

Provincial
Telecommunications
Infrastructure Position
Paper

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A Cape Catalyst Project:

Department of Economic Development & Tourism
Provincial Government Western Cape





CONTENTS

Purpose of this report	3
Introduction	4
The need for Government intervention	9
Broadband.....	14
Definition	14
Broadband technologies	15
Global Broadband context	17
South Africa’s telecommunications environment	20
Overview	20
High cost of telecommunications	23
Ranking/ Indices.....	27
Declining competitiveness and the Networked Readiness Index (NRI).....	27
Networked Readiness Framework.....	28
NRI Data and analysis.....	28
The need for provincial government intervention	33
Accelerating Broadband Deployment and use within the Western Cape	36
Types of intervention available to governments	37
Key areas of intervention for South Africa and the Western Cape	39
Supply-side promotion policies.....	39
Demand-side promotion policies.....	43
Telecommunications Mobilisation Plan for the Province	47
Components of the mobilisation plan	47
Implementation of the plan.....	48
Related Reports.....	51
Sources and References.....	52



Purpose of this report

The Western Cape economy is moving from one based principally around the production and distribution of physical goods to one driven primarily by the production and application of knowledge. As such, the Western Cape is currently characterised by many initiatives in the ICT/ Knowledge economy space. In many of these initiatives, the presence of a well functioning, robust and accessible telecommunications infrastructure is a prerequisite. However, at present, there does not appear to be a coherent response or framework for the development of a telecommunications infrastructure in the Western Cape that would support and enable these initiatives.

This report aims to illustrate the importance of this telecommunications infrastructure in achieving the objectives of the province and argue for why it is important to have government intervention in this space.

International and local experience indicates that government intervention has to deal with both supply side and demand side issues. Indeed, for regional and local governments, demand side issues offer far greater opportunities for intervention.

This report therefore argues that:

- The development of a robust and affordable high speed telecommunications infrastructure (also known as broadband) must be recognised as a priority initiative for PGWC intervention. These interventions must consider the entire telecommunications ecosystem (networks, services, applications, and users).
- The role of the PGWC as a driver for the development of this infrastructure must be recognised. The way that PGWC uses ICT has to radically change from being a passive recipient of what the current market and players have to offer to being a driver (pump) for the creation of a new telecommunications landscape in the Western Cape.
- A provincial broadband vision and strategy should be developed in consultation with the entire range of stakeholders— provincial, national and local government, the wider public sector (SOEs and agencies), private investors and the public.



- A Provincial Broadband task team/ project should be set up to drive the creation of this strategy, co-ordinate existing activities and initiatives and implement identified priority activities. This task team/ project should consist of representatives of all provincial departments and should be co-ordinated by the provincial Department of Economic Development and Tourism (DEAT).

Introduction

The Western Cape economy is moving from one based principally around the production and distribution of physical goods to one driven primarily by the production and application of knowledge. The Information Age has dawned. There is increasing recognition within the Government that information and knowledge have now become a core aspect of the socio-economic development of the country. The dramatic developments in the field of information and communication technologies (ICT's) are at the heart of this transition. What is evolving is a fundamental change in how business is conducted, and how services (including government, health and education services) can be provided. We are experiencing a transformation in our daily living and working conditions.

Nine years ago, in 2001, the Provincial Government of the Western Cape produced a white paper on "Preparing the Western Cape for the Knowledge Economy of the 21st Century". This white paper recognised the enormous significance of developments in ICT's and set out a vision and strategic framework for ensuring that the Western Cape is well prepared for the global knowledge economy of the 21st Century. In this document, we will interchangeably refer to the "information society" and "knowledge economy" to refer to a society/ economy in which the creation, distribution, diffusion, use, integration and manipulation of information and knowledge is a significant economic, political, and cultural activity.

In 2005, the Micro-Economic Development Strategy (MEDS) for the Western Cape selected the following as priority flagship sectors:

- Call Centres, Business Process Outsourcing
- Tourism



- ICT
- Oil and Gas Services
- SMEs.

These sectors all have very considerable potential for output and employment growth and for the entry of new businesses. The Informal Economy and the Creative Industries was added later – based on additional MEDS research.

The policy documents and research are clearly indicating that the creation and nurturing of a knowledge-based society is essential to maintaining and enhancing the Western Cape's international competitiveness. A key factor contributing to the unprecedented economic growth in knowledge-intensive countries and regions in recent years has been the provision of competitive and high-quality infrastructure and services. Grasping the opportunities afforded by the Information Age has to be at the heart of the province's industrial strategy. The readiness to adopt new technologies, an innovative capacity and first class infrastructure and services are essential if the province is to attract and retain inward investment and talent, stimulate job creation and ensure a fully inclusive society.

In highly competitive regions in the global environment, high speed access to the internet for businesses and residents is available almost anywhere and at any time – providing the ideal enabling environment for the growth within commerce, industries, SMMEs and entrepreneurship, stimulating innovation and the enablement of the growth of other economic sectors by communication technologies. The most connected city in the world (in terms of broadband) is Seoul in South Korea – with almost universal broadband access for its 3, 3 million households. Recent studies indicate that five of the most connected cities are in Asia, Europe and Silicon Valley. All of these cities have had remarkable success in providing almost complete connectivity throughout their boundaries.

Comparatively, even basic internet penetration in South Africa lags behind countries with a similar level of development, such as the Czech Republic, Poland, Hungary and Turkey. The latest World Wide Worx survey "Internet Access in South Africa 2010" indicates that South Africa is experiencing its most dramatic Internet usage growth ever. Increase in the number of internet users in South Africa was relatively



stagnant between 2002 and 2007, when it did not develop above 7%. However, this rate nearly doubled in 2008, and stayed the same in 2009. It is estimated that South Africa currently has approximately 5.3 million Internet users.

However, even as South Africa is experiencing its most dramatic Internet usage growth ever, it is falling behind other countries in Africa. From being the front-runner in terms of technology, South Africa now boasts only the fourth biggest Internet-connected population on the continent, and ranks tenth in terms of Internet penetration. Countries like Mauritius, Morocco, Nigeria and Egypt are all racing ahead of South Africa in the Internet stakes.

Within the ambit of regional economic development, government must focus their attention on creating the optimal enabling environment for business, commerce, citizens and consumers to attain the common social and economic development goals and strategies of growing and transforming the province along the vision and mandate as enshrined in the Provincial Growth and Development Summit strategy.

One persistent obstacle to achieving these developmental goals is the affordability and quality of telecommunications costs, with the high cost and poor quality of telecommunication costs (broadband) cited by most firms as the biggest business constraint to the growth and development in the local and regional economy.

This sentiment is even more keenly felt within the economic sectors which tend to be more knowledge intensive, technology driven and service-oriented in nature. This includes the priority sectors of Information and Communication Technologies (ICT), Business Process Outsourcing (including call centres) and the Film and Creative industries; each of which relies on cheap, accessible and high speed internet connectivity to stimulate and enhance their competitive advantages.

The importance of telecommunications costs to the BPO sector, (identified as a high priority economic sector prioritised by national and provincial government for its ability to contribute to employment – led growth), is illustrated by the following conclusion by a recent industry survey of firms: “The cost of telecoms, both international and domestic, has consistently been ranked as a major barrier to business growth. The commitment to deregulation that has been expressed at many levels of government is proving slow to translate into meaningful price reductions.”



In recent months, several potential multi-national foreign investors interested in outsourcing their BPO operations to the WC have decided against the investment, citing high rates of telecommunications as one of the factors that counted against South Africa. Telecommunications costs in South Africa, particularly voice costs, are still estimated to be three to four times more expensive than other offshore locations such as India and the Philippines. Telecommunications cost and quality is therefore a detriment to attracting new business to the Province, providing a need for government intervention and assistance.

From a local government or municipal perspective, headway in this regard has already been made. This can be seen in the initiatives by the Knysna municipality in which it installed its own municipal wireless network. This network was built largely for creating effective and efficient municipal service delivery and wirelessly connects about 64 municipal buildings, libraries and schools. The Knysna project was unprecedented in nature and made headlines in that it defied the objections of Telkom (until recently, the monopolistic telecommunications provider), and with the statutory entitlement under the Electronic Communications Act (2006), implemented and installed its own municipal-wide wireless network. Knysna is the first completely digital town across the whole of Africa.

Another local government example is found in the City of Cape Town's (CoCT) project. In 2008, the City of Cape Town announced its intention to build its own municipal broadband infrastructure network, laying approximately 360km of optic fibre cables linking all its main municipal buildings and being used to carry all of the CoCT's voice and data traffic.

Preceding this decision, the City commissioned "The Economic Impact of a Metropolitan Broadband Network for the City of Cape Town" to explore and identify, among other issues, international experiences and models in implementing city-wide broadband networks and the potential economic impact thereof.

In terms of the potential economic impact of the City's broadband rollout, the chief conclusions reached were that the proposed project would result in two significant macro-economic benefits, viz. contribution to GDP and creation of jobs. In terms of the GDP (or gross domestic product) it was estimated that Cape Town's economy



will have grown by 2.26% by 2016 and at 4.59% by 2026. Similarly, increases will be felt in the numbers of direct and indirect jobs created; and an anticipated 252 000 jobs could be created by 2027. The majority of the indirect job creation will be as a result of the structural changes to the City's economy, primarily as a result of the cost savings, especially lowered telecoms input costs which positively affect productivity gains that would make Cape Town's businesses and industries more competitive.

While both of these municipal telecommunications projects are pioneering and innovative in their own right, it must be recognised that these initiatives stemmed from the municipalities' local economic development plans and strategies and as such, the projects remain geographically bound to the boundaries of the individual municipality. Secondly, both of these initiatives largely focus on using telecommunications infrastructure for the purposes of ensuring efficient and effective municipal service delivery, e-government and e-citizenship, which is limited in its own right since it does not deal with the economic benefits of cheaper telecoms for the purpose of economic development for business and society at large.

While some mention has been made of the CoCT's open access municipal model of "selling" spare capacity on its optic fibre network to businesses, this still needs to be comprehensively investigated with proposals formulated from interested partners and stakeholders.

At the heart of the challenge with public sector support for a telecommunications environment is that there exists a policy and strategic vacuum to guide public sector support of harnessing telecommunications infrastructure initiatives in support of the economic development and enhanced competitiveness of our industries and sectors. It is for this reason that a group of industry stakeholders convened and instituted the SA National Broadband Forum (SANBF). This is an industry lobby group which lobbies government to address the lack of a coherent policy and strategic framework on the development and harnessing of broadband and telecoms infrastructure solutions for the purposes of increasing economic development prospects. In the absence of government leadership in this arena, the SANBF has compiled and released its National Broadband Strategy document for public discussion.



Business and industries across the Western Cape rely on and can benefit enormously from existing and future telecommunications infrastructure initiatives. As a result, the provincial Department of Economic Development and Tourism (DEDT), together with the other stakeholders, has to play a critical role to ensure that affordable high speed internet connectivity is provided as an enabling factor to stimulate industry growth and economic development for the thousands of businesses across our province.

The need for Government intervention

A prerequisite for developing the information society is that government recognises the importance of utilising ICT to achieve its social and economic objectives.

OECD¹ has extensive research recognising the relationship between ICT and economic growth and identifies ICT as a key contributor to productivity growth. The Economic Commission for Africa's publication "*National Information and Communications infrastructure (NICI) e-strategies: Best practices and Lessons Learnt*" attempts to capture the lessons learnt by the Commission as a result of almost a decade of national and sub regional ICT policy making. In this publication, the Commission states that "there is clear evidence of the importance of ICTs in delivering sustainable economic development. Investment in the sector offer opportunities for employment generation, creation of new sources of innovation and enhancement of industrial competitiveness".

The Commission further goes on to state that "Governments not only play a unique role in the diffusion of ICTs but are also leading consumers of ICT products and services".

In a white paper from the Economist Intelligence Unit titled "*The 2007 e-readiness rankings: Raising the bar*" the Economist Intelligence Unit argues that in refining their e-readiness model, they now place a greater emphasis on the role of government in

¹ OECD is the Organisation for Economic Co-operation and Development with is an international organization of thirty countries that accept the principles of representative democracy and free-market economy. The OECD provides a setting in which governments can compare policy experiences, seek answers to common problems, identify good practices, and co-ordinate domestic and international policies. The mandate of the OECD is broad, covering economic, environmental, and social issues.



fostering the use of ICT, both with respect to being providers of vision and policy, and as users of technology i.e. creators and users of digital content.

The Swedish International Development Agency (SIDA), in an extensive study relating to establishing the link between ICT and poverty alleviation, concluded that government has the most diverse variety of areas which can be helped by ICT. They stated that there were three parallel roles that government units play: government as a business, government in its role with respect to its constituents and government as an infrastructure manager and leader.

SIDA further described these roles as:

Government as a business: This aspect of government is similar to any large and complex business, handling activities such as personnel, finance and information management. Its use of ICT can include re-engineering and automation of processes, data-sharing between different arms of government and the provision for transparency, accountability and corruption reduction. An important point reiterated in this study was that the introduction of ICT rarely makes endemic problems disappear but that ICT should be viewed as an enabler i.e. it is not a silver bullet, but rather a potentially powerful tool.

Government and its constituents: This aspect deals with government's interactions with its individual and corporate constituents. The maturing of the Internet and the web has given constituents tools to receive information and interact online, and many governments have responded by allowing and encouraging such activities.

Government as a manager and leader: This aspect deals with government's control over substantial infrastructure and its role in policy making and regulation and the extent to which this translates into enabling social and economic development to deal with poverty.

It is interesting to note that these roles as described by Greenberg, map almost exactly with the objectives of the City of Cape Town's Smart City strategy.

- The use of Information and Communication Technologies (ICT) to improve the efficiency of the administration of the city.



- The use of ICT to better communicate with and deliver services to citizens and businesses. This includes providing information about services and enabling easier access to them; enabling information and financial transactions, and fostering democracy.
- The use of ICT to bring about social and economic development.

There is no real debate on the fact government has to take a leading role in the development of the information society or even with the idea that government has to play an interventionist role with regard to the development of the information society. The key debate is over the extent to which government intervenes.

The World Bank book “Information and Communications for Development 2006: Global Trends and Policies” claims to offer a realistic assessment of experiences, trends, and outlook on the ICT sector, with a focus on actual results and justified expectations. It attempts to track and analyze global ICT development trends and to provide empirical evidence of the benefits that ICT is providing in terms of economic growth and poverty reduction. In this book, Wellenius (2006) states that the “main role of the public sector is to provide the policy framework, regulate the market to the extent that it does not work well enough by itself, and support additional service provision where the market alone does not suffice to meet economic and social objectives.”

Wellenius goes on further to argue that public sector support can help extend services beyond the market, but this must be justified in terms of the economy as a whole. While a case can often be made for narrowing gaps in established markets, justifying public sector support for developing new markets is less straightforward. However, when justified in terms of the economy as a whole, the public sector can stimulate demand or jump-start supply in order to develop sustainable markets for the private provision of the desired services.

Guislain et al (2006), in the same book, states that targeted public intervention to expand services can maximize social returns. In this context, governments must play a leading role in promoting the modernization and extension of ICT infrastructure and services. Guislain et al argues that “even in well-performing markets, there is typically a divide between what service providers are willing or able to do on



commercial grounds and what governments consider necessary from a development or broader economic perspective”.

According to the Global Knowledge Partnership² (GKP), the major role of governments in developing countries is to create enabling economic and legal frameworks, including protection for innovations. The government also plays a significant role in building and training human capacities, and it is responsible for building the infrastructure and making it affordable. Furthermore, the Association for Progressive Communications³ (APC) and other organizations state that information society financing should be based on the principle that information and communication are public goods. This is particularly important for the extension of network infrastructure in developing countries and for marginalized populations in any country.

Finkelievich (2005) emphasises that government must be held accountable for universal access and goes on to state that “although private sector investments represent extremely significant opportunities for ICTs for development (ICTD), which must be encouraged, these investments cannot replace (or displace) the central role of public financing in a fundamental sector such as telecommunication infrastructure networks. Otherwise, these networks would never be found in regions and social groups that were not to be profitable to private capitals”.

As stated earlier, while there is significant debate on the extent (and areas) of government intervention, there is general consensus on the enabling role that

² The Global Knowledge Partnership (GKP) claims to be the World's first Multi-Stakeholder Partnership in the area of ICT for development. It is a global network open for all ICT4D- oriented organisations from all sectors and nations, committed to harnessing the potential of information and communication technologies for sustainable and equitable development. Within the GKP framework, governments, civil society groups, donor agencies, private sector companies and inter-governmental organisations come together as equals to apply ICTs for development (ICT4D).

³ The Association for Progressive Communications (APC) is an international network of organizations that was founded in 1990 to provide communication infrastructure, including Internet-based applications, to groups and individuals who work for peace, human rights, protection of the environment, and sustainability. Pioneering the use of ICTs for civil society, especially in developing countries, APC members were often the first providers of Internet in their member countries. According to GreenNet, one of the founder members of the APC, “The APC currently has 25 member networks serving over 50,000 activists, non-profit organisations, charities and non-governmental organisations (NGOs) in over 133 countries”



government has to play. The World Summit on the Information Society (WSIS), held under the auspices of the United Nations (in 2003 and 2005), which included civil society participation, is probably the best representation of the areas of consensus, although it is important to acknowledge that the WSIS process is itself not without controversy. The summit recognised that to maximize the social, economic and environmental benefits of the Information Society, one of the areas of government intervention would be with respect to information and communication infrastructure as an essential foundation for an inclusive Information Society. Areas of focus for government and stakeholders would include:

- Connectivity as a central enabling agent in building the Information Society. Universal, ubiquitous, equitable and affordable access to ICT infrastructure and services constitutes one of the challenges of the Information Society and should be an objective of all stakeholders involved in building it.
- Well-developed information and communication network infrastructure and applications, adapted to regional, national and local conditions, easily-accessible and affordable, and making greater use of broadband and other innovative technologies where possible, can accelerate the social and economic progress of countries, and the well-being of all individuals, communities and peoples.
- Policies that create a favourable climate for stability, predictability and fair competition at all levels should be developed and implemented in a manner that not only attracts more private investment for ICT infrastructure development but also enables universal service obligations to be met in areas where traditional market conditions fail to work. In disadvantaged areas, the establishment of ICT public access points in places such as post offices, schools, libraries and archives, can provide effective means for ensuring universal access to the infrastructure and services of the Information Society.

The summit also concluded that “Governments need to formulate national strategies, which include e-government strategies, to make public administration more transparent, efficient and democratic” and that “Governments should act as model users and early adopters of e-commerce in accordance with their level of socio-economic development”.



Broadband

Most regional or national strategies to develop a robust and affordable high speed telecommunications infrastructure is commonly referred to as “broadband” strategies. In this section we define what broadband refers to.

Definition

In general, broadband refers to telecommunication in which a wide band of frequencies is available to transmit information. Because a wide band of frequencies is available, information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing more information to be transmitted in a given amount of time (much as more lanes on a highway allow more cars to travel on it at the same time).

Transfer speeds for broadband can be as fast as 10 to 100 times the speed of a telephone dial-up internet connection. Although no official specification exist for how wide broadband needs to be, anything greater or equal to 256kbps (kilobits per second) is generally considered to be broadband. The range of data transfer speeds for broadband is 256kbps to 10Gbps (gigabits per second).

Broadband can be offered through a variety of mechanisms, such as ADSL (Asymmetric Digital Subscriber Line), Satellite, Cable and Wireless. Broadband generally differs from a dial-up connection in the sense that it is ‘always-on’, meaning that one only needs to switch on their computer to access the internet. So in short, for a system or internet service to qualify as broadband it must be high speed, high capacity and permanent (i.e. always on).

It may be useful to consider a brief history of how broadband came into existence and how it has evolved. The introduction of the internet and the World Wide Web in the early nineties has resulted in reliable, affordable and accurate exchange of information between people, businesses and governments everywhere. The use of computers by individuals and businesses for communication has seen conventional methods such as letters, telegrams, fax machines etc. approaching redundancy. This however has not come without problems or hiccups of its own. The issue of speed of data transfer and accuracy is one of these, as parties need to transfer large amounts of data at high speeds.



In response to the issue of speed, telecommunication companies introduced the system today known as broadband. Broadband may be likened to a pipe, where greater quantities of water can flow through with increased size and pressure. The notion of what constitutes broadband has itself evolved and greater speeds are continually being achieved. Technological breakthroughs have allowed re-use of existing infrastructure; e.g., ADSL which uses existing copper cables originally rolled out for narrowband voice communication, and the provision of broadband over wireless channels previously thought impossible.

Today, due to broadband, the world is witnessing limitless possibilities with regards to ICT. Hi-tech applications such as telemedicine, research networks and earth observation all depend on broadband to thrive. Many applications have been developed that seek to improve our daily lives in an innovative manner; and, broadband is the key.

In the near future, telephone, television, radio and the web will all be delivered to one's home via a single broadband connection. In fact broadband is fast becoming an indispensable part of economic, personal and public life.

Broadband technologies

Different technological solutions exist for the implementation of broadband. Below is a simplified brief description of the main technologies through which broadband is implemented.

Technology	Description
ADSL Broadband	ADSL has been developed for enabling broadband connections using existing telephone networks. A modification of one's telephone connection point and a high speed modem is required. It makes use of the telephone line by splitting it into two distinct channels, one for voice and the other for the high speed data connection. The high speed data connection uses a high frequency range not used in normal voice



	<p>communication. This therefore makes it possible to concurrently receive calls while having a session on the internet.</p>
Cable Broadband	<p>This requires a special (generally fibre optic) cable connection to be installed in one's home. It operates over the pay TV networks installed in many metropolitan areas of foreign countries – unfortunately, not in South Africa. A cable is run from the larger cable running down the street to one's residence, this cable is then connected to a special cable modem and then to the computer. If one already has a cable service installed in their home to receive TV, the service provider will help establish whether one lives in an area that receives cable broadband. This is becoming the basis of many of the fibre to the home technology offerings.</p>
Wireless Broadband	<p>Wireless broadband is a fairly new technology, here a wireless modem is connected to the computer which communicates via radio signal to a receiver in one's residential area. Because there is no physical connection, one can connect to the internet from anywhere they take their modem, as long as it is within the coverage area. Now wireless broadband is versatile as you have stationery and mobile wireless broadband. Mobile broadband is commonly used for internet access via mobile phones, PDAs and laptops. In the case of mobile phones a 3G cellular network is required, whereas in the case of laptops, technologies such as WiFi and WiMax are normally used. In the case of stationery wireless broadband a wireless broadband receiver placed on the outside of one's house sends the signals through to a connection on the inside, which</p>



	sends the data through to the computer. Technologies like Canopy (by Motorola), Wireless Mesh Networks, WiMax and CDMA technologies are used in this case.
Satellite Broadband	<p>This receives information in the same way that DSTV receives information and a dish is required for this. This technology is fairly expensive to deploy therefore it is not commonly used. It is however useful in remote areas where any form of broadband connection is not possible. There are two types of satellite broadband</p> <ul style="list-style-type: none">• 1 Way: This uses the satellite for high speed downloads and a dial-up connection over one's phone line for uploads. This however limits upload speed considerably.• 2 Way: This is fairly self explanatory, it uses satellite for both uploads and downloads, thus increasing the capability of the connection. <p>It is also possible to have mobile satellite broadband.</p>

Global Broadband context

The development of broadband networks is very topical at present. Interestingly, the focus has shifted from developing countries, where the debate and discussion has centred on building the infrastructure needed to bring these countries into the knowledge economy. The focus has shifted to more developed countries and whether building networks really ease countries out of the global recession.

According to a recent OECD report, many of the current financial stimulus packages are based, at least in part, on the notion that building network infrastructure can both help revive the economy and address social issues. This 'networked recovery' relies on extending the reach of broadband and upgrading networks to support very high-speed communications. Many countries plan to use their investment to provide



universal broadband coverage, using public money to take networks to places for which private operators could not make a business case. Some are planning to spend their money building very high-speed next-generation networks as well.

These networks will also be enablers for investments in information and communications technology (ICT) in other sectors, such as education and health. These could far outstrip those made in the networks themselves - the US, for example, plans to spend \$19bn on healthcare ICT compared with \$7bn on broadband.

The planned investment, goals and targets of several of the key initiatives in developed countries are outlined below.

	Planned investment	Goals	Penetration targets	Speed targets
Australia	US\$33.4bn	Fibre all the way to the premises	90 per cent of Australians	100Mbit/s
Canada	US\$211m	Extending broadband to under-served rural and remote communities	N/A	N/A
Finland	\$92m of \$279m (public-private)	Extending high-speed broadband	Every household by 2016	1Mbit/s by 2010; 100Mbit/s by 2016
EU	\$1.46bn	Extending and upgrading high-speed Internet (focus on rural communities)	100 per cent coverage with high-speed Internet by 2010	N/A
Germany	estimated \$219m	Accelerating the spread of broadband networks. By 2010 all unserved areas connected. Nationwide-capable broadband access by no later than the end of 2010.	By 2010, 75 per cent of households should have access to high-speed Internet (all by 2018)	Target is 50Mbit/s
Japan	\$29bn	Intelligent transport systems, improving IT infrastructure in the medical sector (new fibre-optic network), training of IT personnel, the promotion of e-government, and the creation of new industries such as environment-related IT	N/A	N/A
UK	\$325m	Universal service commitment for broadband	Virtually every community	2Mbit/s by 2012
USA	\$7.2bn	To foster broadband service to unserved/underserved areas, promote broadband in schools, libraries, health-care providers, and other entities	N/A	No set minimum data speeds

The UK also pursues the 'Digital Region' project, a \$145.7m project to roll out next generation broadband to South Yorkshire

Table 1: The planned investment, goals and targets of broad initiatives in several developed countries

In addition to the initiatives above, the following developed countries have also formulated broadband strategies and interventions over the past two years.

- Singapore - Government will provide a grant of S\$ 750 million of S\$ 2.2 billion to support the roll-out of the fibre network



- Sweden - Broadband government promotion comprised financial incentives to municipalities to fund 2/3 of total NGN investment (Euros 864 million)
- Portugal - Government announced an 800-million-euro credit line for the roll-out of NGAN. This is part of an the first step in a 2.18-billion-euro plan to boost the country's economy
- Ireland - The government will invest 322 million euro in a National Broadband Scheme aimed at completing country coverage
- New Zealand - Government funds S\$ 458,12m investment to boost fiber over the next five years

These global broadband rollout strategies equate to an investment in excess of \$70bn and are aimed at helping more people, especially the disenfranchised (in their economies), to take part in the digital knowledge economy – recognising that increasing participation in this economy is critical to growing the economy out of recession and increasing the competitiveness of the country.

These investments also serve to widen the gap between developed countries and developing countries.

Developing countries have proved vulnerable to the knock-on effects on the economic slowdown through several channels – not only from the impact of job losses, but also from declines in exports, reductions in Foreign Direct Investment (FDI), falls in local stock markets and collapsing global demand for commodities.

According to the World Bank, the reserves of some developing countries have now reached worryingly low levels, suggesting that some countries have limited resources to respond to the recession.

Faced with global recession, many developing countries with limited reserves are being forced to focus on meeting more immediate needs – for example, in housing and sanitation infrastructure. If this does come to pass, the World Bank has raised the concern that developing countries may miss out on a rich development opportunity in the economic benefits conferred by broadband infrastructure development.

The World Bank points out that several factors highlight the potential of broadband infrastructure as an important area of public investment during economic downturn, including:

- Delivering immediate employment and aggregate demand effects and network effects;
- Bringing forward longer-term aggregate supply side (spill-over) effects which can improve the productivity of the entire economy;
- ‘Crowding in’ private investment, when access to private financing is decreasing and more expensive.

They believe that investments in broadband networks should also be a key part of the overall development strategies in developing countries. Achieving distributional policy objectives of reducing the digital divide and facilitating regional development through increased competitiveness are rationales for possible public intervention in broadband infrastructure.

The reality however is that the extensive broadband stimulus plans in OECD countries are likely to impact the digital divide. The roll-out of networks offering 50-100 Mbps bandwidth in many OECD countries in Europe, North America and Asia could reshape the digital divide in terms of relative Internet access speeds in comparison to developing countries. Developing countries may once again find themselves on the wrong side of a growing digital divide.

South Africa’s telecommunications environment

Overview

South Africa has one of the largest and most developed telecommunication networks on the continent. Telecommunications indicators for the continent are outlined below:

	Population	Main telephone lines		Mobile subscribers		Internet users	
	000s	000s	p. 100	000s	p. 100	000s	p. 100
Algeria	33'860	2'922.7	8.63	21'446.0	63.34	3'500.0	10.34
Egypt	75'500	11'228.8	14.87	30'047.0	39.80	8'620.0	11.42
Libya	6'160	852.3	14.56	4'500.0	73.05	260.0	4.36
Morocco	31'220	2'393.8	7.67	20'029.0	64.15	7'300.0	23.38



PROVINCIAL GOVERNMENT OF THE WESTERN CAPE
DEPARTMENT OF ECONOMIC DEVELOPMENT AND TOURISM (DEDAT)

Tunisia	10'330	1'273.3	12.33	7'842.0	75.94	1'722.2	16.68
North Africa	157'070	18'670.9	11.91	83'865.0	53.39	21'402.2	13.64
South Africa	48'580	4'642.0	9.56	42'300.0	87.08	5'100.0	10.75
South Africa	48'580	4'642.0	9.56	42'300.0	87.08	5'100.0	10.75
Angola	17'020	98.2	0.62	3'307.0	19.43	95.0	0.60
Benin	9'030	110.3	1.22	1'895.0	20.98	150.0	1.66
Botswana	1'880	136.9	7.78	1'427.0	75.84	80.0	4.55
Burkina Faso	14'780	94.8	0.70	1' 611.0	10.90	80.0	0.59
Burundi	8'510	35.0	0.45	250.0	2.94	60.0	0.77
Cameroon	18'550	130.7	0.79	4'536.0	24.45	370.0	2.23
Cape Verde	530	71.6	13.80	148.0	27.9	33.0	6.36
Central African Rep.	4'340	12.0	0.29	130.0	2.99	13.0	0.32
Chad	10'780	13.0	0.13	918.0	8.52	60.0	0.60
Comoros	840	19.1	2.33	40.0	4.77	21.0	2.56
Congo	3'770	15.9	0.40	1'334.0	35.40	70.0	1.70
Côte d'Ivoire	19'260	260.9	1.41	7'050.0	36.6	300.0	1.63
D.R. Congo	62'640	9.7	0.02	6'592.0	10.52	230.4	0.37
Djibouti	830	10.8	1.56	45.0	5.40	11.0	1.36
Equatorial Guinea	510	10.0	1.99	220.0	43.35	8.0	1.55
Eritrea	4'850	37.5	0.82	70.0	1.44	100.0	2.19
Ethiopia	83'100	880.1	1.06	1'208.0	1.45	291.0	0.35
Gabon	1'330	36.5	2.59	1'169.0	87.86	81.0	5.76
Gambia	1'710	76.4	4.47	796.0	46.58	100.2	5.87
Ghana	23'480	376.5	1.60	7'604.0	32.39	650.0	2.77
Guinea	9'370	26.3	0.33	189.0	2.36	50.0	0.52
Guinea-Bissau	1'700	4.6	0.27	296.0	17.48	37.0	2.26
Kenya	37'540	264.8	0.71	11'440.0	30.48	2'770.3	7.89
Lesotho	2'010	53.1	2.97	456.0	22.71	51.5	2.87
Liberia	3'750	...	...	563.0	15.01	...	...
Madagascar	19'680	133.9	0.68	2'218.0	11.27	110.0	0.58
Malawi	13'930	175.2	1.26	1'051.0	7.55	139.5	1.00
Mali	12'340	85.0	0.69	2'483.0	20.13	100.0	0.81
Mauritania	3'120	34.9	1.10	1'300.0	41.62	30.0	0.95
Mauritius	1'260	357.3	28.45	936.0	74.19	320.0	25.48
Mozambique	21'400	67.0	0.33	3'300.0	15.42	178.0	0.90
Namibia	2'070	138.1	6.66	800.0	38.58	101.0	4.87
Niger	14'230	24.0	0.17	900.0	6.33	40.0	0.28
Nigeria	148'090	6'578.3	4.44	40'396.0	27.28	10'000.0	6.75
Rwanda	9'720	16.5	0.18	679.0	6.98	100.0	1.08
S. Tomé & Príncipe	160	7.7	4.86	30.0	19.09	23.0	14.59
Senegal	12'380	269.1	2.17	4'123.0	33.31	820.0	6.62
Seychelles	90	20.6	23.79	77.0	89.23	29.0	35.67
Sierra Leone	5'870	...	...	776.0	13.23	10.0	0.19
Somalia	8'700	100.0	1.15	600.0	6.90	94.0	1.11



Sudan	38'560	345.2	0.90	7'464.0	19.36	1'500.0	3.89
Swaziland	1'140	44.0	4.27	380.0	33.29	42.0	4.08
Tanzania	40'450	236.5	0.58	8'252.0	20.40	384.3	1.00
Togo	6'590	82.1	1.30	1'190.0	18.08	320.0	5.07
Uganda	30'880.0	162.3	0.53	4'195.0	13.58	2'000.0	6.48
Zambia	11'920	91.8	0.77	2'639.0	22.14	500.0	4.19
Zimbabwe	13'350	344.5	2.58	1'226.0	9.18	1'351.0	10.12
Sub-Saharan	757'880	12'098.3	1.65	138'310.0	18.28	23'904.2	3.23
AFRICA	963'530	35'411.2	3.77	264'475.0	27.48	50'406.4	5.34

Updated: 24.04.2008

Source: ITU World Telecommunication/ICT Indicators Database.

Fixed line services are growing steadily, while mobile and wireless services are experiencing high levels of uptake. Despite this, the country needs to upgrade its fixed-line infrastructure to enable wired services to compete with a more developed wireless infrastructure. The outdated infrastructure and the high cost of telephony resulted in South Africans paying some of the highest tariffs in the world for basic telephony and Internet access.

Following the national elections in 2009, the South African National Broadband Forum - an initiative of the Shuttleworth Foundation, SANGONeT, South Africa Connect, and the Association for Progressive Communications (APC) - developed a broadband policy framework and submitted it to the Department of Communications. The Forum hopes to contribute to and influence the national broadband strategy which is in the process of development.

The framework document, based on input from business, industry and civil society groups, calls for the provision of broadband access to every town and village as well as achieving the lowest broadband prices and the highest penetration on the continent by 2014. So far, failed liberalisation efforts and low competition has limited South Africa's telecoms sector growth, and it is hoped that a coherent strategy will facilitate the necessary changes.

In September 2009, the national Department of Communications (DOC) released a draft broadband policy for South Africa for comment and input. In March 2010, the National Cabinet held over its final approval of the draft of the national broadband policy for further discussion and appointed an inter-ministerial committee to deal with it. The inter-ministerial committee will be convened by Communications Minister



Siphiwe Nyanda and it will consist of the ministries of science and technology, public enterprises, rural development and land affairs, economic development, and public service and administration

Telkom is the incumbent telecommunications operator and the only provider of residential public telecommunication services in South Africa. It was a fully state-owned company until May 1997, when the government sold its 30 per cent stake to Thintana Communications (a consortium of SBC International and Telekom Malaysia) and a 3 per cent stake to Icingo Investments. As of Q3-09, the government is still the largest shareholder in Telkom with a 38 per cent stake.

At the end of March 2009, South Africa had 51.9 million mobile subscribers. The mobile penetration rate has reached 106.9 per cent. Vodacom, Mobile Telephone Network (MTN) and Cell C dominate the mobile telephony market. At the end of September 2009, Vodacom was the market leader with a 55 per cent market share while MTN's share fell by 2 per cent to about 32 per cent. Cell C was in the third position with a 13.5 per cent market share in June 2009.

In May 2009, Vodafone had completed its acquisition of a further 15 per cent stake in Vodacom, which was previously held by Telkom. As a result, Vodafone raised its stake in Vodacom to 65 per cent.

Vodacom and MTN have offered mobile broadband services since January 2008. During 2008, Vodacom upgraded many of its 3G sites to support 7.2Mbps HSDPA. In December 2009, Cell C announced plans to invest USD 660 million in the deployment of HSPA technology during 2010, hoping to enter the 3G services market.

High cost of telecommunications

The key issue in **urban** areas in South Africa is not so much about access to telecommunications but about the cost of the telecommunications that are available.

In 2008 the Department of Communications (DoC) commissioned an international peer benchmarking study which involved detailed comparative reviews of tariffs, usage, access and quality of service in five nominated peer countries. The five



countries, selected for their relevance to the South African market, were Chile, Korea, India, Brazil and Malaysia.

Price benchmarking was done taking variables like purchasing power parity (PPP) - a theory which uses the long-term equilibrium exchange rate of two currencies to equalize their purchasing power (Wikipedia) – into account.

The results of the study, which focused on fixed telephony, mobile telephony and data services, were recently unveiled in Parliament. The results pointed to something which consumers have been complaining about for a long time: the prices of South Africa's telecoms services are significantly higher than their international counterparts.

“South Africa is with some notable exceptions a high, and in some instances, very high cost to communicate country in relation to its peer group of countries,” the DoC said.

Telkom's prepaid and postpaid fixed telephony services were the two most expensive services on fixed local call rates per minute. Telkom was also the most expensive for a fixed business basket of services.

South Africa's mobile penetration has grown impressively. However it is important to distinguish between mobile penetration and mobile usage. Mobile phone penetration rate is a term generally used to describe the number of active mobile phone numbers (usually as a percentage) within a specific population. Mobile usage refers to the volume of actual voice and data calls on these phone numbers.

South Africa has risen from the fourth ranked country among the benchmark nations in 2000 to first in March 2008, and is now the top ranked country in terms of mobile penetration rates.

Mobile usage in South Africa is however low, most likely due to high cellular call and data rates. Mobile broadband tariffs for high volumes (larger than 2GB) are expensive in South Africa due to the absence of uncapped plans which are available in the other benchmarked countries.

South Africa's SMS prices are the second highest among the surveyed countries while SMS usage is the fourth highest behind Malaysia, Korea and India.



South Africa performed particularly poorly when it came to broadband services.

South African Internet tariffs were found to be consistently high and uncapped broadband plans in South Africa were not commonplace. The level of South African Internet access is relatively low and there is slower growth than in the other countries.

Chile, Korea, India, Brazil and Malaysia all have maximum broadband speeds faster than South Africa. In South Africa the fastest fixed line broadband service is a 4 Mbps ADSL offering from Telkom, significantly lower than Korea's 100 Mbps fiber optic/LAN connections and Brazil's 30 Mbps services.

It was further found that South Africa has the highest price, of the 5 countries surveyed, for an international 2 Mbps leased line - twice as much as the next most expensive country. The country also has 'very low international bandwidth' compared to the other benchmarked countries.

The following table gives an overview of some of the findings in the broadband market.

Table 2: DoC international peer benchmarking study	
Mobile Broadband Tariffs (US\$, PPP)	
1 GB Data Bundle	
Chile	79
Vodacom	76
Brazil	71
MTN	63
Malaysia	55
Korea	41
2 GB Data Bundle	
Vodacom	98
MTN	85
Chile	79
Brazil	71



Malaysia	55
Korea	41
5 GB Data Bundle	
Vodacom	230
Chile	79
Brazil	71
Malaysia	55
Korea	41
10 GB Data Bundle	
Vodacom	449
Chile	79
Brazil	71
Malaysia	55
Korea	41
Fastest Broadband Speeds Available (Kbps)	
Korea	100 Mbps
Brazil	30 Mbps
Chile	10 Mbps
Malaysia	10 Mbps
India	8 Mbps
South Africa	4 Mbps
Price of 2 Mbps international leased line to USA, half-circuit, PPP, 2008	
Chile	2 654
Korea	4 041
Malaysia	5 275
Brazil	6 939
India	7 000
South Africa	15 009



OECD fixed business basket August 2008, PPP, excluding taxes	
India BNSL	36.98
Korea KT	51.34
Chile CTC	64.03
Malaysia TM	85.45
Brazil TELSP	123.55
Telkom Business	163.39

Ranking/ Indices

Declining competitiveness and the Networked Readiness Index (NRI)

One of the most useful sources of data available is the World Economic Forum Networked Readiness Index (NRI) which is published annually and measures the capacity of countries (economies) to fully leverage ICT for increased competitiveness and development. It utilises “a mixture of hard data collected by well respected international organizations, such as the International Telecommunication Union (ITU), the World Bank, and the United Nations, and survey data from the Executive Opinion Survey, conducted annually by the World Economic Forum in each of the economies included in the *Report*”. The NRI covers 127 developed and developing economies all over the world, accounting for over 95 percent of the world’s GDP⁴.

The World Economic Forum together with INSEAD Business School publishes the Global Information Technology Report, which uses the Index as one of its sources. The Index is also used as one of the indicators of a country’s competitiveness in the World Economic Forum’s Global Competitiveness Index. The index was originally developed by the Information Technology Group, which worked at Harvard University’s Center for International Development until 2002.

⁴ Gross Domestic Product (GDP) is defined as the total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment and government spending, plus the value of exports, minus the value of imports. The economic growth rate of a country is the percentage change in the countries GDP from year to year. Hartzenberg et al. (2005)

The Networked Readiness Index Framework represents an effort to untangle the underlying complexity behind the role of ICT in a nation's development. The framework and its components not only provide a model for computing the relative development and use of ICT in countries, but also allows for a better understanding of a nation's strength and weaknesses with respect to ICT. Therefore the NRI for South Africa can be regarded as a useful (and credible) measure of the effectiveness of the use of ICT for social and economic development in South Africa.

Networked Readiness Framework

The Networked Readiness Framework is based upon the following premises:

- There are three important stakeholders to consider in the development and use of ICT: individuals, businesses, and governments;
- There is a general macroeconomic and regulatory environment for ICT in which the stakeholders play out their respective roles
- The degree of usage of ICT by (and hence the impact of ICT on) the three stakeholders is linked to their degrees of readiness (or capability) to use and benefit from ICT.

NRI Data and analysis

An analysis of South Africa's ranking in the NRI over a period of 6 years shows that South Africa was slipping in the ranking i.e. getting worse, not better. This data is shown graphically in figure 1 below.

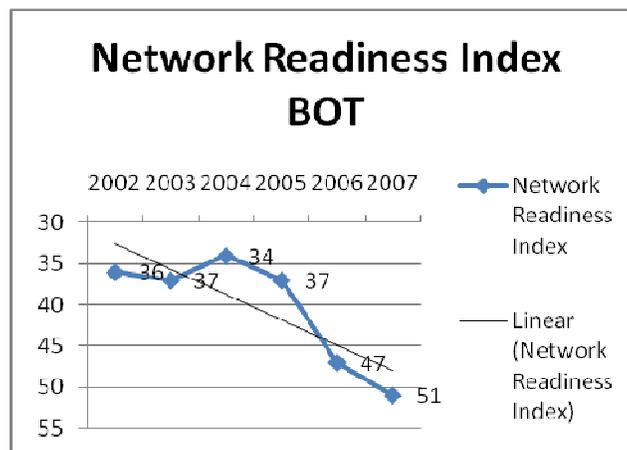


Figure 1: Network Readiness Index Behaviour of Time (BOT) (Sooful, 2008)

In trying to understand what conditions (variables) have an influence on this index; it is important to unpack the model underlying the NRI in more detail. The Networked Readiness Framework, which underlies the NRI, has remained unchanged since 2002, and assesses:

- Environmental Factors: the presence of an ICT-friendly and conducive environment, by looking at a number of features of the broad business environment, some regulatory aspects, and the soft and hard infrastructure for ICT;
- Readiness factors: the level of ICT readiness and preparation of the three main national stakeholders—individuals, the business sector, and the government; and
- Usage Factors: the actual use of ICT by the above three stakeholders.

These factors and their trend lines are reflected in figure 2 below:

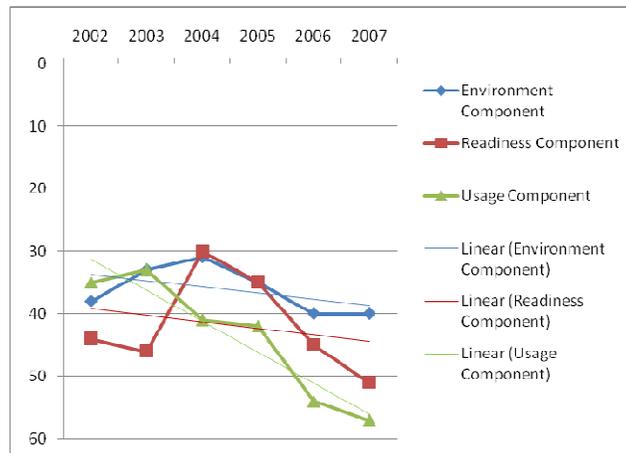


Figure 2: Factors influencing the overall Network Readiness Index (Sooful, 2008)

While this analysis informs us that the usage factors are declining at a more rapid rate than the environmental and readiness factors, it is not particularly helpful in diagnosing the root cause of the decline in South Africa's NRI positioning.

Further analysis of the variables affecting each of the above-mentioned factors (environmental, readiness and usage) was therefore necessary. In order to achieve this, a full understanding of the structure of the Networked Readiness Framework utilised to produce the NRI was developed. This is outlined in the diagram (figure 3) below:

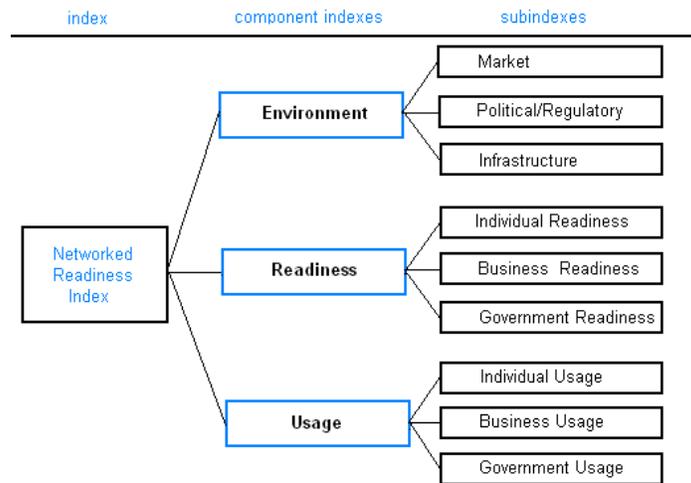


Figure 3: Networked Readiness Index (Insead, 2002)

As outlined in figure 3, the environmental factors that influence the NRI, are themselves influenced by market factors, political/ regulatory factors and infrastructure factors. Data for each of these factors in the South African context was sourced for the past six (6) years, and plotted as a BOT graph (figure 4).

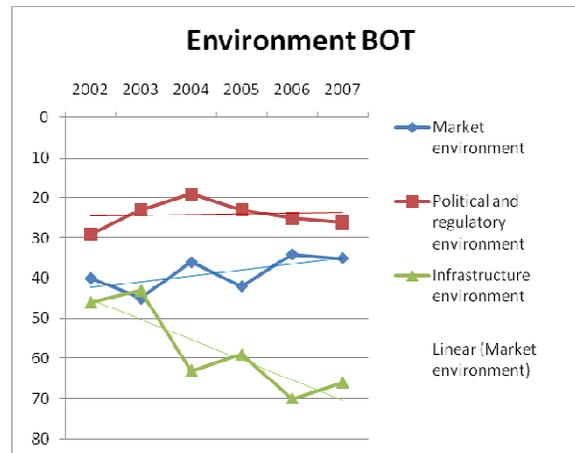


Figure 4: Environmental factors influencing NRI (Sooful, 2008)

This BOT analysis clearly reveals that the market environment with respect to ICT in South Africa is showing improvements over time. Overall, the trend line is in an upward direction i.e. the market environment is improving. The policy and regulatory environment demonstrates a relatively flat trend line over time, implying that it does not negatively or positively affect the NRI. This is interesting as the lack of progress in the regulatory environment is often cited by the popular press as a major contributor to South Africa's slide down this index and other similar indices. This

graph also reveals that the infrastructure environment is in sharp decline i.e. between 2002 and 2007; the infrastructure environment is getting worse.

As outlined in figure 3, the readiness factors that influence the NRI are themselves influenced by Individual readiness factors, Business readiness factors and Government readiness factors. Data for each of these factors in the South African context was sourced for the past six (6) years, and plotted as a BOT graph (figure 5).

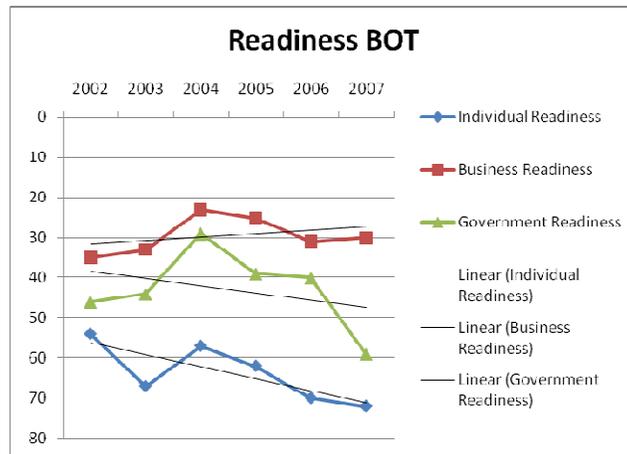


Figure 5: Readiness factors influencing NRI (Sooful, 2008)

From this readiness BOT, it is clear that business readiness is improving, while government readiness and individual readiness is declining.

As outlined in figure 3, the usage factors that influence the NRI, are themselves influenced by individual usage factors, usage readiness factors and government usage factors. Data for each of these factors in the South African context was sourced for the past six (6) years, and plotted as a BOT graph (figure 6).

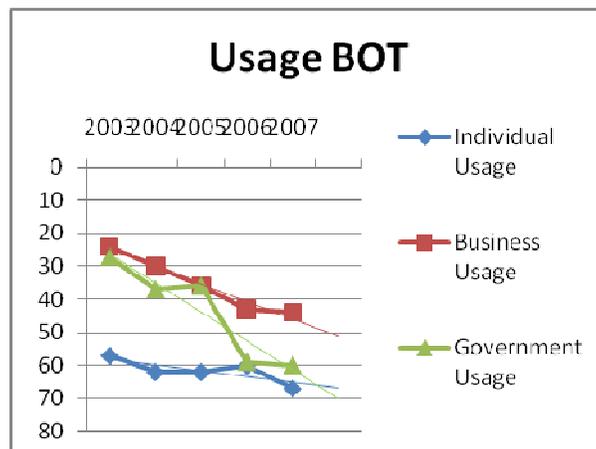


Figure 6: Usage factors influencing NRI (Sooful, 2008)

The usage BOT reveals that with respect to individual usage, business usage and government usage factors, South Africa is declining in the index ranking. The finding for business usage is a little surprising, as one would expect increased business readiness to translate into increased business usage.

However, it is important to note that the factors considered in the NRI are not absolute rankings with respect to whether, for example, the business usage is improving in South Africa. Rather, it is a ranking of whether the business usage is improving relative to the other countries within the study. So, in the context of the observation with respect to business readiness and business usage, this would imply that business readiness in comparison to other countries is improving, but business usage in comparison to other countries is not improving. When the actual data points are graphed (figure 7), it is possible to see that business readiness and business usage do track one another (with the exception of 2004, when the business readiness ranking increased substantially, and the business usage ranking decreased). It is important to note that in 2004, South Africa's ranking with respect to the ICT infrastructure environment decreased rapidly, which could have influenced the availability of cost effective infrastructure, which would impact upon business usage.

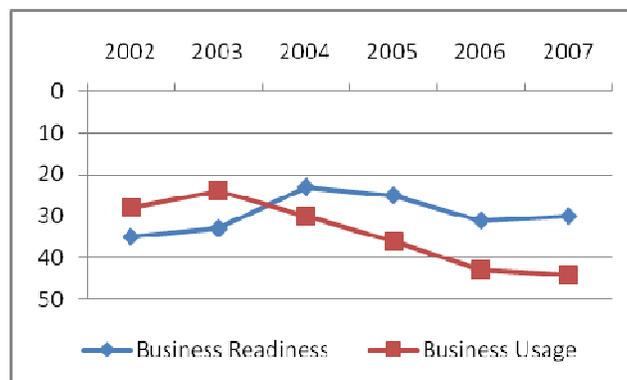


Figure 7: Business readiness and usage behaviour over time (Sooful, 2008)

It is important to reiterate that the NRI framework not only provides a model for computing the relative development and use of ICT in countries, but also allows for a better understanding of a nation's strength and weaknesses with respect to ICT. In the context of this discussion around business readiness and business usage, this



would imply that more needs to be done to create information-rich business processes and business products.

In the above analysis of each of the factors affecting the ICT environment, the ICT readiness and the ICT usage in South Africa, it would appear that the business readiness, the market environment and the policy and regulatory environment are either improving or remaining constant relative to other countries. The crucial areas for improvement are accessibility of infrastructure, ICT readiness in Government, ICT readiness among individuals, and usage of technology (possibly linked to skills, access to local content, cost of access, etc.) across business, government and individuals.

The need for provincial government intervention

Provinces are a critical structural as well as geographic role player in the drive for economic development. In an increasingly globalised world, national policy frameworks become more similar due to the common international capital market, multilateral trade agreements and pressure from the IMF and World Bank. As a result, national borders are less important and regional characteristics are becoming increasingly significant.

A regional strategy for ICT development is a relatively new concept in South Africa. Cape Town's Smart City strategy was the first attempt at developing a strategy that linked the use of ICT to the social and economic development of the city, and spelled out numerous internal and external inter-related projects and initiatives to achieve this strategy. Since then, we have seen the concept of a Smart City or a Digital City emerging in a few other metropolitan cities viz. Tshwane, Johannesburg, Ekurhuleni and eThekweni. However none of these concepts, with the possible exception of eThekweni, has resulted in an integrated strategy that focuses more on social and economic development, and cuts across many areas of the municipality.

This is consistent with the findings by COFISA who highlight the criticism that in the South African National Innovation System (SANSI), "there appears to be fairly weak integration between national level policy and organisations and innovation related policy and support measures at provincial and local level". They also state that the



“concept of a regional innovation system or policies related to its development is relatively new in South Africa”. They also argue that it is widely accepted that complementing a national innovation policy with a strong regional development focus has been successful in many countries in developing regional capacities to benefit from national or supra-national flows of resources. They claim that national innovation policy must find concrete manifestations at the regional or local level.

Internationally the concept of a regional ICT development strategy rooted in an analysis of the region’s own opportunities and problems; the values and preferences of its residents, its change drivers, its relationship to its region and the national and global economy and its assets and resources is growing in popularity. Such a strategy aims to achieve a shared strategic understanding among all stakeholders to align energies to work cohesively for the good of the region. This is evidenced in the outcome of the Second World Summit of Cities and Local Authorities on the Information Society (WSCLAIS) held on 9th to 11th November 2005 in Bilbao, Spain.

At this summit, mayors and representatives of local and regional authorities committed themselves, amongst other things:

- To work actively towards the development of their cities and regions, using Information and Communication Technologies as an instrument for sustainable development in all its dimensions, for each and every community, to bridge the North-South divide, and for all citizens, against marginalisation and social division;
- To implement in their cities and regions an e-local agenda (Digital Local Agenda), designed to promote the Information Society, taking into account in particular the socio-economic and cultural environment, and based on the broad participation of citizens and social actors, with the ultimate objective of fostering sustainable development;
- To strengthen the enabling role of local and regional authorities in guaranteeing adequate and secure technological infrastructure and in promoting ICT-based applications for inclusive services;
- To promote, insofar as it is possible, the use of free software and other tools that facilitate inclusion and digital solidarity;



- To facilitate the mobilisation of resources for digital inclusion, by engaging, if necessary, in new financing mechanisms;
- To prompt all local and regional organisations involved in the development of a more equitable Information Society to implement the commitments of this Declaration.

The outcome of the Second WSCLAIS and the COFISA findings reinforces the importance of a provincial strategy for the development of an information society.

This strategy must be able to strike a balance between the provincial government as a user of ICTs to support service delivery, and promoting the use of ICTs by business and society at large. An information society mindset must permeate growth and development strategies, planning and delivery. But the provincial government should also be clear about what they can actually achieve: whilst they have control over their ICT strategy and telecommunications use, they can only influence and nurture the emergence of an information society. They have little or no influence over broad technology, data or content standards; and can at best only contribute to the improved availability of access to ICTs and the general level of skills needed to use them.

The social and economic conditions that need to prevail for an information society to emerge can be called 'factor conditions'. In essence, an information society depends on the following three factors:

- Broad and equitable access to the infrastructure (telecommunications networks) and tools (computer hardware and software).
- A significant and growing level of skills in the form of basic literacy, computer literacy, information literacy and business literacy. This enables individuals to make use of the access infrastructure and tools that are available to them.
- A significant and growing amount of digital content (information and the applications – like databases – that deliver it) that is locally relevant. Information that adds value to peoples' lives provides an inducement and incentive to develop and acquire basic literacy, computer literacy, information literacy and business literacy skills. These are in turn basic requirements for employment in the knowledge economy.



Additionally, the region requires a regulatory environment and industry support to encourage businesses in general to start-up, innovate and grow, and in particular encourage those business activities that support the knowledge economy (e.g. telecoms, ICT) and knowledge-intensive business activities that make use of ICT. This is the existing objective of the Provincial Government's economic development policy.

The provincial government has a critical and unique role to play by supporting and promoting these factor conditions. Whilst social partners in business and civil society may promote specific elements of the information society through their business activities (for example, telecommunications firms expanding networks that provide access, or NGOs redistributing refurbished computers), only government can take a holistic view, champion the benefits, and support the factor conditions.

National government can take a leadership role by promoting the concept and benefits of an information society, and ensuring the existence of a legislative environment that is conducive to this, establishing boundaries and guidelines that enforce and co-coordinate provincial programs, and offering incentives. But it is local and provincial government, not national government, that deliver many of the services that support the factor conditions, through their approach to infrastructure provision, delivery of social services and economic development activities. At the municipal level only the 'category A' cities are likely to have the scale and resources to initiate any activities on their own. District and other smaller municipalities can only be expected to take a lead from provincial government, and to depend on them for both planning and resources.

Accelerating Broadband Deployment and use within the Western Cape

Government leadership, in concert with business and community leadership, is essential to accelerate broadband deployment and use.



Types of intervention available to governments

Government needs to play a leading role in this process, concentrating on driving the following areas:

- Spearheading broadband diffusion, use and policy developments
- Promoting competition, innovation, interoperability and choice
- Ensuring security, privacy and consumer protection
- Creating regulatory frameworks that balance the interests of suppliers and users
- Intensifying R&D for the development of broadband
- Implementing evaluation and policy co-ordination

In January 2010, the World Bank released a report titled “Building broadband: Strategies and policies for the developing world”. As part of this report, the authors surveyed broadband case studies in the Republic of Korea, Finland, France, Japan, Sweden, the United Kingdom, and the United States.

They found that government intervention included policies and regulatory tools to support the operation of a competitive, efficient market and seek to expand access to all. Government intervention also included demand-side policies and programs.

Most important, every country surveyed—even those with state-led approaches—has sought to create an enabling environment for private investments and market mechanisms to develop broadband networks. The main variation is that some countries, such as Finland, France, the United Kingdom, and the United States, have let the market try its hand at building broadband first, while others, such as Japan, Korea, and Sweden, have had public-private partnerships and a more active role for the state earlier on.

Today, though, all the countries surveyed have moved firmly toward spurring broadband growth through public-private collaborations. Countries such as the United Kingdom and United States that once shied away from developing national broadband strategies have either prepared or begun working on them. Even Finland, which has long relied on the private sector to build broadband networks, has developed a broadband plan that includes public funding. The government will support the construction of faster, more widespread networks.

Another important shift is that countries are expanding universal service programs to include broadband.

The table below summarizes key policies, regulatory environment, and programs (matched with stages of market development) that these countries have used to develop their broadband ecosystems.

Component	Early stage: Promote	Mass market: Oversee	Universal service: Universalize
Networks	<ul style="list-style-type: none"> Develop an enabling environment through policies and regulations that promote investment and market entry Reduce administrative burdens and provide incentives and subsidies for R&D, pilots, and network rollout Create certification systems for cyber buildings Allocate and assign spectrum for wireless broadband services 	<ul style="list-style-type: none"> Consider infrastructure sharing, including unbundling the local loop Reallocate spectrum to increase bandwidth 	<ul style="list-style-type: none"> Undertake , using public/private partnerships, as appropriate deployment of open access broadband networks in high-cost or remote areas Coordinate access to rights of way
Services	<ul style="list-style-type: none"> Provide broadband networks to schools, government, etc.(government as an anchor tenant) Standardize and monitor service quality 	<ul style="list-style-type: none"> Create an enabling environment for intra-and intermodal competition Ensure non discriminatory access for service, application, and content providers 	<ul style="list-style-type: none"> Consider expanding universal service obligation to include broadband
Applications	<ul style="list-style-type: none"> Undertake government-led demand aggregation Government agencies as early adopters and innovators Provide e-government and education applications Promote creation of digital content Develop local content and hardware sector 	<ul style="list-style-type: none"> Support secure, private, reliable e-commerce transactions Implement intellectual property protections 	<ul style="list-style-type: none"> Develop advanced e-government programs Offer grants to community champions and broadband demand aggregators
Users	<ul style="list-style-type: none"> Provide low-cost computers and other user devices, for instance in education Develop digital literacy programs for citizens 	<ul style="list-style-type: none"> Establish ethical guidelines for information use 	<ul style="list-style-type: none"> Expand universal service programs to underserved communities Create community access centers Subsidize user devices for poor households

Table 3: Key policies and programmes for building the broadband ecosystem



Key areas of intervention for South Africa and the Western Cape

All of South Africa has low broadband penetration and is in the initial stage of market development. Therefore, the focus should be policies that promote the broadband market. Promotional policies can promote the supply side, such as inducing investment in the broadband network, and the demand side, such as raising citizen awareness about broadband benefits and easing subscription barriers. The following section provides more details on the policy areas that should be considered in South Africa.

Supply-side promotion policies

Reduce entry regulations to facilitate competition

The first step of broadband policy implementation should be fostering competition with reduced entry regulations. Competition is helped by lowering or removing legal entry barriers into broadband markets. The rapid development and diffusion of broadband is largely due to competition between technologies such as DSL, cable modem, fiber optics, and wireless. To enjoy the full benefits of such competition, governments should not influence the technological choices of providers without good reason.

Possible areas of intervention in the Western Cape

This area of policy development is generally the preserve of National government so the possibility of meaningful intervention by the PGWC is remote.

Use spectrum frequency policies to facilitate wireless service

Forecasts suggest that most broadband market development in the developing world will be through wireless networks. Wireless broadband access efforts will focus on the last mile—from the exchange or node to the subscriber. Allocating the appropriate spectrum for broadband use can significantly alter the business case and usefulness of wireless broadband. Further, governments should manage their radio spectrum appropriately to reduce entry barriers, promote competition, and enable the introduction of innovative technologies.



Possible areas of intervention in the Western Cape

This is very topical in South Africa, where access to spectrum is governed by National government and the independent regulator, ICASA. In the current context, access to spectrum is a definite barrier to entry. This might be an area on which provincial government will have to engage with National government.

Provide government support for backbone network construction

Network construction is the highest entry barrier in the communications industry, requiring significant financial resources. The complete broadband network consists of international connectivity, the national backbone network, regional/ local backbone networks and subscriber access networks. Construction of regional/ local backbone networks is essential to ensure that high quality, low-cost connectivity is available domestically. Starting with the construction of backbone networks allows connectivity among major agencies and institutions—such as government ministries, universities, research centers, and large businesses—while allowing time to determine how to construct the subscriber network.

Businesses might initially avoid investing in backbone networks because they are unsure of the returns on their investments. Governments can provide upfront support to reduce risks or act as an anchor tenant to induce investment. Numerous policy options are available for countries looking to develop their backbone connectivity.

In Korea, projects connected organizations such as public offices and educational institutes under the government's direction. This approach reduced risks for businesses and promoted backbone network investment. It also established a base for e-government and the information society.

Possible areas of intervention in the Western Cape

This is a key area of intervention for the PGWC. Connecting all provincial public offices, healthcare institutions (clinics, day hospitals, and hospitals), libraries, community centres and schools could be a key catalyst in developing the telecommunications infrastructure for a connected province.

By leveraging its current estimated spend of R150 Million per annum and future spend (for connecting currently unconnected libraries, schools and healthcare institutions), an economic model could be built to attract billions of rands of investment into the province. This model could also be enhanced to factor municipal spending and needs into the equation.

Take aggressive steps to reduce providers' investment costs

Civil works are the biggest fixed and sunk cost in broadband network construction. They account for more than two-thirds of the cost of fiber optic networks (Figure 1) and wireless networks. They also play a major role in increasing the cost of network deployment for new service providers as well as incumbents.

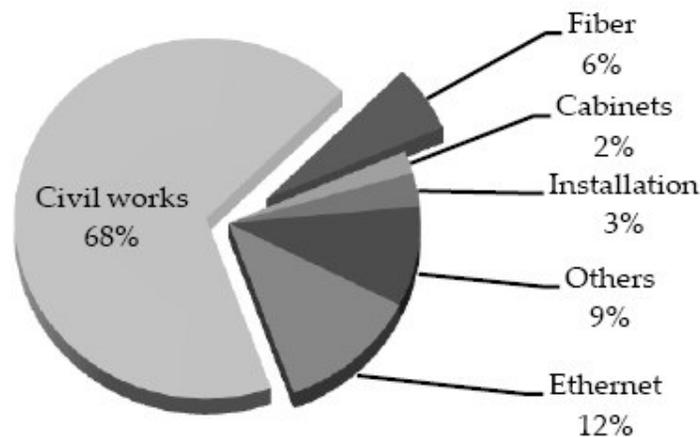


Figure 8: Typical cost components of a fiber optic network

It is also possible to cut the costs of backbone network construction by establishing legal grounds for open access to the passive infrastructure (conduits, ducts, poles, network masts) of other services (roads, railways, power supply facilities). This approach can significantly lower the cost of rolling out telecommunications networks because adding communications equipment (such as cables) to other infrastructure projects is relatively cheap (figure 2).

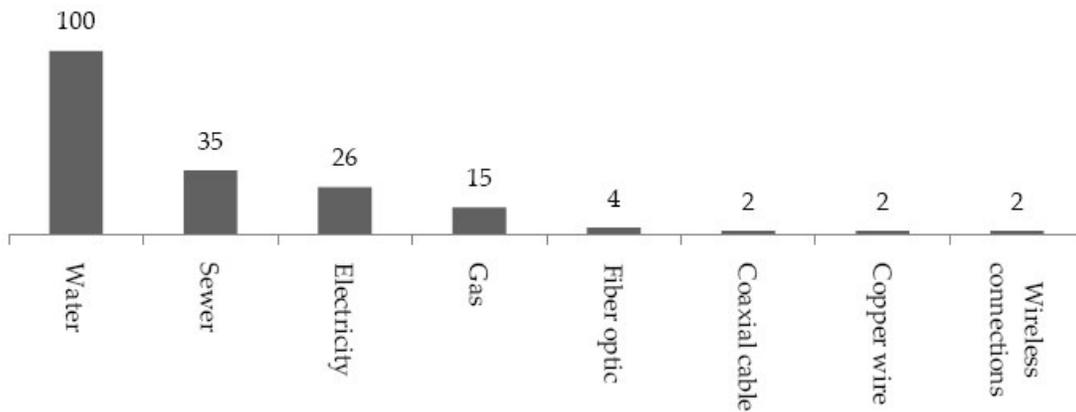


Figure 9: Average cost of infrastructure installation per kilometer (Index: Water=100)

Similarly, when contractors construct other types of new infrastructure, government can require them to build passive infrastructure that communications service providers can access on a non discriminatory basis. Another option is to require the installation of basic infrastructure such as ducts when homes and offices are constructed or renovated and impartially providing the facilities to all providers.

Finally, governments can facilitate joint construction of backbone and subscriber networks among providers. Such a policy may facilitate investment only if the market has sufficient competition and there is little chance of collusion, with only a few providers joining the construction. But in markets with less competition and a greater chance of collusion, such a policy can undermine competition and reduce benefits to users such as lower prices and improved service choice and quality. Thus it requires careful consideration.

Possible areas of intervention in the Western Cape

There are numerous major infrastructure related projects underway in the province and municipalities which could be leveraged to reduce the cost of deploying telecommunications infrastructure. These need to be understood and a model needs to be developed to leverage this infrastructure development for telecommunications. This could be a high impact, low cost intervention that could stimulate significant investment into the province.

The development of provincial government owned passive infrastructure (conduits, ducts, poles, network masts, etc) is a related intervention area that must be explored.



Demand-side promotion policies

Promote digital literacy

To raise public awareness on the benefits of broadband services and promote their use, governments may provide training on how to use computers and the Internet. Recognizing the importance of a digitally literate population, in the early 2000s, Korea provided free or low-cost training to 10 million citizens who lacked access to ICT.

This training contributed a lot to the rapid and widespread penetration of broadband. In the short term such extensive training generates demand. It is also a step toward universal service, because the program mainly targeted underserved groups (women, unemployed youth, military personnel, prisoners). Korea also provided ICT training for children and students—that changed their learning behaviours and interests and, by extension, altered their parents' views on ICT and broadband.

The digital literacy program integrated both demand and supply sides. It was effective only because it included supply-side policies such as providing financial support to schools for network construction and broadband use.

Possible areas of intervention in the Western Cape

This is an intervention area that links in with all of the priority sectors in the Western Cape. It will also equip individuals with skills to be more employable. There are numerous interventions already in this space, as it is a government priority. The ICT component just needs to be integrated into these existing programmes.

Distribute low-cost devices and terminals.

Despite recent price cuts, devices and terminals for broadband use are still too expensive for citizens of developing countries. For instance, a \$400 netbook is more than the GDP per capita of nine Sub-Saharan countries. The so-called —\$100 laptop costs more than a third of GDP per capita in four Sub-Saharan countries.



The World Bank states that low- and middle-income countries could consider developing policies and programs that make user devices more affordable for people who want to buy them but lack the means to do so. To increase demand, countries should choose the most suitable approach among various policy schemes. For example, Korea provides loans through a postal finance service and allows amortization and distribution of free computers to students from low-income groups and people with disabilities. Sweden offers tax breaks and price reductions for bulk purchases. China and Tunisia subsidize standardized computers for poor and rural households.

Possible areas of intervention in the Western Cape

This is possibly an area of intervention that Western Cape-based universities and innovator companies could prioritise for research purposes. PGWC could try to facilitate R&D grant funding for such research as this is a world-wide problem being experienced by both developing and developed countries.

Consider alternatives like active support for computer refurbishment programmes and the creation of secondary markets for refurbished computers. The City of Cape Town, PGWC and large corporate companies in the Western Cape replace approximately 4000 PCs per annum each. A structured government programme (policy, support, and promotion) around this, linked to skills development, environmental issues (e-waste) and possibly Free and Open Source Software (FOSS), could have the impact of making thousands of low cost PCs available in the market – which stimulates the demand for connectivity. The large scale refurbishment programme will also create jobs and build skills in the ICT sector.

Increase public access to ICT

In South Africa and Cape Town specifically, much success has been obtained utilising public access to ICT facilities eg. Smart Cape, Cape Access and Digital Business Centres. The rollout of more of these facilities will drive the increasing use of ICT in society.



Possible areas of intervention in the Western Cape

All libraries and community centres in the province should be equipped with Smart Cape facilities.

RED Door and other business support offices should be complemented by Digital Business Centres. This also has the effect of getting more small and micro businesses utilising ICT.

Have government serves as an anchor tenant

Government's main pump-priming function on the demand side is to serve as an anchor tenant for broadband services. In addition, computerizing public information and providing public or e-government services through broadband networks is essential. E-government encourages citizens to subscribe to broadband services and provides businesses with more information. It also increases government efficiency and enhances governance.

Possible areas of intervention in the Western Cape

This is a primary area of intervention for PGWC. The way that PGWC uses ICT has to radically change from being a passive recipient of what the current market and players have to offer to being a driver (pump) for the creation of a new telecommunications landscape in the Western Cape.

Develop online content and media

Online content and media involve two key challenges. The majority of online content and other forms of media are in English or other international languages not widely spoken in many developing countries. And even if the language is spoken, the content is often not locally relevant. Hence governments should support content and media development in local languages, with locally relevant content. In Korea content development policies have been a critical component of the overall approach and have evolved in line with market developments.

Supporting content development is important for generating demand and, if performed strategically, can increase national wealth. Korea's online game industry



grew rapidly with broadband penetration and has become a major export industry as broadband expands worldwide.

Possible areas of intervention in the Western Cape

Develop a strategy/ framework to support the development of local content. This will include a variety of factors, including some level of infrastructure development. Again, it is important to link the interventions with other priorities of the province. For example, Project Ubusha (which was a Smart Cape-based local content development project) demonstrated how development of local content in Smart Cape could assist in supporting school children and thereby, improving the quality of the education system. Another example is the “Micro-economic Development Strategy for the Music Industry in the Western Cape” which has identified the need for a digital platform for the creation and distribution of local music as a key strategic intervention for the sector.

Encourage businesses to use broadband and e-commerce

Large enterprises may be the first users of broadband because they are usually aware of its benefits. But small and medium-size enterprises (SMEs), which make up most of the private sector, often lack an understanding of broadband and its impact or cannot afford it. Policy measures for SMEs include developing and providing free or low-cost applications, providing tax breaks for investments in ICT and Web-based services, and giving tax cuts to businesses in the ICT industry (such as software developers).

Countries must also pay attention to the legal foundation, such as allowing the use of electronic signatures to encourage businesses to participate in e-commerce. Improvements in information security, including encryption technologies and anti-hacking programs, are critical for stable and safe e-commerce.

Possible areas of intervention in the Western Cape

There are various interventions in this space which will probably comprise part of the sector support strategies.



While it is not possible for the PGWC to provide tax incentives for software developers, there might be other interventions that it could consider. One key intervention could be the development of a Western Cape Cloud Computing infrastructure. This was discussed by industry players at the recent Software Engineering Colloquium in Cape Town convened by the Institute of Electrical and Electronics Engineers (IEEE) and the Cape IT Initiative (CITi). This infrastructure could be used for a variety of purposes e.g. providing standardised systems and processes to government services (including local government), growing the skills and experience of Western Cape-based software engineers by allowing them to build cloud enabled applications at low/ zero cost of entry barriers. Small and micro businesses could be incentivised to use these applications because of their low cost. This could build a software eco-system with supply and demand drivers. The provision of low cost computing devices to small business (discussed above) could provide a further stimulus. A robust, affordable provincial telecommunications infrastructure, coupled with a Cloud Computing infrastructure could provide the backbone of a Provincial Shared Service Centre serving provincial and local government in the Western Cape (driving standardisation, increasing efficiency and effectiveness, while driving costs down).

Telecommunications Mobilisation Plan for the Province

Components of the mobilisation plan

If PGWC is serious about the development of a knowledge economy, a sense of urgency must be created and that activity in the space of telecommunications must start occurring in the province.

A telecommunications mobilisation plan should have the following components:

- Vision/ Establishment of the need for intervention - The development of a robust and affordable high speed telecommunications infrastructure must be recognised as a priority for PGWC intervention. These interventions must consider the entire telecommunications ecosystem (networks, services, applications, and users),



noting the relationship between components and informing the development of policies and programs that develop both supply and demand.

- Recognise the role of PGWC as a driver - The way that PGWC uses ICT has to radically change from being a passive recipient of what the current market and players have to offer to being a driver (pump) for the creation of a new telecommunications landscape in the Western Cape.
- Create a Provincial Broadband vision and strategy - PGWC must develop an ambitious, practical, holistic vision of the status and role of broadband telecommunications within the provincial economy. A provincial broadband vision should set goals informed by consultations with the entire range of stakeholders— provincial, national and local government, the wider public sector (SOEs and agencies), private investors, the public — to raise awareness and secure broad support. These vision statements should be backed by realistic programs and specific policies that fit within the provincial and national development goals. An example key programme could be to connect all healthcare institutions (clinics, day hospitals, and hospitals), libraries, community centres and schools as a matter of priority (not necessarily at broadband speeds) and use that as a key catalyst in developing the telecommunications infrastructure for a connected province.

Implementation of the plan

A Provincial Broadband task team/ project should be set up, consisting of representatives of all provincial departments, to kick-start the implementation of the plan. All departments need to be involved as this is a cross cutting initiative which will impact on their area of operation. Some specific areas of impact for each of the departments are outlined below.

DEPARTMENT	REASON FOR INVOLVEMENT
Department of Agriculture	Agrinet, rural development, safety and security
Department of Community Safety	CCTV, radio communications, crime statistics, etc.
Department of Cultural Affairs and Sport	Libraries, local digital content development, film and music
Department of Economic Development and Tourism	Core responsibility for Economic Development



Department of Environmental Affairs and Development Planning	Environmental issues (masts, radio signals, etc.), right of ways, etc.
Department of Health	Connected health care facilities, e-Health initiatives, etc.
Department of Local Government and Housing	Municipal telecommunications strategies, shared ICT infrastructure and services, etc.
Department of Social Development	Community facilities, Thusong Centres, mobile interaction with service recipients, monitoring and evaluation, etc.
Department of Transport and Public Works	Key infrastructure development, currently responsible for some of the voice telephony, etc.
Department of the Premier	Leadership, Centre for e-Innovation (responsible for data networks and ICT services), Shared Services
Provincial Treasury	Understanding of financing mechanisms, grant schemes, incentives, etc.
Western Cape Education Department	Connected schools, online curriculum, e-education, etc.

This task team/ project, co-ordinated by the Department of Economic Development and Tourism, should be responsible for the following activities:

- Drive the development of a multi stakeholder broadband and knowledge economy strategy for the Western Cape.
- Co-ordinate and align all government telecommunications activity in the Western Cape. This should encompass all provincial departments, local government, national government, state owned enterprises and agencies.
- Develop an economic model/s to stimulate investment in telecommunications infrastructure and related activities.
- Provide technical assistance to municipalities and provincial government departments in the development of their localised telecommunications strategies.
- Create a platform for demonstration projects, pilots and proof of concepts within the province.
- Understand key infrastructure developments in the province to identify opportunities for synergies and cost reduction opportunities for telecommunications infrastructure. This includes understanding the nature of



infrastructure (and other) grant funding and exploring synergies for the development of telecommunications infrastructure or services.

- Develop an understanding of national grants, incentives and other support mechanisms available for telecommunications infrastructure and services development e.g. USAASA, USAL process, Thusong Centres, etc., and assist Western Cape-based private and public sector organisations to access such support mechanisms.
- Develop better indicators that allow for regional differentiation with respect to relative ranking aimed at progressing towards a knowledge economy. This is critical if the availability of knowledge economy skills and infrastructure is really a key differentiator and attractor of investment.

The DEDAT should support this mobilisation plan with the creation of a Telecommunications Programme Management Office (Telecoms PMO) to support the Provincial Broadband task team/ project.



Related Reports

The following reports are support documents to this report and should be consulted if additional information is required.

- Telecommunications project: High level analysis and review of past, existing and potential PGWC and DEDAT activities, interventions, strategies and projects related to the development of a regional Telecommunications and Broadband Strategy
- Telecommunications project: Report on consultation process relating to the draft position paper.



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