

## **CHAPTER 4**

### **1.1 Information and Communication Technology (ICT)**

#### **1.1.1. Background**

The ICT sector has witnessed an accelerated growth of applications that support different types of data, voice and video services over recent years. In addition, the rate of connections of mobile subscribers has surpassed that for fixed line services. These developments affect both the infrastructure and the content components of the ICT sector.

#### **1.1.2. Role of ICT in promoting economic and social development**

Supporting economic growth in the ICT sector will serve as a catalyst for facilitating economic growth in other sectors. Support for the ICT sector's growth will be achieved by creating an environment that will raise investments in the ICT sector and minimise input costs; introducing competition and a managed programme of licensing new players; allowing existing players to play a bigger role through new legislation and policy directives; addressing regulatory constraints on infrastructure; and promoting the development of the small, medium and micro-enterprise (SMME) sector through appropriate interventions, including the black economic empowerment (BEE) charter.

The *State of the Environment Report 2004* indicates that only 1,6% of households in the Western Cape do not have access to telephone services. Those without access are mostly rural, black and coloured farm worker households who cannot afford private telephones or cellphones. In total, approximately 592 000 households (50,5%) have access to a telephone in their dwelling. However, statistics from the International Telecommunications Union (ITU) point to low numbers of Internet users in South Africa.

The three spheres of government acknowledge that ICTs can be used to make the government process more efficient and can improve efficient service delivery. There have been various drives aimed at connecting different government departments, municipalities and also increasing Internet access to remote communities through multi-purpose community centres and other access nodes. The drive towards e-government and e-service delivery within the provincial government and some key municipalities (such as the City of Cape Town and Knysna) has increased the demand for a resilient and affordable ICT infrastructure. Businesses and citizens are the end beneficiaries of this growing ICT infrastructure.

In many cases the provincial government does not (and does not want to) own or operate ICT infrastructure that it uses. It might lease it or use that of various service providers, either state-owned or in the private sector. It is thus necessary to specify the services required before deciding infrastructure needs and then to communicate these needs in order that service providers can plan infrastructure investments.

The provincial government, through its Centre for e-Innovation (Ce-I), has identified the following three areas which must be addressed:

- The creation of a province-wide digital broadband network for the use of provincial government departments and agencies, district councils and municipalities so as to provide a platform for the enablement of other e-government strategies;

- The wide application of geographic information systems as a common framework for information collection and assessment. This will support both the Provincial Spatial Development Framework (PSDF) and the SIP; and
- The encouragement of information sharing between government departments at the forefront of delivering services to citizens so as to enable the creation of a "single aggregated view" of the citizens and businesses of the Western Cape.

The rationale is that overall strategic goals should drive the strategy for planning and implementing government services that depend on ICT. The ICT infrastructure needed for these services should drive the strategic infrastructure plan (SIP).

### 1.1.3. Role-players involved in providing ICT infrastructure

A range of national and provincial organisations are currently responsible for providing ICT infrastructure in the province.

**Telkom** SA Ltd is a government business enterprise, whose main objective is to provide fixed line telephone services to the South African public. It has three operating licences: public switched telecommunications, transmission of radio frequencies, and value-added network services. In exchange for these it has to meet roll-out and service quality targets. These include new exchange lines, new lines for priority customers such as hospitals, schools, local authorities and village communities without an exchange, as well as the upgrading of digital lines. Government sold part of its stake in Telkom through an initial public offering on the Johannesburg and New York Stock Exchanges on 4 March 2003. However, government is still the majority shareholder, owning 38,3% of the shares.

The **South African Broadcasting Corporation** (SABC) was established as a government enterprise to provide radio and television broadcasting services to the country. It operates 17 radio stations and has three free-to-air television channels.

**Sentech** Ltd was established as a public company to provide a common carrier, broadcasting signal distribution for broadcasting licensees. Sentech is Africa's largest signal distributor and forms the backbone of the broadcasting industry in South Africa. The Sentech terrestrial network consists of 210 stations, 718 FM radio stations, 11 medium and 15 shortwave radio transmitters and 607 television transmitters. Satellite equipment also provides direct-to-home downlink beam coverage of most of Africa south of the equator.

The **Independent Communications Authority of South Africa** is responsible for regulating telecommunications and broadcasting in the public interest to ensure affordable services of a high quality to all South Africans. It issues licences to telecommunication and broadcasting service providers and, amongst others, manages the frequency spectrum.

The **Universal Service Agency** administers the Universal Service Fund. This fund is utilised for infrastructure for the universal service area licensees, as well as providing infrastructure for telecentres and school cyber-labs (computer laboratories with ICT equipment which enable access to the Internet and provide multi-media services.)

The **State Information Technology Agency** (SITA) was established in terms of the SITA Act 88 of 1998 to provide government corporate services in the following areas:

- Ring-fencing the affairs of the Department of Defence;
- Taking care of the ICT affairs of all other national and provincial governments;
- Transforming the way in which government conducts its business; and

- Acting as the single channel for procurement of government IT and related services through its IT Acquisition Centre.

In the absence of alternative solutions for under-capacitated municipalities, the **Development Bank of Southern Africa** (DBSA) has installed and funds an option for these municipalities to connect to the Internet via a DBSA network. By March 2005 there were 12 (out of 24) Western Cape local municipalities connected to LgNet and 141 connected nationally. Also, three content providers in the Western Cape had been connected including the Chief Directorate Surveys and Mapping. An associated local government resource centre website has also been implemented.

#### **1.1.4. Western Cape strategic goals and projects**

The Provincial Growth and Development Strategy recognises that "at the organizational level, the knowledge economy involves fundamentally new ways of working, new management practices, new competencies amongst employees and a new role for government and its regulatory agencies."

It similarly recognises that ICT can be leveraged for broader strategic goals such as those underpinning the iKapa Elihlumayo vision and strategy. ICT can be key to transforming the internal operation of government departments and also the manner and type of services delivered by the departments to external clients.

The provincial government has formulated a set of goals related to ICT to support the Growing the Cape Strategy. These are listed in the Department of the Premier: Annual Performance Plan 2006/07. Table 1 presents the goals related to ICT infrastructure.

**Table 1 Strategic goals and services and associated ICT infrastructure requirement**

Strategic goal	Services	Infrastructure	Status of Infrastructure	Examples of projects
Best practice large enterprise corporate Information System	An environment conducive for collaborative work, supporting a non-silo approach to service delivery	Enterprise architecture operationalised Common platforms Disaster recovery	Under development	Phase 2 (process, organisation, information, technology, strategy signed off by MANCO).
Effective applications at corporate level, in departments and in state institutions served by departments	Select and install new applications Develop new applications and extensions and changes to existing applications Maintain applications	Inter-operability Standards e.g. e-government service standards and definitions Operationalised applications	More than 400 applications in operation Many new applications under development	Fleetman CapeGateway portal eLearning applications Collaboration system (communities of practice)
Effective and efficient management of projects	Executive and management provided with aggregated information e.g. budget tracking and progress towards strategic goals Projects effectively managed	Project management standards Operationalised automated project management system		Projects in controlled environment (PRINCE) implemented. Project management tool implemented
Client orientated government services	Provision of information required for development of client-centred government services	Business intelligence system		Business requirement specifications signed off by stakeholders Pilot implemented
Spatially orientated development	Effective spatial planning Development and delivery of services	Consolidated provincial GIS system Other applications linked to GIS system		
Expand on-line access for existing clients Extend on-line access to clients who don't have access	Access to government IT systems for: Government officials Workers in state institutions (e.g. schools and hospitals) All other clients e.g. people with and without Internet access	Terminal PC Kiosk in MPCC Telephone Internet-enabled mobile phone Mobile device Connection Corporate LANs Corporate WANs PSTN Wireless e.g. GPRS, 3G Dedicated digital lines (Diginet) Broadband systems Satellite Standards Communication protocols Webservices e.g. .net, SOAP, WSRP, OASIS		Government official/employee access Network connected PCs in provincial government offices State institution access points PCs at schools connected to Internet PCs at clinics and hospitals connected to Internet Community access points e-Centres RED door mobile unit Emerging farmer mobile unit

#### **1.1.4.1. Provincial government key projects**

##### *Cape Gateway Portal*

The Cape Gateway is the Province's flagship e-government project to date, and provides access to a large amount of useful information for citizens. However, the real value of this approach is yet to be realised, namely its potential to transform and improve government services and performance.

##### *Province-wide area network*

The province is planning to deploy converged video/data/voice network infrastructure. 2005 saw the completion of a feasibility study and business case, and approval from the Minister of Public Service and Administration. Phase one (2006/07) covers the implementation of core infrastructure, and connection of approved local authorities. Over the following years, four departments will be migrated each year, and all will have done so by 2010. The remaining local authorities will be connected by 2008/09.

##### *Geographic information systems (GIS)*

As part of a broader MIS/business intelligence (BI) strategy, the Ce-I is planning the wide application of GIS as a common framework for information collection and assessment. This will, in particular, support the implementation of the PSDF and the SIP developmental priorities of iKapa Elihlumayo.

##### *Cape Access*

The Cape Access programme is using both new and existing infrastructure to provide rural communities with access to information technology. By using existing computer centres in local schools and multi-purpose centres, Cape Access is helping communities to get the greatest benefit from these facilities. New computer centres have been installed in libraries in communities where there are no facilities or where extra-facilities are required.

Each Cape Access site is centred around an e-Community Forum. The forum brings together representatives from the community, including community leaders, NGOs, facility representatives and interested community members.

##### *Free and opens source software (FOSS)*

The province is committed to developing a policy that recognises the use of FOSS where viable and appropriate.

##### *Provincial government enterprise architecture*

The provincial government enterprise architecture provides a framework for mapping out ICT infrastructure and application use by provincial government departments. This provides a framework for ensuring that technology at the government's disposal is used effectively.

##### *Education*

The Khanya Schools Connectivity project aims at introducing ICT in all schools and other learning sites in the period 2005 to 2010. This will mean that every educator and learner in the Western Cape will have access to ICT infrastructure and training to support the teaching and learning process. The Schools Telecoms project has involved the provision to virtually all schools in the province of a PC with communications (email), school administration systems and an Internet link. Section 20 schools, which are not authorised to manage expenditure of their own budgets,

are connected to the Western Cape Education Department school administration systems.

#### *Health services*

The province is continuously developing the health system management applications and related infrastructure across the three academic hospitals, 10 regional hospitals, 24 district hospitals and about 300-400 primary health care facilities (clinics) in the province. There are also a range of initiatives using wireless connectivity to connect primary healthcare facilities and provide the ability to access data via mobile devices.

#### *Economic governance and administration*

Training of emerging farmers through mobile units, providing broadband connectivity via satellite for remote areas and providing wireless disaster management in local government are some of the key projects.

#### **1.1.4.2. Provincial government challenges and opportunities**

The most visible challenge in terms of building a viable ICT infrastructure in the province is that the current regulatory regime and legal framework do not provide for affordable tariffs. Nor do they provide conducive conditions for investment in infrastructure in underserved areas. Connecting remote rural and semi-rural areas remains a costly affair.

Another impediment to extensive infrastructural investment is the current cost of software licences. For example, the Ce-I cluster for Education and Culture/Sport spent R14 million on Microsoft licensing in 2004/05. Open source alternatives are being investigated to mitigate the high cost of ownership of proprietary software.

An important opportunity is that e-government services can be taken to severely underserved clients such as people in urban townships, rural towns and remote areas. Current technologies such as wireless and mobile devices provide the capability. In many cases, this is affordable when one looks at the true cost currently incurred in accessing and providing access to these services.

The coordinated drive towards e-government and e-service delivery highlights the need for a province-wide area network from which all provincial government departments will benefit. This is a strategic investment that needs to be made in order to meet other strategic priorities of building human and social capital.

Another key challenge in investing in and rolling out infrastructure is national, provincial and local government coordination and collaboration in projects. At present there are various disparate and duplicated initiatives in building province-wide area networks and connecting remote communities. The USA, provincial government and the City of Cape Town are duplicating each other's work in terms of increasing access to telecommunications. SITA (through SENTECH) and the DBSA are doing the same work in terms of wide-area networks.

#### **1.1.5. Local government strategic goals and projects**

The extent to which local municipalities and districts are embracing ICT varies significantly. Generally, they can be categorised into three broad groupings:

- those that see ICT as a tool for economic and social development, both within the local government itself and for the communities served;
- those that see ICT as a means for improving internal institutional processes; and
- those that make no mention of ICT in their integrated development plans (IDPs).

Bitou (Eden district municipality (DM)) and Swartland (West Coast DM) are examples of the first group. Their IDPs embrace the use of ICT for achieving many of their strategic priorities, including poverty relief and improving social infrastructure and delivery of basic services.

Examples of municipalities falling in the second group are Witzenberg (Cape Winelands DM), Prince Albert (Central Karoo DM) and Langeberg (Eden DM). These municipalities mention ICT in terms of institutional development of the municipality and capacity building, with related objectives such as effective communication structures and administrative and management systems. ICT is seen as an enabler for internal municipal processes, but is not considered for use beyond the confines of the municipal offices.

Laingsberg (Central Karoo DM) is an example of a municipality falling into the third category, and fails to mention ICT in its IDP at all.

Listings of current and planned projects give a better sense of the actual ICT service development status of each municipality. These listings reveal:

- Many municipalities (10 out of 24) are implementing, upgrading or planning geographic information system (GIS) projects;
- The Swartland Municipality's (West Coast DM) *Batho Pele Gateway*, Stellenbosch's (Cape Winelands DM) electronic community information centre, and Mossel Bay's (Eden DM) *Mosbaya* all have e-government projects of some sort;
- Bitou, Stellenbosch, Central Karoo and Beaufort West (Central Karoo DM) are all running telemetry projects for water management;
- The Cape Winelands district, Witzenberg, Stellenbosch, Theewaterskloof (Overberg DM) and Bitou are all either currently implementing or planning IT-based performance management systems.
- Stellenbosch's document management system will, by 2008, be used for a range of functions, including procurement process management.

The City of Cape Town Municipality and Knysna Municipality (Eden DM) are by far the most advanced in the strategic roll-out of ICT infrastructure. The Cape Winelands DM has completed its master systems plan in line with its IDP. Other district municipalities still need funding to complete this process.

#### **1.1.5.1. The City of Cape Town**

The City has won several awards for its bold vision of IT as a means of enhancing local government service delivery. These include the 2002 African ICT Achievers Award for e-Government and the \$1 million Bill and Melinda Gates Foundation Access to Learning Award for the city's Smart Cape project.

The City is an amalgamation of seven metropolitan local councils. The merger was achieved in 2000. To effect the merger, Cape Town implemented a new management and computerised administrative system to be operated by its 6 500 users. The 62 legacy systems were replaced by a single integrated system with features such as:

- creation of a single corporate body for all old administrative units, with a single budget;
- administration of social services such as health, education, and safety and security;

- administrations of basic services such as water, sanitation, electricity and waste removal;
- public participation in municipal governance;
- use of the Internet to interact with the citizen, providing a single point of service;
- compliance with requirements of various financial accounting and labour legislation and standards, including Public Finance Management Act, generally accepted municipal accounting practice (GAMAP), employment equity, etc.

At this stage, the City has implemented all the back end systems and also an Internet website that provides information and a few very simple on-line transactional services such as beginning the process of registering as a supplier. The next stage of development is the implementation of transactional e-Government services such as applications and issuing of licenses, online payments and on-line procurement by the City.

Project priorities for the City include the following:

#### *Telecommunications*

A two-pronged approach is being followed that includes a long-term development strategy with continual upgrading. The City has connected 500 municipal sites such as community centres and clinics in the under-served areas. Some of these connections include voice over Internet protocol (VOIP) services. Bandwidth of existing networks is being upgraded, in particular to provide access to the recently installed SAP systems and GIS data that are becoming more central in many applications. The City is investigating WAN/WiFi/mesh/point-to-point options for extending city networks and services to wireless devices.

#### *Security*

The City has a large project which aims at addressing (amongst other things) external threats, technical threats and human threats from inside the network.

#### *Compliance*

The City is positioning itself to comply with legislation such as the Electronic Communications and Transactions Act 25 of 2002.

#### *Community projects*

The City has a range of projects which aim to provide access to citizens, particularly those living in poorer communities. Examples are:

- 100 libraries have each been equipped with five Internet-connected PCs running Linux, open-office software, a web-browser and email. Users are entitled to use them for free for 45 minutes per day. The PCs are reportedly very busy all the time that they are available.
- Some community centres have also been equipped with Internet-connected PCs.
- SmartCape is a small business resource centre which provides Internet access, business software packages, videos and the SmartCape portal with links to many relevant business sites; and
- Business centres in Langa and Gugulethu provide ICT facilities plus business advisers.

#### *Health*

The City is implementing a project to connect all 106 health clinics to a network and develop a system where there is one patient record across facilities and a single view of the client.

### *Disaster Management*

The City is linking up with the provincial disaster management systems.

### *e-Government*

As noted above, the backend for the SAP system was recently completed, and the City is now ready to start rolling out client-facing transactional services. Multi-purpose community centres are planned for the near future.

#### **1.1.5.2. Knysna Municipality**

Knysna is the first municipality in Africa to roll out a municipal-wide wireless broadband network for use by its citizens and public officials. The municipality implemented a wireless network project to connect 62 of its offices in a network configuration. The same wireless system that connects the offices will be used to provide both government and private users throughout Knysna with access to a WiFi network. In this way, the municipality aims to deliver cheaper, faster and more reliable information and communication services to the Knysna community. The wireless network, with forty base stations, includes last mile access and provides rural coverage for many of the informal settlements in the area. Knysna municipality will offer wireless access to residents as part of its public service delivery strategy, providing VOIP services.

Residents of Knysna will also be able to access municipal online content as well as e-government sites, emergency services and selected educational services free of charge. UniNet, the Internet service provider, has been contracted to carry out the project.

VOIP services will be offered on a prepaid and subscriber basis to the community, and some 30 public VOIP phones are to be installed in informal settlements, giving free VOIP and WiFi connectivity to the municipality's network. A WiFi phone is being piloted that will offer free VOIP connectivity between VOIP devices.

In addition to the extension of services to previously un-served clients, installation of the WiFi network is expected to save the municipality an estimated R4 million in Telkom fees during the five-year contract period.

### *Regulatory issues*

Telkom has charged that UniNet is a value-added network supplier (VANS) and the project is in contravention of the Telecommunications Act. UniNet maintains that the section in the Telecommunications Act referred to by Telkom relates to private telecommunications networks and not VANS, meaning that it does not apply to UniNet

Knysna's approach is in line with the background paper that informs the strategy for the Western Cape Centre for e-Innovation. For the SIP, the important features that distinguish the Knysna project are:

- It is different because it uses a different technology:
  - No other South African local government has chosen to implement a wireless network to connect all its government offices.
- It is different because it provides different services:
  - No other South African local government has chosen to provide access on its own network people for non-government business.

- No other South African local government has chosen to provide access to a general communications network, i.e. to the Internet, personal phone calls, email.
- No other South African local government has chosen to provide free phone services to people in poor areas.
- It is different because it has different intentions:
  - It intends to stimulate general social and economic development by extending access to telephones and the Internet to everyone in the Knysna area.
- It is different because it has a different approach:
  - The essence of the approach is innovative whereas traditionally government follows tried and tested approaches.
  - It is taking a leapfrog approach, skipping over incremental increases in telecommunications service provision and instead taking a quantum leap.
  - It is challenging the norms set by its country environment by doing something that is recognised as very different in a area that is characterised by conformity.
  - It is taking a risk. It is implementing a system that might be in contravention of regulations.
  - It is setting up in competition with the dominant telecommunications company, an organisation on which it is currently dependent for local telecommunications services and which it will remain at least partly dependent on for services outside the Knysna area.

Perhaps the main value of the Knysna WiFi project will be as a reminder to assess the SIP in terms of how much innovation it displays, how much innovation it encourages and how much innovation it makes room for.

### **1.1.5.3. Local government challenges and opportunities**

There appears to be a lot of overlap in the efforts of municipalities, districts and the province. While some municipalities are evidently well on their way to joining the information society, the information presented in their IDP documents implies that they are unaware the information society exists. Lessons learned from municipalities forging ahead should be shared with others, and collaboration between the three spheres of government is essential if duplication of effort is to be addressed. The Inter-governmental Relations Bill will hopefully assist in resolving the turf wars and duplication.

There are also many local governments that are being left out of developments in ICT services and connectivity through their lack of knowledge, capacity and financial resources. In the absence of alternative solutions for these under-capacitated municipalities DBSA has installed and funds an option for these municipalities to connect to the Internet via the DBSA funded LgNet network. The connection gives them access to specialised on-line services and information relevant to municipalities and also to discussion forums of municipal employees in similar situations to themselves. LgNet provides an interesting model for network-based government services and interconnection in South Africa.

The review for the SIP found that provincial government officials were interested to know if the DBSA might consider extending access to other under-serviced state institutions such as clinics and schools. There are a number of technical and economic arguments against this:

- LgNet has a gateway to the SITA GCCN network which will allow all national government departments, all provincial government departments and

anybody else connected to the GCCN access to the LgNet Virtual Private Network (VPN) and its services provided they have a valid user ID. Currently the LgNet and local government resource centre are 'owned' by the partnership between the Department of Provincial and Local Government (DPLG), South African Local Government Association (SALGA) and DBSA and its focus is the management of municipalities to create an e-community for sharing of information and knowledge.

- Expanding the network to provide a larger coverage will raise the question as how much this will cost to install, maintain and support. It raises the related question of who will then pay for this expansion which will most probably more than quadruple the costs. Expansion will also alter the network design substantially and create other licensing, security, and technology challenges.
- Current best practice is for clients (telecommunications / ICT service users) with very differing needs to be connected to networks that meet these needs. They might use infrastructure provided for general needs in the way that LgNet uses Telkom diginet lines. Smaller networks are then interconnected so that any threat from the one network can be isolated and confined to the source network area. This makes damage control and fixing of problems easier. Very big special-purpose networks are easy targets for hacker and viruses and a security nightmare.

The Knysna WiFi project also highlights the need for a sound regulatory environment. If the Knysna example can be duplicated across the province many current challenges in telecommunications and ICT will be resolved. In South Africa large numbers of people are still denied access to telecommunications services, including e-government services, because the service provider has the power to deny them the service. There are many other service providers that would be only too pleased to provide the service at a profit, but they are prevented from doing so.

#### **1.1.5.4. SIP in the Context of WSIS**

The World Summit on the Information Society (WSIS) was held in two phases, starting in 2003. More than 175 countries participated in a process aimed at decreasing the digital divide and ensuring access to information and knowledge to all. The second phase held in Tunis in November 2005 reaffirmed commitments to (amongst other things):

- Ensure that everyone can benefit from the opportunities that ICTs can offer. This entails governments, the private sector and civil society working together to improve access to information and communication infrastructure.
- Urging governments to create public systems of information on laws and regulations and building wider public access points for disseminating information.
- Building ICT networks and applications based on open and interoperable standards that are affordable and accessible to all, available anywhere and at anytime.

The national government, through the Department of Communications (DoC) and the Presidential National Commission on Information Society and Development (PNC on ISAD), has set a roadmap for implementing some of the commitments made in Tunis. The plan will have as its end goal decreasing the digital divide in all of South Africa's provinces and availing telecommunications to all. The national implementation plan will have implications for SIP objectives and should hasten the delivery of some of the anticipated goals such as:

- affordable telecommunications;
- increased infrastructure for broadband Internet access for all;

- a sound and fair regulatory environment; and
- increased inter-governmental coordination and cooperation.

#### 1.1.5.5. SIP key projects for the province

An investment in the following key projects will improve the ICT infrastructure for the Western Cape and service linkages to other sectors such as health, education, transport and agriculture. (The # indicates where a project is a priority and/or is scheduled for implementation in 2005-2010.

**Table 2 Key projects**

Project	Priority	2005-2010	Lead Sector
Knysna WiFi and similar projects	# under way	#	District municipalities
Provincial government GIS	#	#	
Provincial satellite connectivity project for remote farmers			Provincial government
Free and open source software strategy		#	Provincial and local government
Province-wide area network	# under way		SITA, provincial government
Broadband Internet access via electricity lines		#	
Transactional e-government services	#	#	Provincial, local government
Integrated health systems (Healthcare 2010)	# under way		Department of Health
Master system plans for municipalities	#		SITA
Enterprise architecture for provincial government departments	# under way		Provincial government
Multi-purpose community centres			Provincial government, USA
SITA Internet service provider and WAN			SITA
Investigate under-serviced areas licence (USAL) provisioning	#		USA