

African Leadership in ICT

Assessment of Environmental, Institutional and Individual Leadership Capacity Needs for the Knowledge Society in South Africa

A Situational and Needs Analysis

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Prepared by

Country Research Team: Benjamin Akpor and Mammo Muchie

(AkporBO@tut.ac.za and MuchieM@tut.ac.za)

GESCI Research Team: Helena Tapper and Margaret Nyambura

(Helena.Tapper@Gesci.org and Margaret.Nyambura@gesci.org)

GESCI

9th Floor, Unga House, Westlands

Nairobi, Kenya

Office: +254 20 370 6060/1

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This report is part of 4 assessment reports: Mauritius, South Africa, Tanzania and Zambia, plus a summary report, all available at <http://www.gesci.org/african-leadership-in-ict-alict.html>

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Acronyms

ABET	Adult Basic Education and Training
BEE	Black Economic Empowerment
BRIC	Biotechnology Regional Innovation Centre
CHET	Centre for Higher Education and Training
COE	Centre of Excellence
CSIR	Council for Science and Industrial Research
DBE	Department of Basic Education
DBSA	Development Bank of Southern Africa
DOC	Department of Communications
DHET	Department of Higher Education and Training
DST	Department of Science and Technology
ECD	Early Childhood Development
ELRC	Education Labour Relations Council
FET	Further Education and Training
GDP	Gross Domestic Product
GNP	Gross National Product
HEIs	High Education Institutions
HEQF	Higher Education Qualification Framework
HSRC	Human Science Research Council
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
ISAD	Information Society and Development
KS	Knowledge Society
LTSM	Learner Teacher Support Material
NRF	National Research Foundation
NSI	National System of Innovation
PDOE	Provincial Department of Education
PGM	Platinum Group Metal
PNC	Presidential National Commission

PRI	Public Research Institution
R & D	Research and Development
R & D & I	Research and Development and Innovation
SADC	Southern Africa Development Community
STI	Science, Technology and Innovation
TELI	Technology Enhanced Learning Initiative
TLI	Teacher Laptop Initiative
TTPD	Teacher Training and Professional Development
WEF	World Economic Forum

1. Introduction

The challenges faced by African economies to catch up, leapfrog and make the transition by moving from a resource based economy to knowledge based- economy and society is a daunting one. In this project we concentrate on the following pillars for building a knowledge economy and the extent in which South Africa is positioned to move from a resource based economy to a knowledge society by looking closely at the actors, the policies and practices on the following interrelated spheres:

- Education from basic to higher education training
- Science and technology and Innovation
- The role of ICT as a cross cutting and enabling technology recognised variously as important and fluid as electricity and water in today's world.

There are a number of transitions in South Africa at the political, economic, and academic and community levels occurring simultaneously. The political transition from the Apartheid system to a democratic system based on a highly acclaimed constitution is broadly going along the route that has not created problems, often seen in other parts of Africa.

The economic transition has had a series of broad strategies to maintain strong macro-economic stability whilst undertaking redress to the black population that still suffer from unemployment, inequality with high Gini coefficient, poverty and lack of skill and resources. The economy has been bifurcated with what Thabo Mbeki calls the first economy linked to the global economic system and the second economy that remains both racially and economically with semi- formal and informal economic structures. There has been, from the first economy the Black Economic Empowerment (BEE), strategy that has remained controversial though there have been blacks that have used BEE to useful benefit.

The education system from basic to higher education has been undergoing transformation with increasing diversification of the student population and growing number of hitherto

disadvantaged black students. There are however problems in the availability of qualified teachers, aging white professors and an academy that is not yet as transformed as the political arena. The local level and communities are areas for job creation and service delivery. There is huge local concern that services and jobs are not being created as fast as required, especially to get the youth to engage in productive activities. Currently there is active debate focusing on how municipal and township services and job creation can be promoted to uplift the many that are jobless. It has been suggested that lack of skills at the community level is a serious issue, where 5 million people are unemployable.

The South African national system of innovation has thus bifurcated characteristics where the different stakeholders have differentiated, political, economic, knowledge and service access despite the transition from apartheid to a democratic system since 1994.

2. Country Profile

The population of South Africa was estimated to be 49.99 million in 2010. Fifty-one per cent (approximately 25.66 million) of the population is female. The province of Gauteng comprises the largest share of the South African population. Approximately 11.19 million people (22.4%) live in this province. KwaZulu-Natal is the province with the second largest population, with 10.65 million people (21.3%) living in this province. With a population of approximately 1.10 million people (2.2%), Northern Cape remains the province with the smallest share of the South African population. Nearly one-third (31.0%) of the population is aged younger than 15 years and approximately 7.6% (3.8 million) is 60 years or older. Life expectancy at birth is estimated at 53.3 years for males and 55.2 years for females. The infant mortality rate is estimated at 46.9 per 1 000 live births. Under the age of 5, the mortality rate (per 1,000) is 67¹. The literacy rate, adult total (of people ages 15 and above) is 88%².

According to the 2010 statistics, South Africa has an annual GDP of US\$ 488.6 billion. It ranks 25th in the world economy in 2010³. Per capita GDP is US\$7,100⁴. The economy of South Africa is ranked as a upper-middle income economy by the World Bank, which makes the country one of only four countries in Africa represented in this category, (the others being Botswana, Gabon and Mauritius)⁵.

South Africa is a resource based economy. It is the second largest producer of gold in the world and the largest producer of manganese, chrome and platinum. It is the world third largest exporter of coal. However, the sector is only 3 % of GDP. The service sector, particularly tourism industry is a fairly large sector in South African economy. The manufacturing industry, automotive industry as a large part of it, produces 15 % of GDP. Agriculture contributes 3 % to GDP⁶.

According to the World Economic Forum (WEF) *Global Information Technology Report, 2010-2011*, South Africa has the second best developed telephone system in Africa after Mauritius. The *Report* uses the Networked Readiness Index (NRI), covering a total of 115 economies in 2010-2011, to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments. The WEF ranks South Africa 61st out of the 115 economies and

in the middle income group the ranking is 11th. Tunisia and Mauritius are the only countries in the first 50 most developed countries in ICT (World Economic Forum, Global Information Technology Report, p. xix). Challenges are the long term Telekom monopoly in South Africa that has kept the user rates high and the monopoly has been opened in mobile communications only in the last years.

3. Education, ICT, STI and R&D Policy

i. Knowledge Society Policy & Vision

ICT4D Policies & Plans

South Africa has an Information Society Plan called the Information Society and Development (ISAD) Strategic Plan 2010-2013.⁷ This ISAD plan is coordinated by the Presidential National Commission, located in the Department of Communications. The purpose of the Plan is to provide timely and informed advice to the President on matters related to the development of an inclusive information society and to facilitate coordinated development of an *inclusive* Information Society in South Africa. The country's Information Society vision is the following:

"To establish South Africa as an advanced information-based society in which information and ICT tools are key drivers of economic and societal development."

PNC on ISAD covers the following activities: The operations & ISAD cluster communications, stakeholder management and organisational excellence; Research & Special Flagship Projects; Planning, Coordination & Evaluation: planning and foresight, coordination and integration, evaluation and impact management and e-Applications: e-education, e-health, local content, e-governance and small, micro and medium enterprises⁸.

The strategy has been implemented in two provinces, Limpopo and Northern Cape. The plan is to extend the ISAD plan to other provinces.

Innovation towards a Knowledge-Based Economy, Ten-Year Plan for South Africa (2008-2018) is a national innovation plan. It emphasizes the country's need to invest in R & D, and make South Africa's innovation system functioning to support economic growth and employment. The Plan is coordinated by the Department of Science and Technology through national initiatives. The goal of the R & D investment is 1 % of GNP in the near future.

The plan proceeds from government's broad socioeconomic mandate – particularly the need to accelerate and sustain economic growth – and is built on the foundation of the national system of innovation (NSI). It recognises that while the country's science and technology system has

taken important strides forward, there is a tremendous gap between South Africa and those countries identified as knowledge driven economies. To close this gap, the NSI must become more focused on long-range objectives, including urgently confronting South Africa's failure to commercialize the results of scientific research, and address inadequate production (in both a qualitative and quantitative sense) of knowledge workers capable of building a globally competitive economy.

The title of the Innovation Plan emphasizes innovation – but not innovation for its own sake. South Africa's prospects for improved competitiveness and economic growth rely, to a great degree, on science and technology.

The vision for South Africa in 2018 includes:

- Be one of the top three emerging economies in the global pharmaceutical industry, based on an expansive innovation system using the nation's indigenous knowledge and rich biodiversity
- Deployed satellites that provide a range of scientific, security and specialized services for the government, the public and the private sector
- A diversified, supply secured sustainable energy sector
- Achieve a 25 percent share of the global hydrogen and fuel cell catalysts market with novel Platinum Group Metal (PGM) catalysts.
- Be a world leader in climate science and the response to climate change having met the 2014 Millennium Development Goals to halve poverty.⁹
- Meet the 2014 Millennium Development Goals to halve poverty.¹⁰

The Department of Communications (DOC) leads all ICT initiatives. Its mission is: "Building a Better Life for all Through an Enabling and Sustainable World Class Information and Communication Technologies Environment"¹¹

Education General Policies, Strategies & Frameworks – Access, Quality, Equity, Curriculum

The Bill of Rights in the South African Constitution¹² (RSA, 1996a) stipulates that “everyone has the right to a basic education, including adult basic education; and further education, which the State, through reasonable measures, must make progressively available and accessible”.

According to the South African Schools Act (RSA, 1996), schooling is compulsory for children aged 7-15 or attendance in Grades 1 to 9, whichever comes first. School life spans 13 years or grades, from grade 0, otherwise known as grade R or "reception year", through to grade 12 or "matric" - the year of matriculation. The basic education has six phases namely:

- Foundation phase incorporates grades R to 3
- Intermediate phase incorporates grades 4 to 6
- Senior phase incorporates grades 7 to 9
- Further education and training (FET) incorporates grades 10 to 12

In 2009, South Africa had 32,104 educational institutions. These included 25,906 mainstream schools and institutions and 6,197 other educational institutions, namely, special schools, Early Childhood Development (ECD) sites, public Adult Basic Education and Training (ABET) centres, public FET institutions and public high education institutions (HEIs).

A Ministerial Committee for Learner Teacher Support Material (LTSM) was constituted in February 2010, based on a recommendation from the Review Task Team of 2009 for the Department of Basic Education (DBE)¹³. In the DBE drive to strengthen and support curriculum implementation in South African schools, textbooks and other educational resources are crucial factors in ensuring improved educational performance. In general the LTSM Committee focused on recommendations that would ensure good quality material being made available to all schools as a starting point. Other issues such as good combinations of material in classrooms and supporting teacher development regarding LTSM are expected to develop over time through sustained focus. The recommendations by the committee are summarised as follows:

- *National Catalogue*: The Committee recommends a national LTSM catalogue, per grade and subject, be developed. This should comprise of no more than 8 comparable items.

- *Centralised Ordering:* The Committee recommends a system of nationally centralised ordering of LTSM, drawing on school-based choice of LTSM with key building blocks such as providing sufficient information for decision-making and decentralised delivery and tracking systems.
- *Establish an LTSM Institute:* The Committee recommends that the DBE establish a research and development unit focussed on LTSM, in keeping with international best-practice. It further recommended *reconfiguration of the role of government and private companies in LTSM provision* noting that the options for this recommendation to be implemented were many and further consultations were imperative.

An action plan to 2014 entitled “Towards realisation of Schooling 2025” was released in 2010. The review shows that more children completed the compulsory Grades 1 to 9 (99%) in 2010 compared to those who completed in 1994 (80%). The action plan has 27 broad action areas that are aimed at improving the quality of education in basic education which forms the basis for the rest of the education system.

The South African government has further developed a strategic plan 2010 to 2015 inclusive. The strategic plan notes that before April 2009, the vision of an integrated education and training system was hampered by the dispersal of administrative responsibility for the coordination of the education and training sub-systems across two national departments (Education and Labour), and nine provincial departments of education.

Institutions

- Department of Basic Education (DBE) with the support of nine Provincial Departments of Education (PDOE).
- Department of Higher Education and Training
- Centre for Higher Education Transformation (CHET)¹⁴
- Thutong is the Department of Education portal for all educators and learners, specifically aimed at those in grade R to 12. It has been created to support quality of teaching and learning in South Africa. The portal is part of government's intention,

White Paper on e-Education, to turn South African schools into centres of quality learning and teaching for the 21st century.¹⁵

Education ICT Policies & Initiatives

Information and communication technologies (ICTs) are central to the changes taking place throughout the world. Digital media has revolutionised the information society and advances in ICTs have dramatically changed the learning and teaching process. This has opened up new learning opportunities and provided access to educational resources beyond those traditionally available. The provision of a telecommunication infrastructure available for learning and teaching is gradually increasing, and many schools are exploiting the benefits of ICTs to enhance the quality of teaching and learning.

South Africa has a strategy for information and communication technologies in education developed in 2001. The strategy recognises that revolution in information and communication technologies presents three major challenges in the education system globally. These challenges are: participation in the information society, how ICT impacts on access, cost effectiveness and quality of education; and how ICT affects the education system.

In the South African context, the concept of e-Education revolves around the use of ICTs to accelerate the achievement of national education goals. E-education is about connecting learners and teachers to each other and to professional support services, and providing platforms for learning. E-education is aimed at connecting learners and teachers to information, ideas and to one another via effective combinations of pedagogy and technology in support of educational reform.

The government released a draft white e-education paper in 2004 under gazette notice 1869 titled "Transforming Learning and Teaching through Information and Communication Technologies (ICTs)". The paper notes that the introduction of ICTs to schools creates new ways for students and teachers to engage in information selection, gathering, sorting and analysis. In addition, it acknowledges that ICTs have the potential to enhance the management and administrative capacity of schools. The White Paper sets out Government's response to a new information and communication technology environment in education.

The White Paper characterises schools that implement e-Education as institutions that have:

- Learners who utilise ICT to enhance learning;
- Qualified and competent leaders who use ICT for planning and management;
- Qualified and competent teachers who use ICT to enhance teaching and learning;
- Access to ICT resources that support the curriculum; and
- Connections to ICT infrastructure.

ICT Research and Development and Innovation Strategy (ICT R & D & I)

The ICT R&D Strategy¹⁶ for South Africa was finalised in 2007 and is being implemented under the auspices of the Information Society and Development (ISAD) Plan of South Africa. The National Research and Development Strategy¹⁷ was published in August 2002. The Department of Science and Technology published the Ten-Year Innovation Plan¹⁸ in 2007.

The purpose of the South African ICT R&D&I strategy is to create an enabling system for the advancement of ICT R&D and innovation, within the context of the broader national strategy. It aims to improve economic competitiveness and the quality of life for South Africans. The 2015 ICT vision is as follows:

"South Africa is an inclusive information society where ICT-based innovation flourishes. Entrepreneurs from historically disadvantaged population groups, rural communities and the knowledge-intensive industry benefit and contribute to the well-being and quality of life of our citizens. South Africa has a strong national ICT brand that captures the vibrancy of an industry and research community striving for excellence, characterized by innovative approaches to local and global challenges, and recognised for its contribution to the economic growth and well-being of our people and region."

In line with this vision the key ICT R&D&I strategic objectives are:

- To develop focused and strengthened ICT research activities to achieve world-class research competencies in identified key S&T areas;
- To build a strong and robust ICT innovation environment, with an indigenous ICT sector that is competitive and growing; and
- To build advanced human capital (ICT skills base) for research and industry, as well as the proliferation of ICT in other sectors of the economy.
- The following supporting objectives underpin the ICT R&D&I strategy:
 - The creation of an enabling environment, through effective policy, strategy and support structures, which will lead to effective implementation
 - The development of strong R&D cooperation with countries who are key players in ICT R&D.
 - The provision of resources for the ICT R&D and Innovation System, which will result in ICT GERD funding at OECD levels by 2015.
 - The development of an effective research infrastructure with local and international collaboration.

Proposed strategic interventions for implementation of the ICT R&D&I strategy include:

- The Advanced Human Capital Development Programme which aims to dramatically improve post-graduate enrolment and completion rate in ICT by supporting young researchers as students in employment.
- The Critical Mass Research Programme will support focus and critical mass R&D in identified technology and application domains through an array of instruments that link established researchers and draw in new researchers including post-doctoral researchers and international experts available in the NSI system. These include core grant proposal funding, research chairs, networks and centres of excellence, institutes etc.

- The International ICT R&D Collaboration Programme supports the objectives of the Strategy through collaboration via collaborative R&D projects, researcher mobility and science and technology networking.
- The Large Innovation Initiatives and Grand Challenges addresses the innovation chasm by stimulating broad collaboration across disciplines and amongst players in various stages of the innovation pipeline by leveraging the Innovation Fund and other instruments.

Key performance indicators for measuring effective implementation include:

- Human resource development indicators - will ultimately be measured through PhD graduation rate and ICT Full-Time Equivalent researchers with PhDs. Due to the lag that can be expected in these indicators, these measures will be supplemented by the short-term indicators such as the enrolment of Bachelors, Honors, Masters and PhD levels as early indications of the effects of the ICT R&D and Innovation Strategy.
- Research performance indicators - will be measured by the country's share in global ICT publications and the Relative Citation Index for ICT publications attributable to South Africa.
- Innovation performance - will be measured through US/EU/South African ICT patent share and business expenditure on ICT R&D and Innovation.¹⁹

Professional Development in Education, ICT and STI

In 2007, guidelines for Teacher Training and Professional Development in ICTs were developed as one of the initiatives undertaken by the Department of Education to implement the White Paper on e-Education. The guidelines recognise that Information and Communication Technology (ICT) is fundamental to the implementation of e-education and offers greater opportunities to access learning, redress inequalities and improve the quality of teaching and learning. ICT also makes it possible for teachers to offer learners unprecedented opportunities for development and lifelong learning. E-education requires that teachers, managers and

administrators in public schools and colleges have the knowledge, skills and support necessary to integrate ICT into teaching and learning. However, it is noted that while ICTs have brought new possibilities into the education sector, they have placed more demands on the skills' level of teachers.

The Guidelines for Teacher Training and Professional Development in ICT²⁰ is a step towards guiding the development of the ICT knowledge and skills of teachers to enhance the educational experiences of learners in the implementation of the National Curriculum Statement. The Framework is an attempt to provide direction in addressing the ICT training needs of teachers and attempts to move away from imposing a narrow vision of the appropriate use of ICT in teaching and learning.

The government is providing incentives to the teachers through the Teacher Laptop Initiative²¹. The Teacher Laptop Initiative (TLI), managed by the Education Labour Relations Council (ELRC), addresses South Africa's need for a quality education system and forms part of the cohesive plan by the Department of Basic Education (DBE) and other stakeholders in education to improve the overall quality of education by making resources available to learners and teachers in the public education sector.

Informational Literacy

The *E-Literacy and Skills Development* report²² defines information literacy as the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand. It argues that ensuring that people have real access to ICT's is only one of a number of issues that have wide application and relevance if the level of e-Literacy and ICT-related skills development is to be raised in South Africa. Policies aimed at poverty alleviation, socio-economic development and increasing low-cost access to communications all impact on people's ability to access ICT's, and therefore directly affect any attempt to raise e-literacy levels and skills development. The report says that creating access and connectivity are fundamental, but not enough. It argues that there is a need to distinguish between at least two concepts: one is basic training in ICT's and the other is the use of ICT's in learning to give people skills to handle the information flows they will be confronted with.

The report visions literacy and ICT's in the light of the knowledge society, which is fundamentally changing most aspects of human activities (work and leisure) in both the developed and developing worlds. In this vision, ICT's are an integral part of an information-literate society, and personal participation in this technology-knowledge-innovation-economic development cycle begins with literacy. Hence, literacy includes not only the decoding and comprehension of text, but the ability to access, analyze, evaluate, communicate, and use information to solve problems and create new knowledge – broad based literacy. ICT's, therefore, play a much more fundamental and multi-factorial role than merely providing a delivery and instructional mechanism. This broader vision of literacy better addresses the needs and realities of youth and adult literacy learners, and users within communities that can generate, share, and use knowledge for the benefit of all.

The reports states that the broadest vision of literacy involves empowering every individual to become an active member of the emerging information society. Although policy processes in some parts of Africa include these insights, e.g. Southern Africa Development Community (SADC), these have not yet filtered down to the implementation level in either the education sector or the ICT industry. Throughout Africa, ICT's and information literacy continue, in general, to be regarded as peripheral issues, especially for the poorest and most remote communities.

Key Actors – Public Private Partnerships & Networks

The National System of Innovation (NSI)

A National System of Innovation (NSI) is generically defined as a cluster or network of interacting public and private organisations within a specific country focused on the nurturing and the development of the science and technology space within the borders of that particular country. The 1996 White Paper on Science and Technology (S&T) introduced the South African NSI as the basis of the S&T interventions in the economy. The NSI is an enabling framework for science and technology, and is central to South Africa's prospects for continued economic growth and socioeconomic development.

Key elements to the South African NSI (EU-Africa Cooperation on ICT Under FP7: Status of ICT Research and Development in South Africa, May 2007: Prepared within the framework of the START- project by the Meraka Institute, CSIR, South Africa) include:

- A separate **Department of Science and Technology (DST)** was created in 2004. The recognition of the importance of S&T through the creation of a separate department has led to significant developments in the promotion and support of S&T activities at the national level, but also increasingly in terms of international agreements and levels R&D international collaboration.
- The delineation of Education Departments into a **Department of Higher Education and Training** and a **Department of Basic Education**
- **Department of Communication** coordinates ICT issues and hosts the PNC on ISAD
- The DST's reporting lines were moved from the Social to the Economics and Investment cluster within Government. This restructuring can be seen as evidence of the need to address technology transfer **from higher educational institutions (HEIs) and public research institutions (PRIs)** to the private sector and the emphasis on S&T to stimulate economic growth.
- **A National Advisory Council on Innovation (NACI)** was created to advise government on policy issues. Within NACI a specific group was created to address the low levels of participation of women in S&T - the South African Reference Group on Women for Science, Engineering and Technology (SET).
- Restructuring of HEIs has taken place which has resulted in the merging of some institutions and the creation of **Centres of Excellence (CoE)**.
- Twelve PRIs have been created to carry out R&D, of which the **CSIR, Council for Scientific and Industrial Research**, established in 1945, is the largest. The **Meraka Institute** at the CSIR was specifically established in 2005 to address the need for high-level research in ICTs. The Meraka Institute has as mandate the development of human capital in ICT.

- **A National Research Foundation (NRF)**, responsible for the funding of social and natural science research in South Africa, was created. A specific priority area has been included for the Information Society, through which ICT research is funded. Specific funding instruments have provided opportunity for collaborative R&D funding between PRIs, HEIs and the private sector.
- The **South African Agency for S&T Advancement (SASTA)** was created to promote wider public understanding of S&T. This includes extensive outreach activities such as exhibitions and activities focused on schoolchildren.
- The establishment of the **Technology Innovation Agency (TIA)**, a new public entity aimed at stimulating and intensifying innovation and inventions in order to improve economic growth, and enhance quality of life of all South Africans, by developing and exploiting technological innovations and interventions, and creating an enabling environment wherein these could be commercialized. The TIA will seek to address the main barrier to commercialization of technological innovations by consolidating the fragmented funding instruments that currently exist in South Africa. The TIA will be managed and controlled based on the provisions of the TIA Act, which was signed into law in December 2008. The DST has since established a Project Management Office in preparation for migration of the various entities to TIA. The existing entities which will be incorporated into TIA are the: Biotechnology Regional Innovation Centres (BRICs), the Innovation Fund, AMTS, and the Tshumisano Trust. TIA will be expected to stimulate the development of technology based products and services, by the public and private sector technology based enterprises, thereby developing a significant technology base for the country's economy.²³
- **Universities and Research Councils:** e.g Tshwane University of Technology, University of Pretoria, University of Cape Town, Rhodes University and other universities; Council for Industrial and Scientific Research (CSIR), Agricultural Research Council (ARC) and other Councils.
- **The Innovation Hub, Gauteng**, first science park in South Africa. It is an incubator and R & D centre. Other science parks are being developed i.e. in Durban and Cape Town.

ii.Desk Research Analysis – Assessment of KS Status and ICT, Education and STI Pillars in South Africa

South Africa is one the leading Knowledge based Society countries in Africa as ranked by Information Society Index. The institutions for Knowledge based Society are in place as well as the policies and strategies. One of the key challenges is lack of collaboration between public and private sector and between public sector organisations.

South Africa has great potential technologically and in human resources to become one of the leading countries in research and development and innovation. This requires investments in research and higher education as well as basic education. The national plans and visions are in place. The different levels, national, provincial and local have their visions and plans. These plans need to be aligned.

There are a number of challenges that the South African system needs to resolve to make overall progress in knowledge based society. The Education, ICT, Science and Technology and Innovation pillars are interrelated. Their interaction for promoting social and economic progress is a critical goal that all the stakeholders recognise but seem to have difficulties in translating into tangible social and economic gains for the diverse communities in South Africa. South African national system of innovation can benefit by developing a systematic interaction of policies, knowledge, stakeholders and incentives to facilitate implementation. The main challenge comes from the problems in building skilled human capacity. There are a number of issues that are specific to the development and dynamics of education from basic to higher education in South Africa. The country has not yet overcome the apartheid legacy despite reforms to facilitate a transition to a post- apartheid education arrangement that blends and harnesses the diversity of the population and the races to blend and work to realise the various policies that have been coming out from the Government. There has been also frequent Governmental merging and separations of ministries and it appears that a top civil service that is independent of political and party influence is yet to be formed. This makes it harder when policies are formulated and when top personnel changes education policies come under review and changes of policies are invoked.

Basic education in South Africa suffers from both lack of infrastructure and qualified teachers especially in the rural areas. In one of the interviews we were informed that 3600 schools did not have electricity; 2600 schools did not have water; 400 schools had buildings built from mud; and more alarmingly that 92% of the schools did not have full libraries. In addition there were up to 30,000 unqualified teachers who were teaching in the system. One can imagine if they do not have these basic infrastructures, how they can have ICT infrastructure. Though there is a council for teachers' registration, most teachers were not yet registered. The council of teachers' registration in principle should not register those that are unqualified.

These figures along with other evidence from numerous reports would suggest that basic education in South Africa is in a dire state as a result of the main challenges of expansions and integration. The implication is that the feeder from basic/primary education to secondary schools and the latter to tertiary post-school education systems is essentially very weak (Chisholm, 2004; Gibberd, 2007).

The government has been active in terms of policies to address these issues. The ambition of the South African Government is to integrate fully ICT into all spheres of education starting from the foundation of basic education to all the post-school educational opportunities for the citizenry as a whole. ICT skills are seen as an integral part for the reduction of poverty, creation of sustainable livelihood, harnessing the diversity of society and strengthening economy, state and society as demonstrated through the strategic plans and visions developed in the last 10 years. However, policy declaration is one thing, making the hard choices of implementation by putting in place the mandate, the resources, the policies, the regulatory frameworks, the incentives and the monitoring and evaluation and the feedback is a completely different skill. Discussions with those interviewed, revealed that nearly all of them acknowledged that policy formulation is not a problem; it is implementation that is the real bottleneck.

The Importance of ICT in South Africa

ICT has become as important as electricity, and water in today's globalised economy and society. It is a key cross cutting infrastructure that requires investment to produce, keep up with technological developments sustainability and maintenance. It is a central and driving technology for strengthening the South African national system of innovation. The potential of

ICT is immense in this effort to restructure and help build robust infrastructure in South Africa. Both for the science, technology and innovation and education developments, ICTs are critical to improve infrastructure. In particular for the education and skill formation, ICTs can contribute to the improvement of the quality of education by increasing access to all those who may not be able to communicate with traditional pen and paper means of expanding learning opportunities.

In terms of policy to address these issues the Government has been active. All the necessary instruments and visions are in place. In our interviews we interacted with capable CEOs who knew the limits and opportunities of the ICT revolution in transforming the South African national system of innovation in general and the educational system in particular. What was striking from the research is the limited bandwidth of the ICT component in the South African system of innovation and the realisation by both senior and middle level officials of the need to increase the share of bandwidth in South Africa's national system of innovation.

We reiterate in the key areas of education, a number of policy initiatives taken as reported by middle level officials show the following commitment:

- In 1997 Government started the Technology Enhanced Learning Initiative (TELI) to promote the first set of guidelines on how to spread ICT in the schools in South Africa (Van Audenhove, 2003)
- In 2004 the Government created the White Paper on E-Education with the objective of transforming every pupil in South Africa to be ICT capable in all spheres of education²⁴
- The Department of Communications (DOC) was entrusted to implement ICT diffusion through the Electronic Communications and Transactions Act (2002)
- The White Paper and the DOC are entrusted to accelerate policy implementation by realising cost reduction of communication, bridging the digital gap between urban and rural, historically advantaged and disadvantaged communities
- In addition the White Paper recognises the crucial importance of building an integrated broadband plan that will contribute to the development of a knowledge economy,

stimulating application for innovation, the regulation of e- content , building a people centred, inclusive information society and knowledge based economy

- The White Paper stipulates for the implementation of a national cyber-security policy, information security system, skills development in ICT and converting South Africa into a globally competitive ICT hub.

The ambition of the South African Government is to integrate fully ICT into all spheres of education starting from the foundation of basic education to all the post-school educational opportunities. ICT skills are seen as an integral part for the reduction of poverty, creation of sustainable livelihood, harnessing the diversity of society and strengthening economy, state and society.

The potential of ICT is immense in this effort to restructure and help build robust infrastructure in South Africa. ICTs can improve infrastructure and contribute to the improvement of the quality of education by increasing access to all those who may not be able to communicate with traditional pen and paper means of expanding learning opportunities. Access to ICT is recognised as a basic human right.

The science and technology system for development in South Africa is an integral part of the South African system of innovation to contribute to the knowledge society. The key challenge is human capital and skills throughput from the post-school system. The Ministry of Higher Education and Training has taken measures to revitalise the whole post-school system and the current minister has prioritised teacher training through the new Higher Education Qualification Framework (HEQF)^{25 26}. Efforts to generate accredited in service and pre-service teacher training with ICT being an integral tool for building competence are designed for delivery and rectifying the difficult situation that the education world is in South Africa. The importance of moving South Africa to a knowledge society by embedding ICT in the education system, the science and technology system and through encouraging innovation by making sure that governments, the private sector, universities and communities work in a multi helices coordination, remains a vital consideration to realise fully the success of the national system of innovation in South Africa.

ICT for Science, Technology and Innovation

The South African science, technology and innovation system is evolving with a bifurcated dynamics. The key challenge is to use the ICT infrastructure to reduce and eventually end this bifurcation by harnessing the innovative capability of the economy as a whole an integrated economy. This challenge remains and the ability for the various sectors and stakeholders to work together in collaboration to bring about a productive use of the ICT revolution in South Africa is a concern expressed by both senior and middle level officials as well as those in the private, NGO and academic communities.

ICT application to promote broad based grass roots innovation at the community level by encouraging various stakeholders such as Government, the private sector the education sector to integrate actively their knowledge to transform from the bottom the communities to expand the opportunities for skilled level job creation and services with jobs and services is critical concern expressed by both middle level and senior officials in the interviews we had with them.

ICT can also stimulate the development of small and medium sized enterprises. The extent to which small and medium sized enterprises apply ICT without running into difficulties has been expressed both as a concern and opportunity. The need for expansion of mobile banking and various types of services by the application of ICT has been addressed. There was concern that a country like Kenya had more mobile telephone services than South Africa. ICT's role in building bottom up science and technology, converting indigenous knowledge into innovation and building strong small and medium sized innovative and entrepreneurial sectors for poverty reduction and job creation was highlighted as a common concern by all.

The significance of using ICT to stimulate innovation from the level of the community by a vast expansion of small and medium sized enterprises is to counter the entitlement policy through welfare to cope with poverty. Senior and middle level officials and private sector respondents all emphasised that it is more sustainable to promote science and technology and innovation at the local level by creating multi helices to generate an enterprise in South African economy with an integrated national system of innovation.

4. Field Research

i. High Level Interviews (Senior Ministry Directors, Decision- and Policy- makers responsible for Education & Training, Science & Technology & Innovation (STI) and Research & Development)

A total of 12 senior managers from different government ministries/departments and academics completed the interviews. The interview themes were based on key issues that have to do with their institutional/organisational mandates, actors, policies, regulatory frameworks and capacity building needs/leadership competencies.

On the concepts of the Knowledge Society and its pillars, the consensus response was that the concept of Education, Science and Technology (S&T), Innovation and ICT as a cross-cutting pillars of the KS are fundamentally correct. A clear focus on education was said to be vital in building a knowledge society, since human capital is school-based. Without a functioning education system, ICT, S&T, Innovation and research and development cannot be achieved. All these depend on human capital, without which the knowledge-based society cannot exist. It was also mentioned that the relationship between the pillars is not a linear one but interdependent.

Based on the interview findings, the general perception is that the South African government has a clear mandate for capacity building in the ICT domains, innovation, education and science and technology. It was observed that all the ministries and organisations visited had clear mandates for the development of human capital and creation of enabling environments and structures for the achievement of a knowledge society. There seemed to be confusion however with respect to the place of ICT as a national priority. While most of the organisations/departments reported that the National Government recognises ICT as priority skill, a few of them were of the opinion that ICT development as a skill is not currently a priority skill. It was felt that Engineering, Technology and Science are scarce skills. In general, the findings from the different mandates showed that although the government has clear mandates and visions in building a knowledge society, there was a perception among interviewees that these mandates seemed to be borrowed ideas that were not contextualised to the South African

environment. There seemed not to be enabling structures and programmes for the implementation of the mandates (see Appendix 3).

With respect to actors, it was clear from the interviews that the key actors in defining and implementing the different ministerial or departmental or organisational mandates were government departments (national, provincial and municipal), educational institutions, research councils, private sector and non-governmental organisations (NGOs). Although it was affirmed by all interviewees that organisations with proper collaboration with actors attract enough drivers for change, not all of them claimed such a position.

On the issue of policy, plans and objectives, the consensus among all interviewed was that although the government (past and present) have good policies and plans, implementation is always very poor. All the organisations had common goals of capacity building and expansion, human capital development and willingness to implement policies. Their major constraint was lack of provision of enabling structures for policy implementation on the part of government and minimal funds for execution of projects and plans. Generally, it was also observed that at policy levels, the existing regulatory frameworks were enabling but there appeared to be problems at the level of administration and implementation. While some of the organisations reported the existence of regulatory frameworks that limits their effectiveness, others saw such frameworks to be enabling, rather than limiting.

In terms of capacity building needs and leadership competencies, the general view was that there is a lack of skills in the country, thus leading to the problem of limited human resources, which is a great drawback for the proper functioning of a knowledge society. There is therefore the need for training programmes that enhance technical skills of people. The type of leaders that are needed are not just leaders who specialises in drawing up policies or importing ideas and technologies but those that understand contexts and are able to apply imported ideas to meet national priorities. In general, there is a need for the development of leaders with vision, who understand the need of the community and are able to intervene at the right time.

ii. Middle Level Interviews (middle level ministry and national local agency officials responsible for implementation of Education & Training, Science & Technology & Innovation (STI) and R&D policies and plans)

A total of twelve interviews and six focus group discussions were held. The total number of participants in the focus groups discussions ranged from 4 to 12 persons. Participants in interviews and focus groups were composed of individuals from government departments, private sector, NGOs and academic institutions (see Appendices 2 & 3).

In discussions about KS leadership at environmental policy level, it was consistently felt that leadership capacity in building dialogues, policies and strategize is poor. In instances where it existed, it was only at intention level. In terms of policy formulation, as was observed with senior managers, the general consensus was that the national government is effective at formulating good policies but implementation is always poor. They argued that one of the reasons for the poor policy implementation was because most of the policies are imported and alien to the South African context. They indicated that for effective implementation, there is the need for national leadership to find a way of contextualising such policies. Another reason for poor implementation of policies was attributed to the monitoring and evaluation strategy of national government. They observed that most of the bench marking parameters were based on foreign indicators, which were ineffective. To improve, they suggested proper benchmarking tools within the African context and avoid the monitoring and evaluation mode that was being used, which was more of a punitive than learning M&E strategy. They argued that this could only be achieved if the right individuals are in position of national leadership which was lacking at the time of the discussions.

With respect to organisation level, there appeared to be some measures of dialogue among stakeholders. There was however a major concern that government and organisations seemed to have ineffective dialogue. This was attributed to the divergence of views and priorities between the two. For effectiveness, it was suggested that national government should show the willingness to provide resources for effective implementation of policies. Another area of consensus was that organisational leadership lacked the capacity to frame, manage and interpret evolving developments of national knowledge society and economy agendas. This was attributed to the top-bottom relationship that was in place. In few cases was there claim to

bottom-top relationship; it was presumed to be hypocritical, where agreements at the top were only in principle rather than in practice. For effectiveness, it was suggested that there should be proper balance in top-bottom and bottom-top relationships.

In discussions about the individual leadership level, the focus groups revealed that the majority of individual leaders lacked capacity to effectively communicate on the knowledge society and to think creatively and innovatively. This deficiency has led to low productivity and development of the KS agenda. Some of the causes of this deficiency were attributed to the bureaucratic structures that were set up by national governments and the self-driven interest attitude of individual leaders. The existing nature of risk averseness was reported to be a drawback to the innovation sector. To be successful, it was suggested that individual leaders should have the capacity to plan, manage people effectively and recognise that although vision comes from the top, success can only be achieved if it is driven at all levels.

iii. Leadership Competency Importance-prioritisation survey (carried out with senior and middle level target groups)

During the field research a Leadership Competency importance-prioritisation survey was conducted with senior level and middle level officials in Ministries visited. 47 questionnaires were completed and returned to the field team on the days of the visits. Table 1 presents a profile of the respondents (see Appendices 4 & 5).

Table 1: Profile of the respondents (N=47)

Profile	No of Respondents
Senior Level Management	15
Middle level Management	32

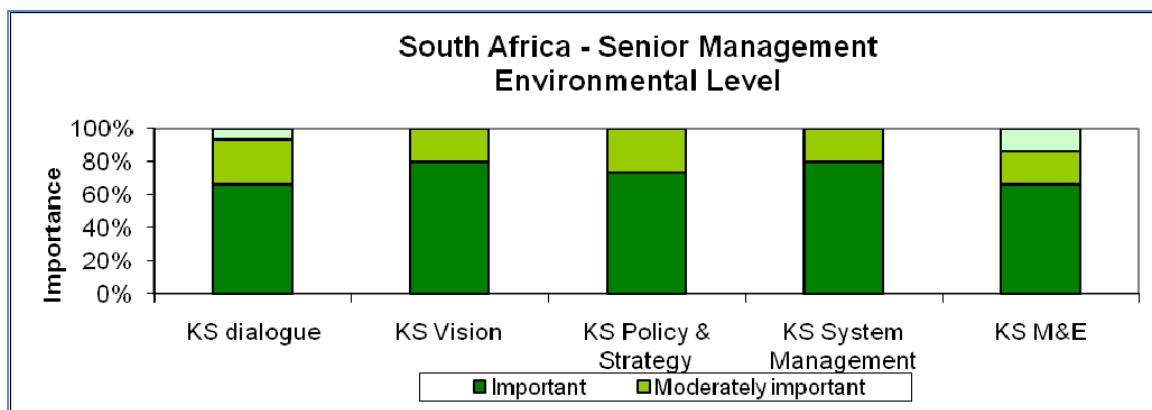
The survey involved two questions.

- In the first question, the senior and middle level officials were asked to indicate their perceived level of importance on each of thirteen ICT & KS competency standards for leaders drawn from the three environmental, organisational & individual level domains of the ALICT leadership framework. They used a three-point Likert scale (1 for

unimportant, 2 for moderately important and 3 for important) to rate the competencies.

- In the second question, senior and middle level officials were asked to identify three leadership competencies that would require priority development for the pilot phase. For this question, the officials used numbers (No. 1 for 1st priority, No. 2 for 2nd priority and No. 3 for 3rd priority) to identify their priorities.

From the importance-prioritisation survey, it was observed that the majority of senior managers view leadership competency domains in ICT and KS - irrespective of whether at environmental, organisational and individual levels - to be important. At the environmental level, KS vision and KS system management had the highest percentage of responses revealing their importance ranking. At the organisational level KS policy and strategy and KS system management received the highest importance ranking. At individual level, the competency domains had equal levels of responses in terms of the importance of each competency domain (Fig. 1).



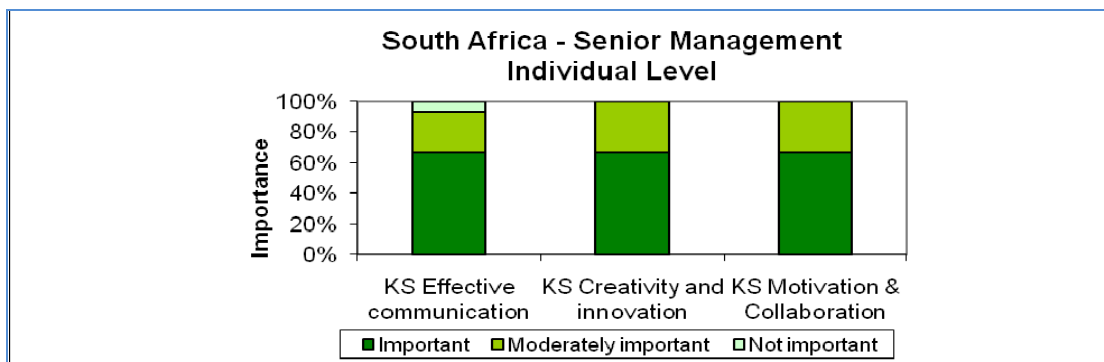
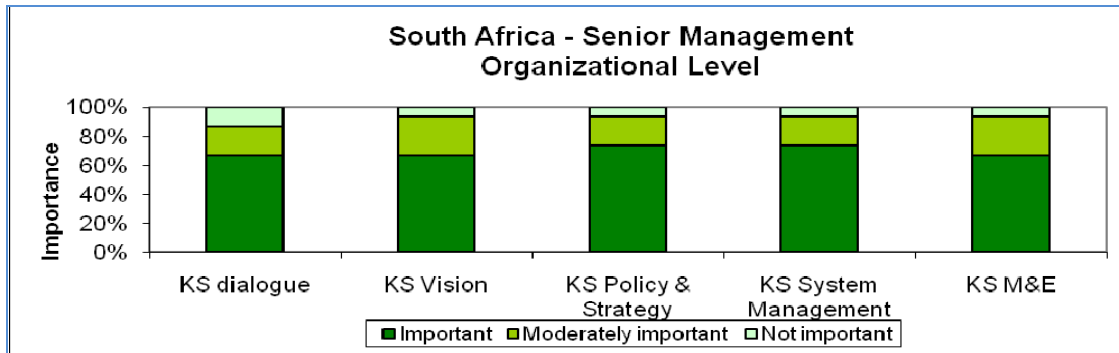


Fig. 1: Senior management responses to leadership in ICT and KS competency domains in order of importance

This finding is consistent with what was observed during the interviews. A major concern of senior managers during the interviews was the presence of good policies at national level without proper implementation strategy. The failure in implementation was largely attributed to the lack of visioning at national level and the lack of dialogue among stakeholders on strategies to contextualise imported policies.

In terms of prioritisation of leadership competencies, KS vision at environmental level, KS policy and strategy at organisational level and KS dialogue at environmental level received the highest priorities from senior management respondents as the focus for capacity building (Fig. 2).

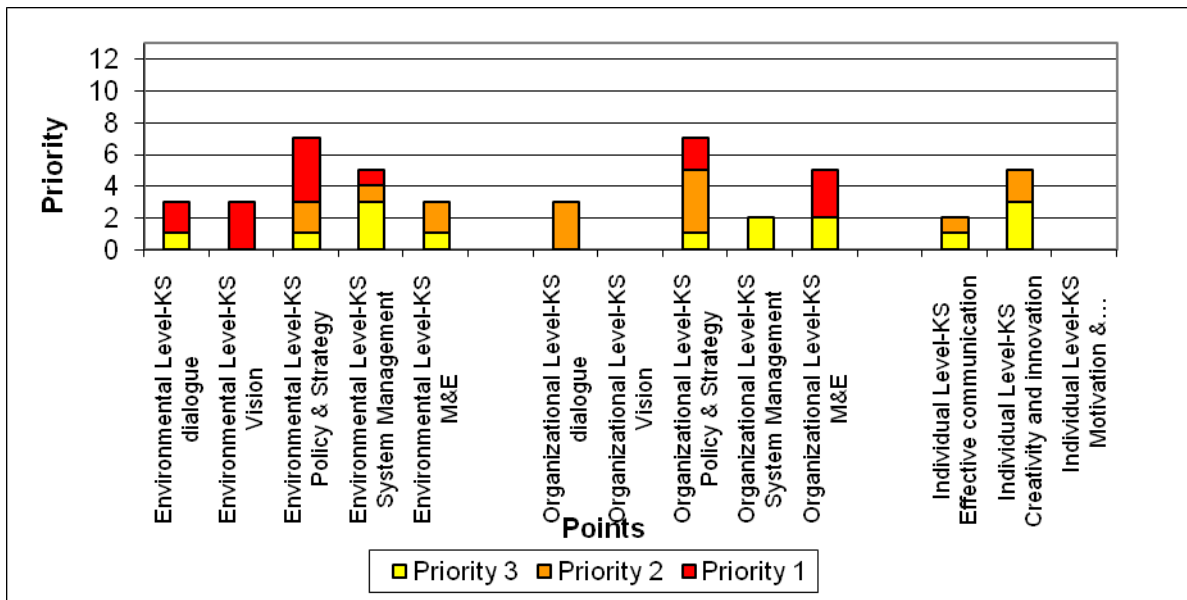
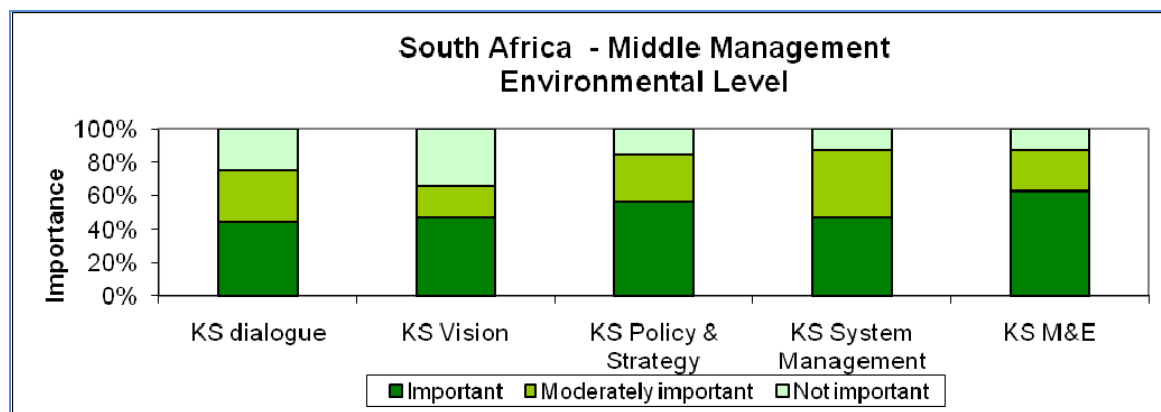


Fig.2 South Africa Senior Level Managers Priority Survey

In the case of middle management responses to leadership in ICT and KS competency domains, KS M&E, KS dialogue and KS Effective communication were observed to have the highest number of respondents who indicated they were important, for Environmental, Organisational and Individual levels, respectively (Fig. 3).



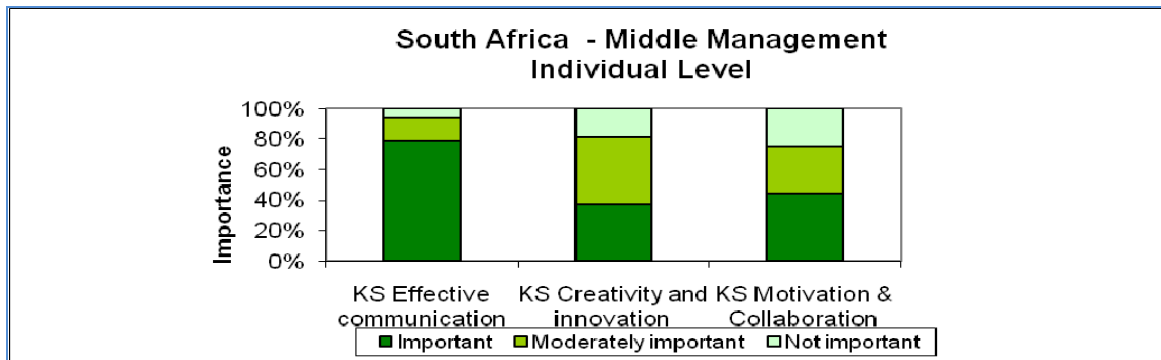
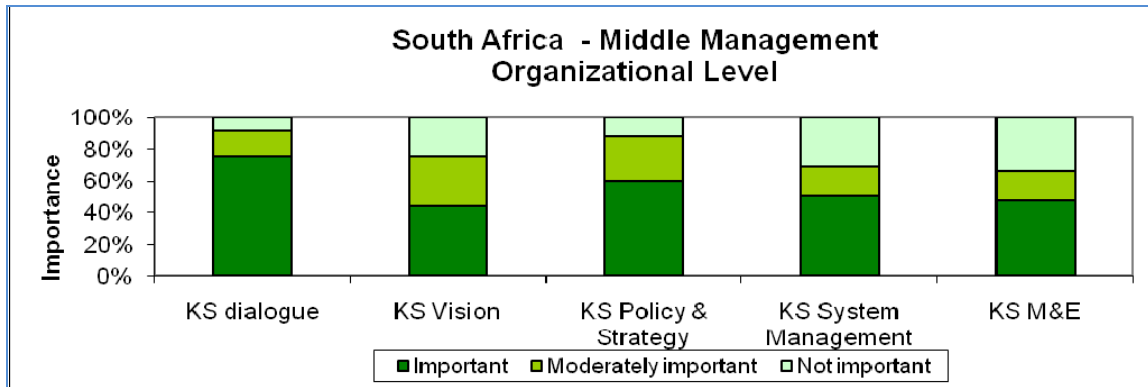


Fig. 3: Middle level officials responses to leadership in ICT and KS competency domains in order of importance

For middle level officials priority areas for capacity building followed a similar pattern to that of senior managers where KS environmental level dialogue & vision, KS organisational level policy, strategy and system management and KS individual level effective communication and motivation received the highest number of respondent priorities (Fig. 4)

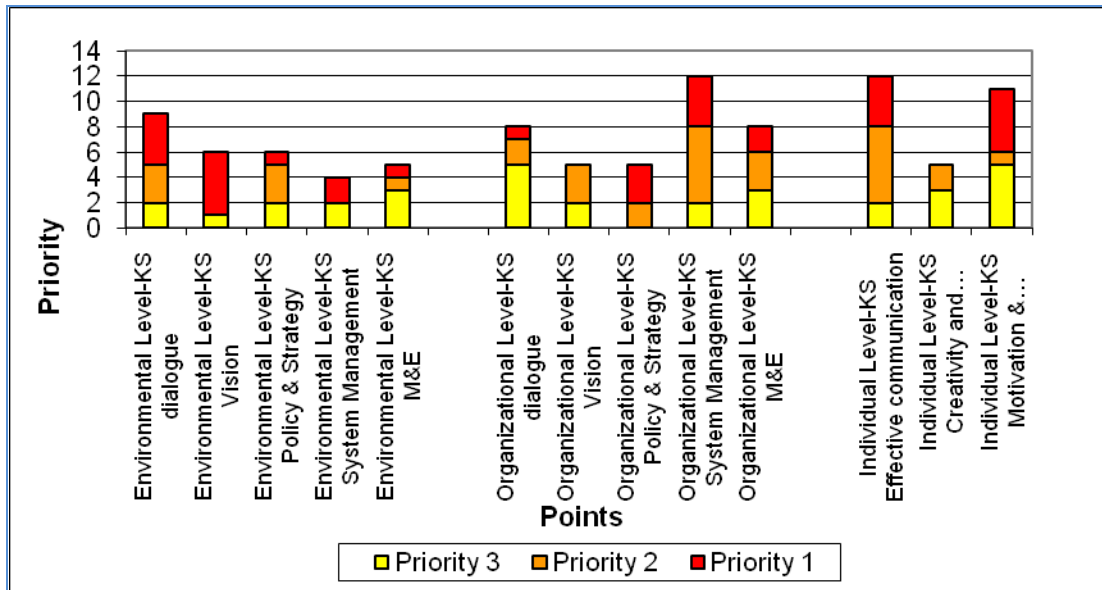


Fig.4 South Africa Middle Level Managers Priority Survey

This focus on building individual, organisational and environmental capacity for KS dialogue, vision and communication as priority areas would correlate with a consistent report from the focus group discussions. The discussions revealed stakeholder perception and belief that for an effective knowledge society to be attained, national government should see itself more as facilitator for policy implementation and that no successful implementation can be achieved unless it is people-driven.

Please refer to the Appendix 6 “Importance – Prioritisation of Leadership in ICT & KS Competency Analysis” for a detailed table summary analysis of the collected data.

ii. Field Research Analysis – Assessment of Emerging Opportunities /Needs

The following suggestions were derived from the interviews and the focus group discussions.

- There is need for collaboration between the various ministries and departments. Team spirit should be encouraged.

- There is need for training on responsibility and accountability among the key staffs. Monitoring and evaluation should also be introduced in the leadership and they must be empowered to take new innovative projects without fear of punitive measures.
- The existing educational curriculum should be updated to accommodate emerging trends brought about by the new technologies.
- There should be targeted training to high management who feels threatened by the new technologies and their application in their day to day activities.
- Top Managers should look for bottom up solutions within their departments/ministries/institutions

5. Conclusions and Recommendations

South Africa has come from an apartheid era to a democratic transition. The desk research reveals that transformation at the political level is more advanced than the economic and education levels. The black majority occupy nearly 70% of the various portfolios at the political level whereas the economic level the white minority retains about 85% of the economy. In addition the research would suggest that the economy is highly globalised – that is more connected to the rest of the world economy than it is to home economy of the local communities both in the urban townships and rural areas. There is the perception that the politics and the economy remain bifurcated. In addition it would seem that the globalised sector of the economy is based on mines, commodities and finance addressing more the market of the global economy than the home economy. This is a big challenge that makes South Africa a vulnerable state despite the transitions and remarkable progress that have been achieved over the last decade.

Summary Findings

Status of Knowledge Society in South Africa in relation to Education, ICT and STI

As noted, there are a number of challenges that the South African system needs to resolve to make overall progress in knowledge based society development considering that the education, ICT, science and technology and innovation pillars are interrelated.

- The stakeholders have difficulties in translating policies into tangible social and economic gains.
- There is the challenge of building skilled human capacity. The country has not yet overcome the apartheid legacy despite reforms to facilitate a transition to a post-apartheid education arrangement that blends and harnesses the diversity of the population and the races to blend and work to realise the various policies that have been coming out from the Government.

- Merging and separations of ministries poses a challenge which has had political and party influences.

However, the government has been active in terms of policies to address the issues with the ambition to integrate fully ICT into all spheres of education starting from the foundation of basic education to all the post-school educational opportunities for the citizenry as a whole.

Opportunities, needs and gaps – with a particular focus on drawing out capacity building needs and leadership competency priorities

- The national system of innovation has to be integrated politically and economically.
- Collaboration between various agencies is lacking.
- Stakeholders lack social capital and trust capital.
- There is a need to understand that rights come with responsibilities and hard work and dedication is critically important. There is a need to promote the appetite for lifelong learning, for building multi skills and create a venturesome and innovative culture across from the youngest age as a life long journey.
- There is discrepancy between good policy documents and lack of implementation. This has serious implication for the ALCIT programme of training. It is important to offer the programme with a view to address this anomaly and make both middle level officials and other stakeholders involved in implementation processes to join and find what hinders implementation and how to find better ways of achieving goals and results with leadership.

Recommendations

General recommendations for leadership development

- There is a need to implement the policy and strategic documents that have been developed in the education, ICT, Science, technology and innovation.
- The government should work with the research institutions such as the universities and help with commercialisation of the innovations and ideas that emerges.
- Individual leaders should be supported and facilitated to make decisions that do not necessary reflect the past ways of doing things. They should be given room to innovate through support and facilitation to ensure increased productivity.

Specific recommendations for module development for first pilot

- When developing the modules, the middle level officials and other stakeholders involved in implementation processes should identify policy and strategic documents that have not been implemented and identify what have hindered implementation and suggest how best this can be done.
- For proper improvement, there should be thorough analysis of activities in the different government departments.
- The concept of knowledge society should be well defined and introduced from a contextual way, i.e. start with what they are doing and what a knowledge society is supposed to look like. The pillars of knowledge society should be well explained and the indicators for each.
- Training should focus on information sharing and dissemination which is key to creation of an information society, should be included.
- Tools for monitoring and evaluation of projects should be introduced to the participants. This should include the outcome mapping tools.

- The work of the National Planning Commission which was set up to integrate departments should be evaluated and the challenges they may be facing in integrating departments addressed through the training.
- Training on ICT as a vital enabler in a knowledge society.
- Encourage leaders to access online journals to keep pace with developments in the global society through training online searches.
- Communication skills among leaders are also key to ensure that policies and strategy documents are understood at all levels through the most effective and efficient communication method.

Implementation Scenarios for first pilot

- No suggested implementation scenario for now.

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Appendices

Appendix 1: Referenced Reports

Education

- [Strategic Plan 2008-2011](#): the leaders on the development of an inclusive information society
- [Strategic Plan 2010-2013](#): making SA a global leader in the development and use of ICT for socio-economic development
- [Action Plan to 2014](#) (2010)
- [Strategic plan 2010/11 to 2014/15 and operational plans for the 2010/11 financial year](#) (higher education)
- [Education For All Country Report 2010](#) (2011)
- [Curriculum](#) 2005 (all versions)
- [White paper on e-education](#) (2004)
- [Strategy for information and communication technology in education](#) (2001)
- [School Infrastructure Report 2009](#) (please refer to table 9 for schools infrastructure)
- [Education For All Country Report 2010](#) (2011)
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Education and ICTs

- [Guidelines for teacher training and Professional development in ICT](#) (2007)
- [Ministerial Committee Report on Teacher Education](#) (2006)
- [REPORT OF THE MINISTERIAL COMMITTEE FOR LTSM REPORT](#) (2010)
- [Managing ICTs in South African Schools: A guide for School Principals](#) (2006)
- [Research agenda for ICT in Education](#) (2007)
- [PNC-ISAD Research Project: E-Literacy And Skills Development](#)

STI Policies and Strategies:

- [Department of Science and Technology](#)
- [National Research Foundation of South Africa](#)
- [DST Strategy 2010-2013](#)
- [Ten year Plan for science and technology](#)
- [South Africa's National Research and Development Strategy](#)

Research Innovation and development

- National Survey of Research and Experimental Development (R&D): [results 2008-2009](#)
- [Centres of Excellence](#)
- [The R&D Tax Incentive Programmeme](#)
- [Innovation Hub](#)

Appendix 2: Interviews: URL, Contact Names and Email Addresses

Interview 1: Council for Industrial and Scientific Research CSIR-URL: www.csir.co.za -Laurens Cloete- Acting CEO, Meraka, e-mail: jcloete@csir.co.za

Interview 2: Innovation HUB URL: www.theinnovationhub.com -Mclean Sibanda- CEO, The Innovation HUB, e-mail: msibanda@theinnovationhub.com

Interview 3: Technology Innovation Agency TIA- URL: www.tia.org.za -Simpfiwe Duma- CEO, TIA, e-mail: simpfiwe.duma@tia.org.za

Interview 4: Department of Communication (DOC): Presidential National Commission on Information Society and Development PNCISD- URL: www.doc.gov.za -BandileHadebe, Director,e-mail: bandile.hadebe@pnc.gov.za

Interview 5: Department of Basic Education DBE- URL: www.dbe.gov.za - Bobby Soobrayan- Director General, DBE, e-mail: soobrayan.b@dbe.gov.za

Interview 6: Directorate of Research and Innovation, Tshwane University of Technology, TUT- URL: www.tut.ac.za - MandlaMsibi- Director, TuT, e-mail: msibimi@tut.ac.za

Interview 7: Department of Basic Communication DOC- URL: www.doc.gov.za - Themba Phiri- Chief Director, e-mail: themba.phiri@pnc.gov.za

Interview 8: National Research Foundation NRF: URL: www.nrf.ac.za - Robert Kriger- Executive Director, International Relations and Cooperation, e-mail: kpotgieter@nrf.ac.za

Interview 9: European Union (EU) Delegation- Geohard Pienaar- Project Officer, Local Economic Development on Science and Technology, e-mail: Gerhard.pienaar@ec.europa.eu

Interview 10: Department of Science and Technology DST-URL: www.dst.gov.za -Mmboneni Muofhe- Chief Director, International Resources, e-mail: mmboneni.muofhe@dst.gov.za

Interview 11: Department of Higher Education and Training DEHT-URL: www.deht.gov.za - Engel van Staden-Director, University Academic Planning, e-mail: vanstaden.e@deht.gov.za

Interview 12: University of Johannesburg UJ-URL: www.uj.ac.za - Adam Habib- Deputy Vice-Chancellor, Research and Partnership, e-mail: adam.habib@uj.ac.za

Appendix 3: Focus Group Discussions Organisations and URLs

1. Non-Zero-Sum Development
Website: www.non-zero-sum.net
2. Southern African Regional Universities Association “SARUA”
Website: www.sarua.org
3. South Africa Node of the Millennium Project
Website: <http://www.samnode.co.za/>
4. Development Bank of Southern Africa “DBSA”
Website: <http://www.dbsa.org>
5. Department of Higher Education and Training “DHET”
Website: <http://www.dhet.gov.za>
6. Department Wits Business School “WBS”
Website: <http://www.wbs.ac.za>

Appendix 4: Leadership capacity questionnaire

African Leadership in ICT (ALICT) Survey on Leadership Competencies

The table below lists three Leadership competency domains for *national environmental, organisational and individual levels* which are based on inputs from stakeholders as well as inputs from the leadership development literature.

Importance – Prioritisation of Leadership in ICT & KS Competency Domains

1. How important are each of the Leadership in ICT & KS competencies? (Please tick as appropriate).
2. Identify the *top three priorities* you would like the African Leadership in ICT (ALICT) programme to focus on in the pilot phase
(Write the no. 1 beside the 1st priority competency; the no. 2 beside the 2nd priority competency; and the no. 3 beside the 3rd priority competency)

Leadership in ICT and Knowledge Society (KS) Competency Domains		Important	Moderately important	Not important
National Environmental Level	KS dialogue National leadership capacity to establish inter-ministerial & inter-sectoral coordination mechanisms on KS pillars of Education, ICT and STI			
	KS Vision National leadership capacity to develop, communicate and give direction to Knowledge Society (KS) vision, mission and values			
	KS Policy & Strategy National leadership capacity to develop inter-related policies, strategies and plans on the KS and its pillars of Education, ICT and STI			
	KS System Management National leadership capacity to manage implementation of inter-related plans, strategies, and programmes on KS and ICT, Education and STI pillars			

Leadership in ICT and Knowledge Society (KS) Competency Domains		Important	Moderately important	Not important
	<p>KS M&E</p> <p>National leadership capacity to use M&E systems and practices as an evidence-based foundation for planning, decision-making and learning on inter-related ICT, Education and STI policy and strategy</p>			
Organisational Level	<p>KS dialogue</p> <p>Organisational leadership capacity to manage dialogues and relations with key internal and external stakeholders on KS or its pillars (ICT, Education, STI) inclusively and constructively</p>			
	<p>KS Vision</p> <p>Organisational leadership capacity to develop its vision, mission and values based on national Knowledge Society (KS) vision and policy</p>			
	<p>KS Policy & Strategy</p> <p>Organisational leadership capacity to translate the KS (ICT or Education or STI) vision, mission, value framework into strategic (medium term) and operational (concrete and short term) objectives and actions</p>			
	<p>KS System Management</p> <p>Organisational leadership ability to design, establish and manage a system for measuring financial and operational performance for delivering on KS (ICT, Education & STI) goals and objectives</p>			
	<p>KS M&E</p> <p>Organisational leadership capacity to use M&E systems and practices as an evidence-based foundation for planning, decision-making and learning on inter-related ICT, Education and STI policy and strategy</p>			
		<p>KS Effective communication</p> <p>Leadership ability to develop key messages about the significance and parameters of KS pillars of ICT, Education and STI for organisational and national development</p>		
Individual Level	<p>KS Creativity and innovation</p> <p>Leadership capacity to plan, manage and encourage organisational modernization, creativity and innovation related to KS and pillars of ICT, Education and/or STI</p>			
	<p>KS Motivation & Collaboration</p> <p>Leadership capacity to create organisational environment that is conducive to achieving KS progress in pillars of ICT, Education and /or STI</p>			

Appendix 5: Importance – Prioritisation of Leadership in ICT & KS Competency Analysis

During the field research a Leadership Competency importance-prioritisation survey was conducted with senior level and middle level officials in Ministries visited. 47 questionnaires were completed and returned to the field team on the days of the visits. Table 1 presents a profile of the respondents.

Table 1: Profile of the respondents (N=47)

Profile	No of Respondents
Senior Level Management	15
Middle level Management	32

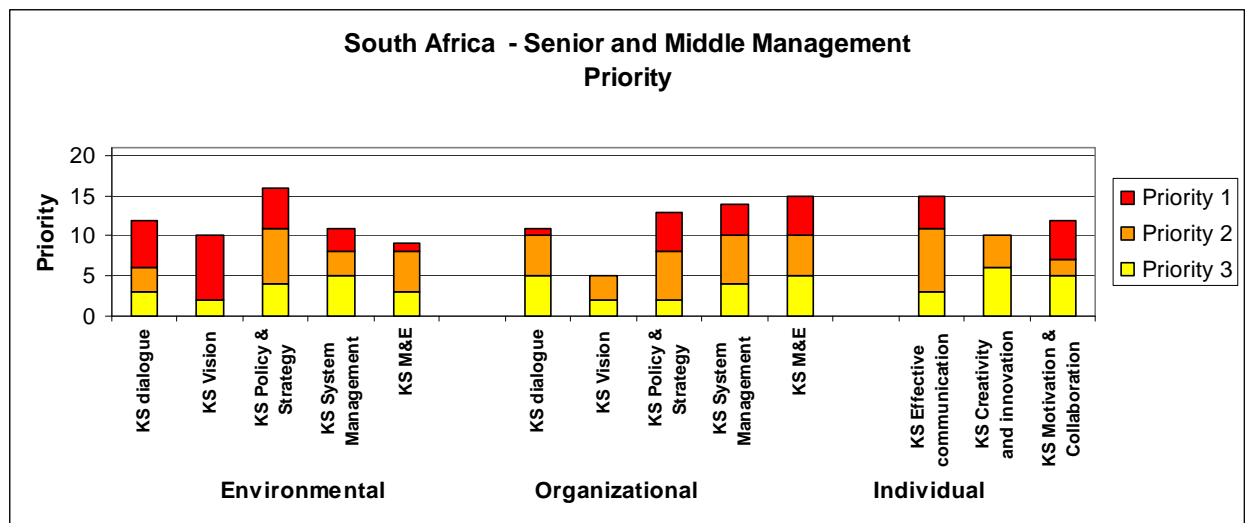
The survey involved two questions.

- In the first question, the senior and middle level officials were asked to indicate their perceived level of importance on each of thirteen ICT & KS competency standards for leaders drawn from the three environmental, organisational & individual level domains of the ALICT leadership framework. They used a three-point Likert scale (1 for unimportant, 2 for moderately important and 3 for important) to rate the competencies.
- In the second question, senior and middle level officials were asked to identify three leadership competencies that would require priority development for the pilot phase. For this question, the officials used numbers (No. 1 for 1st priority, No. 2 for 2nd priority and No. 3 for 3rd priority) to identify their priorities.

Competency areas of the KS	Senior Level Officials				Middle Level Officials			
	Mean	SD	Overall Rank	Rank (out of 13)	Mean	SD	Overall Rank	Rank (out of 13)
Environmental	2.69		1		2.31		3	
KS dialogue: National leadership capacity to establish inter-ministerial & inter-sectoral coordination mechanisms on KS pillars of Education, ICT and STI	2.60	0.40		8	2.19	0.67		7
KS Vision: National leadership capacity to develop, communicate and give direction to Knowledge Society (KS) vision, mission and values	2.80	0.17		1	2.13	0.82		12
KS Policy & Strategy: National leadership capacity to develop inter-related policies, strategies and plans on the KS and its pillars of Education, ICT and STI	2.73	0.21		3	2.41	0.57		5
KS System Management: National leadership capacity to manage implementation of inter-related plans, strategies, and programmes on KS and ICT, Education and STI pillars	2.80	0.17		1	2.34	0.49		6
KS M&E: National leadership capacity to use M&E systems and practices as an evidence-based foundation for planning, decision-making and learning on inter-related ICT, Education and STI policy and strategy	2.53	0.55		12	2.50	0.52		3
Organisational	2.61		3		2.33		2	
KS dialogue: Organisational leadership capacity to manage dialogues and relations with key internal and external stakeholders on KS or its pillars (ICT, Education, STI)	2.53	0.55		12	2.66	0.43		2

Competency areas of the KS	Senior Level Officials				Middle Level Officials			
	Mean	SD	Overall Rank	Rank (out of 13)	Mean	SD	Overall Rank	Rank (out of 13)
inclusively and constructively								
KS Vision: Organisational leadership capacity to develop its vision, mission and values based on national Knowledge Society (KS) vision and policy	2.60	0.40		8	2.19	0.67		7
KS Policy & Strategy: Organisational leadership capacity to translate the KS (ICT or Education or STI) vision, mission, value framework into strategic (medium term) and operational (concrete and short term) objectives and actions	2.67	0.38		4	2.47	0.52		4
KS System Management: Organisational leadership ability to design, establish and manage a system for measuring financial and operational performance for delivering on KS (ICT, Education & STI) goals and objectives	2.67	0.38		4	2.19	0.80		7
KS M&E: Organisational leadership capacity to use M&E systems and practices as an evidence-based foundation for planning, decision-making and learning on inter-related ICT, Education and STI policy and strategy	2.60	0.40		8	2.13	0.82		12
Individual	2.64		2		2.36		1	
KS Effective communication: Leadership ability to develop key messages about the significance and parameters of KS pillars of ICT, Education and STI for organisational and national development	2.60	0.40		8	2.72	0.34		1
KS Creativity and innovation: Leadership capacity to plan, manage and encourage organisational modernization, creativity and innovation related to KS and pillars of ICT, Education and/or STI	2.67	0.24		4	2.19	0.54		7
KS Motivation & Collaboration: Leadership capacity to create organisational environment that is conducive to achieving KS progress in pillars of ICT, Education and /or STI	2.67	0.24		4	2.19	0.67		7

Note: The mean scores in bold represent the weighted average of competencies for each domain



IMPORTANCE	High	Quadrant III: High Importance, Low Priority	Quadrant IV: High Importance, High Priority
	Environmental Level-KS System Management Environmental Level-KS M&E Organisational Level-KS dialogue	Environmental Level-KS Policy & Strategy Organisational Level-KS Policy & Strategy Individual Level-KS Effective communication	
	Quadrant I: Low Importance, Low priority	Quadrant II: Low Importance, High Priority	
	Organisational Level-KS Vision Individual Level-KS Creativity and innovation	Environmental Level-KS dialogue Environmental Level-KS Vision Organisational Level-KS System Management Organisational Level-KS M&E Individual Level-KS Motivation & Collaboration	
Low	Low PRIORITY High		

Appendix 6: Factors enabling & constraining development towards a Knowledge Society in South Africa

<i>Factors</i>	<i>Enabling Features / Opportunities</i>	<i>Constraining Features / Challenges</i>
Knowledge Society	Coordinated development of an inclusive Information Society recognised as drivers of economic and societal development	South Africa's prospects for improved competitiveness and economic growth rely, to a great degree, on science and technology.
Infrastructure	The potential of ICT is immense in this effort to restructure and help build robust infrastructure in South Africa	
Education	The government has developed a strategic plan 2010 to 2015.	<p>The vision of an integrated education and training system was hampered by the dispersal of administrative responsibility for the coordination of the education and training sub-systems across two national departments (Education and Labour), and nine provincial departments of education</p> <p>Improving the quality of education in basic education is a must</p> <p>Strengthen and support curriculum implementation in South African schools, textbooks and other educational resources are crucial factors in ensuring improved educational performance</p>
ICT In education	<p>SA has a strategy for information and communication technologies in education developed in 2001.</p> <p>The provision of a telecommunication infrastructure available for learning and</p>	The strategy recognises that revolution in information and communication technologies presents three major challenges in the education system globally. These challenges are: participation in information society, how ICT impacts on access, cost effectiveness and quality of education; and how ICT affects the

<i>Factors</i>	<i>Enabling Features / Opportunities</i>	<i>Constraining Features / Challenges</i>
	<p>teaching is gradually increasing, and many schools are exploiting the benefits of ICTs to enhance the quality of teaching and learning.</p> <p>the concept of e-Education revolves around the-use of ICTs to accelerate the achievement of national education goals</p>	education system.
Science and Innovation	<p>Prospects for improved competitiveness and economic growth rely, to a great degree, on science and technology.</p> <p>The purpose of ICT R&D&I strategy is to create an enabling system for the advancement of ICT R&D and innovation</p>	Has to be more focused on long-range objectives, including urgently confronting South Africa's apparent failure to commercialize the results of scientific research, and address inadequate production

Appendix 7: Endnotes

¹ Statistics South Africa: Mid-year population estimates (2010)
<http://www.statssa.gov.za/publications/P0302/P03022010.pdf>

²Wikipedia- List of countries by literacy rate:
http://en.wikipedia.org/wiki/List_of_countries_by_literacy_rate

³ Wikipedia -List of countries by GDP (PPP):
[http://en.wikipedia.org/wiki/List_of_countries_by_GDP_\(PPP\)](http://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP))

⁴World economic outlook:
<http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/weorept.aspx?pr.x=35&pr.y=18&sy=1980&ey=2010&scsm=1&ssd=1&sort=country&ds=.&br=1&c=199%2C111&s=NGDPD%2CNGDPDPC%2CLUR&grp=0&a>

⁵ The world bank data: <http://data.worldbank.org/country/south-africa>

⁶ Wikipedia – Economy of South Africa:
http://en.wikipedia.org/wiki/Economy_of_South_Africa#Sectors

⁷ Presidential National Commission on Information Society & Development
<http://www.pnc.gov.za>

⁸ Presidential National Commission (PNC on ISAD)
http://www.doc.gov.za/index.php?option=com_content&task=view&id=73&Itemid=26

⁹ Innovation Towards A Knowledge-Based Economy. Ten-Year Plan for South Africa (2008 – 2018) http://www.esastap.org.za/esastap/pdfs/ten_year_plan.pdf

¹⁰ Innovation Towards A Knowledge-Based Economy. Ten-Year Plan for South Africa (2008 – 2018) http://www.esastap.org.za/esastap/pdfs/ten_year_plan.pdf

¹¹ Department of Communications Official Site: <http://www.doc.gov.za>

¹² Education for all country report. South Africa 2010
<http://www.education.gov.za/LinkClick.aspx?fileticket=4YqjfL3whbg%3d&tabid=422&mid=1261>

¹³ Department of Basic Education: <http://www.education.gov.za/>

¹⁴ Centre for Higher Education Transformation: <http://chet.org.za/>

¹⁵ Department of Education portal: <http://www.thutong.org.za>

¹⁶ Final Draft: Information and Communication Technology Research & Development and Innovation Strategy http://www.ist-africa.org/home/files/RSA_ICTResearchDevelopmentInnovationStrategy_Final.pdf

¹⁷ South Africa's National Research and Development Strategy, August 2002
http://www.ist-africa.org/home/files/RSA_NationalResearchDevelopmentStrategy_Aug2002.pdf

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- ¹⁸ The Department of Science and Technology's Ten-Year Innovation Plan: http://www.ist-africa.org/home/files/RSA_TenYearPlanforScienceandTechnology_2007.pdf
- ¹⁹ Innovation Towards A Knowledge-Based Economy: http://www.esastap.org.za/esastap/pdfs/ten_year_plan.pdf
- ²⁰ Guidelines for Teacher Training and Professional Development in ICT 2007
<http://www.thutong.doe.gov.za/ResourceDownload.aspx?id=35998>
- ²¹ Teachers Laptop Initiative: <http://www.teacher-laptop.co.za/#>
- ²² PNC-ISAD Research Project. E-literacy and Skills Development
http://www.pnc.gov.za/images/stories/report/e-literacy_skills_development_report.pdf
- ²³ Innovation Towards A Knowledge-Based Economy: http://www.esastap.org.za/esastap/pdfs/ten_year_plan.pdf
- ²⁴ White Paper on E-Education (2004) http://us-cdn.creamermedia.co.za/assets/articles/attachments/01528_draftwhitepaper.pdf
- ²⁵ Higher Education Qualification Framework: <http://www.info.gov.za/view/DownloadFileAction?id=70084>
- ²⁶ Department Of Higher Education and Training Strategic Plan 2010/11 To 2014/15 and Operational Plans for the 2010/11 Financial Year
http://planipolis.iiep.unesco.org/upload/South%20Africa/South-Africa_DoHE_stratplan2010-2015.pdf