Larabie (2010, p. 36) contest that policy directing the organization of resources inevitably, either explicitly or implicitly, must address the philosophical or economic question of what goods or services are best organized in private or public hands. They note that without understanding the issues at hand and the stakes involved, public support either directly or via advocacy groups on matters of policy formulation will be impeded.

This research will thus seek to understand the workings of the public discourse surrounding the South African Broadband Policy debate. Wilson (2002) describes a discourse as "a particular system of making sense of the social world out of which commonly accepted actions emerge". It should be noted that this dissertation does not intend to comment on the Broadband Policy per se but rather on the media reporting about the Policy.

Making use of both citation analysis and Habermasian Critical Discourse Analysis (CDA), the intention of this dissertation is to answer the call made by Gillwald (2010) to contribute towards indigenous research that engages in the ICT policy space and aims specifically to understand the interplay between various institutions and the roles they play particularly in the telecommunications arena. An additional aim of this dissertation is to contribute towards the *Transformative Information Systems (IS) discourse* research in developing countries by taking a critical stance and affording a macro view (Avgerou, 2008).

1.1 Need for the Research

The term broadband has become commonplace in modern day dialog in South Africa. It has entered the vocabulary of the man on the street and politicians at the highest level of office (Zuma, 2009, 2010). Although the concept of broadband has been on political agendas for a number of years, and is acknowledged by government as central to a modern economy and information society, penetration and uptake has been poor in South Africa (Gillwald, 2007; Naidoo, Kaplan, & Fransman, 2005).

South Africa has a population of c 49.99 million (Statistics South Africa, 2010) of which, in 2008, 61% lived in urban centres and 8.5% of the total population, had Internet access (CIA, 2010). Comninos, Esselaar, Gillwald, Moyo and Naidoo (2010, p. 31, 36) note:

- Current broadband figures for South Africa reflect extraordinarily high prices and relatively low penetration.
- The negative policy regulatory outcomes are reflected in the low broadband penetration rates, low internet usage figures and substitution of fixed lines both for voice and data. These factors are significant hurdles to realising the technological innovation and productivity gains associated with the introduction of such services in the economy. Large numbers of the South African citizens do not have the most basic access to data services.

Although the subject of broadband availability in South Africa has been on the minds of the public, politicians and academia for some time, the fact that it remains on the agenda seems to indicate that little progress seems to be made in moving the debate forward and getting tangible progress on this matter. The publication, by the Department of Communications (DoC), of the Broadband Policy for South Africa marked a significant step towards redressing this situation.

Gillwald contests that:

> If the divide between Africa and the rest of the world is not to widen further, the impacts on economic growth, development, and employment of new technological developments, such as broadband—the ubiquity of which is both a necessary condition for a modern economy and, currently, largely absent in Africa— require examination, as do appropriate policy and effective regulation of it. (Gillwald, 2010, p. 11)

This study examines the media discourse surrounding the broadband debate. In doing so, it will attempt to discover if there are distortions in these discourses. If distortions are identifying, highlighting these are important as this will enable the general public and decision makers to formulate a better informed opinion and should facilitate better understanding and decision making on the costs, need and relevance of broadband access. As many other developing countries in Africa grapple with similar issues surrounding broadband, the lessons and insights provided in South Africa may be of value elsewhere on the continent and other developing countries throughout the world.

The approach used in this research has been pioneered by Cukier, Middleton and Bauer (2003) when they used CDA for examining media discourse surrounding learning technology in Canada. Further work by Cukier et al. following this approach covered a range of topics including:

- analyzing how Amazon.com used the media to successfully frame the company in a positive light between 1995 and 2008, despite the dot-com boom and bust period (Cukier, Hodson, & Ryan, 2009a).
- an empirical illustration of using Habermasian CDA for analyzing public discourse on learning technologies in Canadian universities (Cukier, Ngwenyama, Bauer & Middleton, 2009b).
- understanding media discourses for the emergence and decline of the "Information Highway" rhetoric in North American newspapers sources between 1992 and 2008 (Cukier, Ryan & Fornssler, 2009c).
- conducting an empirical study of technology media hype surrounding the dot-com market crash (Cukier, Ryan, & Hodson, 2009d).

Vosloo (2008) used this technique for analysing the ICT Strategy documents of the Centre for e-Innovation in the Provincial Government of the Western Cape in South Africa, while Chigona and Chigona (2008) analyzed the media discourse around Mxit, an Instant Mobile Messaging system that enjoys widespread use in South Africa (SA). Shirazi and Greenway (2009) examined the validity claims for Internet Filtering in Islamic Middle Eastern Countries using CDA with the four part Hamerbasian validity test. Therefore the use of critical discourse analysis and specifically analysing the media's role has become an established and valid research approach within the ICT domain.

Avgerou (2008, p. 135), reviewed IS research about how developing countries attempt to benefit from ICTs. Three themes or discourses were identified from the existing literature. The *Transfer and diffusion discourse* suggests that IS innovation in developing countries is mainly concerned about transferring technologies from advanced rich economies and emulating institutions from these countries. It examines how to adapt this knowledge into the conditions found in developing countries. The *Social embeddedness discourse* focuses on the social embeddedness of IS innovation in the context of developing countries. It seeks to understand the construct of new techno-organizational structures within the local social context. The

research emphasis is on understanding local meanings and seeking out appropriate techno-organizational solutions to the local situation. The final discourse on *Transformative IS in Developing Countries* focuses on IS innovation as a transformative socio-economic process. Here the focus is on creating possibilities for the improvement of life conditions and examining how large-scale sustainable socio-economic change can be attained. This is generally done with a local focus but within the context of the global socio-economic order.

According to Avgerou (2008, pp. 142-143), this *Transformative IS discourse* research in developing countries has provided two new elements to general IS research namely:

- The expansion of IS research beyond the boundaries of organizational and inter-organizational links into the broader domain of social consciousness. This is particularly prevalent in material dealing with the developmental potential of ICT and investigating how such potential can be exploited. It has thus introduced macro-theoretical complexities concerning questions on IS innovation and socio-economic development into the general IS research paradigms.

- It has brought an unprecedented level of *criticality* to the IS research field. The analysis of the development potential of ICTs and associated IS innovations with impacts on social, political and economic change contribute to this. Examples of issues addressed by such writings are: controversial government policies on liberalization of telecommunication to facilitate enhanced connectivity and the filtering of internet information content.

Richardson and Robinson (2007) claim that, managerialist research will remain dominant in the IS field while critical research is likely to remain the choice of a minority of researchers and this is due to the differing societal and individual motivations and commitments of each researcher. Using a critical stance in this dissertation thus takes up the challenge posed by Richardson & Robinson for more researchers to take on the critical approach and contribute to the critical school of thought.

1.2 Dissertation Outline

Chapter 2 examines existing literature, introduces the *Broadband Communications Supply Chain* and offers a redefinition of the term *broadband*. The importance of broadband is reviewed, highlighting the economic and social impacts and explains why broadband has become a policy issue. Current international best practices around broadband policy formulation are discussed.

Chapter 3 examines the South African Broadband market and specific South African ICT research. It identifies the key market players and broadband technologies deployed by these players. In addition to the consumer market area, International broadband access and the national backbone infrastructure is discussed. Attention is given to South African specific academic papers on telecommunications reform to further give perspective to the environment. Historical and current activity around broadband policy formulation is discussed. Focus is placed on specific issues around both fixed wire broadband and wireless policy issues.

In Chapter 4 the theoretical framework is introduced while the research methodology is described in Chapter 5. Chapter 6 contains the research findings with the following chapter presenting a discussion of these finding. Chapter 8 is dedicated to a reflection on the research process, and Chapter 9 concludes this dissertation with a set of recommendations and suggestions for further research.

2 Broadband Background

This chapter examines some of the prevalent international broadband policy research. Section 2.1 introduces the *Broadband Communications Supply Chain*. This framework will be used to contextualise the rest of the broadband discussion and will be followed by a section giving and overview of broadband access technologies. The *Broadband Ecosystem* is discussed in Section 2.3 giving a definition of broadband. Section 2.4 looks at why broadband is important to a developing country, while the closing two sections review why broadband has become a policy issue and discusses international best practices for broadband policy formulation.

2.1 Broadband communications supply chain

Williams (2008) proposes a layered broadband supply chain model (see Figure 2-1). He notes that different network elements, processes and business services need to be present to facilitate an end-to-end communication service. At the top of this supply chain are the international connectivity links, usually provided via submarine fibre-optic or satellite links. The second level is the regional and domestic backbone, allowing traffic to flow both domestically and between the International links. The third level represents the routing and switching or the so called “intelligence” in the network. Below this is the typical customer network access, often Asymmetric Digital Subscriber Line (ADSL) or wireless services. Finally, there is the layer of “soft” retail services like customer acquisition, customer care and billing.

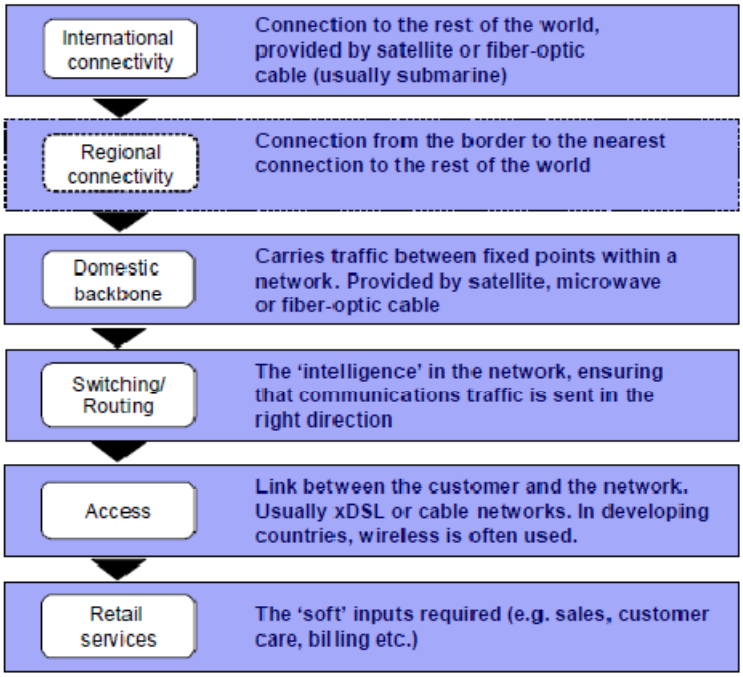

Figure 2-1: Broadband communications supply chain (Williams, 2008)

This high level *Broadband communication supply chain* model provides a framework to anchor further discussion in this dissertation. In Chapter 3 when the South African broadband environment is discussed, reference will be made to this model as well as in the Section 2.3 where the *Broadband Ecosystem* is introduced, but firstly some attention is directed to clarifying some of the typical access technology terms used in broadband discussions.

2.2 Mobile access technologies relevant to South Africa

This section offers a basic introduction to some of the key access technologies relevant to South Africa. Emphasis is placed on wireless and mobile technologies because this is likely to be particularly significant in the developing world (Gillwald, 2010, p. 3). A detailed discussion of all the available access technologies inherent to the broadband domain is beyond the scope of this dissertation, however being familiar with some of the technology terms and understanding their historical and planned future development, should aid in clarifying their role in the broadband deployment arena.

Before considering the wireless technologies, it should be noted that ADSL is currently the dominant wire-line service available in South Africa. It was launched in

2003 and initially offered download speeds of between 256kbps to 512kbps. Typical upload speeds are half that of download speed – hence the asymmetric in ADSL. Currently options of 385kbps, 512kbps, 1Mbps up to a maximum of 4Mbps are available in South Africa although speeds of 10Mbps are being tested at the time of writing (Telkom, n.d.). A comprehensive longitudinal study of Internet diffusion between 1994 and 2004 and its future determinants in SA was conducted by Brown, Collins, Maleka, Morrison, Muganda and Speight (2007).

McQueen, Byrne, Saadi and Maudgalya (2010) offer a summary of definitions and classifications (see Table 2-1) of the various wireless access methods. It is notable that not all of these are considered as traditional broadband access technologies.

Table 2-1: Wireless Networking families (Adapted from McQueen et al., 2010)

Classification	WWAN – Cellular or Wireless Wide Area Networks	WMAN – Wireless Metropolitan Area Network	WLAN – Wireless Local Area Networks	WPAN – Wireless Personal Area Networks
Coverage	National	Metropolitan	In-Building or campus, evolving to public networks	A few meters
Purpose	LAN extension	LAN extension	LAN extension	Cable alternative
Throughput	1 - 300Mbps	1 - 75Mbps	1 - 54Mbps	0.1 – 1 Mbps
Mobility	High	Nomadic	Indoor	Indoor
Technology	3G -> HSPA -> LTE CDMA EV-DO -> LTE	WiMAX (IEEE 802.16)	WiFi (IEEE 802.11)	Bluetooth 2.0+

Cellular or mobile phone networks, also called Wireless Wide Area Networks (WWAN) have evolved through three generations of different families of technologies (McQueen et al., 2010, p. 40). First generation (1G) analog networks were deployed in the early 1980s. During the early 1990s the digital second-generation (2G) networks appeared. These were followed by 3G networks in 2001-2003 with 3.5G networks appearing around 2005. Networks classified as 3.9G have started appearing during 2010 while 4G is still in the design phase. These classifications are often blurred, and various analysts and observers will give different interpretations of these classifications.

Table 2-2 provides an overview of the mobile network technologies currently deployed and likely to be deployed in South Africa. Generation 2.5G+ added GPRS and EDGE (also sometimes classified as 2.75G) services that are still in use in rural areas in South Africa. The launch date denotes international dates, and don't correspond necessarily with the availability of these technologies in South Africa.

Table 2-2: Mobile network generations, launch dates and data rates (Adapted from McQueen et al., 2010)
(dl) is downlink speed; (ul) is uplink speed; TBD denotes "to be determined"

Generation	Network	Launch	Peak data rates	Average data rates	Main Services
2.5G+	GPRS	2000	128kbps	20-50kbps	Voice+data
	EDGE	2003	384kbps	100-130kbps	Voice+data
3G	WCDMA	2001	2,000kbps	384-400kbps	Voice+data
	CDMA 1xEV-DO	2002	2.4Mbps	300-600kbps	Data
3.5G	HSDPA	2005	14.4Mbps (dl)	0.55–1.1Mbps	Voice+data
	HSUPA	2007	14.4Mbps (dl) 5.76Mbps (ul)	TBD	Voice+data
	CDMA 1xEV-DO Rev A	2007	3.1Mbps (dl) 1.8Mbps (ul)	TBD	VoIP+data
	CDMA 1xEV-DO Rev B	2008	73.5Mbps (dl) 27Mbps (ul)	TBD	VoIP+data
3.9G	HSDPA+	2009/10	56Mbps (dl) 22Mbps (ul)	TBD	VoIP+data
	3GPP LTE	2009-2015	100Mbps (dl) 50Mbps (ul)	TBD	VoIP+data

The two dominant competing standards families in the WWAN arena are:

- WCDMA with the key technologies of HSPA (HSDPA & HSUPA), HSPA+ and LTE
- CDMA2000 with EV-DO Release 0 evolving to EV-DO Revision A and B followed by LTE (McQueen et al., 2010).

These families are discussed in the following two sections. This is followed by a discussion of WiMAX the dominant standard in Wireless Metropolitan Area Networks (WMAN). See Figure 2-3 for an overview of the technology evolution path of these technologies.

2.2.1 WWAN - WCDMA family

WCDMA or wideband code division multiple access is the radio technology of UMTS and forms part of the ITU's IMT-2000 family of 3G Standards. UMTS or Universal Mobile Telecommunications System is an umbrella term for the 3rd Generation (3G) of radio technologies developed by Third Generation Partnership Project – 3GPP (www.3gpp.org). 3GPP is a cooperation of various regional telecommunications technology associations and bodies. These are ETSI (Europe), ATIS (North

America), CCSA (China), TTA (South Korea) and ARIB/TTC (Japan). This partnership project is generally accepted as the most important standardization body in the mobile communications market (McQueen et al., 2010).

Building on WCDMA networks, **High-Speed Packet Access (HSPA)** consist of the HSDPA – High Speed Downlink Packet Access (3.5G) and HSUPA – High Speed Uplink Packet Access (3.7G) specifications, potentially delivering up to 14Mbps and 5.76Mbps speeds on the uplink and downlink respectively. HSPA+ (also called HSPA Evolved) is the evolution of HSPA and promises downlink speeds of 42Mbps and uplink speeds of 11Mbps (3GPP, n.d.).

LTE - Long Term Evolution is a specification developed by the 3GPP. It is designed to facilitate download speeds of up to 100Mbps and upload speeds of up to 50Mbps. LTE builds on the existing UMTS infrastructure and as this is the technology predominantly deployed by mobile network operators world-wide, deployment should be relatively quick (Rashvand, 2008). The specification was initiated in 2004 to optimize 3GPP's radio access architecture. (3GPP, n.d.).

Figure 2-2 documents the general availability of technologies in the UMTS model. WICS (2009) notes that the recent economic downturn will result that LTE development will be delayed but that it is still very much in the operator strategies for the medium-to-long term. In the shorter term, HSPA+ will be a more realistic target.

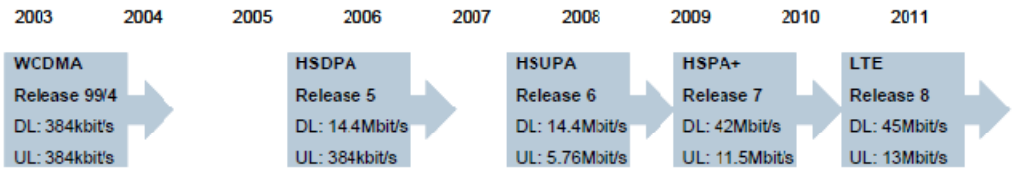

Figure 2-2: Evolution path of UMTS (Source: Hatton - Analysys Mason, 2008)

LTE-Advanced is working towards the ITU's proposal of IMT Advanced, that goes beyond the capabilities of IMT 2000. Some of the key features of IMT-Advanced will be worldwide functionality and roaming, compatibility of services, internetworking with other radio access systems and enhanced peak data rates of 100Mbps for high mobility and 1Gbps for low mobility (3GPP, n.d.).

2.2.2 WWAN - CDMA2000 family

CDMA EV-DO or evolution data optimized is a competing standard with HSPA (McQueen et al., 2010). This standard is driven by the Third Generation Partnership Project 2 (www.3gpp2.org) and is a collaboration between ARIB/TTC (Japan), CCSA (China), TIA (North America) and TTA (South Korea). EV-DO is predominantly deployed by incumbent fixed line operators who have augmented their wired networks with fixed wireless CDMA infrastructure. CDMA 3G is more data focussed, with EV-DO devices mostly consisting of data cards and USB devices (WCIS, 2009). The evolution of CDMA 1x EV-DO to EV-DO Rev A delivers speeds of up to 3.1Mbps. EV-DO Rev B promises peak speeds of up to 15Mbps while EV-DO Rev C (also called EV-DO Evolution) will push this up to 70Mbps. South Africa is one of the few countries where 1xEV-DO Rev A with data cards only has been deployed (McQueen et al., 2010).

2.2.3 WMAN – WiMax

WiMAX or Worldwide Interoperability for Microwave Access for Wireless Metropolitan Area Networks (WMAN) was developed by the IEEE as standard 802.16-2004. WiMAX delivers quality of service in that each participating device owns an access slot. Fixed WiMAX (IEEE 802.16d) operates in the 1- to 66 GHz frequency range, while Mobile WiMAX (IEEE 802.16e) uses between 2.3 and 5.5 GHZ depending on region (Rashvand, 2008). BMI-T (2009b) reports that WiMAX technology currently being built into laptops and mobile devices is predominantly the newer mobile standard 802.16e. WICS (2009) identified the main drivers for uptake of WiMAX in Africa to be:

- the increased demand for broadband access,
- the fact that most Internet Service providers had been granted access to the required frequencies prior to the WiMAX era,
- an increased interest and investment from mobile market leaders.

One of the main challenges remaining is that device cost for both fixed and mobile WiMAX is still high and some observers believe that WiMAX will play only a limited role in emerging markets, being dominated by WCDMA (Obiodu, 2009, McQueen et al., 2010, p. 4).

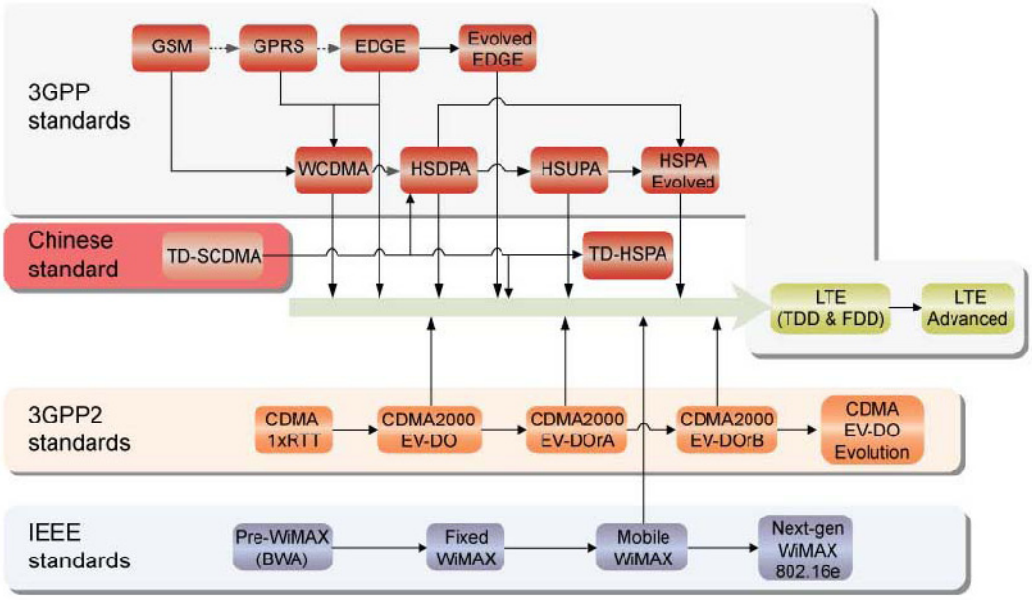

Figure 2-3: Mobile technology evolution paths (McQueen et al., 2010)

In summary, this list of technologies is by no means complete, but covers the most prominent consumer access technologies relevant to the South African environment. The next section considers the definition of broadband.

2.3 The Broadband Ecosystem

Van den Broeck and Lievens (2007) posit, the term broadband has no universally accepted definition but generally refers to high bandwidth Internet access. Early definitions of high-speed bandwidth considered connections faster than 56kbps as suitable, while recently 256kbps and higher constitute the minimum requirement. In reality, broadband offerings of 2Mbps and higher are now quite common and according to The Broadband Forum (n.d.), the target should be 4Mbps in 2009. In essence a bandwidth target is an ever shifting baseline, influenced by consistently updated IS technologies. Thus the definition of this specification should be reviewed regularly as new services become available.

To give some familiar reference points to relative download speeds of different well known data quantities, Table 2-3 provides the theoretical duration time for such data transfers.

Table 2-3: Theoretical time to download data online at different connection speeds (Adapted from The Broadband Commission, 2010)

Download:	56 kbps (dial-up)	256 kbps	2 Mbps	40 Mbps	100 Mbps
Simple web page (160 KB)	23 seconds	5 seconds	0.64 seconds	0.03 seconds	0.01 seconds
5 MB music track	12 minutes	3 minutes	20 seconds	1 second	0.4 seconds
20 MB video clip	48 minutes	10 minutes	1 minute	4 seconds	1.6 seconds
CD / low quality movie (700 MB)	28 hours	6 hours	47 minutes	2 minutes	56 seconds
DVD / high quality movie (4 GB)	1 week	1.5 days	4.5 hours	13 minutes	5 minutes

The Broadband Commission for Digital Development offers a definition of broadband as a cluster of concepts (The Broadband Commission, 2010a):

- Always-on: the Internet service is subject to real-time instantaneous updates, without users re-initiating connection to the server (as is the case with some dial-up Internet connections).
- High-capacity: the connection should be low latency and high-capacity in its ability to respond rapidly and convey a large quantity of bits (information) arriving per second (rather than the speed at which those bits travel).
- As a result, broadband enables the combined provision of voice, data and video at the same time.

The discussion around broadband should however move beyond the merely technical aspects of access and speed. Attention also has to be directed to the social dimensions of having broadband connectivity, considering the potential benefits to users and society as a whole. In many respects the technology is not as important as what can be accomplished using it (Van den Broeck & Lievens, 2007).

Maintaining a focus on the end-user experience and considering the *retail services* and *access* segments of the broadband market, as introduced in the *Broadband Communication Supply Chain* (recall Figure 2-1), Kim et al. (2010) present the *Broadband Ecosystem* illustrated in Figure 2-4. This model proposes that broadband should be redefined beyond the traditional definitions of minimum transmission speed or type of network connectivity and instead broadband be defined as an *ecosystem* consisting of *networks*, *services* carried on these networks, the *applications* they deliver and the *users* making use of these. In this way both the supply and demand side of the market are represented. In this *ecosystem* it is important to both facilitate the demand for and adoption of broadband as well as creating an enabling environment for the supply-side growth of network access and services.

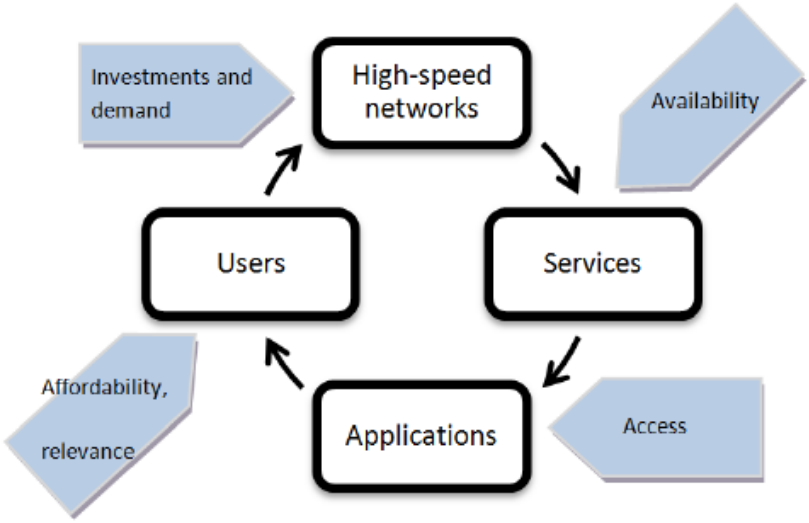

Figure 2-4: The Broadband Ecosystem (Kim et al., 2010)

In contrast to the developed world where **High-speed Networks** are increasingly utilizing "fibre-optics to the home" technology, in developing countries in the Asian Pacific, Africa and the Middle East, high-speed wireless (e.g. WWAN) is expected to show strong growth (McQueen et al., 2010). Cerf (2009, p. 18.7) notes the importance of "sustaining open wireless on-ramps to the Internet" as increasingly people will access the Internet via wireless broadband connections. Although globally the WMAN (WiMAX) broadband subscriber base remains relatively underdeveloped, it has found acceptance in the developing world where there is lack of alternative infrastructure and pent-up demand for broadband access. It is however expected that WiMAX will remain a niche player, being outcompeted by cellular broadband technologies including EV-DO, HSPA and LTE (McQueen et al., 2010, p. 4). From a policy perspective the minimum connectivity speed should be defined as that giving the most people the fastest possible connection and should match the requirements of the services and applications envisaged (Kim et al., 2010, p. 7). Noam (2009) highlights this when she argues that the focus for developing countries should rather be on universal connectivity and not specifically broadband internet connectivity.

In the **Services** domain, due to convergence of traditional video, audio and data, these are now increasingly carried as Internet Protocol (IP) data packets. This shift to IP-based broadband networking is called Next Generation Networks. More data intensive services like television (IPTV) or video streaming require more bandwidth

and thus higher speed networks. Cerf (2009, p. 18.7) notes the need for symmetrical speeds as not only download speed, but also upstream capacity is important. Besides connectivity speed, latency (or delay) is also a critical broadband service quality consideration in real-time applications like voice telephony and video conferencing (Kim et al., 2010, p. 9). Vicente and Gil-de-Bernabé (2010) highlight the issue of broadband quality. They note that this becomes increasingly critical as more interactive media-rich services become available. This is in part driven by more user-generated content being uploaded and shared, and an increasing amount of high-quality video services becoming available. The key factors that influence the total broadband experience are summarised in Table 2-4.

Table 2-4: Key factors in determining broadband experience (Vicente and Gil-de-Bernabé, 2010)

Factor	Description	Example
Download throughput	Net bit rate of downstream data that transverse the network and the broadband connection	Critical for streaming high-quality video, sharing large files such as pictures or video
Upload throughput	Net bit rate of upstream data that transverse the network and the broadband connection	Increasingly relevant for two-way high-quality video communications, uploading/sharing pictures and videos
Latency	Time taken for a packet of data to reach from source to destination	Very important for real-time applications such as VoIP communications and gaming
Other	Network oversubscription, packet loss, jitter, service continuity. Typically embedded in throughout factors	Critical for video broadcast distribution and overall end-to-end experience

However, one element of broadband provisioning which is poorly investigated is the effect of data-caps or limits on data usage and as such the overall broadband experience. In a developing world context this, in association with costs, are significant factors.

According to Kim et al. (201), **Applications** are defined as function-specific software that makes use of the underlying data network to deliver content to user. These so called “apps” are increasingly becoming the focus of the *Broadband Ecosystem*. Traditionally applications were hosted on a user’s computer, but increasingly applications are being hosted and accessed on the Internet or other private networks and this has been termed “cloud computing” (Miller, 2008). Early incarnations of network hosted applications, like Webmail are being supplemented by Web 2.0 type

applications that enable users to generate, distribute and share content in real-time. The Facebook, social networking site is likely the most well known proponent of Web 2.0 technologies (Kim et al., 2010, p. 10).

Finally the **Users** need to be considered in this *Broadband Ecosystem*. In comparison to users of traditional dial-up facilities, users with broadband access have a vast number of different opportunities to consume, create or share multimedia content and mobile broadband is also significant in this respect (Cerf, 2009). McQueen et al. (2010) gives a summary of typical consumer devices and how these fit into the broadband environment (see Figure 2-5). A mobile device, by definition, is one that can be carried and does not require a permanent fixed-line power source to function. MIDs are Multimedia Internet devices; STBs are Set-top Boxes and typically denote devices to facilitate digital to analogue conversion for analogue TV.

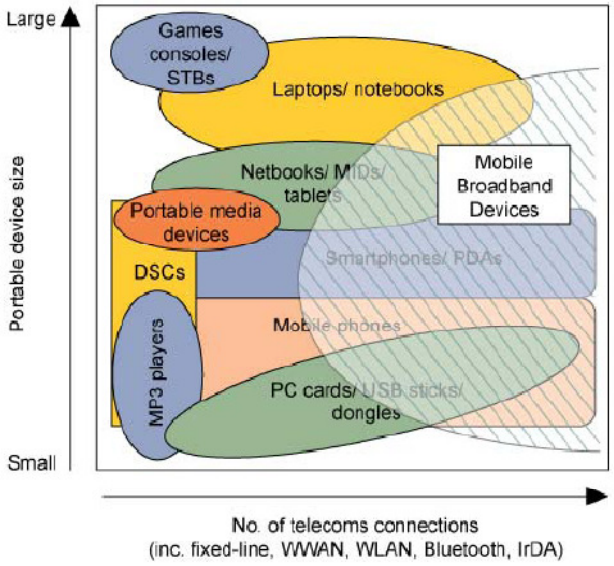

Figure 2-5: Broadband device definition (McQueen et al., 2010)

Three trends in user devices have implications for the *Broadband Ecosystem*:

- Traditional personal computers and laptops are becoming more affordable.
- Mobile telephones are becoming “smarter”, providing faster processors, more memory, better graphical capabilities and more intuitive user interfaces and thus allowing more – and better functional “apps” to run on them.
- The development of the netbook – a portable computer that enables

Internet connectivity with limited local processing.

Business users find value in enhanced connectivity facilitating strengthened business performance while social networking is the largest driver for general users (Kim et al., 2010, p. 11).

2.4 The importance of Broadband

Pickot and Wernick (2007) posit that the economic relevance and societal importance of broadband is becoming important due to the diffusion of broadband Internet infrastructure reshaping the traditional ICT landscape. Society as a whole is being affected with changes in the sectors of information, media, communications and entertainment. The Broadband Commission notes that:

> ... the year 2010 marks not only a key milestone on the road to achieving the Millennium Development Goals (MDGs) and the outcomes of the Geneva and Tunis phases of the World Summit on the Information Society (WSIS). It also marks the 25th anniversary of the landmark 'Missing Link' report of the Maitland Commission, which called for the now seemingly humble target of bringing virtually the whole of mankind within easy reach of a telephone by the early part of the 21st Century.
>
> While strong market demand in the form of mobile telephony and the Internet have since driven the explosion of worldwide ICT diffusion even in the world's poorest countries, we believe we have once again arrived at a crossroads in the evolution of the global digital highway, with broadband as the next great leap forward. (The Broadband Commission, 2010a, p. 15)

And furthermore:

> Today, it is widely understood that nothing scales to critical mass quite like cell-phones and cyber-space. The value of the worldwide mobile and wired Internet increases exponentially as more people, communities and nations become connected to it. Such 'network effects' have been in evidence almost from the birth of the mobile and Internet market phenomena, but we are rapidly entering a new and dramatic phase of growth and demand (The Broadband Commission, 2010a, p. 17).

According to Kim et al. (2010, p. 2), "Broadband is a general purpose technology that significantly affects how people live and work. It is a key driver of economic growth and national competitiveness, and it can contribute to social and cultural development". The traditional digital divides between countries are now also echoed within countries and one of the manifestations of this new digital divide is the

separation of those with access to broadband and those without and is perpetuated by the fact that countries or communities that lack easy access to broadband may miss social and economic opportunities (Kim et al., 2010).

Jones and Scott (2009, p. 1) identify the various positive socioeconomic benefits that broadband can deliver, but highlight the fact that "broadband connectivity is a means and not an end in itself". The importance of broadband is emphasised in the following two sections. The first presents the *Socioeconomic Impact* of broadband with examples of positive benefits, while the second deals with the *Social Impact* of broadband. These impacts are explored from the perspective of an emerging market economy or developing country context. Willson, Marshall, Young and McCann (2009, p. 798) caution that little empirical evidence is available to prove that the espoused benefits of broadband are actually being realised. It is generally very difficult to quantify and calculate these benefits, and government's investments are often based on the *potential* for broadband to contribute to economic development, productivity and public good.

2.4.1 Socioeconomic impact of broadband

A World Bank report (World Bank, 2009) analysed the impact of broadband on growth in 120 countries between the years 1980 and 2006. The analysis showed that each ten percentage points of broadband penetration resulted in a 1,21% increase in per capita gross domestic product growth (GDP) in developed countries, and a 1,38% increase in developing countries (Figure 2-6).

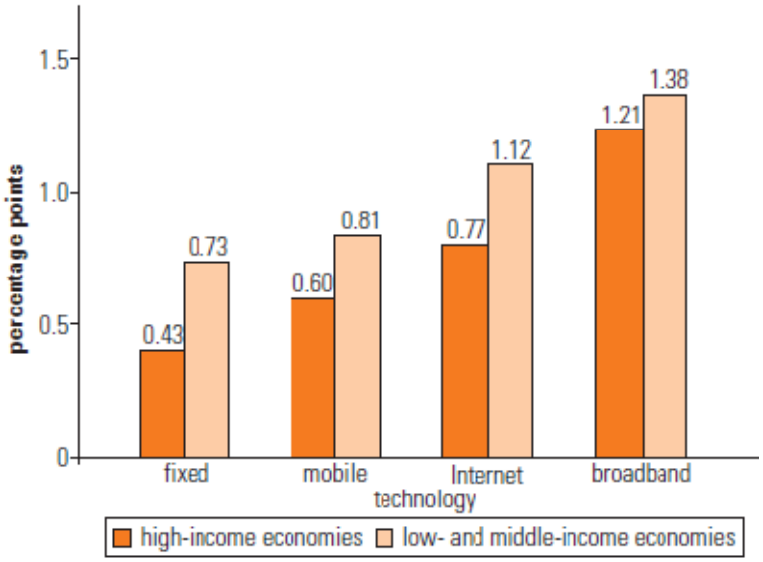

Figure 2-6: Growth Effects of ICT Infrastructure (World Bank, 2009)

Koutrompis (2009) conducted a simultaneous equation-based analysis of 22 Organisation for Economic Co-operation and Development (OECD) countries, and found that a 1% increase in broadband penetration yielded an increase of 0.025% in economic growth. Katz et al. (2010b) measuring the impact of broadband on the economic growth of Germany between 2003 and 2006, found that an incremental penetration of broadband of 1% yielded 0.026% incremental growth in GDP. A study conducted in the Latin American region found that a 1% increase in broadband penetration contributed to a GDP growth of 0.0178% and an increase of 0.18% in the job occupation rate (Katz & Avila, 2010). Thus investing in broadband may be viewed as an investment in economic growth and development.

Due to the global economic downturn, and hence fewer available resources, developing countries are also faced with the challenges of how to protect or expand critical infrastructure investment which is much needed for sustained growth (Qiang, 2009). A common strategy found in the fiscal stimulus packages of many developed economies is to invest in broadband and next-generation networks. This is seen as a counter-cyclic tool to create jobs and provide a foundation for long-term sustained growth and economic recovery. Qiang (2009, p. 4) argues that policymakers in developing countries should follow a similar approach and that broadband investment is often more fiscally sound than many other public spending stimulus options as in some cases it can actually be self-financing.

Both Gillwald (2010, p. 4) and Jones and Scott (2009, p. 2) allude to the debate about the causal effect of broadband rollout and GDP growth. Does improved broadband penetration enhance economic growth or does a growing economy drive the increased use of broadband? In addition, Katz and Avila (2010) note recent research that has established that the economic impact of broadband is stronger in regions that have higher levels of broadband penetration.

According to Jones and Scott (2009) the following positive socioeconomic benefits can be associated with widespread broadband deployment in a developing country:

- Broadband could increase productivity and will generate new jobs
- Broadband impacts on innovation and entrepreneurial opportunities
- Broadband impacts Outsourcing, foreign business and investment
- Broadband leads to efficiencies in healthcare provision
- Broadband multimedia capabilities can improve education
- Broadband could improve government communications

These benefits are discussed and expanded upon in the remainder of this section and examples of positive effects are provided. However, Willson et al. (2009, p. 798) note that as is the case with many innovative endeavours, the areas that will gain most from broadband rollout have yet to be identified, and future benefits are yet to emerge or be contemplated.

Impact on productivity and job creation

One of the immediate benefits of a regional broadband initiative are the jobs created by the labour-intensive infrastructure rollout and the subsequent positions needed to maintain and service the network. The Broadband Commission (2010b) lists a number of international studies detailing the positive impact that broadband deployment has had on job creation. A German study from 2010 found that broadband network construction between 2010 and 2014 would create 304,000 jobs while 237,000 jobs would be created between 2015 and 2020.

A further study done in Brazil during 2009, found that broadband had added about 1 – 1.4% to the employment growth rate (The Broadband Commission, 2010b). Katz and Avila (2010, p. 2) note the improvement of productivity resulting from the adoption of more efficient business processes, like the marketing of excess inventories and the optimization of supply chains. These improvements were as a

result of having provided a more efficient communication infrastructure via the deployment of broadband technology across the business enterprise.

Impact on innovation and entrepreneurial opportunities

In developing markets, broadband and other telecommunications services, particularly cell phone access, can improve the viability of micro-enterprises by enhancing the transfer of information and the communication process (Jones & Scott, 2009). Broadband services can aid day-to-day decision making by providing more timely and pertinent information over-and-above that which is provided by traditional information sources as well as providing one-to-one communications via VoIP (Katz & Avila (2010).

It is important to differentiate between entrepreneurs and survivalist where the latter micro-enterprise is stared purely to make enough money to survive while the former typically identifies an opportunity for revenue generation and growth. An entrepreneurial micro-enterprise is typically more sophisticated and has a greater need for external communication and this communication need could be to diversify into a greater number of geographical markets or to strengthen links to its existing markets (Jones & Scott, 2009, p. 3).

Katz and Avila (2010) note that the extensive deployment of broadband across a population can contribute to the acceleration of innovation resulting from the introduction of new applications and services, for example, new forms of commerce and financial intermediation. All these factors lead to greater efficiency and higher productivity (Jones & Scott, 2009, p. 4).

Impact on Outsourcing, foreign business and investment

Broadband can lead to a more efficient functional deployment of enterprises by maximising their reach to labour pools, for example, outsourcing services, establishing virtual call centres, or gaining access to raw materials or consumers (Katz & Avila, 2010). The availability of greater international broadband connectivity has enabled Business Process Outsourcing (BPO) in many emerging markets. One common application is where business outsource their contact and customer care

centres world-wide and so doing also provide a 24hour service (Jones & Scott, 2009, p. 4).

Impact on healthcare provision and services

Developing countries typically have large rural populations that have difficulty getting to treatment centres due to the poor transport infrastructure. In densely populated urban slums the problem is not so much distance to a treatment centre, but the typical oversubscription of patients to these medical facilities (Jones & Scott, 2009, p. 5).

Srivastava (2008), highlights the potential use of broadband Internet technologies in health care in developing countries, especially in the context of public health programs. The main uses of ICTs in this sector include:

- remote consultations and diagnosis,
- information dissemination and networking between health providers, user groups, and forums,
- Internet-based disease surveillance and identification of target groups for health interventions,
- facilitation of health research and support to health care delivery, and
- administration.

The availability of broadband services to the healthcare industry has the following benefits over and above the traditional access to voice and data services (Jones & Scott, 2009):

- **Immediacy and more information:** A richer set of information can be exchanged using broadband services. For example, an X-Ray images and digital photographs could be sent from a remote treatment centre to a specialist in a larger hospital for immediate analysis.
- **Video telephony:** This could be used for both consultation and training in that it provides a rich medium for two-way communication. This may lead to improved standards of treatment at remote treatment centres.
- **Greater security and privacy:** Broadband enables detailed medical records to be accessed and updated. By using encrypted data transports this information will be protected from interception and alteration.

The Broadband Commission (2010b) highlights the services that can be provided via the various capacities of broadband, from basic web browsing or e-mail to finding or exchanging medical information to the real-time high-definition video interactions of medical procedures for diagnostic or training purposes. They note that these e-health services are vitally important to achieving several of the MDGs, but Srivastava (2008) warns that although broadband technology has immense potential for developing nations, it is constrained by the lack of suitable infrastructure, access technology and policy direction.

Impact on education

Firth and Mellor (2005) note that collaborative e-learning requires broadband, and that the positive impact of broadband Internet on education relies on a number of contributing factors, including:

- The quality of material that the student has access too.
- Material available via broadband Internet is not a substitute to class-room learning and as such e-learning is complimentary to traditional forms of education.
- Monitoring and limiting the excessive and non-productive access to the Internet by students.

An advantage of broadband over other telecommunications technologies, in the e-learning sphere, is that it can handle both multimedia and video streaming, allowing a broader demographic to access on-line resources, including those who are illiterate (Jones & Scott, 2009). The Broadband Commission (2010b) notes that training in all sectors of society can be delivered through broadband video and other applications and has the potential to take education to remote schools and homes. They site an example where a partnership announced in late 2009 between the Indira Gandhi National Open University (IGNOU), based in New Delhi, India and Ericsson, an international telecommunications services provider, will allow up to 2.5 million students from India and 34 other countries to download IGNOU course contents to their mobile phones via a third-generation (3G) network that Ericsson plans to build. A second example cited, is that of the “Ceibal” project, completed in October 2009, at a primary school in Uruguay. The school was provided with Internet access, and every child had been provided with a laptop. It is argued that the cost came to less than 5% of the country’s education budget and that children who participated in this project are likely to reap tremendous educational rewards.

The early availability of broadband facilities to students in many educational institutions in Eastern European countries eventually led to the mass-market take-up of broadband services in those countries in subsequent years, suggesting that the ICT skills acquired at school and at tertiary education institutions, create an environment for these skills to be put to use in commerce and industry and, in turn, this leads on to a greater demand for broadband services (Jones & Scott, 2009, p. 7).

Impact on government

Generally e-government incorporates the governmental use of ICT and in particular the Internet to deliver services and information to the general populace (Jones & Scott, 2009, p. 8). Typical e-government programs address the following areas:

- **Internal:** Connecting different departments and agencies via ICT infrastructure to improve the efficiency of internal communication and processes. Administrative corruption becomes more traceable because financial and administrative transactions leave an electronic trail that can be traced back.
- **External:** Enhancing accessibility and transparency of information collected and generated by governmental institutions. This is a significant driver in many developing countries where corruption in government departments continues to be a problem.
- **Relational:** Facilitating the evolution of the relationship between the state and its citizens, thus paving the way to enhanced democratic processes.

The Broadband Commission (2010a) notes that especially in developing countries, government is often the major user of broadband infrastructure. By aggregating their connectivity needs over National Broadband Networks (NBN), governments can make the business case for national infrastructure more compelling. Successfully moving government services online has the potential of improving speed, efficiency and effectiveness of service delivery. Fundamentally this offers the promise of revitalizing public administration and transforming the way citizens relate to their governments and policy-makers.

2.4.2 Social impact of broadband

Reports from Pew Research Centre's Internet & American Life Project, indicate that the internet and e-mail played a significant role in maintaining dispersed social networks and complemented telephonic or person-to-person interactions of respondents (Kim et al., 2010) and broadband services are important to support these social ties. A 2009 Pew report (Horrigan, 2009) quantified how American citizens deemed broadband to be an important part of their lives (Figure 2-7). The graphic depicts that between 57% and 68% of respondents in the survey indicated that high-speed broadband internet access was either very-important or somewhat-important to the various community-related activities presented. The report further noted that 55% of respondents indicated that at least one of these five categories was deemed very important thus indicating the importance of broadband connectivity in the fabric of civic and economic communities (Horrigan, 2009, p. 33).

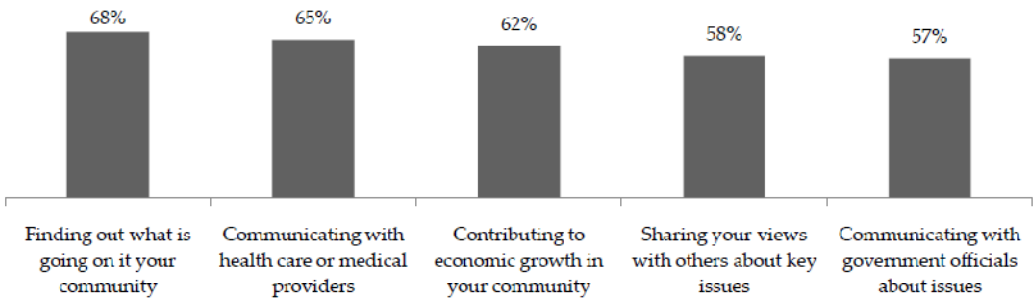

Figure 2-7: Broadband activities cited as important (Horrigan, 2009 adapted by Kim et al., 2010)

Firth and Mellor (2005) focus on the aspects of social interaction that may be impacted by broadband Internet access. These are friendships, community relationships and political activity. They note that the Internet has the ability to enhance the quality of life by increasing contact between parties. Generally people with good offline relationships are able to enrich these relationships by good online relationships, i.e. typically those with good conventional friendship links are able to extend these to the Internet. A feeling of community can be improved by online relationships enhancing conventional ones. Political participation was found to be mainly determined by the basic demographics of age, education, and income. Although Internet access could facilitate greater access to information and transparency, it was found that Internet access did not change the basic demographics for political activity but rather reinforced these.

2.5 Broadband Policy

This section introduces broadband policy and highlights how adherence to broadband policy may assist governments' in building capacity within a country. Specifically broadband policy formulation building blocks and other related telecommunications policy, that has a direct impact on broadband policy, is considered.

The Broadband Commission (2010a, p. 23) offers the Broadband Cloud model (see Figure 2-8), highlighting the inter-dependent forces of Policy, Infrastructure, Technology, Innovation, Content and Applications, People and Government. This helps to frame the importance of policy formulation in the total Broadband Development dynamic.

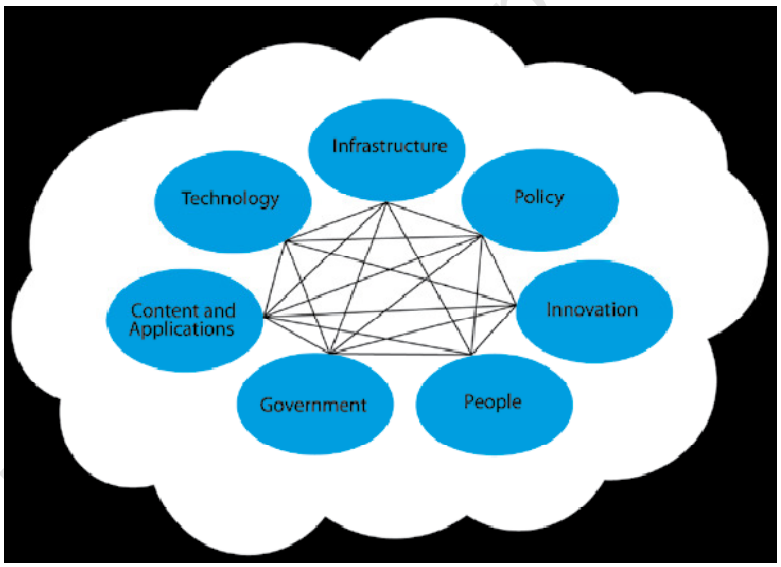

Figure 2-8: The Broadband Cloud - A virtuous cycle for digital development (The Broadband Commission, 2010a)

2.5.1 The importance of Broadband Policy

The Broadband Commission note that:

> Policy leadership and political willpower at the highest level are fundamental to promoting the deployment of broadband networks and development of content and

> ICT skills. Those countries that have succeeded in rolling out broadband networks and integrating them into their economic and social fabric have done so not necessarily on the back of vast wealth or huge investments, but on the basis of early and consistent prioritization of broadband at every level of policymaking. (The Broadband Commission, 2010a, p. 25)

Governments conscious of the widening digital divide and the risk that some groups may be missing the economic and social benefits that broadband access promises, are eager to stimulate and promote the uptake of broadband. Even in countries with mature broadband markets, governments are looking at universalizing broadband access to all its citizens (Kim et al., 2010).

Many developed countries are directing funds from their economic stimulus packages towards broadband in an attempt to counter the recent economic downturn. The USA has committed USD 7.2 billion towards facilitating next generation access and the expansion of broadband coverage into rural areas (Jones & Scott, 2009). Similarly, Australia has earmarked more than half (USD 30 billion) of its total economic stimulus package to the improvement of broadband services. Channelling resources into broadband networks is a move encouraged by The Broadband Commission who state that:

> ICTs generally, and broadband more specifically, can drive economic recovery after the recent economic slowdown. Broadband is spurring technological change across a range of economic sectors – from agriculture to finance, from construction to healthcare and a range of other modern services.
>
> Neglecting the deployment of broadband networks and services can severely jeopardize countries' long-term economic growth prospects and competitiveness in the information age. Future service delivery in health, education, business, trade and government will all rely on broadband enabled platforms, so countries must plan for a future built on broadband. (The Broadband Commission, 2010a, p. 18)

The success of mobile telephony, particularly in the developing world, was driven by massive consumer demand and declining ownership cost (Kim et al., 2010). However, policymakers are conscious that the success of broadband will be much harder to achieve. While the usefulness of a telephone is obvious to most individuals, the same cannot be said of broadband. The problem is particularly pronounced amongst the poor and illiterate where the cost or benefit of using broadband services

is usually not justifiable next to the cost of basic amenities such as food, heat or shelter.

In summary, a national broadband policy should facilitate the provision of affordable access to broadband infrastructure to citizens, business and government and aim to stimulate the usage of broadband services at national, provincial and municipal levels. Cerf (2009, p. 18.1) suggests that one of the core values of a national broadband policy should be to ensure "robust access to the open Internet". The Broadband Commission urges government leaders to note that:

> Since broadband technologies are pervasive and cross-cutting, broadband must be clearly prioritized in a virtuous 'broadband development dynamic' across all the different policy domains – investments in broadband are simply too important to be allowed to become a casualty of bureaucratic rivalries or changing policy priorities. (The Broadband Commission (2010b, p. 19)

2.5.2 Best Practice – broadband building blocks

Katz and Avila (2010, p. 18) found that the formulation of policy is determined by the overarching government vision, and as such impacts on the development of broadband. They note that institutional strength and platform-based competition, and not so much the independence of the regulator, appear to be the most important variables driving broadband innovation and development in a country. In order to implement broadband development strategies, a number of policies, regulations and programs need to be implemented (Kim et al., 2010). A country is typically in a certain stage of broadband market development. These can be broadly classified as:

- **Promote:** Countries with low broadband penetration need to focus on promotional policies for both the supply side and demand side. On the demand-side, these could be raising awareness levels about the benefits of broadband, and on the supply-side inducing investment in network infrastructure.
- **Oversee:** In more mature markets, government should implement competition policies to promote service development in a competitive market environment.
- **Universalize:** In mature markets the universal service programs can be expanded to include broadband as such services are now present everywhere.

Considering these three sequential (but also overlapping) stages of market maturity and each of the components of the *Broadband Ecosystem*, Kim et al. (2010) provide Table 2-5 summarizing the key policies and programs that should be considered as building blocks in a broadband growth strategy.

Table 2-5: Key policies and programs for building the Broadband Ecosystem (Kim et al., 2010)

	Early stage: Promote	*Mass market: Oversee*	*Universal service: Universalize*
Goal	*Focus on promotional policies as a pump-primer to spread broadband networks*	*Facilitate competition through consistent, facilitating regulation*	*Universalize broadband service as the market grows*
Networks	• Develop an enabling environment through policies and regulation that promote investment and market entry • Reduce administrative burdens and provide incentives and subsidies for R&D, pilots, and network rollout • Develop cyber-building certification systems • Allocate and assign spectrum for wireless broadband services	• Consider infrastructure sharing, including unbundling of the local loop • Reallocate spectrum to expand available bandwidth	• Undertake deployment of open access to broadband networks in rural or remote areas, using public/private partnerships, as appropriate • Coordinate access to rights-of-way
Services	• Provide broadband networks to schools, government agencies, etc (government as an anchor tenant) • Standardize and monitor service quality	• Create an enabling environment for intra- and intermodal competition • Ensure non-discriminatory access for service, application, and content providers	• Consider expanding universal service obligation to include broadband
Applications	• Promote government-led demand aggregation • Government agencies as early adopters and innovators • Provide e-government and e-learning applications • Promote creation of digital content • Develop local content and hardware sector	• Support secure, private, reliable e-commerce transactions • Introduce intellectual property protections	• Develop advanced e-government programs • Offer grants to community champions and broadband demand aggregators
Users	• Provide low-cost computers and other user devices, such as in education • Deliver digital literacy programs	• Promote ethics on information use	• Expand universal service programs to underserved communities • Construct community access centers • Provide subsidies for poor households to buy user devices (such as computers)

The Broadband Commission (2010b, p. 25) identified the following key factors and measures that could be deployed to expand or improve a countries communications infrastructure:

- Infrastructure policy should take account of rapid technical advances and be focused on larger goals, not directed towards a specific technology mix. Legacy infrastructure (or lack thereof) constitutes both a constraint and an opportunity.
- Infrastructure goals are separate from questions of public ownership of facilities and the role of competition in spurring private investment.
- Pricing or other barriers that restrict access to networks or infrastructure must be removed as far as possible. Interconnection among networks must be robust, cheap and efficient.

- Preserving flexibility and innovation at the network's edges is essential. It must be possible to attach new applications and access devices, such as smartphones — which is much easier and cheaper than replacing core infrastructure.
- The physical network is distinct from the services and functions that travel across it, and, in the interest of competition and technical progress, too close an association between infrastructure and a particular service should be avoided.
- Fibre-optic networks are likely to be preferred as backbone wired infrastructure, but these must be complemented by rapidly-evolving wireless infrastructure that will provide more bandwidth more economically as technology develops.
- The sharing of infrastructure should be facilitated and encouraged, and policy-makers should consider how best to ensure synergies among applications and services. This means adopting an integrated, trans-sectoral approach.

Cerf (2009, p. 18.8) highlights the importance of transparency by policymakers in that consumers need to be well informed for the market to function well. He implores policymakers to look at ways to make relevant comparative information about broadband available to the public, and to encourage research in resolving technical network problems by analysis of empirical data. Kim et al. (2010) note that, emerging good practices from countries leading in broadband uptake include the following:

- **Be visionary yet flexible:** Develop national broadband strategies that specify the vision and service goals. This needs to serve as a framework in which policies and regulations can be developed and implemented. Note that these strategies need not be static, and should be adapted to the changing market environment.
- **Use competition to promote market growth:** Successful countries used collaborative approaches between the private and public sectors to get to a stage of universalized broadband services. Furthermore, competition was encouraged to expand the broadband market. A level playing field encourages fast private sector led growth in broadband services.
- **Facilitate demand:** Successful countries developed and implemented demand facilitation policies early on during the evolutionary process. These included raising broadband awareness to the general public, making services more affordable and expanding the network reach to the widest population possible in the shortest time.

2.5.3 Net Neutrality

Increased deployment of broadband backbone and access networks can be facilitated by adopting universal access and service policies that compliment the national broadband policy and as such create an enabling environment. Governments ICT policies should be technologically neutral, but through standards, spectrum policy and broadcasting laws, it could influence the direction of broadband technology both directly and indirectly (UNCTAD, 2009). This importance of "Net Neutrality" is highlighted by Cerf (2009, p. 18.7), and he adds that broadband policy should not simply focus on faster broadband networks, but rather on delivering faster access to the Internet. Defining Broadband Internet net neutrality comprises two main positions: the Internet has no gatekeeper or "centralized control mechanism", and "those who own the network do not control the content that runs over them" (Quail & Larabie, 2010, p. 33).

2.5.4 Interlinked Policies

In section 2.5.2 two key areas in policies and programs for building the broadband network are identified. First the unbundling of the local loop (LLB) and second, the allocation of radio spectrum for wireless broadband services (see Table 2-5).

In areas where the conditions of the local loop is of good enough quality to support Digital Subscriber Line (DSL) services, the unbundling of this infrastructure is needed to allow competing operators from using their infrastructure (Williams, 2008; ITU, 2008). These last-mile or local loop access technologies often provide full connectivity between the user and the core network for wired networks (Muhoro & Kennedy, 2005). Where infrastructure is available, the cost of wire based broadband access is likely to remain lower than mobile broadband access for the foreseeable future, and therefore emphasis and focus should not be removed from this process.

Internationally there are policy trends towards more flexible forms of radio spectrum management for Wireless access (Delaere, 2007) and this is of particular importance in developing countries. Song (2008) advocates that civil society in South Africa takes up a position on spectrum management that will maximise the value that

society can gain from the available radio spectrum. This call has been taken up in the form of the Open Spectrum Alliance (OSA, 2009) a “multi-disciplinary grouping of parties with a shared interest in working towards greater efficiency in the allocation, assignment and use of radio frequency spectrum in South Africa. “

2.6 Summary

This chapter explored some of the key international frameworks, models and best practices that informed the South African Broadband Policy of 2010. It introduced the *Broadband Communications Supply Chain* as a framework for understanding the broadband environment. Noting the very diverse definition of Broadband, the *Broadband Ecosystem* is discussed. This model, focussing on the access and retail services levels of the *Broadband Communications Supply Chain,* emphasised the need to not only consider the physical high-speed networks, but also the services, applications and users in the broadband environment. A brief overview of access technologies was provided with a particular emphasis on wireless technologies. The importance of broadband, particularly from a developing country perspective, was discussed, and examples were provided of the positive impacts broadband could have for such a country. The importance of policy formulation for the promotion of broadband was emphasised and some international best practices were examined.

3 SA Broadband Environment and Policy research

This chapter introduces the dominant players in the South African broadband arena and traces how the *Broadband communication supply chain* model is represented in South Africa, focusing on some of the key enabling technologies currently being deployed. To understand the dynamics of the media discourse on broadband policy it is important to take cognisance of the roles and responsibilities of various entities and the activities of various operators in the broadband domain. The manifestation in South Africa of the key areas of International Access, National Backbone Infrastructure and consumer broadband Internet access as per the *Broadband communication supply chain* model are examined. Distinction is drawn between consumer access in the categories of individuals, corporate and academic institutions.

The remainder of the chapter traces the time-line of the South African Broadband Policy making process and furthermore examines existing academic literature about South African ICT Policy and in particular Broadband-related issues.

3.1 South African Broadband Players

Table 3-1 summarises the major players in the South African Broadband arena which includes state agencies, state-owned enterprises, incumbent operators, Internet Service Providers (ISPs) and resellers. The role that civil society organizations play has been deemed to be of a less “formal” nature, and their involvement with the broadband policy formulation process is discussed in more detail in Section 3.5.

Table 3-1: South African broadband role players and their Web homepages

Communications-related State Agencies	
The Department of Communications (DoC)	http://www.doc.gov.za
Independent Communications Authority of South Africa (ICASA)	http://www.icasa.org.za
Universal Service and Access Agency of South Africa (USAASA)	http://www.usaasa.org.za/
Major State-Owned Enterprises (SOEs)	
Infraco (Broadband Infrastructure Company)	http://www.infraco.co.za/
Sentech	http://www.sentech.co.za/
Major Incumbent Operators	
Telkom	http://www.telkom.co.za

Neotel	http://www.neotel.co.za
Vodacom	http://www.vodacom.co.za
MTN - Mobile Telephone Networks	http://www.mtn.co.za
Cell C	http://www.cell-c.co.za
Major Internet Service Providers and Resellers	
Vox Telecom	http://www.vox.co.za
WBS – iBurst	http://www.iburst.co.za
Internet Solutions	http://www.is.co.za
MTN Business	http://www.mtnbusiness.co.za
Vodacom Business	http://www.vodacombusiness.co.za
MWEB	http://www.mweb.co.za

Comninos et al. (2010), note that in South Africa, the state is still a significant player in the communications sector. Although the government's shareholding in Vodacom changed with Telkom's sale of its shares, the state still has a 37.7% shareholding in Telkom and a 14% direct shareholding in Vodacom. Figure 3-1 notes the ownership structures of various government departments on the SOEs.

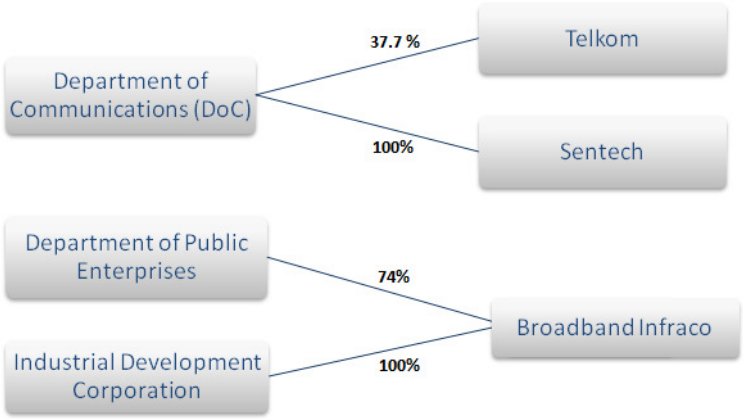

Figure 3-1: SA Government telecommunications ownership (Adapted from Comninos et al., 2010)

3.1.1 Communications-related state agencies

The communications-related state agencies have a function of formulating policy, regulating the industry and play an advisory role as well as have duties of advocacy. However, Naidoo, Kaplan and Fransman (2005) note the importance of the regulator in a national telecommunications environment as one of the characteristics of the telecommunications landscape is the high fixed costs coupled very low marginal

costs. This high fixed cost implies significant economies of scale which, in turn, means that few competitors are likely to survive in such and environment (Cerf, 2009, p 18.5). Considering the low marginal cost, (for example the cost of a VoIP call is zero having acquired a broadband connection) and hence the low revenues, telecommunications operators are likely to struggle to recoup their investment costs. The logical outcome of these characteristics is that of oligopoly, or perhaps even monopoly. Therefore, following the principles of economic theory, it is essential to have a regulator to encourage competition wherever possible – failing this their mandate is to design regulations that mimic the market (Naidoo, Kaplan & Fransman, 2005, p. 3). This is underlined by Pickot and Wernick (2007), noting that where there is no infrastructure, or the cost of duplicating infrastructure is exorbitant, regulatory intervention should be focused on service competition, thus allowing fair access to a shared resource.

The interplay of the regulator and the political domain is highlighted by Naidoo, Kaplan and Fransman (2005) in what they term "The Political Economy of Regulation", which refers to the institutions on which the regulation is based as well as the political processes that determine *who* has the power to make regulations and *what* kind of regulations the regulator is allowed to make. As can be expected, this can have a major impact on the functioning and performance of the telecommunications sector of a country (Naidoo, Kaplan & Fransman, 2005, p. 4).

A further consideration is the quality of appointments to these institutions, and relates to the necessary skills, experience and integrity of candidates. In South Africa there have been cases where institutional dysfunctionality of the state agencies has led to industry seeking policy and regulatory clarity from the Courts (Gillwald, 2009b).

The Department of Communications

The **Department of Communications' (DoC)** mandate as derived from legislation is:

> To create a vibrant ICT Sector that ensures that all South Africans have access to affordable and accessible ICT services in order to advance socio-economic development goals and support of the African Agenda and contribute to building a better world (DoC, n.d.).

To this end, the department lists as some of its core functions (DoC, n.d.):

- To develop ICT policies and legislation that create conditions for an accelerated and shared growth of the South African economy, which positively impacts on the well being of all our people and is sustainable.
- To ensure the development of robust, reliable and affordable ICT infrastructure that supports and enables the provision of a multiplicity of applications and services to meet the needs of the country and its people.
- To strengthen the ICT Regulator, Independent Communications Authority of South Africa (ICASA), to enable it to regulate the sector in the public interest and ensure growth and stability in the sector.
- To enhance the capacity of, and exercise oversight over, State Owned Enterprises (SOE's) as the delivery arms of government.
- To fulfil South Africa's continental and international responsibilities in the ICT field.

ICASA

The **Independent Communications Authority of South Africa (ICASA)** was established in July 2000 after a merger between the telecoms regulator (Telecommunications Regulators Association of Southern Africa) and the broadcasting regulator (Independent Broadcasting Authority). Its function is to regulate the electronic communications, broadcasting and postal services industry in the publics' best interest. Key functions of ICASA include (ICASA, n.d.):

- make regulations and policies that govern electronic communications, broadcasting, and postal industries.
- issue licenses to providers of electronic communications services, broadcasters and postal services.
- monitor the environment and enforce compliance with rules, regulations and policies.
- hear and decide on disputes and complaints brought by industry or members of the public against licensees.
- plan, control and manage the frequency spectrum and
- protect consumers from unfair business practices, poor quality services and harmful or inferior products.

Comninos et al. (2010, p. 36) notes that institutional arrangements have compromised the autonomy of ICASA to regulate the sector effectively and this is reflected in its inability to deal with the critical areas of related to broadband including, competition regulation, licensing and frequency spectrum management. ICASA has been characterised by stagnation, litigation and incapacitation.

USAASA

The **Universal Service and Access Agency of South Africa (USAASA)** was established under the Electronic Communications Act No. 36 of 2005, to promote the goals of universal access and universal service in the under serviced areas of South Africa. Under the Electronic Communications Act, the agency is mandated to (USAASA, n.d.):

- Make recommendations to the Minister of Communications to determine what constitutes universal access by all areas and communities in South Africa.
- Foster adoption and the use of new methods of attaining universal access and service.
- Encourage, facilitate and offer guidance in respect of any scheme to provide universal access and service.
- Encourage any scheme to provide telecommunications services as part of reconstruction and development projects as contemplated in Section 3(a) of the Reconstruction and Development Programme Fund Act, 1994 (Act No. 7 of 1994).
- Stimulate public awareness of the benefits of telecommunications services.

Billions of Rands have been contributed by telecommunications service providers, via the universal services levies, to the Universal Services Fund. However, despite various initiatives, including public internet terminals, supply-side driven telecentres and the allocation of under-serviced areas licences (USALs), all of these have proved to be unsuccessful in redressing the imbalance of telecommunication service provision in the country (Comninos et al., 2010, p. 16) - See also Chetty, Blake and McPhie (2006, p. 342) for a discussion on why the USAL model is not right for South African underserviced areas.

3.1.2 Major State-owned Enterprises (SOEs)

State-owned enterprises, with an interest in communications, have the potential to function at all of the layers of the *Broadband Communications Supply Chain* but typically are seen operating in the top four level only, focusing on infrastructure provision. As will become apparent in the discussion from this section and the next chapter, their role in the South African telecommunications arena have been central too much of the debate about the failed “managed liberalisation” telecommunication policy.

Infraco (Broadband Infrastructure Company)

The formation of Infraco was first announced by the then minister of public enterprises, Alec Erwin in 2006. At that stage Telkom had a virtual monopoly on providing national and international broadband backbone access and was charging Internet service providers and other telecommunications service providers rates far exceeding those seen in other countries. The intention was that, as a state owned enterprise, Infraco would intervene in this market and bring down the cost of communicating in South Africa.

On 8 January 2008 the then president of South Africa, Thabo Mbeki assented the Electronic Communications Amendment Act of 2007 and the Broadband Infraco Act of 2007. This paved the way for the formation and licensing of Infraco to provide broadband services to Neotel meaning they would have a three year period of exclusivity on all Infraco's telecommunication infrastructure. However, there was a two year delay between the assenting of the act and Infraco receiving its operating licence (Gillwald, 2009a).

Infraco inherited the high-capacity metropolitan and intercity fibre optic network from Transnet and the telecoms infrastructure assets of Eskom which would then be leased on a cost basis (Gillwald, 2007). Infraco was also earmarked to facilitate international gateway services and it became a key investor in the West African Cable System (WACS).

The following is an extract from the Government Gazette, 8 January 2008 (No. 30654) wrt. the Broadband Infraco Act, 2007:

> 4. (1) The main objects of Infraco are to expand the availability and affordability of access to electronic communications, including but not limited to underdeveloped and under serviced areas, in accordance with the Electronic Communications Act and commensurate with international best practice and pricing, through the provision of—
> (a) electronic communications network services; and
> (b) electronic communications services.

Infraco's Vision is (Infraco, n.d):

> To provide affordable access to long-distance telecommunications network infrastructure and broadband telecommunications connectivity services in South Africa.

And its mission is to:

- Expand the availability and affordability of access to electronic communications networks and services, including but not limited to underdeveloped and underserviced areas; and
- Ensure that bandwidth requirements for specific projects of national interests are met.

The predicament that Infraco now faces as 2010 draws to a close is that the broadband backbone landscape has changed significantly since 2006. The cost of national bandwidth has plummeted and having waited so long for their operating license, companies like Dark Fibre Africa, Neotel, Vodacom and MTN have built out backbone fibre backhaul between the major centres in South Africa (Comninos et al., 2010). The business case for Infraco is thus fast diminishing, and underscores the inability of government to move swiftly enough to effect changes in the telecommunications space.

Sentech

Sentech is the state owned signal distributor and broadcasting network operator (BMI-T, 2010). In 2002, it was the first company in South Africa to launch a wireless broadband service. The “MyWireless” service utilized the 3.5GHz frequency band. Due to financial constraints there was only a limited rollout to areas in Johannesburg, Cape Town, Durban and Nelspruit. The service was suspended during 2009.

The company plans to provide communications solutions such as voice, data and video on one, integrated digital internet protocol (IP) network and therefore it could, in future, be considered to be in direct competition to established telecommunications companies. Whilst Sentech’s core business remains broadcasting signal networks, the broadband business is envisaged as a major element of the product mix in future (Sentech, n.d.).

3.1.3 Major Incumbent Operators

The key incumbent telecommunication players providing consumer broadband access function in a fast moving market that is in constant flux. A short history and overview of each company is provided with some focus on their strategic direction. Having some insight into the strategic direction of these players is of importance when we consider the potential role they may play in the future broadband development of the country and how the broadband policy may affect them. These

providers typically function at all levels of the Broadband Supply Chain, but for this study, their consumer-related activities will be the focus.

Table 3-2 provides a summary of the key consumer broadband products offered in the South African market by the incumbent telecommunication providers. It covers both wire-line and wireless services and notes the launch date of the service offering.

Table 3-2: South African Broadband Service Providers and Consumer products

Service provider	Brand	Service Launch date	Notes
Telkom	ADSL	August 2002	Access speeds range from 384Kbps to 4Mbps.
	T-Zone WiFi Hotspots	2004	Telkom T-Zone WiFi hotspots are typically deployed in airports, shopping malls and conference centres and form part of a global hotspot network allowing global roaming (BMI-T, 2010).
	WiMax - Do Broadband Wireless	June 2007	Telkom launched South Africa's first WiMAX broadband service and targets areas not covered by its ADSL network. There are plans to include voice services in the future WiMAX product offerings (BMI-T, 2010).
Neotel	NeoConnect	April 2008	Deployed over a CDMA2000 1x evolution-data optimised (EV-DO)
	WiMax	July 2008	Provides a fixed-wireless services aimed predominantly for the corporate market.
Vodacom	3G	December 2004	
	HSDPA	January 2008	3.6Mbps with some 7.2Mbps
	HSPA+	February 2010	First live HSPA+ network in Africa.
MTN	3G	June 2005	
	HSDPA	January 2008	
	HSPA+	May 2010	
Cell C	3G HSPA+	September 2010	Deployed in the 900 and 2100 MHz frequency bands, the HSPA+ 900 deployment offers a larger coverage area and better in building coverage, while HSPA+ 2100 delivers capacity where needed.
WBS	iBurst Wireless	December 2004	Making use of IntelliCell technology from US based company ArrayComm the network was designed from the ground up for exclusive data usage and is pure IP based.
	WiMax	May 2008	Network could support full mobility, but current services target fixed-line alternatives

Comninos et al. (2010) point out that due to the telecommunications policy framework, even though horizontal licensing was introduced, South Africa finds itself in the situation where there are effectively duopolies in both the fixed and mobile market. The nature of competition and the ability for companies to compete are influenced by the policy and regulation of the industry and the failure to introduce pro-competitive measures has resulted in the reluctance of new and aspirant competitors to enter the market and this has been a major contributing factor to the high communications costs in South Africa (Comninos et al., 2010, p. 15).

Telkom

Telkom is the original incumbent telecommunications company in South Africa and dominates the wire-line broadband market. Over the past five years the company has seen a steady decline of fixed line connections and voice revenues due to the effects of fixed-mobile substitution and its long time monopoly of the International gateway's and national backbone infrastructure has also been eroded. This pressure has resulted in the development of the "defend and grow" strategy (BMI-T, 2010). However, despite local market pressures, Telkom has been able to grow its data services in general with a notable gain in market share in the retail ADSL sector (BMI-T, 2010) by providing wired ADSL services using existing copper infrastructure. Access speeds range from 384Kbps to 10Mbps. Via Telkom Internet the company also provides dial-up services and probably has the second largest ISP customer base in South Africa.

According to BMI-T (2010), some of the strategic directions that Telkom has been pursuing include:

- Due to the rapid changes in technologies and the evolving regulatory environment the company developed the "defend and grow" strategy. Enacting this transformational drive, the company announced in April 2009 its reorganisation into three major Business Units, namely Telkom South Africa, Telkom International and Telkom Data Centre Operations.

- The disposal in October 2008 of its 15% share in Vodacom was a strategic move to allow it to move into the mobile space. The shareholders agreement's restriction with Vodafone prevented this earlier. During October 2010 Telkom launched its 8ta Mobile Service (http://www.8ta.com/).

- To increase the relevance of the company to the South African customer, Telkom has been aggressive in introducing service bundles, calling packages and data products.

- Through an agreement with AT&T in April 2009, the two companies will explore ways to provide global seamless communication and technology solutions and services to multinational companies interested in expanding their footprint into sub Saharan Africa.

Neotel

Neotel, the second national operator in South Africa received its license in the 4th quarter of 2005 after amendments to the 1996 Telecommunications Act in 2001. It began offering its first services in August 2006 (BMI-T, 2009a) and in May 2008 the *NeoConnect Prime* commercial service was launched which is deployed over a CDMA2000 1x evolution-data optimised (EV-DO) network and includes high speed internet connectivity with speeds of up to 2.4Mbps (although average speeds are between 300Kbps and 700Kbps). Complementing this service is NeoConnect Lite and Neo Datacard offering a mobile data card internet access solution (BMI-T, 2009a).

A WiMAX service has also been launched by Neotel in July 2008. At the time of writing, it only had spectrum for the fixed WiMAX service and base stations were deployed in Johannesburg, Cape Town and Durban only. The existing 56MHz of spectrum in the 3.5GHz range, is used to provide fixed-wireless WiMAX network services for the corporate market (BMI-T, 2009b).

Neotel also has full access to the SAT3/SAFE international cable landing stations. In addition it lands the SEACOM undersea cable running along the African East Coast. It has deployed and has access to the necessary infrastructure to carry bandwidth from these cables to companies across the country (BMI-T, 2009).

Some of the strategic directions that Neotel has been pursuing (BMI-T, 2010) are:

- Reducing the cost of doing business and extending communications to the "second economy" in South Africa. To achieve this, Neotel plans to make the

most of the advantages of wireless technologies for rapid deployment and easy subscription.

- Key to these strategies is the rollout of Metro Fibre access, CDMA2000 and WiMax technologies enabling converged voice and data services.
- International capacity has been established via strategic partnerships.
- A strategic partnership with MTN and Vodacom announced in January 2009, paved the way for infrastructure sharing and the deployment of a 5,000km national long-distance fibre optic network to interconnect the major centres in South Africa.

Vodacom

Vodacom started in 1993 as a joint venture between Telkom, Vodafone and VenFin when it was awarded one of the two Global System for Mobile Communications (GSM) licences in South Africa. In 1994 it launched one of Africa's first GSM networks in South Africa. The company is a pan-African mobile operator providing GSM services to customers in South Africa, Tanzania, Lesotho, the Democratic Republic of Congo, and Mozambique. Based on number of customers and revenue, Vodacom South Africa is currently South Africa's largest mobile communications network operator (BMI-T, 2009b).

Vodacom received South Africa's first 3G licence in June 2004, and launched its first 3G services in 1st quarter of 2005. The current GSM network covers about 97.9% of the population with 2G services and 54% of the population with 3G services. At the end of March 2010, 140 sites had HSPA+ services with 21.6 Mbps access. Coverage maps for Broadband services provided by Vodacom are available at: http://www.vodamap.net/3g/

Growth strategies for the company includes maintaining its leadership in core mobile voice and data business, expanding broadband connectivity and data services, and the selective expansion into Sub Saharan Africa (Vodacom, n.d.).

Mobile Telephone Networks – MTN

MTN Group is a pan-African mobile provider with GSM operations in Botswana, Cameroon, Côte d'Ivoire, Nigeria, Republic of Congo (Congo-Brazzaville), Rwanda, South Africa, Swaziland, Uganda, Zambia, Iran, Afghanistan, Benin, Cyprus, Ghana,

Guinea Bissau, Guinea Republic, Liberia, Sudan, Syria and Yemen (MTN, n.d.). The company was initially awarded a South African GSM licence in September 1993 and has subsequently expanded across the region (BMI-T, 2009b).

MTN was awarded a 3G license in June 2004 and launched its 3G services in July 2005 (BMI-T, 2009b). MTN's 3G Evolved service making use of HSDPA was launched at selected high-traffic 3G sites early in 2006. As at June 2010, MTN's 3G network covers 44% of the population. Coverage maps for MTN are available at: http://www.mtn.co.za/Travel/Pages/CoverageMap.aspx

Some of the Strategic directions that MTN South Africa has been pursuing include (BMI-T, 2010):

- Continued upgrades to the network facilitate the increasing voice and data services demands.
- In 2008 a project was launched to complete a migration to Next Generation Network (NGN) Services by 2011.

Cell C

Cell C acquired its mobile licence in August 2001, launching its services in December 2001 and becoming the third mobile network operator in South Africa. Although Cell C has a national roaming agreement with Vodacom, it has also rolled out its own base stations (BMI-T, 2009). Currently 86% of traffic is carried on Cell C's own base station network and it has achieved coverage of 86.5% of the population (BMI-T, 2010).

Comninos et al. (2010) notes that Cell C has struggled to get a foothold in the market mainly due to its delayed issuing of a license. During the two year delay between Cell C applying for a license and it being granted, the market had changed considerably because of the introduction of Prepaid services. This lapse also allowed the incumbent mobile operators (Vodacom & MTN) time to raise interconnection fees by 515%. Although these issues relate predominantly to voice services, it closed the window of opportunity that would have enabled the company to compete ultimately on data services too.

Cell C launched its EDGE network in November 2005, and covered 90% of South Africa's metropolitan areas by the end of 2006. The operator initially focused on the entry level market where basic services for e-mail and banking were deemed sufficient (BMI-T, 2009). Since this assessment, Cell C's much publicised 3G/HSPA network, announced in December 2009, started rolling out 21.6 Mbps HSPA+ broadband services in September 2010. Coverage maps for Cell C are available at http://www.cellc.co.za/about/coverage-map, but at the time of writing, do not depict data capabilities.

During 2010 Cell C undertook a significant re-branding and repositioning exercise and its strategic direction is clearly about enhancing their ability to compete in the growing data market.

WBS - iBurst

Established in 1997, Wireless Business Systems (WBS) through its operational arm iBurst, aims to provide mobile data network services for corporate, government and domestic requirements.

After amendments to the licence in 2004, iBurst was able to provide customers with broadband wireless internet access services and since May 2005 has rapidly achieved a dominant position in the South African market providing services in all the major metropolitan areas. Its *iBurst Wireless* service is a wide-area mobile broadband system, making use of IntelliCell technology from US based company ArrayComm. Using adaptive antenna technology, the radio frequency spectrum is used more efficiently and hence provides a better service than 3G technologies. The network is designed from the ground up for exclusive data usage and is purely IP based.

iBurst launched its WiMAX service in May 2008. The WiMAX network from iBurst could support full mobility, but current services target fixed-line alternatives. At the time of writing, maximum download speeds of 512Kbps or 1Mbps are offered with monthly capped quotas of 5GB and 10GB (BMI-T, 2009b).

3.1.4 Major Internet Service Providers and Resellers

The major Internet Service Providers and Resellers of broadband services in South Africa typically function in the lower levels of the *Broadband Supply Chain* by focusing on Access and Retail Services.

Vox Telecoms

In June 2007 DataPro changed its name to Vox Telecoms to re-position itself in the market from a pure ISP to a complete telecommunication service provider. It acquired Storm Telecoms in late 2007 and the ABSA ISP business in early 2008. The DataPro name was retained for the corporate ISP business while @tlantic Internet Services is focused on the consumer ISP market (BMI-T, 2010).

Internet Solutions

Internet Solutions was founded in 1993 and became the first commercial ISP in South Africa. In 1997 Dimension Data Holdings (DiData) took full shareholding of the company and IS now operates as a division of Dimension Data. During 2009 it was awarded ECNS license enabling it to compete with incumbent operators in providing telecommunications infrastructure.

Its traditional focus has been on providing corporate South Africa with leased line access to the internet and providing value added services including VPNs and hosting. This corporate focus remains today with the addition of wholesale customers, like other ISP, with MWEB being one of the biggest.

Strategic directions that IS has been pursuing include (BMI-T, 2010):

- Leverage the existing extended customer base in the corporate sector to remain a significant services-based player without needing to invest in its own infrastructure.
- To this effect, it has been leasing backbone facilities from both Telkom and Neotel and has become a direct customer of SEACOM.

MTN Business

In May 2002 the ISP, Citec - bought by MTN in early 2001 - was re-branded as MTN Solutions. In 2005 MTN bought the remaining 40% of Johnnic e-Venures's shares in MTN Solutions. In 2009 MTN Business was formed by merging MTN Solutions and the newly acquired Verizon to supplement its corporate ISP business (BMI-T, 2010).

MTN Business provides a single integrated IP network and ISP for all the MTN Group companies. It also targets South African businesses to provide internet access and hosting services (MTN Business, n.d.).

Vodacom Business

Vodacom Business was launched in 2008. It offers converged business network and IT services. Like many other players, Vodacom Business is offering a "one stop shop" for access services and targets the SMME, corporate and Government market segments (Vodacom Business, n.d.).

MWEB

MWEB is part of the Naspers and MIH family of Brands. In November 2008 it sold its African operations to Telkom South Africa retaining only the South African business. It provides dial-up, analogue, ISDN and ADSL internet access to customers in both the home and business market. As MWEB owns the largest dial-up services market, it has been able to convert many of these existing customers to ADSL services. In March 2010 MWEB shocked the local market by introducing a range of uncapped ADSL products for both the residential and business market. This step aligned the South African ADSL market with those in North America an Europe where uncapped ADSL is common. MWEB probably has the largest ISP customer base in South Africa (BMI-T, 2010).

MWEB also provides hosting services and premium content through various media partners. In May 2010 it provided subscriber's access to DSTV on demand via an online portal.

3.2 South African International Broadband Access

The commissioning on 23 July 2009 of the SEACOM high capacity bandwidth undersea cable, linking Southern and East Africa to Europe and Asia attracted considerable media interest. The added backhaul capacity is invaluable, but as in many other developing countries, the problem of the 'last mile' is the true issue at hand in the South African context.

The current and planned explosion of *International connectivity* (Figure 2-1) to South Africa is best depicted graphically by the online map maintained by Steve Song of the Shuttleworth Foundation (see Figure 3-2). This schematic depicts the planned and available broadband cable capacity to Africa in Gigabits per second (Gbps). Most of the Sub-Saharan cables make landfall in South Africa.

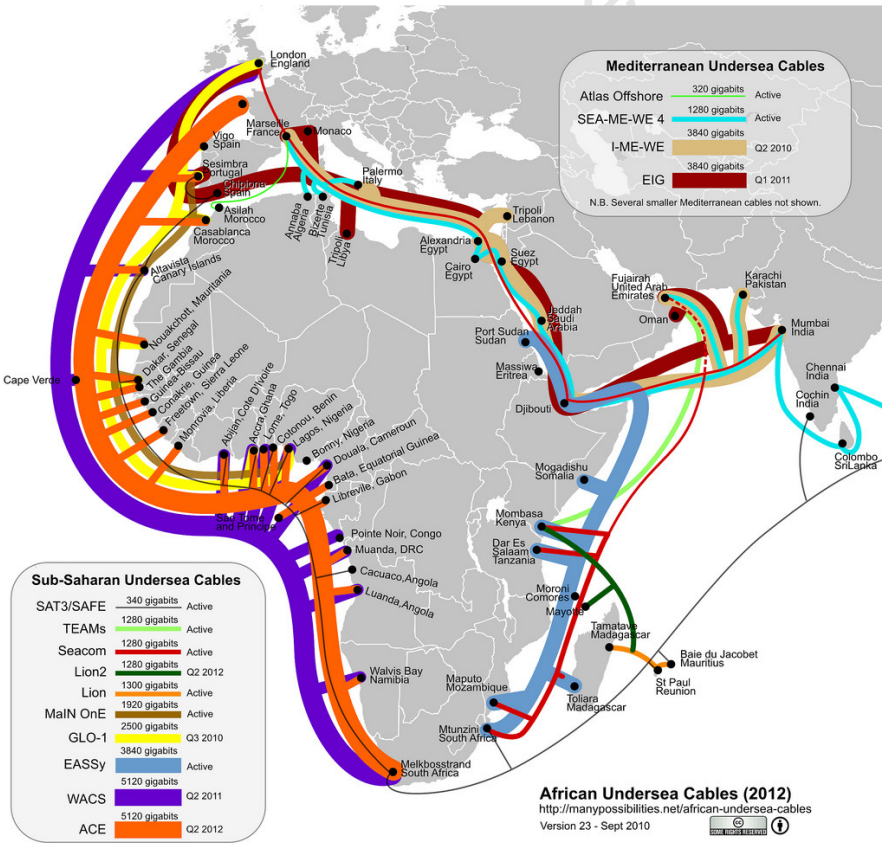

Figure 3-2: African Undersea Cables (Song, 2010)

Goldstuck (2010, p. 47) compiled a summary matrix presented in Table 3-3 of the current and future undersea cable projects according to year and Gbps capacity and

this clearly illustrates the impact of the SEACOM cable connection in 2009 and also shows the exponential growth expected if all the intended projects come to fruition.

Table 3-3: African Undersea Cable Capacity – Gbps (Goldstuck, 2010, p. 47)

Gigabit/second	2008	2009	2010	2011	2012	2013
Atlantis-2	40	40	40	40	40	40
SAT3/SAFE	40	250	770	770	770	770
SEACOM	0	1280	1280	1280	1280	1280
TEAMS	0	120	120	1200	1200	1200
GLO-1	0	0	640	640	640	640
EASSy	0	0	640	640	640	640
MainOne	0	0	1920	1920	1920	1920
ACE	0	0	0	1920	1920	1920
Infinity	0	0	0	2560	2560	2560
WACS	0	0	0	3800	3800	3800
FLAG System-2	0	0	0	0	2560	2560
Total Capacity Gb/s	**80**	**1690**	**5410**	**14770**	**17330**	**17330**

3.3 National Fibre Backbone Infrastructure

All the current and future International broadband access as described in Section 3.2 is of little value if there is not a mechanism to relay the capacity nationally throughout the country. This *domestic backbone* (recall Figure 2-1) is the challenge in facilitating national broadband access however, in the South African context very little information is available about the extent of the national backbone infrastructure.

According to Goldstuck (2010, p. 53), Telkom held the monopoly in providing urban fibre capacity until 2006. With the licensing of Neotel and with the backing of its parent company Tata, c. ZAR 10 billion was committed to building out a new fibre network. Also during this time (2006) another key infrastructure player entered the market. Dark Fibre[1] Africa (DFK) began laying down its own independent fibre network in the main metropolitan areas of South Africa. Their business model is to lease capacity on this network to existing telecommunication companies. In mid 2009 DFK formally launched their service. According to DFK, the civil engineering, infrastructure and ducting account for up to 80% of the total cost of constructing a

[1] Dark fibre refers to optical fibre that is yet to be used or is "unlit" As light is the transmission medium in fibre this is an apt description.

fibre optic transmission network and sharing this cost between various operators makes economic sense.

3.4 Modes of Broadband Internet access in South Africa

There are three ways by which South Africans typically gain access to Broadband Internet. First, typical consumer based access via telecommunications service providers, second, via a Corporate Broadband connection at their place of work and finally via an academic institution like a school or university. However, the International Telecommunications Union (ITU, 2009) notes that mobile broadband will play a significant role in expanding the availability of high-speed Internet access in developing countries.

3.4.1 Consumer Broadband Internet Access

The first commercial ADSL roll-out occurred in 2003, and ushered South Africa into the Broadband Internet access world (Goldstuck, 2010). During early 2004, Sentech launched MyWireless and by December that year, iBurst and Vodacom had launched broadband products. Brown, Letsididi and Nazeer (2009) conducted an preliminary study on factors influencing consumer choice of both narrow- and broadband in South Africa. BMI-T (2010) notes that privately held cellular internet connections for residential PC started to overtake ADSL by 2009. Although typically cellular internet connections were bought by business to keep their employees connected at home, the attractiveness of lower prices and better value for money has resulted in an increase of consumers acquiring mobile internet subscriptions for personal and family use. Figure 3-3 depicts the predicted market growth for various internet access technologies for the residential market in South Africa. Notice the prediction of strong growth of wireless technologies.

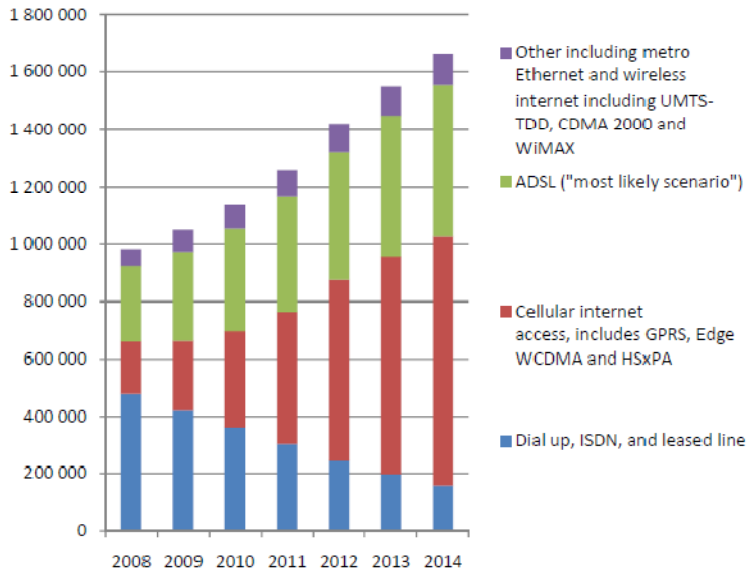

Figure 3-3: South African residential PC internet connections (BMI-T, 2010)

Goldstuck (2010) notes that although in 2009 an estimated 3.5 million mobile subscribers had access to cellular Internet services, only 450,000 indicated that this was their primary means of Internet access.

3.4.2 Corporate Broadband Internet Access

The corporate broadband access market until recently was dominated by Telkom, with Internet Solutions and Verizon Business (formerly UUNET Internet Africa) the other players (Goldstuck, 2010). Additional players in the form of BCX, Gijima AST and Vox have recently entered the fray. With MTN Business's acquisition of Verizon, the current market leaders in this segment remain Telkom, Internet Solutions and MTN Business.

The number of users having access to broadband Internet services via corporate leased lines is estimated to have been around 2,060,000 in 2009 (Goldstuck, 2010, p. 122). It is significant to note is that when Corporate Broadband access is provided, it becomes the de-facto primary means of Internet access. Goldstuck (2010) points out that one needs to differentiate between actual broadband users vs. broadband subscriptions – as a single user could make use of multiple subscriptions. Research conducted by World Wide Worx showed that more than one third of South Africans who make use of wireless broadband, also make use of some other form of

connectivity as their primary Internet access mechanism. In particular corporate users with high-speed Internet access will switch to 3G usage when out of office.

3.4.3 Academic Broadband Internet Access

Broadband Internet access from most academic institutions is via the Tertiary Educational Network of South Africa (TENET). Until 2001 access was provided via UNINET under the Foundation for Research Development's National Research Foundation (NRF). TENET is a Section 21 (non-profit) company controlled by the 40 universities and research institutions procuring Internet access services through it. Currently international bandwidth to TENET is supplied by SEACOM (Goldstuck, 2010, p. 133).

The number of users having access to broadband Internet services via academic institutions for 2009 is estimated to have been around 650,000. This comprises an estimate of 510,000 from tertiary institutions and 140,000 from schools (Goldstuck, 2010, p. 135).

3.5 Time-line of South African Broadband Policy initiatives

A summary of the key events that transformed the South African telecommunications environment in the last 20 years is provided in Appendix D. In this section, focus is placed on the key initiatives and events around the making of the South African Broadband Policy from April 2005 to October 2010. An analysis of these events formed the basis for the media reporting between April 2009 and September 2010. This ultimately provided the media corpus that is under review in research dissertation.

Table 3-4 provides a time-line for key initiatives around the formulation of a South African Broadband Policy. Reviewing government's early involvement with driving the broadband policy process there is a noticeable 28 month gap. The earliest documents referring to a National Broadband Policy are in those of the Department of Communications Strategic Plan for 2005 – 2008. Following this are regular mentions of a Broadband Policy in Budget Vote speeches in 2005 and 2006. A final mention is made to it in a speech at the Government Technology Conference on the 3'rd of November 2006. Only on 26 March 2009 is mention made again of the

Broadband Policy, this time in the 2009/2010 Budget Vote speech for the Department of Communications.

During 2007 the academic community in South Africa kept their focus on Broadband highlighted by the fact that Issue No 8 of the Southern African Journal of Information and Communication (SAJIC) was entirely dedicated to this theme (SAJIC, 2007). The first mention of a South African Broadband Strategy was found in a Blog by Willie Currie (Currie, 2008). The formation of the South African National Broadband Forum (SANBF) during early 2009 was the next significant event that mobilized support to engage with government and get broadband back on the agenda.

After the appointment of a new minister of communications in 2009, events moved swiftly towards the publishing of a Draft Broadband Policy in September of 2009. This was followed by a period for commentary and an industry colloquium between government and interested parties to discuss the draft policy. In July of 2010 the final Broadband Policy was published after it had been approved by parliament. More details are provided in Table 3-4 and events are further discussed and analysed as part of the findings and discussions presented in this dissertation.

Table 3-4: Time-line of key South African Broadband Policy and related initiatives.

Date	Initiative
5 Apr 2005	The first mention of a Broadband Policy in a Government document or statement: The Department of Communications Strategic Plan 2005 – 2008. http://www.info.gov.za/view/DownloadFileAction?id=82991
3 Nov 2006	The last mention of a Broadband Policy in a Government document or statement before the extended period of silence. http://www.info.gov.za/speeches/2006/06110712151002.htm
2007	Issue 8 of *The Southern African Journal of Information and Communication* focusing on broadband. http://link.wits.ac.za/journal/journal-08.html
26 Nov 2008	Willie Currie BLOGs: Towards a National Broadband Strategy. http://www.southafricaconnect.org.za/?p=157
26 Mar 2009	The first mention of the Broadband Policy in a Government document or statement after the extended period of close on 28 months of government silence. http://www.info.gov.za/speeches/2009/09032616151004.htm
24 Mar 2009	A forum is convened by The Association for Progressive Communications (APC), along with South Africa Connect, Sangonet and The Shuttleworth Foundation to formulate a national broadband strategy.
6 April 2009	Compilation of input from participants in the workshop convened by the SA National Broadband Forum (SANBF) on 24 March 2009 http://www.apc.org/en/system/files/Broadband+strategy+framework_compiled_input_0

	6042009.pdf
15 Apr 2009	YouTube video providing an overview of discussions held at the March Forum: http://www.youtube.com/watch?v=x8l6YFmc8LU
Apr 2009	The SANBF publishes a Framework for a Comprehensive National Broadband Strategy in South Africa. http://www.broadband4africa.org.za
May 2009	Retired General Siphiwe Nyanda is appointed as communications minister with as deputy minister Ms Dina Pule.
23 Jun 2009	Minister Nyanda delivers DoCs 2009/2010 Budget Vote speech.
23 Jul 2009	SEACOM, the 15,000 km undersea fibre-optic cable began operations, providing Djibouti, South Africa, Tanzania, Kenya, Uganda and Mozambique, with high speed internet connections to Europe and Asia.
Aug 2009	The SANBF meets with the Department of Communication (DoC) signifying a change in the previous stance of the ministry.
Aug 2009	Ms Mamodupi Mohlala is appointed to the post of Director General (DG) in the DoC.
15 Sep 2009	The DoC's DG presents the International Peer Benchmarking Study on SA's ICT sector to the Parliamentary Portfolio Committee on Communications. http://www.pmg.org.za/files/docs/091020telecoms.pdf
18 Sep 2009	The DoC publishes the Draft Broadband Policy for South Africa in the Government Gazette. http://www.info.gov.za/view/DownloadFileAction?id=107663
18 Oct 2009	Deadline for written submissions to the DoC on the proposed Draft Broadband Policy.
18-19 Nov 2009	The DoC hosts a colloquium where government and telecommunications industry representatives debated the draft policy document. http://www.ellipsis.co.za/wp-content/uploads/2009/11/BB-Policy-Workshop-Agenda.pdf
11 Mar 2010	A government spokesperson announces that Cabinet has established an Inter-Ministerial Committee to finalise the Draft National Broadband Policy for South Africa. The committee will consist of the ministers of Science and Technology; Public Enterprises; Rural Development and Land Affairs; Economic Development; and Public Service and Administration. (Vecchiatto, 2010)
20 Apr 2010	The minister of communications announces in his budget speech that the Broadband Policy has been finalized for implementation. (Nyanda, 2010)
13 Jul 2010	The DoC publishes the Broadband Policy for South Africa in the Government Gazette. http://www.info.gov.za/view/DownloadFileAction?id=127922
31 Oct 201	Retired General Siphiwe Nyanda is replaced by former deputy communications minister Roy Padayachie and the new deputy minister is Mr. Obed Bapela.

3.6 South African General ICT and Telecommunications Research

Many previous studies have focused on South African ICT and in particular telecommunication policy. This section contains a non-exhaustive list of material highlighting some of the themes that emerged.

3.6.1 Telecommunications reform failure

An overarching theme is the general failure of the telecommunications reform process to truly liberalise communication in South Africa. This is addressed by Gillwald (2005) when she reviewed the countries' telecommunications reform process, in the first decade of democratic rule in South Africa, against the national development policy objectives of (1) affordable access to communications services and (2) accelerated development in order to meet the needs of a modern economy. She argues that the implementation of international reform models has negatively impacted affordability of access to telecommunications services and has therefore inhibited innovation in the sector. She proposes that a policy approach that would fundamentally restructure the vertically integrated market would remove anti-competitive incentives. This, in turn, would free-up the regulatory resources to focus on developing more strategic regulations that could contribute to the national development objectives.

Horwitz and Currie (2007) detail the political interference resulting in the relative failure of South African telecommunications reform and trace the rollout of telecommunications services by Telkom to underserviced areas and populations and the establishment of the independent regulator. They document Telkom's misuse of its five year period of exclusivity to thwart competition, and raise prices and discusses how government effectively sabotaged the independent regulator as "the ANC[2] leadership has been loathed to trust democratic structures outside of its immediate control".

Ponelis and Britz (2008) reflect on the South African telecommunications policy from a social justice perspective. They argue that with global advances in ICT, the right to communicate takes on new dimensions, since it is virtually impossible to fully participate in a globalized world without these advanced technologies. Since South

[2] The African National Congress (ANC) came to power after the first democratic elections in 1994.

Africa's return to the international arena after the end of apartheid sanctions, its citizens have the right to fully participate in global political, economic and social activities. However, telecommunications is vital to make this participation possible. Their research further examined how the sole fixed line service provider Telkom, misused its monopoly and failed to provide affordable access with acceptable levels of service to the country which, in turn, has resulted in South Africa being one of the most expensive countries in which to use telephonic communication. This high cost is one of the contributing factors that excludes and marginalizes those with low income from effective communication and thus socio-economic and political participation. Further, they argue that modern ICT and access to information must be recognized as a basic fundamental right that should be legally protected in South Africa.

This failure of telecommunication reform policy spills over into the realm of broadband policy too. Gillwald (2007) noted that South Africa's broadband policy has emerged from two potentially contradictory approaches. First, "managed liberalisation" (an adaptation of the ITU's reform model) and the second a fully state owned broadband operator. The former strategy has created a number of fixed and mobile broadband providers in a vertically integrated market structure. The pressures of technology convergence necessitated the ECA of 2006 and associated regulatory and licensing reforms. Despite these changes, broadband uptake has remained low due to high cost of both fixed and wireless services as a result of limited competition and ineffective regulation. This prompted government to adopt a second strategy, in parallel to and in contradiction to the first process. It established Broadband Infraco to facilitate broadband backbone infrastructure and international access. Gillwald argues that until these contradictory policy approaches are resolved the sector will remain inert.

3.6.2 ICT Policy and funding models

There is general lack of material on ICT Policy and funding models for implementation. Abrahams, Bakker and Bhyat (2007) note that diffusion of Internet access has been slow in South Africa's cities and towns and that the uptake of broadband has been even slower. The challenge they identify is to find workable financial and operational models that could fit various metropolitan areas, cities and towns.

3.6.3 Policy incoherence

A theme of policy incoherence highlights the failure of ICT policies in general to work in tandem with other government policy initiatives. Brown and Brown (2008) examined the critical link between human development and ICT policy in South Africa. They find that South Africa is lagging behind many similar developing countries both in terms of human development and ICT growth and that South African ICT policy lacks a strong emphasis on human development. They argue that: "Simpler human development-focused ICT policies and regulatory systems are a prerequisite for the introduction of affordable ubiquitous modern ICT products and services to all of South Africans.".

Oyedemi (2009) studied ICT Access Policy Agendas in South Africa and found that although the intensions of the policies are to serve the public interest and aspire to social good, neoliberal free market tendencies made these programs ineffective in many instances. Social inequalities and poverty render many of the access programs unattainable and it is argued that policies that address social inequalities should be aggressively pursued in tandem with access programs.

3.6.4 ICT Policy and development

This theme touches on the failure of South African ICT policies to deliver on poverty reduction and developmental goals. Moodly (2005) in his critical assessment of the South African State's ICT for Poverty Reduction discourse notes that it functions both as a powerful ideology and rhetorical tool. He argues that problematizing the government's discourse on ICT for development should not be seen as a denial of

the potential benefits that ICTs could have to contribute to development agendas. It is rather a critique of:

- "the apolitical technological determinism and modernization-induced idea of technical progress as a linear 'stages of growth' trajectory" and
- that discourses rest on ideologies, and ideologies encompass values and values are not always shared automatically by all stakeholders.

In developing countries where critical choices must be made about the allocation of scarce resources, the importance being accorded to ICT should be fully interrogated. He concludes that on the whole, the government's ICT initiatives are more technology driven than user-oriented (Moodly, 2005, p22).

Gillwald (2010, p2) implores the research community to move beyond the "best practices" reform checklists and economic reviews that clearly show that Africa is lagging in the ICT sector performance and to actively search for answers as to *why* this is the case. She assesses a number of narratives on ICT and development and proposes the following areas of research - pertinent to Africa - that should be focused on in the coming years:

- The continuation of data collection and analysis by nongovernmental institutions to inform evidence-based policy formulation.
- A systematic extension in analysis of individual and micro-success stories into macroeconomic examinations of ICTs.
- The extension of national data analysis and case studies needs to be extended to regional and continental level.
- A recognition that currently, commercial endeavours of ICT application, is more likely to yield tangible poverty alleviation results. The haphazard state-driven universal services approaches and ICT4D technology pilots have yet to deliver on this goal.
- The need for capacity development of academics and highly skilled, critically minded ICT policy and regulation practitioners.

In summary, a bleak picture is painted of general policy failure and poor regulatory outcomes. It highlights the governments failed policy of "managed liberalisation" in that it was unable to introduce real competition into the sector as it was compelled to protect its own stake in the telecommunications industry by virtue of its shareholding in Telkom, Neotel, Vodacom and Sentech. In addition this seems to point to a general lack of skills in the sector and political interference at many levels.

3.7 Summary

This chapter reviewed the different role players in the South African broadband market. It considered the mandates of the DoC and the associated state agencies. Furthermore it reviewed the providers of broadband infrastructure and consumer access – both state-owned enterprises and corporate. Attention was to given to the National Backbone infrastructure and the recent improvements in International connectivity. Various modes of how South Africans currently access broadband Internet were discussed.

A section was dedicated to the historical time-line on the process of making the South African Broadband Policy. The time-line of the more general telecommunication reform in South Africa is presented in Appendix D. The chapter concluded with a review detailing some of the major themes emerging from existing academic literature covering broadband policy and more general South African ICT Policy.

4 Theoretical framework

This chapter describes the underlying philosophy and approach followed in this research. It highlights the theoretical framework used and motivates the choice of the critical epistemology and in particular the choice of CDA as the research strategy. Habermases' Theory of Communicative Action (TCA) is introduced and a method of using it in practice is discusses. Finally, the importance of reflectivity in critical research is discussed.

4.1 Critical Research

The use of critical research in Information Systems (IS) is recognised as the third research approach besides positivist and interpretivists research (Stahl, 2008b). The critical research philosophy was presented in the seminal paper by Orlikowski and Baroudi (1991) and has become increasingly accepted in IS research (Howcroft and Trauth, 2004).

Stahl (2008a) notes that critical scholars have utilized a number of theories over time and that in the European tradition an explicit link exists between Marxism and critical theory. The initial theoretical approaches of the Frankfurt School of critical research were further developed by second and third generation scholars including Habermas. Other critical theories include postmodernism, postcolonialism and poststructuralism. Foucault and Bourdieu are two of the other critical theorists besides Habermas, whose work has been used extensively in critical IS research. However, Stahl (2008a) also points out that the categorization of research approaches is potentially misleading as it could imply that the approaches are the only ones available, and that they are mutually exclusive. Instead he proposes that *critical intention* and *critical topics* should lead to the definition of critical research.

Critical intention in critical research is about challenging the accepted realities and thereby promotes resistance to the accepted norms. The critical researcher should therefore open up previously closed discourses and initiate new discourses, thereby constantly challenging the status quo and assume that society can and should be improved (Stahl, 2008a). As such, personal motivation is a key element to being

critical and a critical stance is “focused on what is wrong with the world rather than what is right” (Walsham, 2005, p. 112).

Critical topics are usually chosen on the grounds of facilitating the critical intention of the research. The topics of power, empowerment and emancipation are therefore typical choices in critical research. Power in this sense is usually about human persuasive power and how it is created and accepted in society. Previous critical research about power and empowerment has investigated systems failure, the digital divide and gender issues. The theme of emancipation has been studied in relation to alienation, authenticity, identity and limited reasonableness (Stahl, 2008a). Walsham (2005) echo’s these themes and notes that critical topics “tends to focus on issues such as asymmetries of power, alienation, disadvantaged groups or structural inequity” (Walsham, 2005, pp 113).

4.2 Concept of Discourse

The term “discourse” has its origins from the Latin verb currere – “to run”. Discurrere is “to run apart” and diskursus is “to run to and fro” hence the notion of exchanging ideas. The French *le discours* is somewhat less formal than the English interpretation of *discourse* while the German *diskurs* is more formal than the English term referring to a debate about a specific topic (Stahl, 2005). These differences of interpretation should be recognized when considering Faucault’s (French) and Habermas’ (German) discourses.

4.2.1 Foucault’s Discourses

Foucault focuses on the conditions of discourses and in particular who is included and who is excluded from participating. The concept of “power” is key to Foucault’s work and its direct relationship to knowledge is one of the primary reasons human beings participate in discourses (Stahl, 2004). One of the weaknesses of Foucault’s theories is his overly wide concept of power. He has been criticized by Habermas that his focus on the micro level of power relationships has been at the cost of the macro level view, and that it is at this level where the more critical issues of the day lie (Stahl, 2005).

4.2.2 Habermas' Discourses and Theory of Communicative Action

As with Foucault, Habermas also places discourse in the centre of his theoretical writing. Hamermas' Theory of Communicative Action (TCA) argues that our ability to jointly coordinate our actions using language and communication is a fundamental feature of humans that distinguishes us from all other species (Mingers, 2009). This ability to communicate is grounded in our capacity to *understand* one another. Reaching this understanding is accomplished through the process of rational discussion and debate – the "force of the better argument". The nature of these rational arguments (or discourses) can be clarified by considering:

- That the process of the debate should aspire to the *ideal speech situation.*
- The *validity claims* of each utterance can be challenged and defended.

Mingers (2009, p178) summarises the *Ideal Speech Situation* to be strived for to encompass:

- That all potential speakers are allowed equal participation in a discourse
- That everyone is allowed to:
    - question any claims or assertions made by anyone
    - introduce any assertion or claims into the discourse
    - express their own attitudes, desires or needs
- No one should be prevented by internal or external, overt or covert coercion from exercising the above rights.

TCA is used to explain the concept and function of discourses and highlights that any communicative action always has an ethical aspect (Stahl, 2005). One of the central concepts in Habermas' work is rationality or reasonableness i.e. - the disposition to give reasons for one's actions (Stahl, 2008a). The framework of Habermas' TCA helps to explain this rationality as it is based on the anthropological assumption that as human beings we require social interaction to survive and thrive. As such the role of communication is to facilitate cooperation. During the process of communication, each statement or expression has associated with it certain *validity claims* i.e. truth, legitimacy and authenticity. An additional dimension of clarity or comprehensibility is generally added to the English-language literature on conditions of successful communications. Chigona and Chigona (2008) offer Table 4-1 categorizing the four validity claims into a "competency" category, but also add a "world" categorization.

Table 4-1: Summary of validation claims (Chigona & Chigona, 2008)

Competence	World	Claim	Explanation
Linguistic		Comprehensibility	Utterance should be clear in terms of syntax and semantics.
Communication	Objective	Truth	Utterance should match what the case is in reality.
	Subjective	Sincerity	Checks the intentions of the speaker. Cannot be observed, can only be inferred.
	Social	Legitimisation	Utterance should be in accordance with socially accepted norms.

The "three-world-concept" is one more of the underpinning aspects of TCA. The *Objective World* describes the universal truth or reality while the *Subjective World* represents the individual's internal interpretation and beliefs. The *Social World* indicates what actions are desirable and conform to accepted norms in society. The four validity claims are categorized by Cukier et al. (2009b) in Table 4-2.

Table 4-2: Categories and principles for Habermasian CDA (Cukier et al., 2009b)

Validity claim	Criteria for ideal communication	Potential distortion	Validity test	Speech elements for empirical analysis
Comprehensibility	What is said is audible (or legible) and intelligible.	Confusion	Is the communication sufficiently intelligible? Is the communication complete? Is the level of detail too burdensome for the reader or hearer?	Completeness of physical representation; Syntactic and semantic rules
Truth	The propositional content of what is said is factual or true.	Misrepresentation	Is evidence and reasoning provided sufficient?	Argumentation
Sincerity	The speaker is honest (or sincere) in what she says.	False Assurance	Is what is said consistent with how it is said?	Connotative language; Hyperbole Metaphors; Jargon
Legitimacy	What the speaker says (and hence does) is right or appropriate in the light of existing norms or values.	Illegitimacy	Are competing 'logics' (e.g. Stakeholders) equally represented?	Use of 'experts' and 'authorities' Silences

Comprehensibility (C) addresses the technical, syntactical and semantic clarity of the communication. Essentially it is a qualification of what is being communicated is intelligible, audible or legible. Information overload and excessive jargon in addition to incomplete communication can trigger the violation of the comprehensibility validity claim.

The **Truth** (T) validity claim looks for falsehoods and bias interpretations in the texts. It requires that the corpus is examined in a contextualized situation and examines utterances against the *Objective (real) World* and as such requires a comprehensive understanding of the context in which the statements are presented. It also requires that cognizance is taken of the full corpus under examination, and not a single item in isolation (Chigona & Chigona, 2008).

Interpreting whether what is being communicated is consistent with what is meant forms the basis of the **Sincerity** (S) claim. Sincerity can only be inferred and examining the actions of the speaker and how a message is communicated needs to be compared to what was being said. Particular attention is paid to emotive speech, metaphors and even technical jargon used to enforce the technological imperative. The sincerity claim is evaluated in the *Subjective World* and as such is tainted by our own interpretations and beliefs, and those of the speaker (Chigona & Chigona, 2008).

Finally, **Legitimacy** (L) covers the question if the communication conforms to the social environment where it is delivered. It considers who is silenced and who are considered as an expert and evaluates if there is a balance in the communication. As the legitimacy validity claim is examined against the *Social World* the tests are to determine if the outcomes are desirable and acceptable to the society it affects (Chigona & Chigona, 2008).

Discourses occur if there is disagreement between these validity claims and describe the communication process of clarifying these differences. An additional aspect to consider is that communicative action requires all speakers to accept each other's fundamental equality and as such considers their arguments seriously and with respect (Stahl, 2004, 2005). The critics of Habermas point to this very issue of fundamental equality or the liberated stance that all participants are seen as being equal and the bias it introduces to participatory approaches. There is also the ongoing contradicting division between ideal and real discourses (Stahl, 2005).

Cukier et al. (2009b) point out that Habermas' own work emphasized the macro-level (public sphere) of analysis in contrast to the traditional use of TCA in IS research which has focused on the micro-level (e.g. organizational communication and IS

development). One important area which has been poorly developed in critical IS research is how technology companies utilize the media to shape public opinion and influence our thinking and decision-making on such matter.

4.3 Operationalizing Habermasian CDA

Cukier et al. (2009b) recommend a four step approach for conducting analysis of the data associated with a discourse under review. The approach is essentially cyclical whereby steps two and three should be highly iterative and could trigger step one again.

Step 1 – **Defining the corpus to be analyzed**: Multiple data sources should be used to facilitate being able to gather all relevant material that will explain the situation or artefact under consideration.

Step 2 – **Analyzing the content and do the coding**: The analysis is done per document the corpus and also over the full set. This is done to find empirical evidence pertaining to the various validity claims that may be supported or validated. The underlying and recurring themes emerging from this process will be further broken down in specific instances.

Step 3 – **Reading and interpreting the empirical evidence from Step 2**: The documents are now re-read to uncover and test both implied and explicit validity claims. The test involves searching for imperial observations that contradict the validity claims made in the texts. Quantitative analysis can be used to highlight recurring themes and may highlight omissions.

Step 4 – **Explain the findings**: Explores and explains the findings in the context of the broader environment of the study area.

4.4 Reflectivity in Critical Research

Howcroft and Trauth (2004) highlight the importance of researchers reflecting on the understanding and interpretation of their work as all situations are experienced via

our own social an organizational background. They suggest three tasks, namely *insight, critique* and *transformative redefinition* that can assist a researcher in finding this reflective balance.

- *Insight* requires that the researcher needs an understanding of the environment (knowledge, objects and events) and how these are created, maintained or sustained. Less obvious issues and aspects peculiar to what is being studied should be highlighted. Insight can lead to the creation of alternative and competing discourses and as such supports the critical intent.
- *Critique* is about challenging the prevailing beliefs, assumptions and ideologies. This includes questioning the political, economic and social forces that shaped technological artefacts.
- Finally the *transformative redefinition* task encourages the gathering of the relevant knowledge and practical understanding to begin to facilitate change. This tasks the researcher with putting something forward and not simply being negatively criticality.

4.5 Summary

This chapter discussed the underlying philosophy and approach that was followed in this dissertation. The critical epistemology was introduced, and the concept of discourse was reviewed. Turning to CDA, the validity claims of Comprehensibility, Truth, Sincerity and Legitimacy that form the basis of Habermases' Theory of Communicative Action (TCA) were introduced. A review of the four step approach to operationalizing Habermasian CDA was followed by a section highlighting the importance of reflectivity in critical research.

5 Research methodology

This chapter describes the research methodology employed in this study. Two methodologies are utilized; first Citation Analysis which allows for the overall examination of patters in the discourse and second CDA which provides the insights into media distortions and indentifying underlying interests (Cukier et al., 2009a, 2009c, 2009d). The data collection technique and sampling plan is explained followed by a review of the coding and data analysis techniques employed. Finally ethical issues are considered.

5.1 Contextual and background information

The logical starting point to gather the information about the National Broadband Policy is to examine the original documents and statements from Government or political parties which are listed by various websites (see Table 5-1). Government statements or press releases related to the National Broadband Policy were retrieved as well as speeches by ministers or deputies that referred to the Broadband Policy. Most often articles in the press were written as a result of these publications or press release statements by government and although this material did not form part of the final corpus of media articles under review, it provided essential background information which was used to inform discussion in this dissertation.

Table 5-1: Government or Political Party Statements

Title	Owner	Web Site
South Africa Government Online	Government Communications (GCIS)	http://www.gov.za/
South African Department of Communications Official Site	DoC	http://www.doc.gov.za/
Parliamentary Monitoring Group	Parliamentary Monitoring Group, South Africa	http://www.pmg.org.za/
elipse regulatory solutions	Ellipsis Regulatory Solutions CC	http://www.ellipsis.co.za/

In addition, a number of specialist Web sites were identified that were either specifically dedicated to the National Broadband Strategy or were concerned with general ICT issues in South Africa. These Web sites are typically maintained by civil organizations or interest groups and are listed in Table 5-2, together with their Web

address, owner information and mission description. Again, although these websites did not yield information that contributed directly to the formal corpus of media articles under review in this dissertation, the activity on these sites were deemed an important indicator to the health of public discourse on broadband policy in South Africa.

Table 5-2: Dedicated ICT Policy Web Sites

Title	APC Africa ICT Policy Monitor
Owner	Association for progressive communications (APC)
Web Site	http://africa.rights.apc.org/
Mission Description	Mobilising African civil society around the importance of ICT policy for the development of the continent. [*sic*]
Title	southafrica connect - Connecting ICT policy debate
Owner	Shuttleworth Foundation and Research ICT Africa
Web Site	http://www.southafricaconnect.org.za/
Mission Description	South Africa Connect aims to stimulate debate and provide information and analysis on South African ICT policy by means of public seminars and fora as well as through online spaces. Through these various channels, South Africa connect aims to influence interventions in ICT policy, regulation and practice that are geared towards connecting South Africans to global 'network society' and information economy. [*sic*]
Title	Call for a Comprehensive National Broadband Strategy for South Africa
Owner	APC, SANGONeT, the Shuttleworth Foundation and South Africa Connect.
Web Site	http://www.broadband4africa.org.za
Mission Description	All South Africans should have affordable broadband access to the Internet. The South African National Broadband Forum invites everyone who believes that affordable broadband access is a national priority to express their support for the development and implementation of a comprehensive National Broadband Strategy for South Africa. [*sic*]
Title	Research ICT Africa Network
Owner	Research ICT Africa consists of a network of researchers in 20 African countries
Web Site	http://www.researchictafrica.net
Vision and Mission Description	The Research ICT Africa Network conducts research on ICT policy and regulation that facilitates evidence-based and informed policy making for improved access, use and application of ICT for social development and economic growth. RIA will conduct public-interest research on ICT policy and regulation that responds to national, regional and continental needs. It provides African researchers, governments, regulators, operators, multilateral institutions, development agencies, community organizations and trade unions with the information and analysis required to develop innovative and appropriate policies, effective implementation and successful network operations that can contribute to sustainable development. The network will contribute to the gathering of up to date ICT data and establish repository of information for furthering research and policy formulation. The programme will promote interaction

	between researchers and their peers at national, regional and international levels to harmonize methodologies, tools and standards for conducting public-interest ICT policy research. [*sic*]

5.2 Citation Analysis

Following Cukier et al. (2009a, 2009c, 2009d) a method of citation analysis was sought to represent the overall shape or trend of media citations of key technology terms. Figure 5-1 presents the quantitative use of a few selected technology terms using the multidisciplinary full text Factiva Archive database system, as analysed by Cukier et al. (2009d).

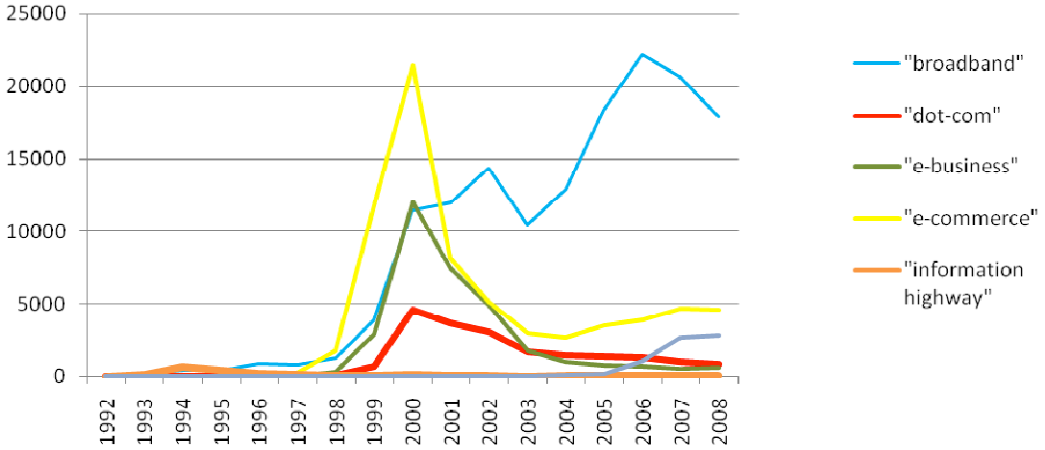

Figure 5-1: Citation Analysis of "Dot-com" Rhetoric (Cukier et al. 2009d)

Seeking a more accessible means to do a similar analysis, the Google News service was used, in particular the Advanced News Archive Search feature (http://www.google.com/archivesearch/advanced_search). From the Google News Archive Help screen:

> In addition to searching for the most relevant articles for their query, users can get a historical overview of the results by browsing an automatically generated timeline. We provide two ways of searching: *Search Archives*, which presents articles in order of relevance to the query; and Timeline, which presents a timeline of events and articles associated with the query. The timeline is dynamically generated in response to each query.

By employing the “Show Timeline” feature it is easy to analyze citation trends over time. Figure 5-2 shows the Google Advanced News Archive Search interface.

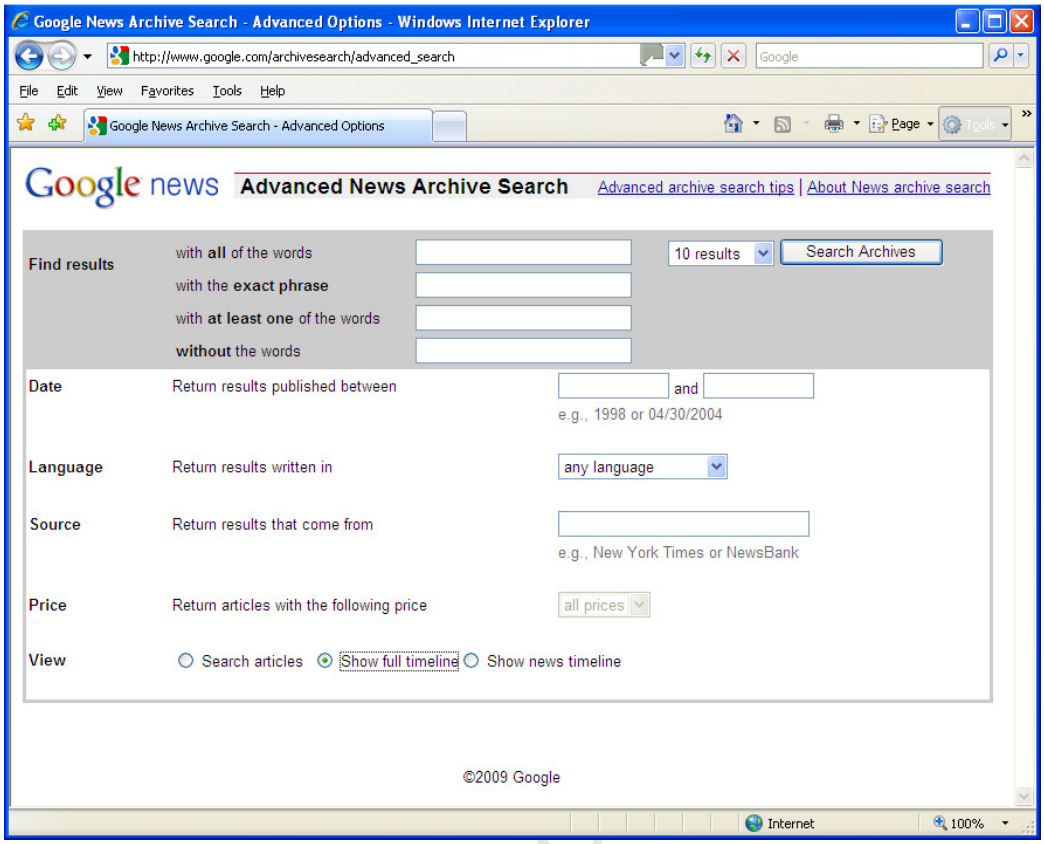

Figure 5-2: Google - Advanced News Archive Search

To verify if the Google service would provide similar results to those presented in the Cukier et al. (2009d) analysis, the searches were repeated for the terms “dot-com”, “e-commerce” and “broadband” using the same time frame. The following figures clearly show a strong parallel between the results obtained from Factiva and those from the Google News Archive search facility.

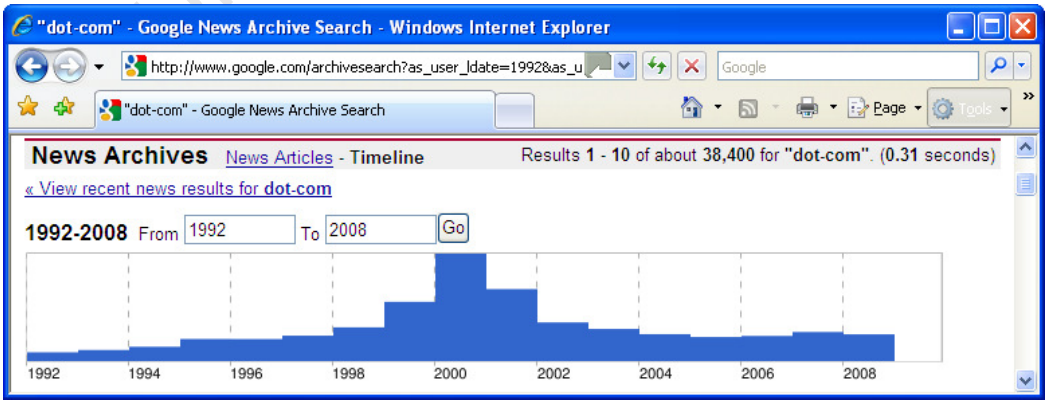

Figure 5-3: Google News "dot-com" citation trend.

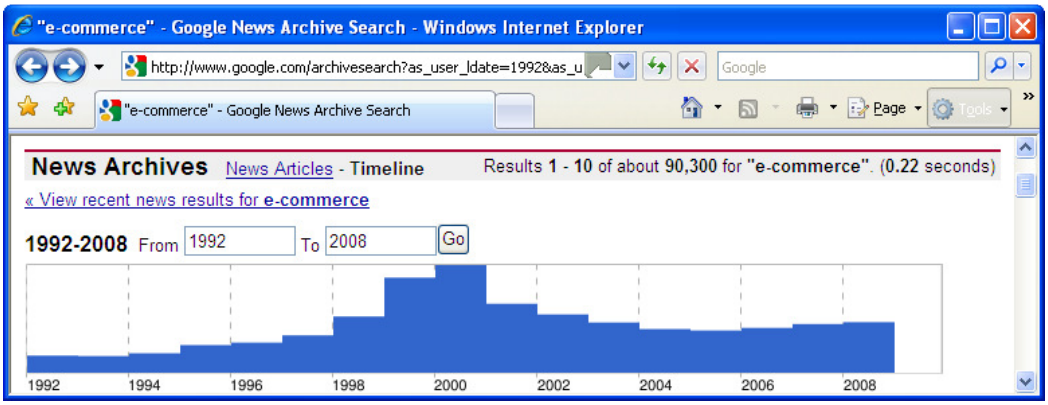

Figure 5-4: Google News "e-commerce" citation trend.

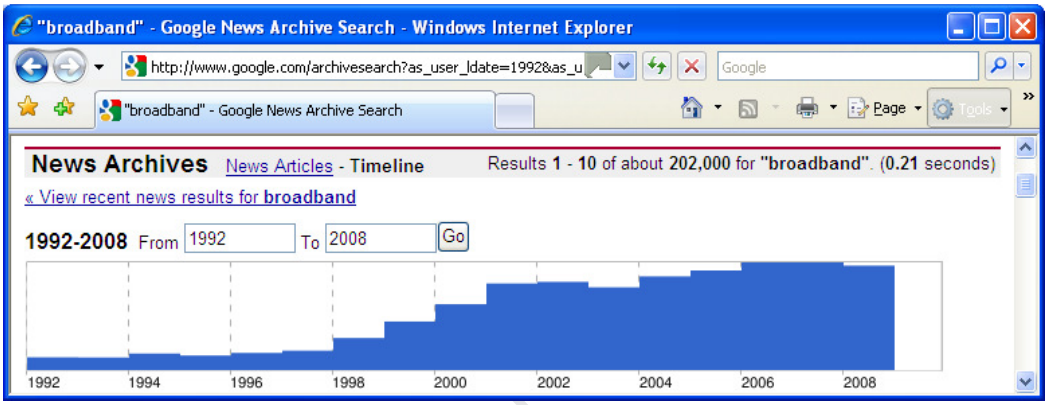

Figure 5-5: Google News "broadband" citation trend.

It therefore appears that the Google News Archives Search facility provides a usable citation analysis tool which is comparable to the recognised methodology employed by Cukier et al.

The default results returned by the Google search engine cover all publication sources monitored by Google. As this research is particularly interested in South African media responses, the “Source” field was specified as “South Africa”. However this did not have the expected result of only showing South Africa media results. After some experimentation it was found that adding the term “South Africa” to the “exact phrase” field did provide more meaningful results but it should be noted that these results are not necessarily from South African sources. It is expected that the Google functionality in future would be more fully implemented, but to establish general citation trends, the tools still provided value.

This Google Tool also allows specific time periods within the timeline to be identified and provide links to the items comprising the numbers represented in the timeline. This facility was used to get actual counts of news articles cited.

5.3 Corpus Selection

Examining the print-media contribution to the broadband debate it soon became apparent that in South Africa, the electronic media also plays a pivotal role. A number of well established Web based IT publications and focused news forums exist and therefore in addition to contributions from traditional print media, articles from these sources were included in the corpus. Further to these more traditional "news" orientated Web Sites, the identification of specialist Web Sites was deemed of importance as often these sites can act as a barometer of activity or participation in a discourse domain.

For print-media contributions, obtaining circulation figures from the Audit Bureau of Circulations of South Africa (ABC, 2010) and analysis from the media analysis group OMD (OMD, 2010) the figures presented in Table 5-3 indicate the leading South African National newspaper by number of copies sold to date in the 2'nd quarter of 2010.

Table 5-3: Newspapers ranked by Copy Sales 2010 (Adapted from ABC, 2010)

Title	Group	Lang.	Appears	Copy Sales
Daily Sun	Media24	English	Daily	433,055
Sunday Times	Avusa	English	Weekend	267,361
Soccer Laduma	Media24	English	Weekly (Wed)	261,814
Rapport	Media24	Afrikaans	Weekend	252,822
Sunday Sun	Media24	English	Weekend	230,365
City Press	Media24	English	Weekend	165,644
Sunday World	Avusa	English	Weekend	140,915
Ilanga	Mandla-Matla	Zulu	Weekly (Mon/Thu)	102,696
Ilanga Langesonto	Mandla-Matla	Zulu	Weekend	78,770
Son	Media24	Afrikaans	Daily	121,138
Isolezwe	INC	Zulu	Daily	97,793
Sowetan	Avusa	English	Daily	96,907
The Star	INC	English	Daily	77,311
The Citizen	Caxton	English	Daily	51,888
Mail & Guardian	M&G Media	English	Weekly (Fri)	34,441

Considering the data provided in Table 5-3, the Web Sites of the Groups publishing the Newspapers or the individual Newspapers websites themselves were searched using the keyword "broadband policy". The earliest available articles published, being from June 2009, until those published up to the 30th of September 2010 were included in the corpus. The results are presented in Table 5-4. It is perhaps not surprising that article counts for the general print media are substantially less than those found in the more specialized focused Web based News publication portals.

Table 5-4: Newspapers and News Web Portal sites "broadband policy" article count.
The "Code" column lists the identifier associated with the article title as found in the corpus list. See Appendix B for the full corpus list. The "#" represents the number of articles found.

Title	Group	Web Site	Code	#
Fin24	Media24	http://www.news24.com/	Fin24	4
News24	Media24	http://www.news24.com/	News24	3
Sunday Times, The Times	Avusa	http://www.timeslive.co.za/	TL	5
Sunday World	Avusa	http://www.sundayworld.co.za/		0
Sowetan	Avusa	http://www.sowetanlive.co.za/		0
The Star	INC	http://www.iol.co.za/		0
The Citizen	Caxton	http://www.citizen.co.za/	Citiz	2
Mail & Guardian	M&G Media	http://www.mg.co.za/	MG	3
Business Day	Avusa	http://www.businessday.co.za/	BD	6
Financial Mail	Avusa	http://www.fm.co.za/	FM	1
TOTAL				**24**

It is relatively simple to find circulation figures for print media and use that as a point of departure to identify the associated Web portals however, determining the most influential or widely read Web sources dealing with IT-related matters is problematic as there are no audited circulation figures.

Many of the print media publishers that had Web portals and published material online, are members of the Digital Media & Marketing Association (DMMA - www.dmma.co.za), an independent, voluntary, non-profit association focused on growing and sustaining a vibrant and profitable digital industry within South Africa. The members list of DMMA was used as a starting point to identify other online publishers. In addition, using results from the Google Search Engine, utilized in the previous section and exploring South African based search engines like Ananzi (www.ananzi.co.za) and Aardvark (www.aardvark.co.za), the list of Web based publishers was extended.

News focused Online Media Web sites that yielded results for the "broadband policy" search are presented in Table 5-5. As would be expected, those sites dedicated to an ICT focus, carried a higher number of articles. The earliest articles available, being from April 2009, up to the 30th of September 2010 have been included in the corpus.

A number of News Web sites act as aggregators and presented no fresh material, but linked to stories from the original Web sites. Therefore to prevent duplication of materials, those aggregator sites have not been included in analysis. The Title, Owner and Web Site columns are self explanatory.

Table 5-5: Online ICT News Resources "broadband policy" article count.
The "Code" column lists the identifier associated with the article title in the corpus list. See Appendix B for the full corpus list. The "#" represents the number of articles found.

Title	Owner	Web Site	Code	#
ITWeb Online	ITWeb Limited	http://www.itweb.co.za/	ITWeb	33
MyBroadband	MyBroadband.co.za News	http://mybroadband.co.za	MyBB	33
TechCentral	NewsCentral Media	http://www.techcentral.co.za/	TC	10
iafrica.com	Primedia Online	http://www.iafrica.com/	iAfrica	3
Policy, Law, Economics and Politics	Creamer Media	http://www.polity.org.za/	PolNews	2
Service: Leadership in Local Government	Cape Media Corporation	http://www.servicepublication.co.za	ServPub	2
Engineering News	Creamer Media	http://www.engineeringnews.co.za	EN	5
TOTAL				**88**

Considering the Online ICT Web sites that yielded the largest number of articles to the media corpus, it is interesting to review their history and how they position themselves in the market. A summary of these statements is provided in Table 5-6.

Table 5-6: Corpus selection – Top ICT Web site

Title	Description
ITWeb Online	The Web site was launched in 1996 – well ahead of the Internet boom – as a collection of information and news about the information technology sector. It has since developed into the default location to find news on the local technology industry and its vast database of all previously published articles represents the single biggest archive of information on the local information and communications technology sector. [*sic*]
MyBroadband	MyBroadband (also known as MyADSL) was founded in 2003 to serve the South African broadband and IT community. It provides visitors with up-to-date coverage of IT and Internet related news, and gives them a place to give their views and share information. The MyBroadband-MyADSL forums have become the premier place to discuss broadband and technology related issues. It is a great information resource and there are many representatives from broadband service providers that will gladly answer your questions. Our tech-savvy members will also give you a straight answer to most questions. [*sic*]
TechCentral	TechCentral is the leading quality news and information resource for people involved in South Africa's fast-growing information and communications technology industry and those interested in the fast-changing world of information technology. We provide quality news, reviews and comment relevant to our quickly expanding audience. [*sic*]

In total 112 media articles consisting of 24 items from the traditional print media domain and 88 from specialist or other Web Media sites were identified for analysis. Although the Google News archive searches presented in the previous section provided a general trend analysis, and provided links to a number of media articles, the more rigorous process to gather articles as described in this section yielded the full corpus.

After completion of the corpus compilation, and reading and analysis started, it was discovered that a number of articles were duplicated across a few of the Media and Online News Web sites. These articles were typically provided by the South African Press Association (SAPA) and were normally presented under slightly different headings. The clusters of duplicates are presented in Table 5-7, however it is thought that these duplicates will have a minimal impact on the analysis short of that they would more likely have been read by more individuals as they had a wider distribution.

Table 5-7: Duplicate Corpus Items

Item Identifier	Publication Dates	Topic
[10, 13]	Aug 31& Sep 1, 2009	reporting on Southern African telecommunications networks and application conference (Satnac)
[19, 21]	June 23 & 24, 2009	reporting on rural broadband
[51, 53, 54, 57]	November 19 & 20, 2009	reporting on the Ministers Speech at the Broadband Colloquium
[47, 55, 56]	November 17 & 20, 2009	reporting on the Broadband Colloquium
[69,71,72,74,75,76]	March 11, 2010	reporting on the finalisation of the broadband policy
[80, 82, 83, 85]	April 20 & 2, 2010	reporting on the finalised broadband policy
[90, 91, 92]	June 15, 2010	reporting on cabinets approval of the broadband policy

See Figure 6-8 and Figure 6-9 in the next chapter for an analysis of the minimal impact of these duplicated articles on the general shape of the discourse.

5.4 Content analysis and coding

Cukier, et al. (2009b) suggest that the objective of the content analysis and coding step is to identify empirical observations associated with each validity claim and to determine the frequency of arguments used. This analysis should also uncover rhetoric and opinions (often unsupported) that are frequently repeated and as such become embedded "… into the taken-for-granted lifeworld of listeners and readers as established fact." (Cukier et al., 2009, p. 182).

Appendix A contains the guiding questions proposed by Cukier et al. (2003) and used by Stahl et al. (2005) and Vosloo (2008). Each of the texts will be examined for the four validity claims.

After the material was gathered from the various sources, each article was printed and it was ensured that a date was included with the article. The printed material was then chronologically ordered and put in a binder to enable easy access and to facilitate the reading of all the material in a chronological order. It was also easy to add additional information to this binder as extra material was uncovered. In addition to the printed format for analysis, the electronic versions of the articles were also uploaded into the Computer Assisted Qualitative Data Analysis System (CAQDAS),

Nvivo 8 from QSR International. Each item was renamed to include the Date and the Item# in the article name. This facilitated easy sorting to also enable reading of the material in a chronological order in the Application. Including the Item# in the name made for easy cross referencing when it came to writing up the results of the analysis performed. As the corpus had a considerable number of items under review the identification of themes and the easy coding of these themes using a CAQDAS was of great value.

5.5 Reading and interpreting the empirical observations

The validity claims uncovered in the previous step were tested against the rest of the corpus, and also against insights gleaned from the background reading with the aim of finding evidence that negate the validity of claims made in the texts. A further task was for the meaning of the text to be explored in the context of the political arena. The implications of differing outcomes of scenarios pertaining to the participants in the discourse are evaluated (Cukier et al., 2009b). A quantitative analysis of recurring arguments or terms highlighted the predominant themes of the corpus and this in turn drew attention to omissions that undermined the full understanding of the domain being studied.

5.6 Limitations of the study

As with any study of media discourse analysis it is impossible to find and examine all the media articles that have been published on a given subject, even if a restriction has been placed on the given time period as has been done in this study.

In any CDA the personal circumstances of the researcher offer a potential source of bias that should be acknowledged. In my case it is important to acknowledge that I am currently a full time employee of Vodacom, a telecommunications company in South Africa and this has given me access to certain services and technologies for free or at a nominal cost. Although I have made every attempt to be impartial I may also tend to be less critical of my employer and their stance and involvement in the broadband provisioning in South Africa.

Thompson (2005) highlights the fact that a CDA always involves subjective judgements by the researcher and as such there can never be a “definitive” analysis

of a corpus. A researcher also has to find a balance between over- or under-analysis the material under review. To mitigate the subjective bias, Thompson suggests providing the reader with access to the sources in the corpus. This has been accomplished by a providing the list of material in Appendix B. In addition a file containing the full text copy of all the items in the corpus is available for download at: http://dl.dropbox.com/u/14843141/Broadband-Policy-Media-Corpus.zip. Documenting the distortions found in the texts the reader can then form their own opinion about the judgement made by the researcher.

5.7 Access and ethics

As this is a media discourse analysis there should be no issues with access or ethics. The media texts under scrutiny are all in the public domain. Contextual background information was in many cases provided by industry specific research and publications that had been licensed by my employer.

5.8 Summary

This chapter focused on the research methodology deployed. It examined the sources that were used to gather background material – essential in the CDA process. An innovative mechanism was sought for providing general citation analysis. The Google News Archive feature was benchmarked against published citation analysis results and proved to be accurate and a valuable tool. Next the corpus selection process was described, with attention being given to content analysis and coding techniques. Expected limitations of the study were highlighted as well as consideration to ethical issues.

6 Findings of Empirical Material and Analysis

In the previous chapter the research methodology was introduced. This chapter presents the results of the media Citation Analysis and the empirical findings of the Critical Discourse Analysis of selected media articles with illustrative examples. Refer to Appendix A for the list of guiding questions to each of the four Hamermasian validity claims. The cited examples from the corpus are presented as "[Item#]" where Item# refers to the Item Number as found in the Corpus List detailed in Appendix B.

6.1 Citation Analysis

Following Cukier et al. (2009a, 2009b, 2009d), Citation Analysis was used to determine overall patterns in the media discourse. This section presents a comparative citation analysis of the terms "broadband", "broadband policy" and "mobile broadband" with and without the term "South Africa". By using the Google News Archive search functions, the figures below represent Google Archived News items up to and including August 2010, because the analysis was conducted during September 2010. It is thus significant to account for the fact that the year 2010 is not fully "populated" yet.

A search for "broadband" reveals a steady increase in the use of the term globally with 56 articles mentioning the term in January 1989 and 7,160 articles mentioning the term in August 2010. Figure 6-1 shows the long-term citation analysis results for the term "broadband" while Figure 6-2 depicts how the drill-down feature is used to find the estimated number of results for a specific month – in this case August 2010 – this being the latest available data as these analysis were conducted in September 2010. Note the circled result count of 7,160 in the top right of the screen capture in Figure 6-2.

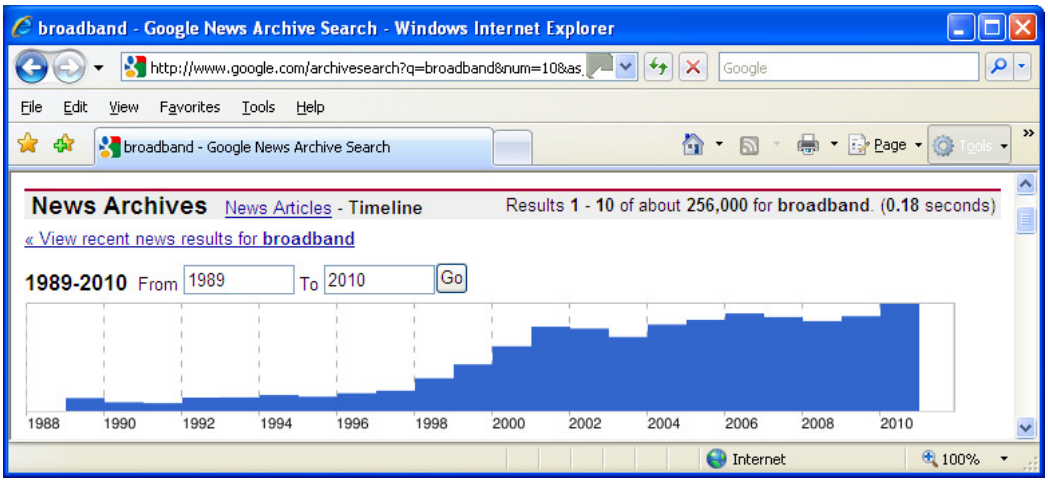

Figure 6-1: Long-term Citation Analysis of "broadband" in news media.

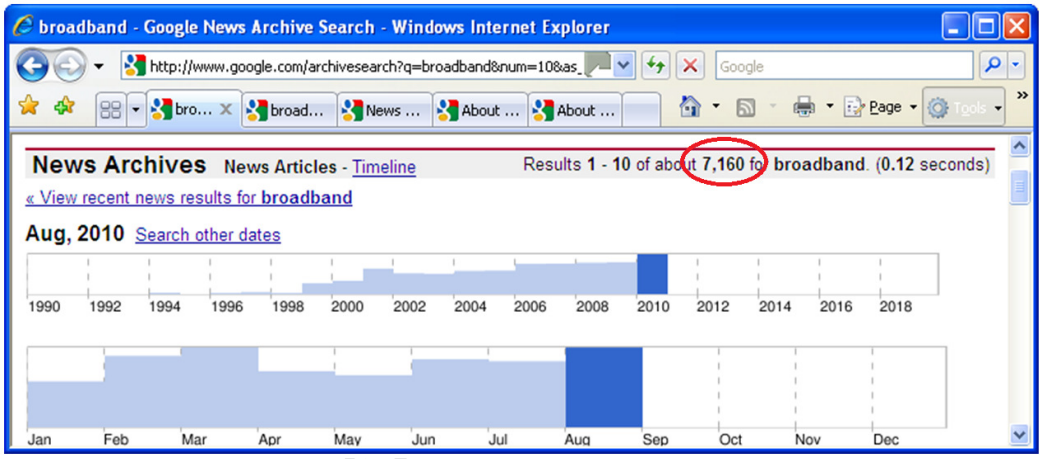

Figure 6-2: Drill-down to find relative data points.

Repeating this search and adding “South Africa” to the search criteria reveals 23 articles in January 2000 with about 136 in July 2010 also representing a steady increase (see Figure 6-3).

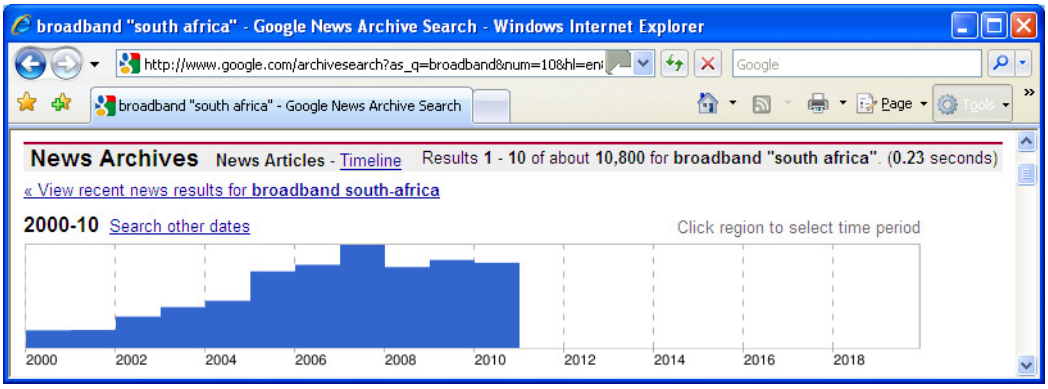

Figure 6-3: Citation analysis of "broadband" and “South Africa” in news media.

A similar set of searches for the term “broadband policy” reveals that the earliest significant international citations date back to the 1990s but only start to increase significantly in 2002 and have continued to increase since. In 2010, typical citations ranged from ten to forty references (see Figure 6-4). Adding “South Africa” to this search shows a lack of any significant coverage on the topic (see Figure 6-5). On closer examination, the early references from 2001-2007, were not from South African sources. The relevant citations from September and November 2009 and early 2010 are related to news reporting on the announcement of the South African Draft Broadband Policy.

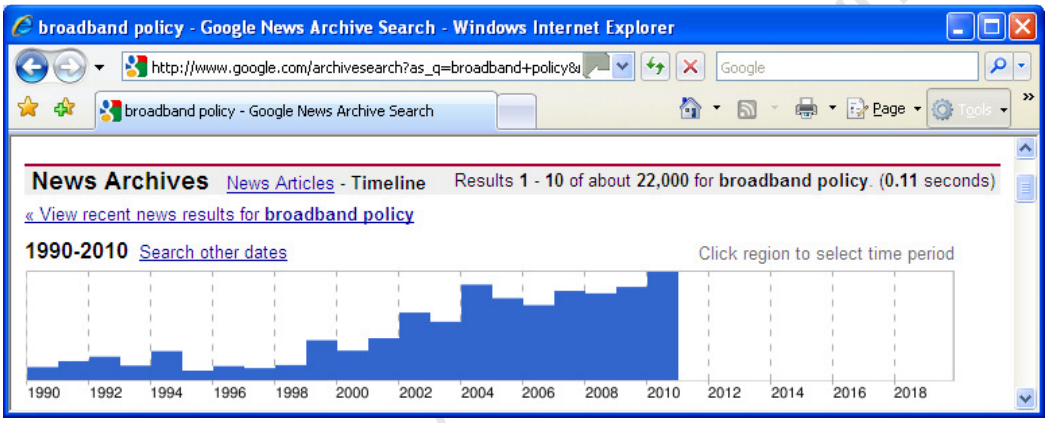

Figure 6-4: Citation analysis of "broadband policy" in news media.

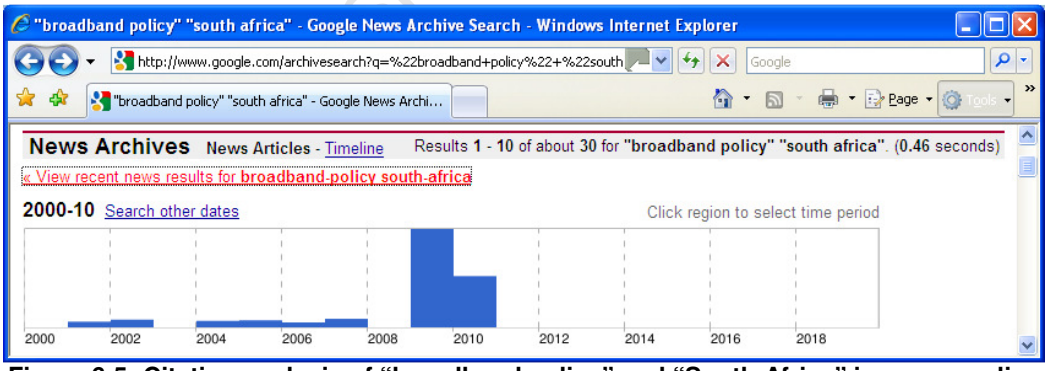

Figure 6-5: Citation analysis of “broadband policy” and “South Africa” in news media.

A Google News Archive search for the term “mobile broadband” was conducted to compare international and South African citation analysis trends. The trend results for these searches are depicted in Figure 6-6 and Figure 6-7.

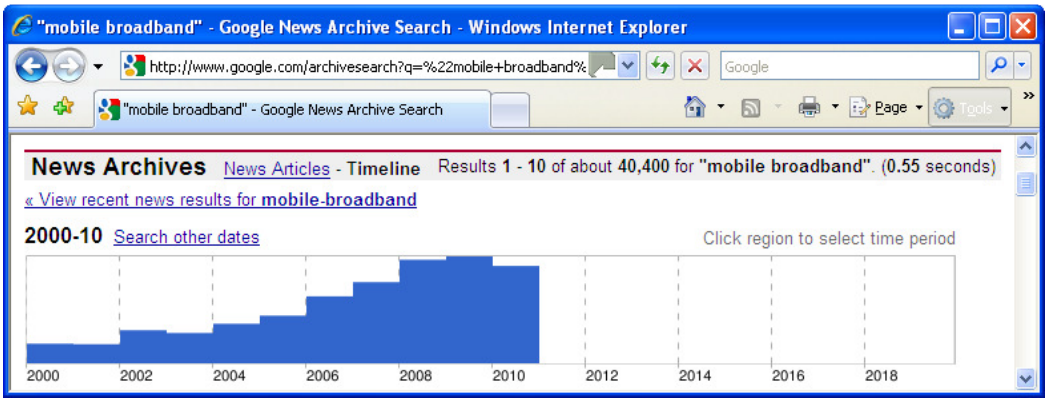

Figure 6-6: Citation Analysis of "mobile broadband" in news media.

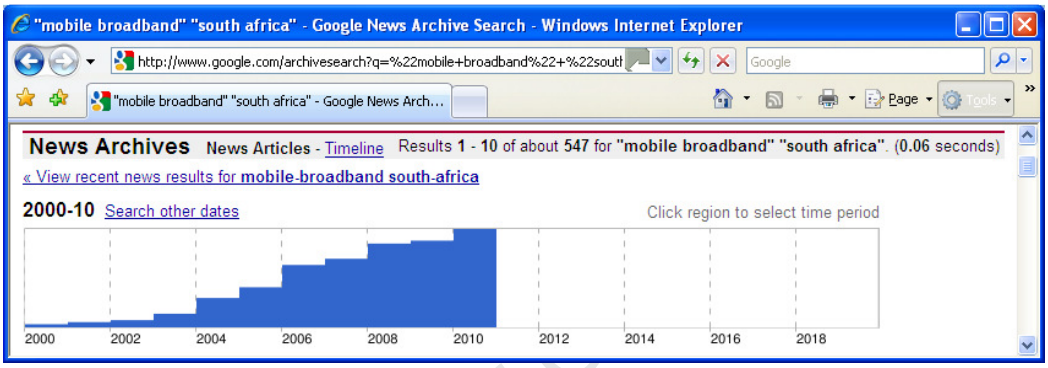

Figure 6-7: Citation Analysis of "mobile broadband" and "South Africa" in news media.

This analysis reveals that as opposed to the “late arrival” of citations of “broadband” and “South Africa” and the virtual lack of articles about “broadband policy” and “South Africa”, the citations of “mobile broadband” and South Africa are well matched. News articles relating to “mobile broadband” start appearing during January 2000 and have been steadily increasing since which could be indicative of a strong association between broadband and mobile technologies in a developing country context. What is perhaps surprising is that true mobile broadband services only became available in South Africa in 2004 (see Table 3-2).

Examining the general trend on all these Citation Analysis, it is clear that both globally, and in relation to South Africa the hype cycle surrounding the “broadband” rhetoric has yet to reach its discursive plateau and thus corroborates similar findings from Cukier et al. (2009d). However, the focus on more technology driven interest and less political and policy orientated reporting is significant and will be explored further in the CDA.

Focusing on the corpus selection as defined in Section 5.3, and comparing this to the key events as noted in Table 3-4, the time line presented in Figure 6-8 and Figure 6-9 shows an association between government initiatives and media reporting. Each slot on the X-Axis represents a calendar week from Sunday to Saturday. The Y-Axis denotes the number of articles. Each plotted point is the article item number as can be found in Appendix B.

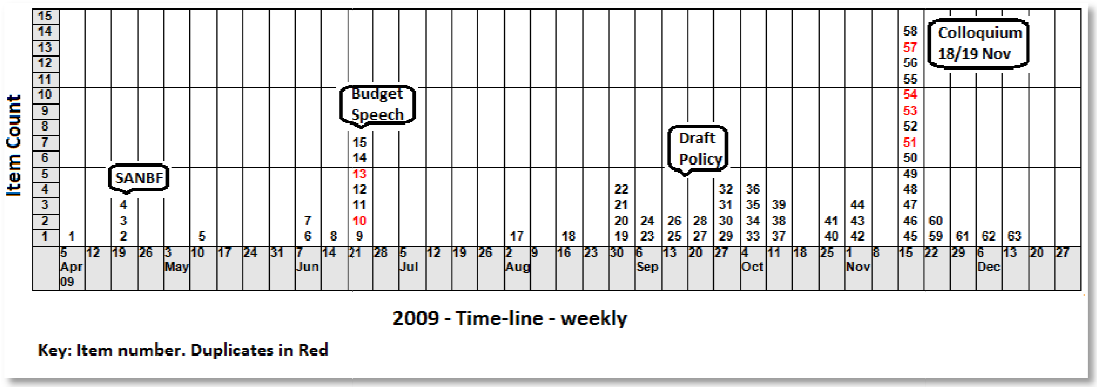

Figure 6-8: Time-line of 2009 corpus article appearance by week

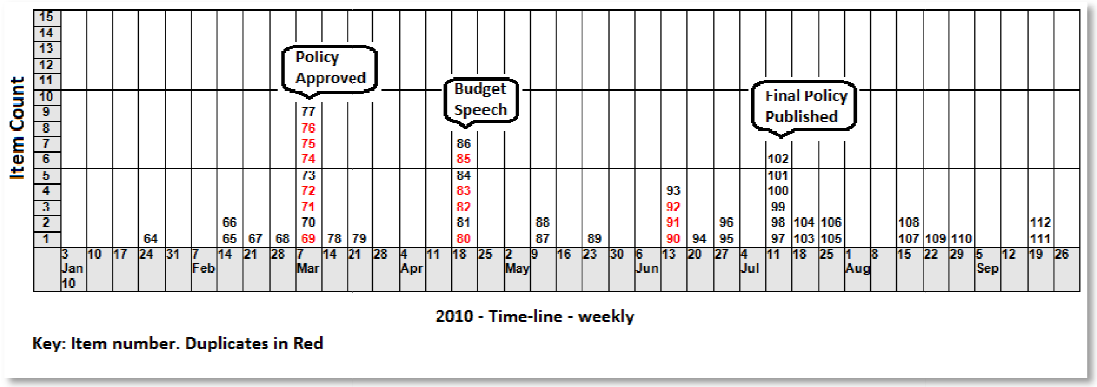

Figure 6-9: Time-line of 2010 corpus article appearance by week

Note that article item numbers in red are duplicates, but it is significant that these were all published in different locations or publications. As such additional copies of these items will not contribute new insights to the discourse and will not influence the CDA aspect of this research. However, retaining the articles as part of the Citation Analysis is important as it does contribute to the overall shape and article frequency of the discourse.

Considering Figure 6-8, the April 2009 cluster of articles relates mostly to the lobbying by the SANBF whilst the June 2009 cluster relates to the ministers budget

speech in parliament highlighting the broadband policy initiatives. The focus of the cluster of articles around September 2009 to October 2009 is mainly on the publishing of the draft Broadband Policy in September whilst the November cluster highlights activity around the industry colloquium in November. It is notable that between December 2009 and February 2010 there is limited reporting of broadband related news. Considering Figure 6-9, the next cluster around March 2010 relates to the announcement of the finalisation of the Broadband Policy whilst the mid April 2010 cluster focused on the ministers budget speech to parliament while the July 2010 cluster incorporates the reporting on the publication of the final Broadband Policy. It is notable to what extend the government had power to shape the frequency of reporting and that by comparison other entities, for example the SANBF, in their early drive for media attention fared relatively poorly in comparison.

The "Word Map" presented in Figure 6-10 gives an indication of the frequency of words found in the corpus by sizing the font proportionally to its occurrence. Again it highlights the dominance of government (department, DoC, government, minister, Nyanda, etc.) with broadband and policy in the discourse and gives another visual cue on the overall shape of the media discourse on broadband policy.

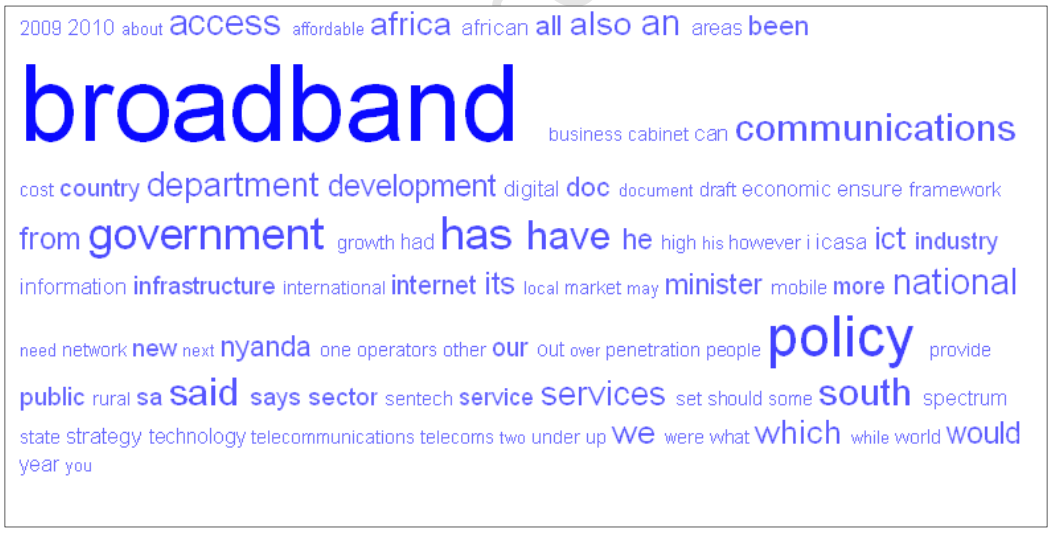

Figure 6-10: Nvivo Corpus Word Map

In summary, the Google News Archive tool was used as a general citation analysis device and provided evidence that South Africa's media reporting on "broadband" followed international trends to a large degree, but showed a lack of reporting on "broadband policy". Turning to the detailed corpus selection, there is evidence of a link between frequency of media reporting on "broadband policy" and government

announcements and press releases – in this corpus government was the driver of the discourse.

6.2 Empirical Analysis of Comprehensibility (C)

Following Cukier et al. (2009b) Comprehensibility Claims focuses on semantics and syntactical accuracy. As the corpus consisted of material from both the general press and more technical focused publications, it is to be expected that a considerable amounts of industry specific language or jargon would be present, however these technical terms are well understood by the industry professionals that the publications are intended for and as such do not need further clarification. There are examples where good explanations are given to how existing access speeds and technologies relate to the Broadband Policy. For example:

> The policy document says SA will follow the guidelines set out by the ITU's development sector. "As such, broadband will be interpreted as an always-available, multimedia-capable connection with a download speed of at least 256kbit/s."
> That means that basic third-generation cellphone services are considered to be broadband, as is Telkom's entry-level digital subscriber line service, which provides access speeds of up to 384kbit/s. [94]

And further it is reported that an analyst states:

> The ability of every citizen having a broadband access point within two kilometres is also very achievable, as mobile access already allows for Edge or 3G coverage, which currently exceeds the policy's definition of greater than 256kbs, and already covers more than 90% of the population of SA. [102]

It could be argued that at times clarity or comprehensibility is obscured in that most articles did not only discuss the Broadband Policy per se or in isolation, but in relation to other matters. This does, however, highlight the complexity and interdependency of a successful Broadband Policy on other related activities in the sector. The themes most often cited in conjunction with the Broadband Policy agenda include:

- Migration to the digital broadcast standard for terrestrial television and the set-top-box manufacturing strategy,
- The radio frequency spectrum usage policy and audit,
- Implementation of the local and digital content development strategy and
- The National cyber security policy.

The Broadband Policy reporting is also often reported alongside political news such as commentary about the leadership within the DoC and other state related entities. This is in strong contrast to the government rhetoric that reports Broadband Policy in a positive and non-critical style.

In summary, there is no evidence that jargon is used to confuse or lessen the clarity of the discourse. There is, however, evidence that many other related topics are included in the discourse and these could potentially distract from comprehensibility.

6.3 Empirical Analysis of Truth Claims (T)

Considering Truth Claims, attention is given to the positive or negative sentiments in the discourse (Cukier et al., 2009c). The benefits of broadband as espoused in the discourse are summarised in Table 6-1 and emanate predominantly from governments framing of the draft and final Broadband Policy to the media.

Table 6-1: Broadband benefits as defined by the media corpus

Positive Claims – Broadband benefits	[Item#] cited
provision of multimedia	[81] [85]
provisioning of e-government & governance	[85] [48] [3] [31] [81] [89]
economic benefits & e-commerce - impact on GDP	[85] [48] [41] [90] [65] [12] [31] [23] [89] [94] [101]
broadband can provide inclusivity of all - rural - e-citizenship	[48] [3] [9] [41] [23] [94]
provisioning of e-health & healthcare	[48] [3] [41] [4] [67]
provisioning e-education - reverse skills-gap - learning/teaching	[48] [3] [41] [19] [17] [4] [67] [89]
social upliftment	[41] [90] [101]
building the information society	[70] [42] [94]
wider & cheaper internet access usage/uptake	[90] [33] [42]

Positive claims contained in the same articles as those dealing with the Broadband Policy were often from a wide range of related topics. The most prominent of these positive claims, both broadband and non broadband related, are presented in Table 6-2. Comparing these positive claims with the negative sentiments contained in the corpus underscores the general mood of the discourse. Considering not only claims directly related to broadband, but also general – non broadband related claims - presented in the same articles are necessary to accurately reflect the overall mood and tone of the discourse. By a process of association, the overall negativity contained in the discourse reflects on the broadband policy debate.

Table 6-2: Positive Claims - Broadband Policy and non Policy related

Positive Claims – Broadband Policy Related	**[Item#] cited**
Optimism over new minister & policy or colloquium	[36] [55] [15] [23] [7] [60] [44] [47] [63] [59]
USAASA issues to be addressed & USALs	[11] [9] [12]
Optimism over clarification of roles & responsibilities	[84] [64]
Radio frequency spectrum (RFS) to be addressed	[11] [70] [12] [23] [60]
Local and digital content production strategy	[31] [89]
Positive Claims – Non Broadband Policy Related	**[Item#] cited**
Mobile interconnect fees down	[55]
Optimism of ICT importance to government	[65] [67]
ICT meetings forums (multi stakeholder)	[40] [67]
African ICT market growth	[41]
Better access (SEACOM & more ISP licences)	[86] [17] [88]
SABC turnaround	[11]
Business Process Outsourcing - call centres	[70]
MTN BEE deal	[102] [110]
Inter-Governmental Implementation committee	[93] [12]

To illustrate the overall view of negative claims contained in the corpus, three summaries are presented. The first considers negative claims related to the draft policy and final Broadband Policy document (see Table 6-3). Table 6-4 provides a summary of the general negative claims found in the corpus and this reflects against the general positive claims as presented earlier.

Table 6-3: Negative Claims – Draft and Final Broadband Policy

Negative Claims – Draft Broadband Policy	**[Item#] cited**
Lack of clear definition of affordability an what broadband is	[20] [46] [29] [30]
Lack of consultative process	[20] [30]
Lack clear directive how Broadband Policy aims will be implemented	[46] [30]
Lack of clear deliverables in Broadband Policy	[30]
Negative Claims – Final Broadband Policy	**[Item#] cited**
Not ambitious enough - very achievable	[102] [112] [34] [108]
Lack of definition of roles	[102]
Financial constraints	[102]
Lack of clarity in definition	[112] [52]
Lack of user awareness	[112]
Lack of education and literacy	[112]
Lack of defined objectives	[108]

Table 6-4: Negative Claims – General telecommunications sector related issues

Negative Claims	[Item#] cited
DoC dysfunctional - Nyanda - Mohlala dispute	[98] [100] [06] [31] [79]
Delays in migrations to digital broadcasting – Set-top-box issues and IPTV broadband constraints	[98] [68] [70] [77] [109]
ICT meetings - frustrating	[40]
failure in telecoms industry - stifled competition	[3] [111] [01] [26] [4] [22] [2] [59]
Technology is moving faster than Policy/regulation	[19] [86] [65]
Lack of integration in Policy and regulatory action - disjointed efforts	[19] [111] [01] [65] [37] [5] [102] [112] [104] [64] [22] [2] [30] [89]
Low broadband penetration and high costs	[51] [57] [111] [33] [01][37] [26] [34] [35] [8] [89] [43]
Issues with USAASA and USALs (universal access) - rural exclusion	[111] [37] [14] [31] [103]
SA behind on ICT innovation and thinking & adaptability - ICT lags	[111] [62] [78] [26] [66] [96] [32] [22] [39] [8] [108] [105]
Local Loop unbundling - high Telkom ADSL costs	[86] [26] [112] [89]
Delays in Broadband Policy	[01] [70] [15]
Issues with ICASA	[37] [26] [102] [12] [14] [110] [31] [79] [60] [89] [25]
Issues with Sentech & Infraco roles in Broadband	[37] [102] [58] [84] [64] [31] [95] [23] [63] [68] [24]
Issues with Radio Spectrum Management	[37] [63]
Financial requirements around Broadband & ICT issues	[111] [102] [66] [64]
General lack of management and accountability - leadership	[66] [104] [79] [95]

In the media discourse, the need for a Broadband Policy is initially most clearly articulated by the SANBF. They point to the failure of Government's managed liberalisation of the telecommunications industry and state:

> The NBF feels government's efforts have failed, as issues of limited competition and the high cost of services still remain. The solution, it says, lies in the creation of a comprehensive national broadband policy which will help it deal effectively with broadband extension. [1]
>
> … for the last five years the telecommunications industry has provided very little growth in the economy because the South African Government has failed in its liberalisation efforts. Progress was marred by politics, cronyism and infighting, which stifled competition at the cost of the consumer. [2]

The SANBF further clarifies what it believes to be the main benefits to be derived from an effective Broadband Policy placing emphasis on the educational possibilities offered by broadband:

> … high-speed broadband access will in turn stimulate the creation of commerce and digital broadband content by content providers, such as educators, so that

> Government's mandate of affordable learning and teaching can be fully realised. Other sectors, such as health care, government services and job creation will also benefit. [2]

However, the emphasis on the ability of broadband to facilitate the improvement of education is lost in the overriding e-government rhetoric framing the Broadband Policy view from government. While one of governments espoused benefits of broadband does include e-education, the focus of governments drive for broadband seems to be more on e-government and economic benefits to be derived from broadband availability. Given the clear need for improvement in the basic standard of education (Van der Berg, 2007) to facilitate further economic growth, this is clearly a shortfall.

In general, the statements from government were often focused on the imbalance of broadband availability between urban and rural areas, and the ability of Broadband Internet access to facilitate e-government:

> ... It will outline targeted interventions to encourage the uptake and usage of broadband services across the country, particularly in remote rural and underserviced areas. [10]

> We have to ensure that, as the country moves to the information society and knowledge economy driven by modern technologies, the poor are not left behind. [10]

> People need access to information and services, irrespective of their social or economic status, without them having to travel long distances to access these. [10]

> The statistics put the global rate of average penetration for broadband at a mere 22 and half percent, with South Africa only accounting for just over one million broadband connections which translate to a penetration rate of only two percent. [51]

> We have not been able to meet the objective of ensuring that as many people as possible have access to what is undoubtedly rapidly becoming a basic tool, the internet … Statistics tell us that broadband penetration in our country is low because of, among other things, the lack of adequate infrastructure and the high cost of accessing broadband services. [51]

> We have finalised the broadband policy whose vision is to ensure that South Africans have universal access and services to broadband by 2019," Nyanda said. "The benefits accruing from the policy will include the provision of multimedia and e-

> government throughout the country … The implementation of the broadband policy will impact on the growth of the economy through expanding markets, increasing business efficiency and promoting competition … South Africans will be able to see a single face of government and be able to connect with all levels of government and different departments using a single platform". [80]

One of the most glaring omissions from the Broadband Policy discourse by the DoC is that of cost and actual information about implementation. Although it could be argued that such items are to be addressed outside of the policy document, for example in a detailed implementation strategy, this is never made clear and hence leaves many unanswered questions in the mind of the observer which ultimately could lead to doubt in the policy as a whole.

While many articles were neutral and did not offer any opinion or insight into the debate, some did provide balanced criticism.

> Despite Ambrose's [see Glossary] belief in the policy's possible success, he maintains that the document reads like a list of leading practice, and comes across as a wish list of magical outcomes for the country. [102]

Further on in the article, it touches on the very issue of lack of clarity on cost and an implementation plan:

> No financial strategy has yet been provided to meet the objective, but the policy does mention that government will use state-owned enterprises, such as Sentech and Infraco, for the provisioning of electronic communications network services.
>
> The biggest challenges will be that of actual implementation, as state-owned enterprises, such as Sentech and Infraco, are to be tasked with much of the burden, and historically have performed abysmally in any form of commercially viable national infrastructure projects. The role of the private sector is not fleshed out and appears to be secondary, which will be a major flaw in implementation. [102]

One assumption that is not adequately explored in the discourse is whether government departments are indeed ready for e-government. There are no questions raised about whether government IT departments have been integrated into an e-government environment or whether departments are ready to offer e-services and e-transactions and if government officials are ready to deliver and support e-government services to the public. One of the few statements in the discourse on this

matter is by Minister Nyanda when in May 2010 he alludes to the probability that government departments are indeed not ready, as he urges the adoption of ICT:

> "Therefore, the development of a coherent framework for the deployment and utilisation of ICT in government is critical. It is urgent that the government adopts and uses ICT in order to modernise services, improve administration and efficiency." [89] 27 May 2010

This would surely be a prerequisite for e-service to the citizens? Mutula and Mostert (2010) note that despite South Africa's significant investment in ICT infrastructure, policy and regulatory framework and well articulated service delivery principles these have as yet not been effectively leveraged to enhance service delivery to its citizens. A number of challenges to effectively rollout e-government services persist. General issues that have prevented efficient service delivery include problems of poverty, inequality, corruption, insecurity, illiteracy and skills shortages. In the context of e-government project failures Mutula and Mostert identified issues that include:

- Projects adopting technologies without the accompanying human skills and capacities to manage, integrate and sustain them.
- Centralizing the use of technologies by national governments without extending the benefits to intermediary institutions such as local government, parliament, civil society, etc.
- Not linking good governance to the broader and more inclusive democracy.
- High levels of digital illiteracy.
- Inadequate resources. (Mutula & Mostert, 2010, p. 44)

In summary, some distortions are to be found when considering Truth Claims in the discourse. A number of positive claims about the benefits the Broadband Policy should have on the socio-economic development of the country are not well substantiated. There are omissions about how the policy is to be implemented; the readiness of government departments for e-government and what costs would be involved.

6.4 Empirical Analysis of Sincerity Claims (S)

Analysis of Sincerity Claims requires the examination of the agreement between what is said and what is meant. In addition, consideration should to be given to the intent as expressed in the discourse, and the underlying intent (Cukier et al., 2009b). There is some evidence of hyperbole, metaphors and connotative language to reinforce certain perspectives in the discourse the most prominent of which is the use

of the term “digital divide”. The “bridging” of this divide [37, 67] or “being on the wrong side” [105] of the divide, elicits an emotive response.

There are also examples were disappointment and frustration about certain aspects or aspirations, contained in the Broadband Policy come to the fore. The feeling of mediocrity or the lack of ambition is contained in words like “lacklustre”, “eminently achievable” and “lowering the bar [112]”:

> ...the main requirements of accessibility and affordability appear to be carefully thought out and **eminently achievable** by 2019 [102]

> The South African Government has recently released their national broadband policy which aims to provide all citizens with a 256 Kbps connection by 2019. This **lackluster** (sic) goal from Government is falling well behind other similar projects. [108]

> We must avoid the temptation to set **targets** that are **already being attained**, when the real need is something far more ambitious. [112]

There are also a number of examples where the Broadband Policy is not directly discussed, but it is framed within the ambit of some other event or internationally related activity. The process of comparing South Africa against better performing nations, in respect of broadband penetration or broadband access speeds, elicits an emotional response of inferiority and triggers the expectation that the Broadband Policy should be able to get South Africa on a par with these leaders. It is notable that these examples contained in Table 6-5 are predominantly of developed countries and hardly any mention is made of other developing countries.

Table 6-5: Other country superiority - elicits emotive response

Country	Item #	Citation
South Korea and others	[8]	South Korea, where 95% of homes have broadband, Singapore and Taiwan are among the top five countries in terms of access to the high-speed Internet, according to a survey released on Thursday.
Finland	[39,41,96,108]	[96] Finland's citizens now have the right to a one-megabit broadband connection, with 100 Mbps to become a right by 2015
United States	[8,78,87,105]	[105] The International Telecommunication Union (ITU) Standardization Sector defines broadband as a "transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0 Megabits per second (Mbits)".
United Kingdom	[108]	UK's broadband policy head suggests that everyone can get at least two-megabits per second broadband by the end of 2012.
Australia	[111]	The Australians have recognised the importance of broadband, going so far as to making a national broadband policy a political ticket in the previous elections.

Most often these links with international news items serve to illustrate how far behind South Africa is to the developed world and it is implied that having a Broadband Policy would facilitate a way for South Africa to close the gap. A typical example of this comparative reporting is unpacked in the following paragraph.

Few things trigger a response of national pride as much as a country's national sports teams. In South Africa this is particularly true of the sporting code of Rugby where the Springbok name and emblem epitomises the highest level of the sport. The Wallaby is the Australian equivalent of the South African Springbok. The article published on the 20th of September 2010 entitled "A Wallaby business lesson" [111] is particularly poignant as it hits a nerve of many an ardent South African Rugby supporter, especially after the dismal showing of the national team during the July 2010 Australasian tour. This is a prime example of the emotive use of "story telling" to make the point that not only in sport but also on the business front and technology frontier South Africa is not winning at the moment. Implied is that if South Africa was to follow Australia's example in prioritizing broadband policy and broadband funding, the country could get back on track with public and private enterprise activities, and perhaps the Rugby team would also return to its winning ways.

In summary, there is some evidence of the use of metaphors and connotative language. Predominantly the discourse elicits a response of technological inferiority and the need to catch-up. The advent of the broadband policy however does little to change the mood in the discourse.

6.5 Empirical Analysis of Legitimacy Claims (L)

Central to investigating Legitimacy Claims in a discourse is to focus on participation and authority, i.e. who is included and excluded from the discourse (Cukier et al., 2009b). The overriding contributor to the discourse is the DoC through statements by the minister and his deputies. The Minister at the time is quoted as stating:

> We have finalised the broadband policy whose vision is to ensure that South Africans have universal access and services to broadband by 2019 … The benefits accruing from the policy will include the provision of multimedia and e-government throughout the country….The implementation of the broadband policy will impact on the growth of the economy through expanding markets, increasing business efficiency and promoting competition. [82]

The deputy minister at the time Dina Pule is quoted as saying:

> We are putting in place measures to increase competition in accordance with the Electronic Communications Act. We are finalising the Broadband Policy Framework, which encourages the roll-out of ICT infrastructure and affordable services for the benefit of all South Africans, including those in rural areas. [67]

A number of statements in the discourse are also attributed to the Director General (DG)[3] of the DoC, for example:

> There has been a market failure in the telecommunications sector and direct state intervention is required, particularly on the policy level, says Department of Communications director-general Mamodupi Mohlala. [26]

The next dominant voice in the discourse is that of market analysts, most notable those of BMI-TechKnowledge Managing Director Denis Smit with 11 articles quoting him and World Wide Worx Managing Director, Arthur Goldstuck and Steve Ambrose with seven articles reflecting their views. As “experts” and “neutral bystanders” their

[3] The Director General (DG) of the DoC reports to the minister of Communications and is tasked with strategic leadership of the Department. The role includes planning and directing the Department’s activities and serving as the Accounting officer.

views often provided the only alternative non-governmental insights into the discourse. Goldstuck is quoted as saying:

> Based on those definitions, any cellphone network that provides 3G or Edge access is a broadband public ICT access point, and we are already at the 15% household penetration mark on that basis …The state needs to make it clear that it is referring not only to the broadband access point, but also to a community resource that provides access to ICT facilities, such as broadband-linked computers, at an affordable price. [112]

Civil society in general is not well represented in the discourse at all. The SANBF initially had a strong voice in the discourse with a total of 12 articles, but it fell silent after the Draft broadband policy was announced in September 2009. At that stage the forum expressed a number of concerns about the policy. Examples of these concerns include:

> Steve Song from the South African National Broadband Forum (SANBF) said that it is a good start that the DoC has taken the initiative to draft a broadband policy. Song however points out that the draft itself fails to draw on existing examples of broadband policy from around the world and expert analysis from the World Bank, OECD, and others on effective national broadband strategies.
> "It also fails to set clear progress targets," Song said. [30]

Considering the publications that did not carry stories on the Broadband Policy, refer to Table 5-3 and compare these to Table 5-4. It is notable that the Sunday World, Sowetan and The Star did not yield any results even though they form part of large media groups. The publications in the Media24 group (e.g. Daily Sun, Son, Sunday Sun and City Press) with the highest circulation figures also fared poorly to contributing to the corpus. The Daily Sun did not have a searchable archive on their Web site, but their dedicated page on demographics is instructive, catering mainly for Living Standards Measure (LSM)[4] 4-7 (Daily Sun, n.d.). It therefore seems that certain demographical groups (lower LSM's) in the population have been marginalized in the debate about the Broadband Policy. Is it possible that these citizens have been excluded from the discourse because it is perceived that they are unable to engage or disinterested in matters of policy debate? They are thus seen as lacking agency and are not engaged in the process. One has to then question the possible success of policy outcomes formed on this basis.

[4] The South African Advertising Research Foundation defined a Living Standards Measure (LSM) which divides the population into 10 LSM groups, 10 (highest) to 1 (lowest) and has become the most widely used marketing research tool in Southern Africa.

Conspicuously absent from the discourse are voices from ICASA. Although repeated reference is made to the entity its voice is never heard and the same can be said for the USAASA with a rare exception in article [103]. The SOEs are also silent on the specifics of the policy per se. Multiple references are made to Sentech and Infraco, but no representation from these entities in the discourse ever touches on the actual broadband policy as such. As the policy spells out the crucial role that these state entities and state-owned enterprises are to play in the ultimate success of the policy implementation, it is even the more surprising and troublesome that they are not represented in the debate. What is clear from the discourse is the uncertainty prevailing at many of these entities:

> According to Sentech's communications head Polly Modiko, staff remain uncertain about the future of the company. She says there is no business plan or definite turnaround strategy in place. "There has been no full-time CEO appointed and everything is still uncertain here." [96]

It can be argued that this apparent lack of leadership and clear direction evident at the state entities and state-owned enterprises is the reason that they have not engaged with the media on this matter.

There is also a general lack of comment from industry players with the rare exceptions being iBurst's Jannie van Zyl and Altech CEO Craig Venter. There is no input from any of the major broadband providers including Telkom, Vodacom, MTN or Cell-C. Why would these entities not have engaged with the media on the broadband policy objectives? There is evidence that they commented on the draft policy and participated in the colloquium that followed, but they chose not to enter the public discourse. The answer perhaps lies in that there seems to be no reason for them to make comment as for these entities the policy or implementation will have little impact on their current business plans or directions. Companies are motivated by market pressures and apart from state mandated license obligations are generally not driven by government policy as these two "world" seem to work on a different time scales.

Also missing from the media discourse are substantial inputs from academia – a rare exception is to be found where Research ICT Africa's director Alison Gillwald is quoted as saying:

> Alison Gillwald recently highlighted that South Africa - which was once one of the most advanced countries regarding Internet services - has now fallen behind some of its African peers. According to Gillwald policy failure is at the root of this problem, which calls for a comprehensive assessment of the current telecoms policies and legal frameworks. [22]

The extensive use of experts and continued comparative inclusion of other developed counties in the narrative is used to legitimise the need for a Broadband Policy. There is never a question that the formulation of a Broadband Policy is not an imperative.

In summary, overall there is evidence that there are distortions in the discourse regarding legitimacy claims. Government is by far the biggest contributor to the discourse, but entities likely to be involved with the actual implementation and roll-out of services described by the Broadband Policy have been sidelined. There is also little participation by the citizens for whom the policy should improve conditions and the latter part of the discourse is devoid of inputs from civil organisations that had championed the original impetus.

6.6 Summary

This chapter provided the results of the Media Citation Analysis. Using the Google News Archive tool to compare South Africa with international trends, it was found that there was a parallel between general reporting on “broadband” and “mobile broadband”, but that reporting on “broadband policy” seemed lacking. Examining the trends found in the selected corpus, it is evident that the discourse is driven predominantly by government announcements and actions. This seems to link with observations from Cukier at al. (2009c, p. 620) when they report on the citation analysis for the term “information highway” in North American newspapers and note that the increased use of the term correlated with American government initiatives around the National Information Infrastructure development.

The empirical findings of the CDA revealed that there is no evidence that jargon is used to confuse or lessen the clarity of the discourse, but Comprehensibility(C) may be affected due to the inclusion of many other related topics. Some distortions are to be found when considering Truth Claims (T). A number of positive claims about the

effects the Broadband Policy should have on the socio-economic development of the country are not well substantiated. There are omissions about how the policy is to be implemented; the readiness of government departments for e-government and what costs would be involved to implement the policy fully. The Sincerity (S) claim shows there is some evidence of the use of metaphors and connotative language and that the discourse elicits a response of technological inferiority and the need to catch-up, however the mood of the discourse does not change and as such the policy is not perceived to make any difference to the current status quo. There is evidence of distortions in the discourse regarding Legitimacy claims (L). Government is by far the biggest contributor to the discourse, but entities likely to be involved with the actual implementation and roll-out of services described by the Broadband Policy have been side-lined. Civil organisations although initially vocal, are absent later in the discourse and as such there is no representation of the citizens in the discourse. The imperative of a Broadband Policy are never questioned hence signs of technological determinism go unchallenged.

7 Discussion

This chapter discusses the findings from the citation and discourse analysis presented in Chapter 6. The chronological listing of materials used is to be found in Appendix B. Also refer to Table 3-4 giving the time-line of events that shaped the Broadband Policy initiatives. The overriding themes that emerge from the discourse are examined. Although government had ample avenue to relay a positive sentiment about the Broadband Policy, the overall mood of the discourse is not optimistic and possible reasons for this will be discussed in the following sections. Consideration is given to the association and disassociation of various grouping with the Broadband Policy.

7.1 Broadband definition and interpretation

Reviewing the final Broadband Policy (DoC, 2010) there is evidence that, to some degree, government has followed the philosophy of the *Broadband Ecosystem* (see Section 2.3) when it formulated the Broadband Policy. The inclusion in the policy of aspects related to the investment and demand for high-speed networks, the availability of services and the general access to applications providing relevant locally developed content as well as consideration of affordability and relevance to users, is proof of this. However, considering the media corpus it becomes apparent that this understanding is not commonly shared by all observers as many discussions focus only on network access and speed and give little consideration to the importance of related content and the needs of the users. The culprits here are most often observers focusing on the technical merit of various access speeds and network technologies or when comparative studies measuring these metrics are quoted. Some of the confusion about the definition of Broadband and government's responsibility in clarifying and promoting better understanding of and ultimately the provisioning of broadband, can be found in the following extract from the corpus, discussing the final policy document:

> "The state needs to make it clear that it is referring not only to the broadband access point, but also to a community resource that provides access to ICT facilities, such as broadband-linked computers, at an affordable price." [112]

Considering Habermas' theory of communicative action, and the particular emphasis he places on discourses in the *public sphere* (Cukier et al., 2009b), it becomes

apparent that the ideal speech situation is not present in this media discourse on the Broadband Policy as there is no clarity about the interpretation of the broadband concept. Van Rooyen (2002) highlights the lack of science and technology coverage in the South African press, and Turner (2008) underlined the need for South African journalists to empower their readers with scientific knowledge and improve South Africans scientific literacy in a world that is increasingly dominated by scientific and technological advances. Only when this issue is addressed will the general populous be able to fully engage in the broadband debate and allow government to implement a policy which fully represents the needs of all of its citizens.

With the convergence of broadcasting and media with traditional data networks ever increasing, it is understandable that there is some confusion in the general public's perception of what broadband incorporates. Entities under the domain of the DoC include ICASA and Sentech. ICASA oversees and regulate various aspects of this converging domain, and typically makes regulations and issues licenses for all electronic communications and broadcasting, and as such manages radio frequency spectrum too. Sentech being the national broadcast signal distributer has also made its intentions clear that it wants to compete in the broadband market and so a casual observer could be excused for not appreciating where a Broadband Policy would fit into this picture.

In summary, the struggle that policy advisors and academia have had in articulating what is embodied in the Broadband concept is echoed in the South African media reporting on the Broadband Policy in that no clear and concise definition is to be found. Government has an obligation to clarify and educate citizens about what it envisages the Broadband Policy to deliver, and the media is a critical enabler to convey this information.

7.2 Technological Determinism

The role of ICT in general and that of broadband policy are inextricably linked to developmental discourse (ICT4D) in the South African context. As noted by Wilson:

> Moving beyond models of development based on catching up to western ideals, to the production of locally specific alternative development processes and outcomes, is essential if we hope to make use of these powerful technologies to improve the quality of life of the world's many and diverse groups of poor people who are currently also excluded from the information society. (Wilson, 2002)

This general aspiration of having to catch up is prevalent in the discourse. It emanates both from government and non government statements, for example:

- Most South Koreans have broadband [8]
- SA Broadband: Exactly how bad is it? [32]
- SA broadband woefully below par [54]
- SA broadband penetration poor: Minister [61]
- "Africans have missed the industrial revolution, we can't afford to miss the digital revolution," Mohlala said. [67]

Cukier et al. (2009b) note the well-established tradition in critical theory of exposing discourses that espouse the ideas of the technological imperative – presenting technological change as being unavoidable and unstoppable. The general atmosphere of the broadband discourse under review is that of "techno-optimism", the "technology imperative" and "technological determinism". Roode at al. (2004) note how *technological optimism* relates to the belief that developmental problems (in Africa) can be resolved by the availability of, and access to ICTs. According to Wilson (2002), the *technology imperative* or *technological determinism* discount the fact that information or knowledge do not necessarily have to be associated with ICTs. While ITCs may provide a conduit to accessing certain types of information, or gain certain knowledge, this is not necessarily the only way. This inevitability of technology as the future and assumptions of ICTs as the "magical development solution" (Wilson, 2002) are best captured in some of the article headings to be found in the corpus: Examples of these include:

- ICASA opens discussion on internet TV [77]
- Broadband for all by 2019 – Nyanda [80]
- Universal broadband by 2019: Nyanda [85]
- Government defines broadband as 256kbit/s [94]
- 1Mbps now a legal right [96]
- 2Mbps connection for all by 2012 [108]
- Digital TV: Connecting the unconnected? [109]

However there are also examples in the discourse which advocate that broadband in itself is not a solution to the social and economic improvements needed in the country. For example minister Nyanda is quoted as saying:

> ICT is a potentially transformative developmental tool, provided it is well located within the overall policy framework and is not seen as an end in itself but a necessary means. [89]

Mention is made of the need for an integrated approach when it comes to ICT policy. For example minister Nyanda said:

> We are in discussions with the department of rural development and land reform to ensure that we participate in the agrarian reform and food security programme through technology intervention in our sector. [80]

However, overall, little attention is given to highlighting other policies or activities that would be needed to facilitate the success of the Broadband Policy objective and this theme is not well represented in the corpus.

This phenomenon is not unique to South Africa and in a review of the Australian government's broadband initiatives around 2003 (Allen, 2006, p. 1537) notes that the Australian media's reported that the country was "lagging" or "slipping" in broadband uptake. As such there are similarities with the reporting in South Africa. Allen (2006) also notes Australia's techno-optimism in its general ICT policy outlooks. Although Australia is considered a developed country, the "ICT growing pains" it has experienced in the past decade, and the Australian response to these, may well hold lessons for developing countries faced with similar situations.

7.3 Broadband Policy and the citizens

Considering South Africa's low broadband penetration level, it clearly falls into the "Promote" classification position defined in the "typical stages" of broadband market development (see Section 2.5.2). Government focus should thus be on promotional policies to stimulate both the demand for broadband, by raising awareness about the benefits of broadband and the supply of broadband, by facilitating investment in network infrastructure and content development. It would thus be reasonable to expect that the media discourse would be reflective of these drives that government should be undertaking.

However, Broadband Policy does not appear to feature prominently in the collective minds of the general public. It can be argued that the policy has the potential to significantly improve people's lives and wellbeing, but currently the development of a Broadband Policy is secondary to more pressing issues such as basic services provision. Issues that directly affect people's quality of living inevitably take precedence. One reason for this poor public engagement is perhaps related to the way that the non ICT focused media reported on the Broadband Policy. These

sources closely followed the press releases from government, but rarely added substantial commentary to these statements, usually quoting verbatim the statements from the government spokesperson. The reports from the SAPA are a case in point. These findings support literature that "explores how and why journalists tend to rely heavily on official government sources for information and policy perspectives" (Guardino, 2009, p. 3).

It is also notable that there were no stories about the Broadband Policy to be found in a number of the leading print media sources (see Table 5 4) and the discussion in Section 6.5. These papers were Sunday World, Sowetan and The Star. These sources would carry stories about "broadband", but none on "broadband policy", indicating that although the readership is engaged in some aspects of endpoint delivery of broadband services, they are not engaged in the policy development necessary to facilitate the full broadband potential. Similar to findings by Quail and Larabie (2010, p. 45), the poor coverage of the topic "does not lend itself to a critically informed and engaged public". There is mention in the media of governments intention to make policies more relevant to the citizens – in the context of the articles quoted, it is not entirely clear if the following statement relates to the Broadband Policy or the Radio Frequency Spectrum Policy:

- "A popular version of the policy will be issued to make the policy more accessible," Maseko said. [76]
- "Popular versions of the policy will be issued to make the policy more accessible. This means it will be a more simplified version as the current document is a very technical and very thick volume. This policy is very important and needs to be accessible to all." [70]

Following Habermas' ideal speech and discourse ethics, mutual understanding can only be realized if all parties are represented in the discourse (Cukier at al., 2009b). Section 6.5 highlights the omission of a number of stake holders from the discourse, the most critical being the very people the Broadband Policy would most benefit. The observer is therefore left with doubts about the effectiveness of government's drive towards fostering awareness of the benefits of broadband. Without a clear picture of the benefits of an all encompassing policy, the importance of the policy is belittled in the mind of the general public. Allen (2006) summarizes the Australian Broadband Policy situation poignantly when he notes:

> The government imagines the "citizen", that elusive and ideal character of much national policy development and implementation in three ways. The citizen is required

> to play their part in the development of broadband infrastructure; must be subject to the government's limited efforts to improve that infrastructure; and be the beneficiary of a future that is, through technological development, much richer and more satisfying than the present. (Allen, 2006, p. 1544)

This paragraph captures the "helplessness" of the citizen and elicits the feeling of being a bystander in the broadband development process. As in the previous section, this comparison draws on information from Australian research, and highlights the fact that even in the developed world similar scenarios are to be found to those experienced in South Africa. Taking learning points from both developed and developing countries may be of value in this situation.

7.4 Custodianship and changes in the discourse over time

During the period under review, there is a notable change in the discourse from optimism about the then new minister (retired General Siphiwe Nyanda) and the proposed policy drafting, and gradually this flows out to a less favourable and pessimistic outlook. The importance of following this mood change in the discourse is that the Broadband Policy is inextricably linked to the DoC and the minister of communication. As these entities are afforded the custodianship of the Broadband Policy, the observer's feelings about the policy become entangled with feelings about the custodian. Cukier et al. (2009b p. 179) highlight that Habermas' own critical analysis of public discourses were never on the sentence or micro-textual level, but were rather oriented to the impact and implications of the discourse.

Initially a number of favourable and optimistic comments are to be found about minister Nyanda. For example during 2009 the following positive citations are to be found:

- APC welcomes the minister's bold steps to develop a national broadband policy for SA. We hope that all sectors of society will participate as partners with the government to develop a national broadband policy that will achieve the aims the minister has set out in his speech. It is good news that SA now has the leadership to advance towards the goal of affordable broadband for all. [15] – June 2009

- On the question as to whether the broadband policy will actually result in 'affordable broadband for all', Goldstuck said that he does not think General Nyanda wants to be remembered as a lame duck minister of communications, "so I suspect we will see real action from Government to improve broadband in the course of his term in office." [30] – September 2009

- Venter says the appointment of communications minister Siphiwe Nyanda has already made a big difference, providing the sector with much-needed leadership. [36] – October 2009

- However, Smit says he is confident that much more may flow out of the latest colloquium. He says the new administration appears determined to do something to get the sector moving again… "I'm gung ho [Slang: Extremely enthusiastic and dedicated] about what's happening," Smit says. "I think the new administration is serious about what it's doing." [44] – November 2009

- Communications minister Siphiwe Nyanda has breathed fresh life into a ministry left moribund by his predecessor, the late Ivy Matsepe- Casaburri. The retired SA National Defence Force general has approached his new portfolio with almost military precision, going to the heart of the problems afflicting SA's telecommunications sector. [47] – November 2009

- The new communications minister, a former military general, has set about fixing many of the problems left by his predecessor. Many executives in SA's telecoms industry speak highly, both publicly and privately, of his first six months in office. It's still early days, but Nyanda appears to have the energy and the nous to get the sector, which had been crippled for years by policy indecision, moving again. [63] – December 2009

However, barely three months later there is a notable change in reporting where less favourable comments attributed to the minister begin to appear in the discourse. These examples are all from 2010:

- Democratic Alliance MP Niekie van den Berg said he believed the government wants to exercise stricter control over the regulator. Nyanda should carry the can, said Van den Berg, as he had failed to exercise political leadership. [79] – March 2010

- Nyanda in new storm over state tenders …A source close to the pair said Ms Mohlala had refused to approve tenders because they were awarded to companies linked to people close to Gen Nyanda and a private company, General Nyanda Security (GNS). [98] – July 2010

- Communications Minister in tender scandal [100] – July 2010

A similar pattern is to be found for reporting on the Broadband Policy, where initially it was hoped that it would provide clarity and then later in the discourse more critical comments are to be found.

- "The National Broadband Policy, which is expected in March, will spell out the future mandate of Sentech. There are crucial questions surrounding the capacity of Sentech and the document will hopefully address these," says Smit. [64] – January 2010

- "With such strong economic arguments backing the policy and a dedicated strategy for broadband in the future, there is no doubt that technology will move up a few notches of importance in government's eyes," adds Smit. [65] – February 2010

- …the Department of Communications through the National Broadband Policy. The policy will harmonise national, provincial and local broadband projects. [66] – February 2010

- However, MD of BMI-TechKnowledge Denis Smit says, before the crows dive in for Sentech's spectrum, certain details about the company's future must be made clear. "It is possible that Sentech's role will be announced in the broadband policy the department has finalised," he says. [84] – April 2010

- …analysts applaud the objective of the policy. WWW Strategy MD Steven Ambrose notes that the published policy document appears well researched, and draws on global leading practice to propose considered and balanced macro outcomes…."Based on the policy document, the main requirements of accessibility and affordability appear to be carefully thought out and eminently achievable by 2019. The highlighting of content development is also a very laudable goal." [102] – July 2010

Although there are numerous comments of concern throughout the discourse, the comments on the draft policy could potentially have been resolved in the final policy document. However comments that are specifically directed towards the final Broadband Policy document, i.e. articles published after July 2010 are significant as they represent a discontent that cannot easily be rectified. Following are examples of some of these issues raised:

- Smit argues that the policy is too vague regarding the role of state-owned enterprises. "I am concerned, however, that the document does not articulate fully the roles of Sentech, SITA and Broadband Infraco. This is very problematic as there is a lot of

confusion about roles, especially that of Sentech," he offers. [102] – July 2010

- Ambrose concurs: "The biggest challenges will be that of actual implementation, as state-owned enterprises, such as Sentech and Infraco, are to be tasked with much of the burden, and historically have performed abysmally in any form of commercially viable national infrastructure projects. The role of the private sector is not fleshed out and appears to be secondary, which will be a major flaw in implementation." [106] – July 2010

- The South African Government has recently released their national broadband policy which aims to provide all citizens with a 256 Kbps connection by 2019. This lackluster goal from Government is falling well behind other similar projects. …South Africa's broadband policy is also light on details and it is unclear how the Department of Communications (DoC) plans to achieve its goals. The lack of defined objectives sets the DoC up for failure as the involved stakeholders are bound to flounder without clear leadership and a way forward. [108] – August 2010

- He adds that a key concern of the national broadband policy is that it sets such a low bar on its definition of universal broadband access. [112] – September 2010

In summary, this section highlighted the parallels between the changing mood of the discourse on both the minister and the policy. Perceptions of the Broadband Policy cannot remain unaffected by this. This follows Habermas in that it highlights the impact and implication of the public discourse (Cukier et al., 2009b). This changing atmosphere from general optimism and hope to the latter predominantly critical statements seems to find reflection in the political power-plays within the DoC itself. This is examined more closely in the following section.

7.5 Custodianship and perceptions about the DoC

To illustrate further how perceptions about the Broadband Policy are formed, this section focuses on the symbioses between the policy and its main custodian, the DoC. The analysis in Section 6.5 revealed that the DoC is the primary contributor to the discourse. Through a brief review of activities at the department and the general resultant turmoil, the argument is that our perception about the Broadband Policy does not stand unaffected by these events. As Gillwald (2010) pointed out, it is necessary to recognize the political dimensions of policy reform and to examine the interaction of the state and the market if we are to understand the general failure of

ICT policy outcomes in Africa. Table 7-1 summarises the events at the DoC under discussion in this section.

Table 7-1: Time-line of key events at the DoC (April 2009 – October 2010)

Date	Event
May 2009	Retired General Siphiwe Nyanda is appointed as communications minister with as deputy minister Ms Dina Pule.
Aug 2009	Ms Mamodupi Mohlala is appointed to the post of Director General (DG) in the DoC.
Oct 2009	The DoC's head of Human Resources (HR), Ms Basani Baloyi is reinstated after an earlier suspension on disciplinary charges.
Nov 2009	Ms Basani Baloyi is suspended again.
July 2010	Minister Nyanda suspends the DG, Mamodupi Mohlala.
Aug 2010	Dr Harold Wesso is appointed acting DG.
Oct 2010	Ms Mohlala leaves the DoC
Oct 2010	Retired General Siphiwe Nyanda is replaced by former deputy communications minister Roy Padayachie and the new deputy minister is Mr. Obed Bapela.

The DoC is no stranger to controversy and upheaval (the late Ivy Matsepe-Casaburri's long drawn out court battle with Altech and her policy of "managed liberalisation" being poignant examples). During the period under review on the discourse about the Broadband Policy (April 2009 to September 2010) the DoC was no less controversial.

The appointment of the former South African National Defence Force chief Siphiwe Nyanda as communications minister in May 2009, replacing the late Ivy Matsepe-Casaburri, came as a surprise to many in the telecommunications industry. At the time many analysts expected Pallo Jordan or the deputy communications minister, Roy Padayachie to be appointed. The appointment of the deputy minister Dina Pule, also came as a surprise. At that stage the DoC had developed a reputation for being dysfunctional (Comninos, 2010, p. 36) and that it had remained out of touch with the sector it was supposed to work with. The department also needed a new DG as the post had been vacant since January 2009. So during early 2009, there was a wide-ranging optimism that the new minister would bring much needed urgency and leadership to the underperforming DoC.

Towards the end of August 2009, Ms Mamodupi Mohlala was appointed to the post of DG. During January 2010, it was reported that the DoC's head of HR, Basani Baloyi, would face a disciplinary committee to account for 26 internal disciplinary charges against her. Baloyi was officially suspended twice during 2009, but

contested the first suspension in the Johannesburg Labour Court and was reinstated in October of 2009. The second suspension went uncontested in November 2009.

The first signs of a rift between minister Nyanda and Ms Mohlala surfaced on the 15th of July 2010 when newspaper reports suggested that Nyanda was about to suspend the DG following ongoing disagreements over tenders she refused to sign. A statement was issued denying these allegations, but on the 23 July 2010 Ms Mohlala was dismissed by Nyanda following an "irreparable breakdown" in their relationship. After a protruded battle about her position, Ms Mohlala finally severed her ties with the DoC towards the end of October 2010.

In the interim, Dr Harold Wesso was appointed acting DG. Shortly after his appointment, Dr Wesso met with members of the Parliamentary Portfolio Committee on Communications on the 11th August 2010. Here he described the department as a “sinking ship” and that “…there is no sense of purpose. A number of senior and competent people are on suspension. This has impacted on productivity.”.

In October 2010, the parliamentary portfolio committee issued their report on the performance of the DoC for the past financial year, and noted:

> The Committee is gravely concerned that for the better part of the current financial year, the Department was in a state of virtual disarray, if not, wholly dysfunctional. This, in part, is characterized by the large number of vacancies, particularly at senior management level; the current low level of spending on operational programmes; the poor staff morale; the financial and corporate governance challenges confronting the Department and public entities such as the SABC and Sentech; and the absence of effective leadership at managerial level. (PMG, 2010)

On 31 October 2010 president Zuma announced changes to the National Executive (Zuma, 2010b), effectively firing Nyanda and appointing former deputy communications minister Roy Padayachie as the new minister to head up the Department of Communications. At the same time a new deputy minister was also appointed.

According to Cukier at al. (2009b, p. 182), following the critical interpretive technique, requires that the discourse is explored in the context of the political situation and the implications of the outcomes to the participants. As this brief glimpse into an 18 month window of “life at the DoC” illustrates, one has to question how any entity can

function with this level of instability and upheaval and with apparent lack of continuity in its leadership structure. As the Broadband Policy is so closely linked and associated with the DoC it is hard not to project the negative sentiments about the department onto the policy.

7.6 The role of state agencies and SOEs

Gillwald (2010, p. 9) alludes to the importance of understanding institutional failure when it comes to ICT policy formulation. As in the two proceeding sections this section explores the contextual political (Cukier et al., 2009b) and institutional arrangements (Gillwald, 2010) that have implications for the Broadband Policy.

Throughout the discourse there are repeated references to not only the DoC being in a state of crisis, but so too the unrest in associated entities, like ICASA, USAASA, Sentech and Infraco. In the same way that the Broadband Policy is linked to the minister and DoC via custodianship, other state entities are mandated in the policy to bring the policy to implementation (see DoC, 2010, p. 18). Just as the activities at the DoC, and the media sentiments about the minister influence the observer's thoughts about the Broadband Policy, so too are they linked to reporting on the intended implementers of the policy. The troubles inflicting ICASA are, for example, highlighted in:

- He added: "ICASA is currently underperforming and is extremely vulnerable to political influence and legal threats from operators. There's still a great deal to be done by ICASA to establish a regulatory framework conducive to the development of new broadband services. [37]

- Nyanda's use of political power during the negotiations with South Africa's cellphone operators on interconnect tariffs was seen as sending out a clear signal that he has lost faith in Icasa's current leadership.
  An insider close to the dispute said that massive changes were expected at Icasa, with Mashile's term due to end in June and the terms of three councillors and the chief executive ending in September this year. [79]

The proposed bill for amendments to the ICASA Act caused a stir in industry and the LINK Centre's submission on the proposed bill summed it up concisely (LINK Centre, 2010):

> There are certainly problems with the legislation governing the broad ICT sector and with the effectiveness of the regulatory institutions governing the sector. But these cannot be resolved by the introduction of what appears to be a hastily conceived and poorly drafted 'proposed' bill, several aspects of which appear to be manifestly unconstitutional, and which deeply undermines the possibility of effective and independent regulation of the sector.
>
> The LINK Centre, therefore, calls upon the Department of Communications and the Minister to institute a formal, structured, consultative stakeholder process to debate and consider the most appropriate policy and legislative interventions to ensure effective, independent regulation of the ICT sector in the future.

The troubles at the USAASA are highlighted by the following examples from the discourse:

- There will soon be clarity on how hundreds of millions of rand in the Universal Service Fund will be spent. The money is meant to be used to facilitate the roll-out of telecommunications infrastructure in underserviced and rural parts of SA, but has remained largely untapped for years. [103]
- …add to this the continued malaise that our universal access agency, USAASA, finds itself in and it is clear that our rural communities cannot look forward to broadband access any time soon. [111]

As far as concerns about Sentech and Infraco, the following examples:

- Earlier this month, government slashed Sentech's budget, as it had failed to spend R500 million allocated for its broadband network project. [67]
- Sentech's one and only consumer broadband product was canned last year, after the company lost millions on the project. [84]
- The biggest challenges will be that of actual implementation, as state-owned enterprises, such as Sentech and Infraco, are to be tasked with much of the burden, and historically have performed abysmally in any form of commercially viable national infrastructure projects. [102]
- Meanwhile, state-owned entity Sentech lost its CEO, Sebiletso Mokone-Matabane, in March. Sentech's chief operations officer Beverly Ngwenya was appointed acting CEO at the embattled state company in April. [104]

Telkom, although not directly affiliated with the DoC still has a substantial shareholding from government, and concerns raised about its operations include the following example:

> In addition, Telkom is still reeling from the loss of CFO Peter Nelson, as well as CEO Reuben September. Nelson will stay on at Telkom until November, but September's

> resignation is immediate. Adding to that loss are 134 Telkom managers, who opted for voluntary early retirement packages.
>
> The resignation at the government parastatals, such as Sentech and Telkom, have a lot to do with ineffective and heavy-handed state interference, and lack of clear policy directives, as well as the flouting of good corporate governance. [104]

In summary, the weakness of ICASA is emphasised and in addition to the political interference, presents key factors influencing the development of broadband policy and provisioning. The ongoing changing of personnel at ICASA, Telkom and Sentech is cause for concern while the USAASA's inability to get to terms with its mandate is also likely to be a substantial hindrance to adequate universal broadband provisioning. As these entities are all strongly associated with the initiatives contained in the Broadband Policy, the negative sentiments are inevitably also projected onto the policy. In the same way that one would associate the policy with the custodians, one would also associate the policy with the implementers. Cukier et al. (2009b) highlights the need for contextualization of the discourse to consolidate understanding, and this section aimed at providing such context to the broadband policy debate.

7.7 The role of Civil Society

Gillwald highlights the important role of civil society in the process of regulation and policy formulation when she contests:

> The imperfect nature of the telecommunications market with its high barriers to entry, the inherent bottlenecks, and the required co-operation among competitors for seamless communications, has made the case for social and economic regulatory intervention indisputable and underpins any policy which has at its heart rights to communication, the consumer welfare, fair competition and mechanism to deal with the market failure associated with the delivery of services to uneconomic areas. (Gillwald, 2009b)

Cukier et al. (2009b, p.177) notes the inclusion of "lobbyists and pressure groups" as members of the *public sphere* and highlights their essential role in the maintenance and evolution of a democratic society. Earlier the withdrawal of Civil Society groups like the SANBF and APC from the discourse was highlighted (recall Section 6.5). To verify if these entities were excluded from the media discourse by choice or had been

marginalised otherwise, their websites or web-portals were visited to see if any prominent commentary was presented there about the final Broadband Policy. It was noticed that most of these websites were not current or functioning despite the fact that many of them seemed to be well positioned and ideally suited to comment on and contribute to the debate about the National Broadband Policy. Most markedly, the SANBF, who through its members was most probably instrumental in focusing the government's attention on the formulation of a broadband strategy or policy, has been inactive. At the time of writing the last update to this site seems to have been in May 2009. Although substantial press coverage was given to this Web site and the partners responsible for its launch, it is surprising that after the government's publication of the Draft and Final Broadband Policy, there has been no ongoing dialog via this Web site or statements of endorsement or rejection.

As one of the main intentions of this Web Site was to gather "signatures" in support of the presented Broadband Strategy it is perhaps instructive to find that only 1778 individuals and 250 organizations had added their names to the broadband framework as per the Web site viewed during November 2010. In May 2009, Steve Song is reported to have stated that the SANBF hoped to have gathered 10,000 individual signatures. At that stage 1228 individual and 171 organizations had signed (Mahlong, 2009). This probably is an indication of the limited influence the site has had on the general public and probably also relates to the lack of "readiness" of prospective signatories to participate in such an online petition.

The APC's Africa ICT Policy Monitor Web site (see Table 5-2) was ideally positioned to include comment or foster debate on the National Broadband Policy, but again the last updates to this site date from March 2009. Although other resources on the APC Web site are of great value, for example the November 2009, updated APC ICT Policy Handbook, the ICT Policy Monitor had been closed down at the time of writing. As statement about the demise of the Africa ICT Policy Monitor on the APC Website states:

> Over the past seven years of its operation, the Africa ICT Policy Monitor became a substantial database of ICTs news, events, and analyses of trends and shifts in policy development. And APC, together with our partners, has made significant inroads into raising the profile of the need for progressive ICT policy approaches in Africa. Countries now see the ICT policy development process as critical to both economic development and the social well-being of its citizens.
>
> Yet the landscape has also shifted with this growing awareness, and the need for a portal like the Africa ICT Policy Monitor that collects and organises news and resources on such a vast array of issues has diminished. Because of this, as well as due to the lack of ongoing funding needed to drive information projects like the

> monitor, the APC policy team has taken the decision to close down the monitor in June.

Another example of a Web site with much promise but little up to date information is that of “southafrica connect” (see Table 5-2). It clearly played an important role in re-igniting the broadband policy initiatives with one of the earliest activities a BLOG post by Willie Currie (Currie, 2008). At the time of writing, the last entry in the BLOG or “recent posts” section for this site was more than a year ago in October 2009.

An obvious question is why these websites “disconnects” are occurring? One explanation could be that there are just too few minds and too few bodies that are spread too thin to cover all bases. It seems to point to the general lack of skilled people to drive and sustain these initiatives. In order to maintain an effective broadband lobby, it is necessary to have a larger core of lobbyists. A second explanation can be found in the statement from APC about the lack of ongoing funding in their decision to close down the Africa ICT Policy Monitor web site. It could also be that people move on to work on different projects - a case in point being the appointment of Willie Currie as a new councillor to ICASA in October 2010. The observer is however left with doubt over why these civil society groupings have disassociated themselves from the media discourse on the Broadband Policy, and inevitably this leads to a negative perception about the Broadband Policy.

7.8 The role of corporate broadband providers

Cukier at al. (2009b, p. 176) note that little critical analysis has focused on how technology companies shape individual and collective decision making. It is therefore important to consider this aspect in the analysis of the Broadband Policy discourse. As noted earlier (Section 6.5), the big local corporate broadband providers have not been engaging with the media on the Broadband Policy. Unlike the situation at the state related entities where a vacuum in leadership may have resulted in the limited engagement, the large corporations are well resourced and have the ability to make their voices heard in the media if they so choose. It therefore seems likely that their lack of endorsement of the Broadband Policy is by choice. This leaves the observer to reflect on why this is the case? Does the private sector not have faith that the Broadband Policy is of value? Again subconsciously this affects the public’s view of the Broadband Policy.

Throughout the discourse there is a concern about the lack of co-ordination between government, regulatory activities and the private sector.

- Africa Business News COO Gary Alfonso suggested that there was a "massive paralysis" in terms of regulatory deliberation, adding that there was a disconnect in the way that regulators were dealing with the issue of convergence. "Regulators need to be much more progressive," he stated, and said that regulatory framework decisions should aim at getting all stakeholders, including: governments; regulators; multinational companies; small and medium-sized enterprises; and consumer groups, around the same table. [21]

Although one would have expected that the process of drafting the Broadband Policy and the associated industry colloquium would have facilitated a means for the different role players to move closer together, the evident lack of participation by private entities in this discourse underlines that this does not seem to have happened. Later items in the discourse are also illustrative of this:

- … the ideal situation will be to try use a public-private partnership model, especially if it's to provide Internet access in underserviced areas. However, the Public Finance Management Act, which governs how state-owned businesses gain funding, has already thwarted one possible partnership for Sentech. [96] – July 2010

- The role of the private sector is not fleshed out and appears to be secondary, which will be a major flaw in implementation. [102] – July 2010

- While the plethora of undersea cables has delivered the theoretical capacity to do the same [provide high speed broadband internet access], our government continues to struggle with the concept of regulating to allow for competition in last mile connectivity. [111] – September 2010

- … independent telecommunications analyst Richard Hurst notes: "The current problem is that everyone has their own plans, there is no concentrated and concerted effort on the part of the country as a whole to drive broadband uptake." [112] – September 2010

Further evidence on the lack of private enterprise involvement centres on consultative forums. Article [40] reports on the inaugural meeting of the "ICT Industry Forum" held during October 2009. It notes that similar earlier initiatives proved frustrating to the private sector in that their proposals were rarely implemented. The regular meetings between the DoC and industry bodies like the South African

Communications Forum and the Computer Society are scheduled to be held quarterly. In May 2010 [89] reports that the ICT Industry Forum has met twice since inception, but searching the DoC Web site for information about this forum or media reports about the activities of the forum proved fruitless.

In summary the concern about uncoordinated efforts remains. The ability of the SOE's to deliver on the Broadband Policy objective is questionable. The ability for SOE's to form public-private partnerships is hampered by current legislation and as such private enterprises will continue to follow their own agendas. True dialog between the private sector and government still seems to be in its infancy. Similarly to the disassociation of the civil society groupings in the public discourse on the Broadband Policy, we also see this disassociation of industry. Once again this puts some negatives questions about the policy in the mind of the observer.

7.9 Policy vs. Strategy

In the discourse there is evidence of some contention between policy and strategy/action. The SANBF advocated a strategy and not a policy. The position of the government is best explained by the then deputy minister of communications, Dina Pule when she explained:

> The Deputy Minister conceded that policies generally had to play catch up to technology development, but emphasised that, "policy is critical because it provides, amongst other things, certainty for players in the market place, protects the rights of consumers, and provides the framework for future developments". [48]

In the discourse examples of the desire to see progress and action include:

- "The message is clear: we have had words and documents coming at us for years; only decisive action, with frameworks, timelines and measurable objectives will convince observers that, this time, it is the real thing." [30] – Arthur Goldstuck

- "What we really need is decisive action with frameworks, timelines and measurable objectives." [37] – Dominic Cull

This tension about the efficacy of Policy intervention is perhaps best summarised in the school of thought that questions the need for more policy. Indeed a notion which is not as farfetched as one may think is perhaps the "No Policy is the Best Policy" approach (Vecchiatto, 2009; Vegter, 2009). Going back to one of the key documents

that re-ignited the drive to focus government's attention to the broadband plight states it well (Currie, 2008):

> There is no need for any grand policies – a coherent national broadband strategy will suffice – and government can concentrate on enabling the emergence of a fully competitive sector to expand affordable broadband access for all citizens.

International best practice seems to suggest that policy is needed, but this clearly needs to be balanced by action. The feeling created about this aspect in the discourse is that the Broadband Policy is "lip service" only and that it "ticks the boxes", but there is no optimism that it will make a real difference to the citizens of the country.

7.10 Summary

This chapter placed the discourse analysis in the context of the political and institutional arrangements of the country. It follows Habermas in focusing on the impact and implications of the discourse (Cukier et al., 2009b). Section 7.1 highlighted confusion about the definition of broadband while Section 7.3 noted the absence of citizens from the discourse. The tendencies in the discourse to favour technological determinism were discussed in Section 7.2. Contrary to the discussions in Sections 7.4, 7.5 and 7.6 were the *association* of the DoC, the former communications minister, state agencies and SOE's created a negative perception around the Broadband Policy, the *disassociation* of Civil Society groups and business as discussed in Sections 7.7 and 7.8 has the same effect. Although the government's rhetoric on the Broadband Policy is of a positive nature, the constant linking of the policy to reporting on negative industrial and political aspects influences the observer's perception of the policy and the ability for the policy to be implemented. In this way the media is shaping our thoughts about the policy.

8 Reflectivity

There is need for critical researchers to be reflective about their research (Howcroft & Trauth, 2004) and therefore this chapter gives consideration to the research process and engages in the tasks of *insight, critique* and *transformative redefinition.* Perhaps the most fundamental choice made by any researcher is the topic of their research and although having a clearly defined objective at the start of the project is of value, the "exploration" of alternative questions and approaches enhances the total experience.

With hind-sight, I believe that I underutilised the functionality provided by the availability of the Computer Assisted Qualitative Data Analysis System (CAQDAS), Nvivo 8 from QSR International as it had the potential to have played a much larger part in organising background material and keeping track of my thoughts as the search for a research topic progressed. In the end the system was only used for the final analysis of the corpus, and although useful in this respect, much better use could have been made of the software's overall capabilities. To some extent the Google Desktop Search Engine provided an adequate substitute. The software indexes documents found on a local computer system and makes finding information from these documents as easy as a normal Google search query. This facility proved to be invaluable when the cross referencing of material was required or finding that "lost" document that contained a certain key reference phrase.

Being an employee of one of the mobile broadband providers put me in the fortunate position to gain access to both mobile and fixed line broadband internet access from home. During the time this research was conducted, ADSL became available to my place of residence. I had mobile broadband available prior to this, but the availability of ADSL with a WiFi network to access the Internet from anywhere in my home made a big change in how I worked and did my research for this project. It provided a glimpse into what it should be like for all citizens to have broadband availability as just another service like electricity or water.

Much of the material gathered for the media corpus was compiled by using the Google Search engine or dedicated search engines at the media source's Website or Web portal. As such, the quality of the results returned, depend on the quality of the indexing and categorization of the search engine. It is conceivable that re-running the

queries again at a later stage could yield other results as search engines technologies at the Web sites may be improved over time. For this reason the corpus list is provided in Appendix B as a point of reference.

One of the main challenges faced during the research process was to find a balance between focusing solely on the media discourse and moving beyond that boundary and engage in the discussions about the merits of the policy itself or the department responsible for the policy. Although as a critical researcher one is encouraged to open new debates, validate findings that are uncovered and ensure that these match with reality, it was difficult to determine where to draw the line. It is also a constant struggle to remain completely objective in analysing the material - one has to constantly question one's own assumptions and motives. I was also acutely aware that being employed by a large telecommunication provider company inherently clouds one's judgement about the industry specially if this company places such a strategic focus on the data portion of its business. As pointed out by Thompson (2005), there is always an aspect of subjectivity when dealing with research of this nature.

A task which I found particularly demanding was gaining insight into the workings of the telecommunications policy arena. With limited time available and the complexities in the domain only becoming apparent as the research progressed, there are inevitably avenues and insights that have not been represented in this analysis although I believe that the overall conclusions are still valid. In some ways this research has not been able to fully explore or explain the integrities of the political and economic plays between the various role-players in the sector. As such the discourse around the Broadband Policy is only a small piece in a big puzzle. Without further research it cannot be categorically stated that similar discourses on for example "spectrum management" or "migration to digital television" would follow a similar pattern.

Although the insights contained in this analysis may be highly focused, in the spirit of *transformative redefinition* the following chapter will put forward key learning points and suggest further research that may add value and begin to facilitate positive change.

9 Conclusions and recommendations

Given the growing international focus on broadband as a platform for future growth and development, the formulation of a South African Broadband Policy during 2009 and the publication of the final policy in 2010 was a worthy topic for examination. This chapter reflects on the findings and summary of the discussion in the previous chapters. It considers the study's validity and reliability, discusses the contribution and closes with a set of recommendations.

9.1 Summary of findings

A concern raised by academia for a number of years is the generally poor outcomes of ICT policies in Africa leading to questions of why the reform paradigm of competition, generally successful elsewhere, has failed in Africa. It is suggested that critical research that takes cognisance of the political dimensions of policy reform and examines the interaction between the state and the market could contribute towards a better understating of these policy failures (Gillwald, 2010). To contribute towards indigenous research that engages in the ICT policy space and aims specifically to understand the interplay between various institutions and the roles they play, particularly in the telecommunications arena, this dissertation examined the South African media reporting on the Broadband Policy formulation process.

The media has the ability to not only influence what we think about, but also how we think about it. In this way media discourse makes a considerable contribution towards socially shaping reality and as such can have an influence on determining public opinion (Chigona & Chigona, 2008, p. 43). If there are distortions in media reporting, it is important that these are highlighted to ensure that a balanced view is presented to all stakeholders. Having a better understanding enables the general public and decision makers to formulate an informed opinion on the costs, need and relevance of broadband access. Making use of both citation analysis and Habermasian CDA, this study set out to answer the following research questions:

- What is the shape and nature of the discourse on "Broadband Policy"?
- What impact might media distortions have on the success of broadband policy?

A summary of the Citation Analysis and CDA are presented in the following two sub-sections.

9.1.1 Citation Analysis

The citation analysis at the general level and then the more detailed analysis at the corpus level revealed that although there is much "activity" in the discourses on "broadband" and "mobile broadband" the quality of discourses on "broadband policy" is somewhat lacking in the South African context and points to a focus on technology rather than politics or policy.

At the general level citation analysis revealed that, like other countries, South Africa is yet to reach its discursive plateau on broadband rhetoric indicating that currently there is no word or phrase that is likely to replace it, like it was the case for "information highway" in the 1990's. Focusing on the more detailed corpus selection and examining the frequency of articles published, revealed that it predominantly followed government related statements and activities. Considering the analysis of background material it became apparent that Broadband had disappeared from government's agenda between November 2006 and March 2009 and that intervention by civil society most probably raised awareness levels again indicating the power of civil engagement.

9.1.2 Critical Discourse Analysis

The CDA revealed that the association and disassociation of various role players in the South African broadband environment has created a negative perception around the Broadband Policy. Although the government's rhetoric on the Broadband Policy is of a positive nature, the constant linking of the policy to reporting on negative industrial and political aspects ultimately influences the perception about the policy and the ability for the policy to be implemented. In this way the media is shaping the observer's thoughts about the policy. Where Cukier et al., (2009c) found that the media hype created around the "information highway" in the North American newspapers during the 1990's has mostly been surpassed by reality, there is a sense that the South African government, via the media, is unable to create this same hype about the potential of Broadband. It could be argued that having only considered media articles about "broadband policy" this might not give a true reflection of media and public perception of broadband benefits, but even so the government fails to make a convincing argument in the media about the importance of broadband and the Broadband Policy and therefore leaves doubt in the mind of the observer on how the policy is going to be implemented and the effects it might have on society.

9.2 Validity and reliability

A CDA by its very nature is a subjective exercise and Thompson (2005) noted that there can never be a definitive analysis of a corpus. As mitigation against this subjective bias, the critical researcher has to acknowledge and be continuously aware of his/her own assumptions and motives and aim to stay completely objective.

To further mitigate against bias interpretation, the method used for the citation analysis was documented and described, and the formula followed to gather the detailed corpus material is fully declared. The list of material that was analyzed is provided, as is access to the full text versions. The analysis method is documented and a reader of this study can thus verify or form their own opinion about the judgments made by this researcher.

9.3 Contribution of the study

This study has contributed to the body of knowledge about the formulation of ICT Policy and Broadband Policy in the context of a developing country. Some contribution was made to unravelling the complexities of the political and regulatory aspects in the South African telecommunications environment, although this is an area where further ongoing research is needed. The study has demonstrated the critical research philosophy by making use of both Citation Analysis and CDA. The *critical intention* of this research was verified by highlighting and questioning a number of aspects and anomalies concerning the South African Broadband Policy debate. In doing this it is hoped that new discourses may emerge to clarify the perceptions found in this study. The *critical topics* covered by this research align with political power and emancipation. Considering the generalizability of this research (Lee & Baskerville, 2003) the theoretical contributions of this dissertation to understanding media involvement in ICT and broadband policy formulation may be of value in other settings or when considering other policy formulation processes.

On a practical note, in the area of Citation Analysis the research experimented with the Google News Archive facility to provide a generally available citation analysis tool for news articles. This proved to be an intuitive system to use and with ongoing refinement of the Google search technologies should be a valuable mechanism for

use in future research. It is important to recognise the strengths and weaknesses of the Google facility, i.e. not all news articles would be indexed, and also not all languages or countries. In many research fields, citation analysis would require the inclusion of scientific literature and in the case of the Google News Archive facility, these sources would be excluded.

9.4 Recommendations

This section contains recommendations related to both institutional arrangements and opportunities for further research.

- This study revealed the importance of inclusivity and civil society's leading role in this respect. In South Africa, a country that strives to be a modern free-thinking society, it is troublesome that the government still has such a tremendous influence over the perceptions and priorities of its citizens. The involvement of civil society in a "bottom up" approach to drive government policy should be the norm rather than the exception.

- Government should direct attention to the strength of state related institutional entities involved in the telecommunications sector and should not underestimate the importance of quality leadership and competencies within these entities. Building public-private partnerships to further broadband deployment should be investigated by the DoC.

- To ensure buy-in from its citizens the Governments of developing countries should fully articulate and explain the benefits that broadband technologies might bring to society. Although it is generally accepted that broadband on its own has little value, the integration of broadband initiatives with other developmental goals are imperative.

- The important role the media has to play in fostering greater understanding of technological advances to its readers is highlighted and therefore media houses should be encouraged to educate their readers about emerging technologies and policy relating to these technologies.

- Further research to gain a better understanding on the position of civil society

organisations like those represented in the SANBF on the Broadband Policy is required. Time and resources did not allow direct interaction with these role players to clarify their interpretation of the current situation. An investigation into the number of individuals (lobbyists), and their areas of special interest in the ICT space could go some way to explain the phenomenon about civil society involvement described in this dissertation.

- Gaining firsthand accounts from state agencies, SOEs and the private sector role-players on their interpretation of the Broadband Policy initiatives may also go some way in substantiating if the trends identified in this dissertation match with reality.

- Comparative studies between South Africa and other developing and developed countries (like the Australian examples in this dissertation) on the role that media plays in the general ICT Policy debate may be of valuable to gain insights into how the citizens of a country may become more active participants in a world dominated by ever increasing technological advances.

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11 References

3GPP. (n.d.). *The Mobile Broadband Standard – Technologies – Keywords*. 3rd Generation Partnership Project (3GPP). Retrieved November 20, 2010 from http://www.3gpp.org/-Keywords-LTE-HSPA-EDGE-etc-

ABC. (2010). *ABC 2nd Quarter Presentation: G Patterson.* Audit Bureau of Circulations of South Africa (ABC). Retrieved August 21, 2010 from http://www.abc.org.za/Manager/ClientFiles/CuteEditor/Images/ABC%20-%202010%20-%20Q%202.ppt

Abrahams, L., Bakker, B. & Bhyat, M. (2007). Municipal Broadband: The 'Next Generation' and the 'Last Mile'. *Southern African Journal of Information and Communication,* 8.

Allen, M. (2006). Broadband technologies and techno–optimism and the hopeful citizen. In J. Weiss, J. Nolan, J. Hunsinger & P. Trifonas (Eds.), *International handbook of virtual learning environments* (pp. 1525–1548). Dordrecht: Springer.

APC. (2009). *The APC ICT Policy Handbook (2nd Edition)*. Association for Progressive Communications (APC). Retrieved October 4, 2010 from http://www.apc.org/en/pubs/books/apc-ict-policy-handbook-second-edition

Avgerou, C. (2008). Information systems in developing countries: A critical research review. *Journal of Information Technology*, 23(3), 133.

BMI-T. (2009a). *South Africa Telecommunications Report Q3 2009*. Business Monitor International – TechKnowledge Group, May 2009.

BMI-T. (2009b). *SA Telecommunications Services Changing Landscape.* Business Monitor International – TechKnowledge Group, January 2009.

BMI-T. (2009c). *International Peer Benchmarking Study on South Africa's ICT Sector. Department of Communication (June 2009)*. Retrieved November 1, 2010 from http://www.pmg.org.za/files/docs/091020telecoms.pdf

BMI-T. (2010). *SA Wireless Access and Broadband Market.* Business Monitor International – TechKnowledge Group, October 2010.

Brown, I., Collins, T., Maleka, B., Morrison, D., Muganda, N. & Speight, H. (2007). Global diffusion of the Internet XI: Internet diffusion and its determinants in South Africa: The first decade of democracy (1994–2004) and beyond, *Communications of the Association for Information Systems,* 19,142–182.

Brown, I., Letsididi, B. & Nazeer, M. (2009). Internet Access in South African Homes: A Preliminary Study on Factors Influencing Consumer Choice, *The Electronic Journal on Information Systems in Developing Countries,* 38(2), 1–13.

Brown, W. & Brown, I. (2008). Next generation ICT policy in South Africa: Towards a human development-based ICT policy, *Social Dimensions Of Information and Communication Technology Policy*, 282/2008, 109-123.

Cerf, V. (2009). The open Internet: what it is, and why it matters. *Telecommunications Journal of Australia*, 59(2), 18.1-18.10.

Chetty, M., Blake, E.H., & McPhie, E. (2006). VoIP deregulation in South Africa: Implications for underserviced areas. *Telecommunications Policy*, 30(5-6), 332-344.

Chigona, A. & Chigona, W. (2008). MXit up in the media: media discourse analysis on a mobile instant messaging system. The *Southern African Journal of Information and Communication*, 9, 42-57.

CIA. (2010). *The World Factbook*. United States of America - Central Intelligence Agency (CIA). Retrieved December 18, 2010 from https://www.cia.gov/library/publications/the-world-factbook/index.html

Comninos, A., Esselaar, S., Alison Gillwald, A., Moyo, M., & Naidoo, K. (2010). *South African ICT Sector Performance Review 2009/2010*. Research ICT Africa. Retrieved November 28, 2010 from http://www.researchictafrica.net/new/images/uploads/SPR20092010/SA_SPR-final-web_Master_13Oct.pdf

Cukier, W., Bauer, R. & Nesselroth, E. (2006). Distortions in the media: A Habermasian approach to analyzing technology macro discourse. *Academy of Management Annual Meeting*. Atlanta, GA.

Cukier, W., Hodson, J. & Ryan, P.M. (2009a). A Critical Discourse Analysis of Amazon.com's Rise in the Media 1995-2008. *World congress on Privacy, Security, Trust and the Management of e-Business*, 25-27 August, 2009, 1-10.

Cukier, W. Middleton, C. & Bauer, R. (2003). The Discourse of Learning Technology in Canada: Understanding Communication Distortions and the Implications for Decision Making. *Global and Organizational Discourse About Information Technology,* 197–221.

Cukier, W., Ngwenyama, O., Bauer, R. & Middleton, C. (2009b). A Critical Analysis of Media Discourse on Information Technology: preliminary results of a proposed method for critical discourse analysis. *Information Systems Journal*, 18(2), 175-196.

Cukier, W., Ryan, P.M. & Fornssler, B. (2009c). The Rhetoric of the "Information Highway" in the Media 1992-2008: Was the Hype Actually Trumped by the Reality? *Science and Technology for Humanity (TIC-STH)*, 2009 IEEE Toronto International Conference, 618-623

Cukier, W., Ryan, P.M. & Hodson, J. (2009d). Hype and reality: The changing discourse of dot-coms in the media 1992-2008. *Special Topics Conference Business Discourse*, University of Southern California.

Currie, W. (2008). *Towards a National Broadband Strategy*. southafrica connect. Retrieved November 8, 2010 from http://www.southafricaconnect.org.za/?p=157

Daily Sun. (n.d.) *Demographic Profile*. Daily Sun. Retrieved November 8, 2010 from http://www.dailysun.co.za/or_demographicProfile.aspx

Delaere, S. (2007). European Policy trends toward flexible spectrum management. *The Southern African Journal of Information and Communication*, 8, 8-29.

DoC. (n.d.). *About the DoC*. Department of Communications (DoC). Retrieved November 28, 2010 from http://www.doc.gov.za/index.php?option=com_content&view=article&id=428&Itemid=505

DoC. (2010). *Broadband Policy for South Africa*. Department of Communications (DoC). Retrieved November 19, 2010 from http://www.info.gov.za/view/DownloadFileAction?id=127922

Firth, L. & Mellor, D. (2005). Broadband: benefits and problems. *Telecommunications Policy*, 29, 223–236.

Gillwald, A. (2005). Good intentions, poor outcomes: Telecommunications reform in South Africa. *Telecommunications Policy*, 29, 469–491.

Gillwald, A. (2007). Between Two Stools: Broadband policy in South Africa. *Southern African Journal of Information and Communication,* 8.

Gillwald, A. (2009a) *Avoiding evidence-based policy: Broadband development in South Africa*. Retrieved September 26, 2010 from http://www.sae.gov.br/bandalarga/wp-content/uploads/2009/11/Gillwald-Broadband-Brazil-151109.ppt

Gillwald, A. (2009b). *M&G/Neotel Breakfast Address*. Retrieved November 27, 2010 from http://www.researchictafrica.net/new/images/uploads/Gillwald%20M&G%20Neotel%20breakfast%20June%202009%20integrated.pdf

Gillwald, A. (2010). The Poverty of ICT Policy, Research, and Practice in Africa. *Information Technologies & International Development*, 6, 79-88. Retrieved December 5, 2010 from http://itidjournal.org/itid/article/viewFile/628/268

Goldstuck, A. (2010). *Internet Access in South Africa 2010 – A Comprehensive Study of the Internet Access Market in South Africa*. World Wide Worx, 2010.

Guardino, M. (2009). *Media Discourse, Public Policy and Democracy: A Preliminary Case Study of the Reagan Tax and Budget Plans of 1981*. Unpublished paper, Syracuse University. Retrieved December 11, 2010 from http://jpm.syr.edu/pdf/fellowpdfs/31_a.pdf

Habermas, J. (1984). *The Theory of Communicative Action*. Boston: Beacon Press

Horrigan, J. (2009). *Home Broadband Adoption 2009*. Pew Internet & American Life Project. Retrieved September 13, 2009, from http://www.pewinternet.org/~/media//Files/Reports/2009/Home-Broadband-Adoption-2009.pdf

Horwitz, R. & Currie, W. (2007). Another instance where privatization trumped liberalization: the politics of telecommunications reform in South Africa – a ten-year retrospective. *Telecommunications Policy*, 31, 445-462.

Howcroft, D. & Trauth, E. M. (2004). The choice of critical information systems research, In B. Kaplan, D. P. Truex, D. Wastell, A.T. Wood-Harper & J. DeGross, *Information Systems Research: Relevant Theory and Informed Practice (IFIP 8.2 Proceedings)* (pp. 196 – 211), Dordrecht: Kluwer.

ICT Empowerment Charter Working Group. (2005). *Draft Black Economic Empowerment Charter for the ICT sector*. Retrieved November 1, 2010 from http://www.ictcharter.org.za/content/ICTbeecharter04may2005-Minister.pdf

Infraco. (n.d.). *Corporate profile*. Retrieved November 29, 2010 from http://www.infraco.co.za/CorpProfile/default.aspx

Independent Communications Authority of South Africa (ICASA) (n.d.) *Frequently Asked Questions*. Retrieved November 28, 2010 from http://www.icasa.org.za/Faq/tabid/82/Default.aspx

International Telecommunications Union (ITU). (2008). *African Telecommunication/ICT Indicators 2008: At a crossroads*. Retrieved November 8, 2010 from http://www.itu.int/ITU-D/ict/publications/africa/2008/index.html

International Telecommunications Union (ITU). (2009). *Measuring the Information Society – The ICT Development Index - 2009*. Retrieved November 8, 2010 from http://www.itu.int/ITU-D/ict/publications/idi/2009/index.html

Jones, C. & McLeod, D. (2010). Padayachie replaces Nyanda. *TechCentral*. Retrieved November 5, 2010 from http://www.techcentral.co.za/padayachie-is-new-communications-minister/18576/

Jones, D. & Scott, M. (2009). *Creating successful broadband policies in developing countries. Research Report*. Analysys Mason.

Katz, R.L. & Avila, J.G. (2010). *The impact of broadband policy on the economy*. Paper presented at the 4th ACORN- REDECOM Conference, Brasilia, May 14-15, 2010. Retrieved December 31, 2010 from http://www.acorn-redecom.org/papers/acornredecom2010katz.pdf

Katz, R.L., Vaterlaus. S., Zenhausern, P & Suter, S. (2010). The impact of broadband on jobs and the German economy. *Intereconomics*, 45(1).

Kelly, T., Mulas, V., Raja, S., Zhen-Wei Qiang, C. & Williams, M. (2009). *What Role Should Government Play in Broadband Development?* infoDev, The World Bank. Retrieved November 5, 2010 from http://www.infodev.org/en/Document.732.pdf

Koutroumpis, A. (2009). The economic impact of broadband on growth: A simultaneous approach. *Telecommunications Policy*, 33, 471-485.

Kim, Y., Kelly, T. & Raja, S. (2010). *Building broadband: Strategies and policies for the developing world*. Global Information and Communication Technologies (GICT) Department, World Bank. Retrieved November 5, 2010 from http://www.infodev.org/en/Document.756.pdf

Langmia, K. (2005). The role of ICT in the economic development of Africa: The case of South Africa. *International Journal of Education and Development using Information and Communication Technology. (IJEDICT)*, 2(4), 144-156. Retrieved November 1, 2010 from http://ijedict.dec.uwi.edu/include/getdoc.php?id=1703&article=200

Lee, A. S. & Baskerville R. L. (2003). Generalizing generalizability in information systems research. *Information Systems Research*, 14(3), 221–243.

LINK Centre. (2010). *Comment by the LINK Centre, University of the Witwatersrand, Johannesburg on the Proposed Independent Communications Authority of South Africa Amendment Bill*. LINK Centre, University of the Witwatersrand, Johannesburg, South Africa. Retrieved November 11, 2010 from http://link.wits.ac.za/news/LINK-2010-ICASA-Bill-Comment.pdf

Madon, S., Reinhard, N., Roode, D. & Walsham, G. (2007). Digital inclusion projects in developing countries: processes of institutionalization. *The Proceedings of the 9th International Conference on Social Implications of Computers in Developing Countries.*

Mahlong, A. (2009). Broadband plans more 'complicated'. *ITWeb*. Retrieved November 2, 2010 from http://www.itweb.co.za/index.php?option=com_content&view=article&id=22704:broadband-plans-more-complicated&catid=147

McQueen, D., Byrne G., Saadi, M. & Maudgalya, N. (2010). *Mobile Broadband Devices: 2nd edition*. Informa Telecoms & Media.

Mekuria, F. (2008). Affordable Mobile Broadband Services: Models & the Way Forward. *W3C Workshop Report: The Role of Mobile Technologies in Fostering Social and Economic Development*. Maputo, Mozambique 1-2 April 2009. Retrieved November 5, 2010 from http://tibor.w3.org/2008/10/MW4D_WS/papers/mekuria.pdf

Mekuria, F. and Rai, I. (2008). Issues in Next Generation Wireless Network Technologies & Services for Developing Regions. *WiNS-DR'08 , September 15, 2008, San Francisco, California, USA.*

Melody, W.H. (2006). Policy implications of the new information Economy. In M. Tool & P. Bush (Eds.), *Institutional Analysis and Economic Policy*. Dordrecht, NL: Kluwer, 411-32 Retrieved December 11, 2010 from http://lirne.net/resources/papers/ToolBook-NIE.pdf

Miller, M. (2008). *Cloud Computing – Web Based Applications that Change the Way You Work and Collaborate Online*. Que.

Moodley, S. (2005). The promise of E-development? A critical assessment of the state ICT for poverty reduction discourse in South Africa. *Perspectives on Global Development and Technology*, 4(1), 1-26.

MTN. (n.d.). *MTN Group*. Retrieved December 11, 2010 from http://www.mtn.co.za/AboutMTN/Pages/MTNGroup.aspx

MTN Business. (n.d.). *About MTN Business*. Retrieved December 19, 2010 from http://www.mtnbusiness.co.za/AboutMTNBusiness/Pages/default.aspx

Mutula, S.M. & Mostert, J. (2010). Challenges and opportunities of e-government in South Africa, *The Electronic Library*, 28(1), 38-53.

Naidoo, R., Kaplan, D., & Fransman, M. (2005). The South African Telecoms Innovation System and the Diffusion of Broadband. *GLOBELICS AFRICA Conference, Tshwane, South Africa. 31 October – 4 November, 2005*. Retrieved November 27, 2010 from http://radian.co.za/docs/BROADBAND_paper_final.doc.pdf

Noam, E. (2009). Why Broadband Internet Should Not Be the Priority for Developing Countries. In W. H. Lehr & L. M. Pupillo (Eds.), *Internet Policy and Economics : Challenges and Perspectives* (pp. 73-78). New York, US. Springer.

Nyanda, S. (2010). Minister of Communications S Nyanda Budget Vote speech - ICT for accelerated service delivery and empowerment! - 20 Apr 2010. Retrieved August 8, 2010 from http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=9573&tid=9590

Obiodu, E. (2009). *Mobile market trends in Africa*. Ovum.

OECD. (2008). *Broadband Growth and Policies in OECD Countries. Organisation for Economic co-operation and development*. OECD Ministerial Meeting on the Future of the Internet Economy, Seoul, Korea, 17-19 June 2008.

OMD. (2010). *South Africa and SADC: Media Facts – 2010*. OMD. Retrieved August 8, 2010 from http://www.omd.co.za/samediafacts2010.pdf

Orlikowski, W.J. & Baroudi, J.J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2(1), 1-28.

OSA. (2009). *About*. Open Spectrum Alliance. Retrieved August 8, 2010 from http://www.openspectrum.org.za

Oyedemi, T. (2009). Social inequalities and the South African ICT access policy agendas. *International Journal of Communication*, 2, 151-168.

Pickot, A. & Wernick, C. (2007). The role of government in broadband access. *Telecommunications Policy*, 31(10-11), 660-674.

PMG. (2010). *Budgetary Review and Recommendation Report of the Portfolio Committee on Communications on the Performance of the Department of Communications for the 2009/10 financial year, dated 20 October 2010*. Parliamentary Monitoring Group. Retrieved November 9, 2010 from http://www.pmg.org.za/node/23899

Ponelis, S.R. & Britz, J.J. (2008). To talk or not to talk? From Telkom to Hellkom: A critical reflection on the current telecommunication policy in South Africa from a social justice perspective. *The International Information & Library Review*, 40(4), 219-225.

Press, L. (2009). Broadband policy: Beyond privatization, competition and independent regulation. *First Monday*, 14(4). Retrieved November 8, 2010 from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2374/2159#author

Qiang, C.Z.-W. (2009). *Broadband infrastructure investment in stimulus packages: relevance for developing countries*. World Bank, Washington, DC.

Quail, C & Larabie, C. (2010). Net Neutrality: Media Discourses and Public Perception. *Global Media Journal – Canadian Edition*, 3(1), 31-50. Retrieved December 11, 2010 from http://www.gmj.uottawa.ca/1001/v3i1_quail%20and%20larabie.pdf

Rashvand , H.F. (2008). WiMAX Cybercity & NGN. *Proceedings of The International Conference on Mobile Technology, Applications & Systems 2008 (Mobility Conference)*, 10-12 September, 2008, Ilan, Taiwan.

Richardson, H. & Robinson, B. (2007). The mysterious case of the missing paradigm: a review of critical information systems research 1991-2001. *Information Systems Journal*, 17, 251-270.

Roberts, M., Mavrakis, D. & Jesty, R. (2009). *Future Mobile Broadband: HSPA & EV-DO to LTE Networks, Devices & Services. 3'rd Edition*. Informa Telecoms & Media.

Roode, D., Speight, H., Pollock, M. & Webber, R. (2004). It's Not The Digital Divide – It's The Socio-Techno Divide! *Presentation to the 12th European Conference on Information Systems*, 14th June 2004, Turku.

SAJIC. (2007). *The Southern African Journal of Information and Communication. Issue No. 8*. Retrieved December 19, 2010 from http://www.sajic.org.za/index.php/SAJIC/issue/view/32

Sentech. (nd). *Sentech – About Us*. Sentech. Retrieved November 26, 2010 from http://www.sentech.co.za/about

Song, S. (2009). *Opening Spectrum in South Africa*. Retrieved September 13, 2009, from http://www.shuttleworthfoundation.org/our-work/blogs/opening-spectrum-south-africa

Song, S. (2010). *African Undersea Cables (2011)*. Retrieved November 20, 2010 from http://manypossibilities.net/african-undersea-cables/

Srivastava, A. (2008). Broadband for Health in Developing Countries. In Y.K. Dwivedi, A. Papazafeiropoulou & J. Choudrie (Eds.), *Handbook of Research on Global Diffusion of Broadband Data Transmission*. (pp. 581-592). IGI Global.

Stahl, B.C. (2004). Whose Discourse? A Comparison of the Foucauldian and Habermasian Concepts of Discourse in Critical IS Research, *Proceedings of the Tenth America's Conference on Information Systems*, August 2004.

Stahl, B.C., McBride, N. & Elbeltagi, I. (2005). Combining Postmodernism and Critical Theory in the Study of IS in the Middle East – Some Methodological Considerations, *4th International Critical Management Studies Conference*, Cambridge, UK, July 2005.

Stahl, B. C. (2008a). Empowerment through ICT: A critical discourse analysis of the Egyptian ICT policy. *Social Dimensions Of Information And Communication Technology Policy, Proceedings of the Eighth International Conference on Human Choice and Computers (HCC8),* IFIP TC 9, Pretoria, South Africa, September 25-26, 2008.

Stahl, B. C. (2008b). The ethical nature of critical research in information systems. *Information Systems Journal, Special Issue on Exploring the Critical Agenda in IS Research, edited by Carole Brooke, Dubravka Cecez-Kecmanovic, Heinz K. Klein*, 137-163.

Statistics South Africa. (2010). *Mid-year population estimates – 2010*. Statistics South Africa. Retrieved November 5, 2010 from http://www.statssa.gov.za/publications/P0302/P03022010.pdf

Telkom. (n.d.). *Products and services – DSL*. Telkom. Retrieved December 18, 2010 from http://www.telkom.co.za/products_services/dsl/index.html

The Broadband Commission. (2010a). *A 2010 Leadership Imperative: The future built on broadband*. The Broadband Commission for Digital Development. Retrieved November 19, 2010 from http://www.broadbandcommission.org/report1.pdf

The Broadband Commission. (2010b). *Broadband: A platform for progress*. The Broadband Commission for Digital Development. Retrieved November 19, 2010 from http://www.broadbandcommission.org/report2.pdf

The Broadband Forum. (n.d.). *Call for a Comprehensive National Broadband Strategy for South Africa*. The Broadband Forum. Retrieved May 2, 2010 from http://www.broadband4africa.org.za

Turner, G.K. (2008). A comparative analysis of the coverage of science news in Cape Town newspapers. *Unpublished MPhil (Journalism) dissertation, Stellenbosch University*. Retrieved December 5, 2010 from https://scholar.sun.ac.za/bitstream/handle/10019.1/1761/Turner,%20GK.pdf?sequence=1

UNCTAD. (2009). *Information Economy Report 2009: Trends and Outlook in Turbulent Times*. United Nations Conference on Trade and Development (UNCTAD), Switzerland

USAASA. (n.d.). *Strategic Overview*. Universal Service and Access Agency of South Africa (USAASA). Retrieved November, 28, 2010 from http://www.usaasa.org.za/?q=con,11,Strategic Overview

Van den Broeck, W. & Lievens, B. (2007) Why Broadband? The meaning of broadband for residential users. *South African journal of information and communication*, 8, 30-52.

Van der Berg, S. (2007). Apartheid's Enduring Legacy: Inequalities in Education. *Journal of African Economics*, 16 (5), 849-880.

Van Dijk, J. & Hacker, K. (2003). The Digital Divide as a Complex and Dynamic Phenomenon. *The Information Society*, 19(4), 315-326.

Van Gorp, A.F. & Morris, C. (2008). Serving under-serviced areas in South Africa: the potential for Wi-Fi community network deployment and the role of regulation. *Info: The Journal of Policy, Regulation and Strategy for Telecommunications, Information and Media*. 10(1), 65-78.

Van Rooyen, C. (2002). *A report on science and technology coverage in the SA print media*. South African Agency for Science and Technology Advancement (SAASTA). Retrieved December 5, 2010 from http://www.saasta.ac.za/scicom/pdfs/setcoverage_printmedia.pdf

Vecchiatto, P. (2009). Govt, regulation irrelevant in telecoms. *ITWeb*. Retrieved November 7, 2010 from http://www.itweb.co.za/sections/telecoms/2009/0904151150.asp?S=Legal%20View&A=LEG&O=FRGN

Vegter, I. (2009). No policy is the best policy. *ITWeb*. Retrieved November 8, 2010 from http://www.itweb.co.za/index.php?option=com_content&view=article&id=20788:no-policy-is-the-best-policy

Vicente, M. & Gil-de-Bernabé, F. (2010). Assessing the broadband gap: From the penetration divide to the quality divide. *Technological Forecasting and Social Change*, 77(5), 816-822.

Vodacom. (n.d.). *Strategy for Growth*. Vodacom. Retrieved December 11, 2010 from http://www.vodacom.com/strategies_for_growth.php

Vodacom Business. (n.d.) *About Us*. Vodacom Business. Retrieved December 11, 2010 from http://www.vodacombusiness.co.za/web/vodacombusiness/vb_about_us?URLId=100499&URLId=100347

Vosloo, S. (2008). *A Habermasian-based Critical Discourse Analysis of the ICT Strategies of the Centre for e-Innovation, Provincial Government of the Western Cape*. Unpublished Masters Dissertation, University of Cape Town, South Africa.

Walsham G. (2006). Doing interpretive research. *European Journal of Information Systems,* 15, 320-330.

WCIS. (2009). *Survival of the fittest: facing the challenge of brutal competition*. World Cellular Information Service (WCIS), presentation to Vodacom in June 2009.

Williams, M. (2008). *Broadband for Africa – Policy for promoting the development of backbone networks*. infoDev, The World Bank. Retrieved November 8, 2010 from http://www.infodev.org/en/Publication.526.html

Willson, P., Marshall, P., Young, J. & McCann, J. (2009). Evaluating the Economic and Social Impact of the National Broadband Network. *20th Australasian Conference on Information Systems*, 2-4 Dec 2009, Melbourne, Australia

Wilson, M. (2002). Understanding the International ICT and Development Discourse: Assumptions and implications. *South African journal of information and communication.* 3(0)

World Bank. (2009). *Information and Communications for Development 2009: Extending Reach and Increasing Impact*. The World Bank. Retrieved May17, 2010 from http://go.worldbank.org/55ZNQF16N0

Zuma, J.G. (2009). State of the Nation Address by His Excellency JG Zuma, President of the Republic of South Africa, Joint Sitting of Parliament, Cape Town - 3 June 2009. Retrieved September 12, 2009, from http://www.info.gov.za/speeches/2009/09060310551001.htm

Zuma, J.G. (2010a). State of the Nation Address by His Excellency JG Zuma, President of the Republic of South Africa, Joint Sitting of Parliament, Cape Town - 11 February 2010. Retrieved August 8, 2010, from http://www.info.gov.za/speeches/2010/10021119051001.htm

Zuma, J.G. (2010b). President Zuma announces changes to the National Executive. Retrieved November 6, 2010, from http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=14170&tid=23540

12 Appendix A – Guiding Questions for CDA

The Guiding Questions for a Critical Discourse Analysis as presented by Cukier et al. (2003) and subsequently used by Stahl et al. (2005), Cukier et al. (2009b), Vosloo (2008).

(C) Clarity/Comprehensibility

C1. Is there use of jargon?

C2. Are the terms that are not explained?

C3. Is there evidence of obfuscation?

(T) Truth: Argumentation and evidence

T1. What is said about the Broadband Policy?

T2. Are the issues and options clearly defines?

T3. What costs and benefits have been identified and assessed?

T4. What evidence has been provided to supports these arguments?

T5. Has the relevant information been communicated without distortion or omission (frequency of occurrences are of value here)?

T6. Are there ideological claims which are unexamined?

(S) Sincerity: Metaphor and Descriptions

S1. Do metaphors and connotative words promote or suppress understanding?

S2. Do metaphors and connotative words create false assurances?

(L) Legitimacy: Whose Interests?

L1.Who is speaking, who is silent, and what are their interests?

L2. What is privileged? What is not said about Broadband Policy?

L3. What is assumed or implied?

L4. What is missing or suppressed in the discourse?

L5. How are the decisions legitimized?

L6.Who is involved? Who is not involved?

L7. What are the stakes and interests involved or excluded?

13 Appendix B – Media Corpus

The Media Corpus indicating the Source Code and sorted by publication date. Items in red indicate duplicate items in the corpus. Key events are inserted in blue. A file containing the full text copy of all the items in the corpus is available for download at: http://dl.dropbox.com/u/14843141/Broadband-Policy-Media-Corpus.zip

Item #	Source	Date	Article Title
1	ITWeb	08-Apr-09	Broadband input welcome
2	MyBB	19-Apr-09	Broadband on agenda for new government
3	EN	21-Apr-09	New govt should take fresh look at broadband policy framework
4	ITWeb	21-Apr-09	Broadband ideas for new minister
5	ITWeb	14-May-09	Broadband plans more complicated
6	ITWeb	12-Jun-09	Parliament sees DoCs woes
7	MyBB	12-Jun-09	National broadband policy a top DoC priority
8	MYBB	19-Jun-09	Most South Koreans have broadband
		23-Jun-09	**Minister Nyanda delivers DoC 2009/2010 budget vote speech**
9	EN	23-Jun-09	SAs set top box manufacturing strategy advanced
10	News24	23-Jun-09	Cheap internet for rural areas
11	BD	24-Jun-09	New law to ensure SABC is not left to mercy of markets
12	ITWeb	24-Jun-09	Nyanda covers familiar territory
13	MG	24-Jun-09	Govt to ensure that broadband reaches rural areas
14	ITWeb	25-Jun-09	Nyanda waves regulatory big stick
15	ITWeb	26-Jun-09	Broadband forum hails minister's speech
16	MyBB	20-Jul-09	Broadband initiative now in Minister's Hands
17	ITWeb	04-Aug-09	Conference brings broadband insights
18	ITWeb	20-Aug-09	Strict govt timelines for ICT projects
19	EN	31-Aug-09	SA to release broadband policy soon - Minister
20	MyBB	01-Sep-09	Website launched for your Broadband Policy Comments
21	PolNews	01-Sep-09	SA to release broadband policy soon
22	MyBB	02-Sep-09	Communications Minister has big broadband plans
23	MyBB	07-Sep-09	National broadband policy under the spotlight
24	ITWeb	11-Sep-09	Govt to exit retail broadband
25	TC	13-Sep-09	Sentech vows to hold on to valuable spectrum
26	ITWeb	15-Sep-09	State intervention urged for telecoms
		18-Sep-09	**DoC publishes draft Broadband Policy**
27	MyBB	23-Sep-09	Broadband Policy - Your input needed
28	ServPub	25-Sep-09	Government ICT to accelerate
29	MyBB	28-Sep-09	What is affordable broadband
30	MyBB	30-Sep-09	Affordable Broadband for all
31	MG	01-Oct-09	Giving perspective to pieces of SA digital puzzle
32	MyBB	02-Oct-09	SA Broadband - Exactly how bad is it
33	ITWeb	05-Oct-09	SA performs poorly on broadband
34	MyBB	05-Oct-09	Broadband pricing targets - Success is assured
35	MyBB	05-Oct-09	The DoC's price reduction plan
36	BD	09-Oct-09	Room for improvement
37	ITWeb	13-Oct-09	Broadband requires policy push
38	ITWeb	14-Oct-09	Africas broadband redefined

39	MyBB	15-Oct-09	100 Mbps broadband connection to become legal right
40	BD	26-Oct-09	Nyanda holds first quarterly meeting with ICT companies
41	EN	30-Oct-09	Africa urged to pay more attention to broadband access
42	MyBB	10-Nov-09	National Colloquium on Broadband Policy
43	TC	10-Nov-09	DoC to host industry colloquium on broadband next week
44	TC	11-Nov-09	Submissions pour in ahead of broadband confab
45	MyBB	16-Nov-09	Broadband policy colloquium agenda released
46	MyBB	17-Nov-09	What is broadband
47	TC	17-Nov-09	Why DoC confab could deliver
		18-Nov-09	**Day1 - DoC colloquium on draft Broadband Policy**
48	EN	18-Nov-09	Govt sees tremendous potential for broadband growth
49	ITWeb	18-Nov-09	Govt sticks to ICT deadlines
50	MyBB	18-Nov-09	How to improve broadband
		19-Nov-09	**Day2 - DoC colloquium on draft Broadband Policy**
51	Fin24	19-Nov-09	SA broadband far below average
52	ITWeb	19-Nov-09	Eruptions over broadband definition
53	MG	19-Nov-09	Nyanda decries broadband penetration in SA
54	TL	19-Nov-09	SA broadband woefully below par
55	BD	20-Nov-09	Military signals
56	FM	20-Nov-09	Military signals
57	iAfrica	20-Nov-09	SA broadband not broad
58	ITWeb	20-Nov-09	SOEs given purpose
59	TL	22-Nov-09	Good news for local Internet customers
60	MyBB	25-Nov-09	Telecoms - The year that was
61	MyBB	29-Nov-09	SA broadband penetration poor - Minister
62	ITWeb	07-Dec-09	ICT development lags
63	TC	18-Dec-09	TechCentrals ICT Newsmakers of the Year
64	ITWeb	28-Jan-10	Sentech defends cable involvement
65	ITWeb	12-Feb-10	Broadband puts ICT on political map
66	ITWeb	19-Feb-10	Gauteng ICT suffers funding shortage
67	ITWeb	26-Feb-10	SA, DoC - walk the walk
68	ITWeb	02-Mar-10	DoC speeds up policies
		11-Mar-10	**Announcement that Cabinet is to finalize Broadband Policy**
69	Fin24	11-Mar-10	Govt to finalise broadband policy
70	ITWeb	11-Mar-10	Broadband policy delayed
71	MyBB	11-Mar-10	SA Broadband policy finalised
72	News24	11-Mar-10	SA broadband policy soon
73	PolNews	11-Mar-10	Committee to finalise national broadband policy
74	TC	11-Mar-10	Government moves ahead on broadband, spectrum policies
75	TL	11-Mar-10	Broadband policy finalised
76	Citiz	11-Mar-10	Ministerial committee to finalise broadband policy
77	BD	12-Mar-10	Icasa opens discussion on internet TV
78	ITWeb	15-Mar-10	US readies broadband policy
79	MG	22-Mar-10	SA communication breakdown
		20-Apr-10	**DoC in Budget Speech announces Broadband Policy is finalized**
80	Fin24	20-Apr-10	Broadband for all by 2019
81	MyBB	20-Apr-10	Nyanda wants lower retail prices
82	MyBB	20-Apr-10	Universal access to broadband by 2019
83	TC	20-Apr-10	Universal broadband by 2019
84	ITWeb	21-Apr-10	Sentech faces shake-up
85	Citiz	21-Apr-10	Universal broadband by 2019: Nyanda
86	iAfrica	22-Apr-10	SA internet vision

87	TL	13-May-10	FCC tries to calm cable on web
88	ITWeb	14-May-10	DoC hails broadband price war
89	ServPub	27-May-10	State of the ICT industry
90	Fin24	15-Jun-10	Cabinet approves broadband policy
91	News24	15-Jun-10	Nod for broadband policy
92	MyBB	16-Jun-10	Broadband policy approved by Cabinet
93	ITWeb	17-Jun-10	Broadband for all a step closer
94	TC	24-Jun-10	Government defines broadband as 256kbit
95	TC	01-Jul-10	Sentech in limbo
96	MyBB	02-Jul-10	1 Mbps now a legal right
		13-Jul-10	**Final Broadband Policy is published**
97	MyBB	14-Jul-10	Broadband for all in SA by 2019
98	BD	15-Jul-10	Nyanda in new storm over state tenders
99	ITWeb	15-Jul-10	MTNs BEE deal to help get spectrum
100	MyBB	15-Jul-10	Communications Minister in tender scandal
101	TL	15-Jul-10	Nyanda sets broadband targets for 2019
102	ITWeb	16-Jul-10	Broadband for all not likely
103	TC	20-Jul-10	Clarity soon on R1bn telecoms fund
104	ITWeb	23-Jul-10	Who will lead SAs telecoms
105	MyBB	27-Jul-10	What is broadband
106	MyBB	28-Jul-10	Broadband for All in South Africa
107	MyBB	10-Aug-10	Vodacom 3G-HSDPA not broadband - ASA
108	MyBB	20-Aug-10	2 Mbps connections for everyone by 2012
109	MyBB	27-Aug-10	Digital TV - Connecting the unconnected
110	ITWeb	31-Aug-10	MTN unveils public share offering
111	iAfrica	20-Sep-10	A Wallaby business lesson
112	ITWeb	22-Sep-10	ITU broadband vision - a challenge

14 Appendix C – The Millennium Development Goals

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

15 Appendix D – Key events in SA Telecommunications Transformation

This Appendix summarises some of the major events that significantly transformed the regulatory regime for the telecommunications sector in South Africa according to BMI-T (2008), BMI-T (2009c) and Gillwald (2009).

Year	Event
1991	The corporatisation of Telkom.
1992	The licensing of two mobile operators, Vodacom and MTN.
1994	The first democratic elections.
1995	The White Paper on Telecommunications (facilities vs. service based competition).
1996	The enactment of the Telecommunications Act of 1996. (This provided for the establishment of a regulator and created conditions for privatisation of the original incumbent. It provided for further mobile liberalisation, liberalised the ISP/VANS market although they were still restricted to use Telkom facilities.)
1997	The sale of a 30% shareholding in Telkom to Thintana.
2000	The ICASA Act of 2000 creating a joint telecom and broadcasting regulator.
2001	The Telecommunications Amendment Act of 2001 making provision for the licensing of a Second Network Operator and introducing the feasibility of further mobile competition – a 4th mobile operator.
2001	The issuing of a third mobile licence in.
2001	The merging of the separate broadcasting and telecommunications regulatory authorities to form ICASA.
2002	The issuing of a Multimedia Services Licence and Carrier of Carriers License to Sentech Limited.
2002	Electronic Communications & Transaction Act.
2003	The public listing of Telkom SA on the Johannesburg Stock Exchange (JSE).
2004	The licensing of the Second Network Operator.
2005	The Electronic Communications Act (ECA) of 2005 provides a legal framework for the convergence of communications technologies in South Africa.The coming into effect in 2005 of a ministerial determination expanding commercial opportunities available to several types of market participants, notably VANS providers permitted to offer voice telephony services.
2005	The 2005 declaration of submarine cable landing stations as essential facilities.
2006	In May the then Minister of Communications Dr Ivy Matsepe-Casaburri established the Local Loop Unbundling Committee chaired by Professor Tshilidzi Marwala to expedite the local loop unbundling process for completion by 2011.
2006	The ICASA Amendment Act of 2006 enables the independent regulation of the ICT sector in South Africa.
2007	The Broadband Infraco Act 33 of 2007 (The state owned broadband company. Infraco only received its licensed in October 2009.).
2007	In December the Local Loop unbundling (LLB) committee's report was delivered and the

	recommendations provided for three models namely, full unbundling, line sharing and bit-stream access.
2008	Since January 2008 ICASA has developed a framework and setup various sub-committees to implement the recommendations of the LLB report.
2008	The Broadcasting Digital Migration Policy (8 September 2008) facilitates the freeing up of radio frequency spectrum through the digital migration process. The migration of analogue to digital TV will release spectrum in the 470 – 862 Mhz band. This so called "digital dividend" has the potential to not only improve broadcasting services such as traditional radio and TV but also enable additional ICT services, specifically wireless broadband (Hartley, 2009).
2009	The Draft National Spectrum Policy (18 September 2009)