African Leadership in ICT

Assessment of Environmental, Institutional and Individual Leadership Capacity Needs for the Knowledge Society in Africa: A Situational and Needs Analysis in Four Countries

Mauritius, South Africa, Tanzania, Zambia

A Situational Needs Analysis

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Prepared by

Country Research Teams:
Mauritius - Mohammad Issack Santally, Kevin Sungkur & Indur Fagoonee
South Africa - Benjamin Akpor and Mammo Muchie;
Tanzania - Charles Senkondo;
Zambia - Moses Mwale & Michael Chilala

GESCI Research Teams:
Helena Tapper, Patti Swarts, Alex Twinomugisha, Senthil Kumar, Juho Mikkonen

Project Leaders:
Mary Hooker, Roxana Bassi

Research Support:
Mary Hooker, Roxana Bassi, Helena Tapper, Margaret Nyambura, Niamh Brannigan

This report is part of four 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

ALICT	African Leadership in ICT
EFA	Education For All
EPZ	Export Processing Zone
GDP	Gross Domestic Product
GESCI	Global E-Schools and Communities Initiative
HDI	Human Development Index
IICBA	International Institute for Capacity Building in Africa
ICT	Information Communication Technology
KS	Knowledge Society
KE	Knowledge Economy
MDA	Ministries, Departments and Agencies
MoFED	Ministry of Finance and Economic Development
NRI	Networked Readiness Index
RSA	Republic of South Africa
STI	Science, Technology and Innovation
UNDP	United Nations Development Programme
UNECA	UN Economic Commission for Africa
UNESCO	United Nations Education Scientific and Cultural Organization
UPC	Universal Primary Completion
WEF	World Economic Forum

1. Introduction & Background

This report synthesizes the findings from an African Leadership in ICT situational and needs analysis survey. The survey was carried out in four countries selected from the Southern, Eastern and South-central African regions, namely, South Africa, Mauritius, Zambia and Tanzania. The rationale for the project stems from the programme document on [Africa Leadership in ICT (ALICT): Building Leadership Capacities for ICT and Knowledge Societies in Africa](#) (2010). The main area of focus of the ALICT programme is to build the absorptive capacity of current and potential future African leaders to acquire, assimilate, transform and exploit the benefits of knowledge through knowledge sharing and exposure to technology. The aim is to build leadership capacity for producing dynamic organisational capability and creating conducive policy environments for development towards Knowledge Societies.

The purpose of the study was to define the learning needs and capacity gaps of African Leaders in ICTs and the Knowledge Society on the basis of the consultation and survey processes conducted in the selected four countries. The aim was also to develop a general understanding of the status of the Knowledge Society in the Africa context. The surveys in the four selected countries focused on examining each country's own priorities, needs, gaps and opportunities in terms of data, policies, capacities, institutional structures and finance, as well as national development strategies, plans and initiatives on the Knowledge Society (KS) and its pillars of Education, Information and Communication Technologies (ICT) and Science, Technology & Innovation (STI).

This study presents the findings of the desk and field research conducted in the four countries. The report synthesizes the key priorities and initiatives in the KS Education, ICT and STI landscape identified in each country.

The successful development towards a Knowledge society depends on a number of critical factors. The following considerations have been drawn from [GESCI's commissioned study series on the Knowledge Society themes](#) of (i) Education & Development, (ii) Innovation & Change, (iii) Science & Technology and (iv) Leadership & Educational Change.

For a Knowledge Society to be realised, supported and further developed, the following dimensions are critical considerations:

1. Education and Innovation should be viewed as interrelated drivers for socio-economic development, in a context where ICT is the enabler for both Innovation and Education.
2. Expanded Education, Research and Development should be positioned for creating awareness regarding the significance of Science and Technology and for building S&T capacity for the development and strengthening of Innovation systems.
3. A comprehensive approach to Science, Technology and Innovation should be developed which goes beyond activities and institutions that lie within the responsible ministries and seeks the involvement of all line ministries and agencies, and mobilizes the private sector, academia and donors.
4. Leadership capacity should be developed to address "system wide," and "system deep," change for coordination and extension of policies into sustainable implementation and development across all system levels.

These four factors formed the framework for the review of the state of the Knowledge Society and its pillars in each selected country. The review further examined the scope for ALICT programme goals and objectives to address the country's development agenda with regard to the KS and its pillars. On the basis of this situational and needs analysis, this report presents the findings and recommendations for crafting appropriate strategies to develop the ALICT Leadership programme content and capacity building structure/model and assist African states in building their leadership capacities on the vision of Knowledge Societies and the role of ICT, Education and STI in socio-economic development.

This report presents a synthesis of findings from the four country situational and needs analysis reports. The individual country reports can be accessed on the ALICT website using report links provided in the reference section.

2. Conceptual Overview of the Knowledge Society

i. Information Societies

Masuda (1980) defines an Information Society as a new type of society, where the possession of information (and not material wealth) is the driving force behind its transformation and where human intellectual creativity flourishes. While Castells (1996) argues that the information society is the new mode of human existence, in which the production, recording, processing, and retrieving of information in organized networks plays the central role. According to Castells (ibid), that what characterizes the current technological revolution is not the centrality of knowledge and information, but the application of such knowledge and information to knowledge generation and information processing.

ii. Knowledge Societies

In the global economic and social landscape countries and regions have become increasingly dependent on knowledge as resource and technological infrastructure (ICT) to access and use knowledge for development. Knowledge and technological infrastructure can be used to enhance efficient use of knowledge in agriculture, industry and services to enhance economic and social development of a country (Tapper, 2000). This means environmentally friendly and sustainable development using knowledge in all sectors.

The Knowledge Societies are identified as societies based on the creation, dissemination and utilization of information and knowledge, in which case knowledge assets are deliberately accorded more importance than capital and labor assets in the economy and the economy relies on knowledge and innovation as the key engines of economic growth. It is a society with an economy in which knowledge is acquired, created, disseminated and applied to enhance economic development.

The creation and dissemination of knowledge and technological innovations have been driven by advances in science combined with the information revolution (Dahlman, 2007). Innovations are, however, not only technological but also social and organisational innovations. Further, for the knowledge based development process to exist, there is need to have an educated and skilled labour force, a dense modern and intelligent information infrastructure (able to provide necessary services

anytime anywhere), an efficient innovation system and an institutional regime that offers incentives for the efficient creation, dissemination and utilization of knowledge (Durouchi *et al.,* 2006).

iii. Knowledge Society Pillars

The ALICT programme focuses on the interconnection between knowledge structures and ICT infrastructure that contribute to socio-economic development towards the Knowledge Society through the four pillars of **ICT**, **Education**, **Science and Technology,** and **Innovation.** The programme aims to build absorptive capacities of current and potential future African leaders (policy and decision makers, implementers and practitioners) to acquire, assimilate, transform and exploit the benefits of ICT and knowledge to produce a dynamic organisational capability through peer knowledge sharing and collaboration and exposure to technology (GESCI 2010). However, these general goals must be translated into a more concise, flexible, conceptual framework and implementation plan. The four pillars of Knowledge Society for the ALICT Programme are captured in Figure 1 below.

Figure 1. Pillars of the Knowledge Society
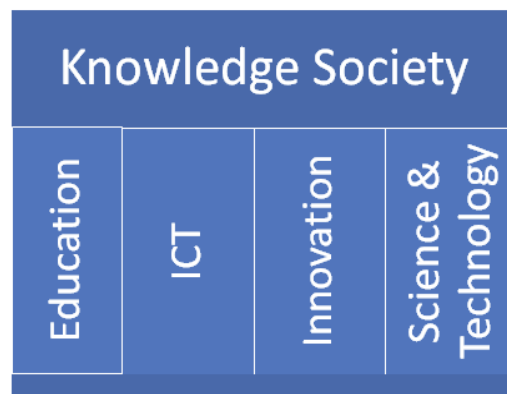
Source: Butcher 2010

Neil Butcher (2010) in a paper commission for ALICT on *ICT, Education, Development, and the Knowledge Society***,** points out that education is of vital importance in the knowledge society. Education is a source of basic skills, as a foundation for development of new knowledge and innovation, and as an engine for socio-economic development. It is not only the means by which individuals become skilled participants in society and the economy, but is also a key driver expanding ICT usage.

Butcher considers the role of ICT critical for enabling access to networks where new knowledge is processed and sources to acquire knowledge for further refining. ICT skills are vital for the new Knowledge based Economy and Society if the potential of ICT to contribute to socio-economic development is to be realised. ICT can make the education system more relevant and responsive to society's needs. Therefore, ICT can also contribute to the development of important Knowledge and "new millennium" skills such as critical thinking, information retrieval, analytical capacity, problem solving, communication and the ability to understand and manipulate new media. ICT is particularly suited to the development of such skills due to its ability to promote and enhance communication, collaboration, access to a wide range of information, information processing, simulation and visualization.

Butcher opines that rather than considering ICT, education, science, technology and innovation as separate pillars required to support the knowledge society, one may view these elements as interrelated drivers of Knowledge Society for socio-economic development (ibid. p.7). This is visually captured in Figure 2 below.
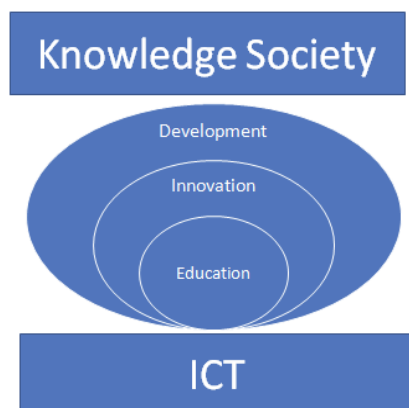
Figure 2: ICT as an enabler of the innovation and education required for development and sustenance of a knowledge society

Source: Butcher 2010

The UN Economic Commission for Africa (UNECA) (2010b) in a paper commissioned for the ALICT programme on *Science and Technology and the Knowledge Society* observes that there is a growing universal recognition that science, technology and innovation (STI) play a significant role in a country's economic development and are key contributors to poverty reduction, health care, environmental conservation and development of the knowledge society, through their ability to solve problems and initiate and sustain economic growth. UNECA refers to the "Addis Ababa Declaration on Science and Technology and Scientific Research for Development", adopted by the African Heads of State and

Governments in January 2007. In that declaration the leaders recognised that scientific and technical capabilities determine the ability to provide the basic necessities such as good health care, clean water, improved sanitation, adequate infrastructure etc., which calls for African countries to evaluate the role that science, technology and innovation play in economic transformation.

UNECA (2010a) in a second paper commission for the ALICT programme on *Innovation and Change and the Knowledge Society*, refers to the innovative society as one whose growth and development is based on continuous learning in which the stock of knowledge is continuously replenished and renewed. In such a society, extensive networks of and interactions among information sources and research actors ensure a continuous cycle of knowledge generation, acquisition, exchange and use. Innovation and change are spurred in this cycle and become a permanent feature of the society to drive economic growth and competitiveness.

iv. Leadership in the Knowledge Society

Leadership in the Knowledge Society requires new mindsets (i.e. shifts in thinking), new skills and capacities to provide leadership politically, economically and socially in environments that are rapidly changing. In this regard leaders need to adopt more creative and strategic thinking, new approaches to problem-solving and acquire the skills for team building, collaboration and effective communication and the technical and technological capabilities for higher levels of efficiency, productivity and impact in planning, implementation and evaluation processes including foresighting and forecasting (Swarts 2010).

Gaible (2010) in a paper commissioned for ALICT on *Leadership, Educational Change and the Knowledge Society*, refers to effective leaders as agents of transformation and also the first ones to be transformed. Ron Heifetz (n.d. cited in Gaible 2010), co-founder of the Center for Public Leadership at Harvard University, suggests that tackling problems that have unknown solutions and unpredictable outcomes is the true role of the leader. Problems with known solutions simply require effective management; problems for which there is not a known solution, and no clear outcome, which Heifetz calls "adaptive challenges," are the problems that cannot be addressed without real leadership. These are the challenges that contemporary leaders in a rapidly changing world need to have the abilities to address.

The ALICT programme capacity building approach will take a broad holistic and systems view of capacity development that will go beyond the conventional perception of management training. It aims to facilitate empowerment of individuals, organisations and communities to make **strategic choices** and to **transform those choices** into desired actions and outcomes. It aims to build and enhance the knowledge, skills and attitudes of future leaders to manage transformation and change, to manage institutional pluralism, to enhance coordination, to foster communication, and to ensure that data and information are shared and used in planning, implementation and evaluation processes. The ALICT approach will seek to build leadership capacities at the three levels appropriate for sustainable system change at the individual, team/organisational and environmental/ stakeholder levels as captured in Figure 3 below:

Figure 3: Three levels of capacity building

Source: Wordpress (2011)

The three levels are summarised as follows:

Individual Level

According to UNESCO-IICBA (2006) capacity at the individual level is the most fundamental element of capacity. Capacity at this level includes knowledge, skills, values and attitudes related to self-awareness and efficacy, self- confidence and development, creativity, problem solving, and leadership. These could be developed through various modalities using formal and informal modes including blended approaches, on-the-job training, practice-based assignments based on real work-based issues, etc.

Team and Organisational Level

Sometimes organizations fail to achieve their goals because they fail to recognise and utilize individual capacities and strengths. Capacity at the team and organisational level refers to all the elements that have an influence on the team and organization. This includes vision, individual capacities, facilities, equipment and resources as well as management processes (e.g. alternative approaches) systems and tools. Intangible features like commitment, productivity, performance culture of collaboration, understanding of strengths and weaknesses, awareness of potential opportunities, etc.

Environmental and Stakeholder Level

Capacity at the environmental and stakeholder level refers to the necessary conditions, support and environment required to optimize individual and team and organisational capacities. These may include skills and awareness for sustainability, inclusiveness, transformation, customer care and impact. According to UNESCO-IICBA (2006) this includes "systems and frameworks necessary for the formation/implementation of policies and strategies beyond an individual organization" (p. 5).

Leadership Competency Domains

To be part of the transformation of the Knowledge Society pillars of Education, ICT and STI, leaders need to lead by modelling effective Knowledge Society leadership competencies. Stakeholders need to see their leaders apply leadership skills that are manifested in effective dialogue, vision, mission, strategy, planning, implementation, monitoring and evaluation of Knowledge Society policy and development in the Education, ICT and STI inter-related pillars. For this reason GESCI has drawn from the literature (UNESCO 2005; UNDP 2008) to identify thirteen critical leadership professional competencies and behaviours for capacity development at national environmental, institutional and individual levels. The

competencies are meant to provide benchmarks for development of curriculum modules and content that will help candidates meet standards and that will prepare them as future leaders and contributors to the development of Knowledge Societies (Table 1).

Table 1: Competency Standards for Leaders in Three Levels

Leadership in ICT and Knowledge Society Competency Domains	
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
	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
Organisational Level	**KS dialogue** 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
	KS Vision Organisational leadership capacity to develop its vision, mission and values based on national Knowledge Society (KS) vision and policy
	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
	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
	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
Individual Level	**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
	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
	KS Motivation & Collaboration Leadership capacity to create organisational environment that is conducive to achieving KS progress in pillars of ICT, Education and /or STI

The four country situational analysis project represents a critical phase for developing the ALICT Leadership programme. The identification of the needs and opportunities will be the basis for designing, developing, testing and implementing appropriate capacity building and knowledge-sharing modules

and programmes. The goal is to develop a model that can bring value to African Leaders for addressing the challenges and availing of the opportunities for development towards Knowledge Societies for All.

3. Methodology

The study was conducted in a two-stage information gathering process - starting with desk research carried out by GESCI specialists using the internet and available documentation. This served to generate a knowledge base about the general KS status in each of the four selected countries. The general desk research was complemented by desk research carried out by research consultants in each country who provided further research and documentation as well as leads and pointers for the field research. The second step involved collaborative field research by GESCI and country consultant teams. The field research consisted of interviews, meetings, focus group discussions and a capacity development needs survey conducted with a broad range of stakeholders (Ministries responsible for Education & Training, Science &Technology & Innovation (STI) and their agencies, as well as other government agencies and Development Partners involved in ICT, STI and Research & Development programmes and initiatives). Each country report provides a list of the interviewees and an overview of the field research instruments utilized in the appendices.

The following study limitations should be noted:

- **The study attempts to summarize** the key findings on the Knowledge Society (KS) (and its pillars of ICT, Education and Science, Technology & Innovation) context as well as leadership capacity building needs and opportunities from the four individual country reports. The study does not attempt to cover all facets of the KS and its pillars. The findings should be regarded as illustrative rather than exhaustive.

- **The short duration of the field research** to conduct the situational and needs analysis on the KS and its pillars in the complex environments of the four selected countries was challenging. This report represents a snapshot of the KS landscape in each country. More in-depth studies would be required to further investigate some of the issues that have emerged.

- **The small sample of senior level and middle level officials** surveyed on leadership competency importance and prioritization during the field research presents limitations on the accuracy of the findings. Results from this survey can serve for the pilot phase of the leadership programme implementation but cannot be generalised at this point.

- **The multiplicity of initiatives, programmes, institutions and organizations** affiliated to the KS agenda and its pillars of ICT, Education and STI in the countries surveyed presented particular challenges in determining which areas to focus on and review in such a vast and complex landscape.

i. Country Profiles

Mauritius Country Profile

Mauritius has a population of 1,281,214 based on statistics from 1 July 2010. The country is densely populated with 596 persons per km², the highest in Africa. Mauritians are a multi-ethnic society including people of Indian, African, Chinese and European origin. English is the official language, but Creole is the most popularly used language spoken by about 70% of the population at home. Mauritians are multi-lingual and most also speak French (International Telecommunications Union, 2004).

The Mauritius economic success story has been widely praised with some referring to it as the "African Tiger" with sugar, Export Processing Zone (EPZ) services, tourism and financial services as the four pillars of the economy. The government is giving top priority to the development of ICT to make it the fifth pillar of the economy. Sectors such as seafood processing, information technology and medical tourism are rapidly developing. The economic policies aim to make the country more resilient to external financial shocks and to increase its competitiveness in global markets. A key element is a focus on higher value-added services such as information and communications technology.

The World Bank classifies Mauritius as an Upper Middle Income economy (2010, p5). In the 2010 World Bank Doing Business indicators, Mauritius was ranked 17 out of 183 countries, improving from 24 in the 2009 survey and showing the country as a strong reformer. Mauritius ranks particularly strongly in indicators on starting a business, protecting investors and paying taxes. In addition, the World Economic Forum (WEF) ranked Tunisia and Mauritius as the only African countries in the first 50 most developed countries in ICT (WEF 2011). According to the Ministry of Finance and Economic Development (MoFED) having "one of the lowest tax rates in the world has been a powerful competitive edge to attract businesses, investments and talents to Mauritius" (MoFED 2010). In 2006 Mauritius set its goal on being among the top countries in the World Bank Ease of Doing Business ranking. The country started introducing economic reforms and passed the Business Facilitation Act which enabled higher rankings every year. At the start of the reforms in 2006 Mauritius was ranked 49th in the world and in 2010 it was ranked 17th. Mauritius also improved in other international rankings including the Mo Ibrahim Index of African Governance, the World Competitiveness Report and the Africa Competitiveness Report. As a result Mauritius has acquired a reputation for good governance, a business-friendly environment and solid social indicators (see full Mauritius report on ALICT website).

South Africa Country Profile

The population of South Africa was estimated to be 49.99 million in 2010. 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. According to the 2010 statistics, South Africa has an annual GDP of US$ 488.6 billion. It ranks 25th in the world economy in 2010[1]. Per capita GDP is US$7,100[2]. 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)[3].

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 GDP[4]. 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.

South Africa has an Information Society Plan called Presidential National Commission on the Information Society and Development Strategic Plan 2010-2013.5 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.

South Africa has a ten year plan, Innovation towards Knowledge-Based Economy for 2008-2018. This plan is coordinated by Department of Science and Technology (see full South Africa report on ALICT website).

Tanzania Country Profile

The United Republic of Tanzania is a union of Tanganyika and Zanzibar covering an area of 945,087 sq km with a population estimated at 43.7 million in 2009. The United Republic of Tanzania is a result of the political union between mainland Tanganyika and the off-shore islands of Zanzibar and Pemba. Zanzibar has its own government and its own Ministries. Administratively, the country is divided into 25 regions with 126 districts in all[6]. Dodoma is the official capital and home to Tanzanian Parliament while the government ministries and major institutions and diplomatic missions are located in Dar Es Salaam. Swahili is the official language with English being used as the official primary language of commerce administration and higher education.

In Tanzania, 43.5% of the population is between 0-14 years, 53.7% between 15-64 years and 2.8% above 65 years of age with a projected annual growth rate of 2.07% in 2008[7].   The literacy level for the total population has been recorded at 69.four%[8].   The Tanzanian economy is heavily dependent on agriculture which employs 80% of the workforce and accounts for half of the GDP[9].

The countries long-term strategic vision is laid down in the Tanzania Development Vision 2025 document. Vision 2025 lays out three principal objectives[10]: (1) achieving quality and good life for all, (2) good governance, and the rule of law and, (3) building a strong and resilient economy that can effectively withstand global competition. The Vision is meant to address the development of Tanzania within a changing technological and global market environment. Education has been noted in Vision 2025 as a strategic change agent for transformation and creation of an educated nation. ICTs are being recognised as a major driving force for the realization of Vision 2025. It has been noted that the task demands adequate investments to improve the quality of science based education and the creation of a knowledge-based society (see full Tanzania report on ALICT website).

Zambia Country Profile

According to the Zambia 2010 Census of Population and Housing preliminary report, the country has a total area of 752, 614 square kilometers, with a total population of 13,046,508 (6,394, 455male and 6,652, 053 female). It has nine provinces and a total of 73 districts. The population growth rate is at 2.8% (2.6% males and 3.0% female). The Human Development Index (HDI) for the year 2010 was at 0.395 (as against 0.389 for Sub-Saharan Africa and 0.624 for the world). Life expectancy in the same year was at 45.four years, with an infant mortality of 86.3 for every live 1000 births and an HIV prevalence rate of 15.2%.

According to the Zambia Development Agency (2009), preliminary estimate figures for economic indicators indicated that GDP per Capita in 2009 was 1,100; employment was at 85%, while adult literacy was 70% and the urbanisation rate was 38%. The different sectors contributed to GDP as follows: Agriculture – 5%, Manufacturing – 10.1% Construction – 11%, Mining – 8.four% and Communications – four%.

Knowledge Society developments are anchored in the Zambia Telecommunications Act of 1994 which led to the liberalisation and increased participation by the private sector of the telecommunication industry and the establishment of the Communications Authority (CAZ) in 1994; The Zambia Science and Technology Policy (1996); The Zambia Vision 2030 (in 2005); The Zambia National ICT Policy (launched 2007); The Ministry of Education ICT Policy; The Zambia ICT Act of 2009; The Computer Crimes and misuse Act and other policy and regulatory framework documents. Through these documents, the Zambian government and stakeholders recognises the need for ICT in the development of the country and set out to address challenges. The government visualizes a Zambia transformed into information and knowledge based society and economy, supported by consistent development and pervasive access to ICT's by all citizens by the year 2030 (see full Zambia report on ALICT website).

4. Survey Highlights

i. Policies and Visions for Knowledge-Based Economies and Societies in Africa

Knowledge Society Articulation in ICT, Innovation and Education Policies

Similar to other regions in the world the African vision for Knowledge-based Economies (KE) and Knowledge-based Societies (KS) is becoming the nexus of social, political, economic and cultural development and policies. The policy focus is for development of the *KS pillars of Education, Innovation, Science and Technology with investment in ICT policies and strategies as a cross-cutting and enabling infrastructure* to drive development. In all of the four countries surveyed, there are several common development objectives which underpin national vision for transition towards knowledge-based economies and societies.

The South Africa survey report identifies the challenge facing African economies as one of *transitioning from a resource based economy to a knowledge based-economy*. The South Africa Information Society and Development Strategic Plan (2010–2013) focuses on facilitating coordinated development of an *inclusive* Information Society in which information and ICT tools are key drivers of economic and societal development. The Innovation towards a Knowledge-Based Economy (2008-2018) represents the South Africa national innovation plan to support transition to a Knowledge-based Economy and Society. While the emphasis of the plan is on innovation, it is not innovation for its own sake. The report identifies the key to economic competiveness and growth as relying to a great degree on advances in the technological and scientific knowledge embodied in the knowledge and skills of the South African people. Thus the national science and technology system that is integral to the system of innovation designed to contribute to the South Africa knowledge society requires transition to more effective human capital development and skills formation in its Education and Training system.

The significance of *Education and Training as a critical pillar for producing high level-skills as a basis to knowledge-based economic development* appears to be widely recognised in policy and planning across all countries surveyed.

An analysis of the Mauritius national policy documents and plans clearly indicates the focus on the education pillar with an overall goal to make possible "humanpowerment" for building a creative and competent Human Resource base.

The Mauritius strategic goals of Human Resource Development during the period 2008-2020 are as follows:

- Transform Mauritius into a Knowledge Economy
- Build a world class human resource base
- Develop and implement a lifelong learning policy
- Foster Research & Development for effective HRD
- Provide professional orientation to prospective entrants in the labour market.

The significance of *ICTs as a critical pillar and driver for knowledge-based economic transition* emerges in the Zambian Government's National Vision 2030 launched in 2005. The Vision articulates a development path in which Zambia is transformed into Information and Knowledge-based Society and Economy, supported by consistent development and pervasive access to ICT's by all citizens by the year 2030. The Zambia National ICT policy launched in 2007 articulates a vision where information and communication technology will contribute to national objectives for providing innovative and productive life long education and training that is accessible to all as a vital precursor to knowledge-based development.

The emphasis on *human capital development that is conducive towards developing a society characterized by skilled, flexible and innovative individuals nurtured through quality education and training* is again articulated in the Tanzania Vision 2025 where Education is considered to be a strategic agent for mindset transformation and the creation of an educated and learning nation. The Vision is meant to address the development of Tanzania within a changing technological and global market environment where ICTs are being recognised as a major driving force for transition to and participation in global knowledge-based economies.

Thus there are *several faces to policy development for knowledge societies* where a number of transitions at the political, economic, academic and community levels are required simultaneously. As noted above, the knowledge society vision is embedded in the various national Educational, ICT, Science and Technology and Innovation policies and plans.

Table 2 presents an overview of the four country national and sector policy and planning that accumulatively present an agenda for transition towards knowledge societies and economies.

Table 2: Knowledge Society Articulation in National Policy and Planning

	Knowledge Society and Economy Articulation in National Policies & Plans
Mauritius	The National IT Strategy Plan 2007 – 2011 (NICTSP) represents a comprehensive ICT policy to realise the vision of government in the making of an information based economy and of an information society.
South Africa	The Information Society Plan: Presidential National Commission on the Information Society and Development Strategic Plan 2010-2013 objective is "to establish South Africa as an advanced information-based society in which information and ICT tools are key drivers of economic and societal development." The Innovation towards a Knowledge-Based Economy, Ten-Year Plan for South Africa (2008-2018) is the national innovation plan.
Tanzania	The Tanzania Development Vision 2025 lays out three principal objectives: (1) achieving quality and good life for all, (2) good governance, and the rule of law and, (3) building a strong and resilient economy that can effectively withstand global competition. The Vision recognises the role of ICTs in accelerating socio-economic development and poverty reduction and calls for promoting ICTs and making investments in infrastructure and solutions that would make Tanzania an "ICT Hub". The Knowledge Society vision can be identified in national policy plans inclusive of The National Strategy for Growth and Reduction of Poverty (NSGRP) of 2005; The National ICT Policy (2003); The ICT in Education Policy (2007).
Zambia	In Zambia Knowledge Society developments are anchored in the Zambia Telecommunications Act of 1994 which led to the liberalisation and increased participation by the private sector of the telecommunication industry and the establishment of the Communications Authority (CAZ) in 1994; since then the Zambia Science and Technology Policy (1996); the Zambia Vision 2030 (2005); the Zambia National ICT Policy (launched 2007); the Ministry of Education ICT Policy (draft, 2007); the Zambia ICT Act of 2009; the Computer Crimes and misuse Act and other policy and regulatory framework documents have been developed to underpin Zambia's development path towards a Knowledge-based Economy and Society.

From the review above of the country National Knowledge Society visions and policies, it is clear that linkages between the Knowledge Society Pillars of Education, ICTs, Science and Technology and Innovation are being articulated fairly well, at least on paper. The emerging national frameworks for knowledge society development represent the attempts across the surveyed countries to concretize these linkages.

ii. Emerging Frameworks for ICT, Education, Innovation and Development to support a Knowledge Society

General Observations

The country reports present the following trends and patterns related to the status of development towards Knowledge Societies in the four countries surveyed as well as the issues, opportunities and challenges therein.

In all of the four countries surveyed there are clear policy frameworks emerging for moving from a resource based economy into a knowledge based economy. Education, ICT, Science Technology and Innovation (STI) are recognised as vital components of this change. There is also an *awareness of the inter-relatedness* between the Education, ICT and STI pillars and that their interaction for promoting social and economic progress is a critical goal. However the challenge for countries lies in *translating the four pillar interaction into tangible social and economic gains* that will benefit all communities. There is a need for adaptability and congruence of structures for implementing and coordinating four pillar initiatives towards knowledge-based society development. There emerged in all reports *clear gaps in systems/ mechanisms/ structures* for overseeing, coordinating, monitoring and evaluating initiatives and facilitating information sharing and exchange between entities.

Infrastructure presents challenges for access on a physical level and opportunities for exponential growth and change on a virtual level. In all countries surveyed education and training infrastructure is proving inadequate to meet the demands of expanding school populations resulting from the successes of Education For All (EFA) and Universal Primary Completion (UPC) policies. Many schools particularly in rural zones lack basic facilities and access to reliable electricity is a problem. Yet the exponential growth of mobile telecommunications in each country presents a scenario of a virtual future that may not be so dependent on a physical one.

- With improved connectivity by way of international submarine cables and national fibre backbones countries like Tanzania and Zambia are experiencing exponential growth in virtual access capacity.

- The Tanzania country report records over 1000% growth in capacity from two years ago.

- The Zambia report points to the emerging opportunities for the education sector to expand access and improve the quality of education by use of ICTs and for ensuring equity through provision of open learning and distance education to those living in Zambia's rural set ups.

- While *connectivity is now emerging as a given in all countries* challenges remain. The Telekom monopoly as described in the South Africa report means that user rates continue to remain high even though mobile communications have started to open up the competition.

All countries have developed policies and plans in one or more of the KS pillars. Some of the countries aspire to becoming regional ICT and knowledge hubs. The country reports indicate however that plans and policies *vary in efficiency and real application*.

- The Mauritius report describes what is perceived to be a perpetual beta process of educational planning and reforms over the last decade that would require a more in-depth review if Mauritius was to become a knowledge hub comparable to the likes of Singapore.

- In the Tanzania report some of those interviewed see the Tanzania vision to become an "ICT Hub" hampered by a lack of coordination and fragmentation in the implementation of the National ICT Policy.

Education systems are slowly being transformed, while there are *continuing concerns regarding school infrastructure, teacher availability, skills training and employability*. Many of the countries appear to be caught in a low skills equilibrium characterized by self-reinforcing networks of national and local institutions which interact to stifle the demand for improvement in competency and skills.

- Mauritius has promoted a policy of massive investment in modernizing the education system with ICT being seen as a key driver for innovation and creativity as well as a tool to improve teaching and learning processes. However, field interviews revealed that teacher education does not seem to have kept pace with the demands of the rapidly evolving new economy and has mainly remained rooted in the old "grammar of schooling" and has not been aligned with the imperatives of 21st century learning.

- In South Africa efforts have concentrated on generating accredited in service and pre–service teacher training with ICT being an integral tool for building competence. The focus in the training design is to rectify and transform the difficult situation of a South African education

system facing increasing diversification of the student population and a growing number of hitherto disadvantaged students.

- In Tanzania there are growing concerns that the national vision 2025, development policies and strategies highlighting the importance of ICTs as an enabler for Educational, Innovation and Science and Technology development, have promoted insufficient or sporadic interest and involvement in the ICT issues from higher political and administrative levels in government, civil society groups and the private sector. The Tanzania country report records insufficient human capital with competence in technical ICT issues, to the extent of significant inward migration from other countries. The report observes inadequate performance management skills (and system) that is the result of a lack of a systematic leadership development strategy.

- The country reports present a phenomenon that represents an *emerging leadership competency gap* between current leadership deficiencies that are influenced by structural inertia and the leadership competencies demanded by the shared vision of a knowledge-led future in Africa.

All of the country reports cited a *lack of coordination and insufficient communication* as one of the main issues to be addressed.

- The Zambia country report notes that while the Vision 2030, the Fifth National Development Plan (2004), and the National ICT Policy (2007) all provide for the necessary policy guidance on provision of ICTs and establishment of an information society and economy, what seems lacking is a productive inter-ministerial and inter-agency dialogue to facilitate development of inter-sectoral policies and strategies to guide policy implementation by different ministries, government agencies and civil society.

- The Tanzania country report observes the need for proactive approaches to accelerate the development of the country as a knowledge society through clear policies, strategies and collaboration among stakeholder themselves, whether within or among institutions of the public administration, the communities and the private sector.

Specific Observations – Education, ICT, Science & Technology and Innovation

Education

All of the education policies and plans in the country reports identify a strategy for a new model of education and training, *a model of lifelong learning that encompasses learning throughout the lifecycle*, that spans in various forms and dimensions from early childhood through to retirement.

- The Tanzania Government views Education as "a strategic agent for mindset transformation and knowledge creation".

- The Mauritian Government views the role of education and lifelong learning as a "service to society, to ensure upward social movement and as a source of the knowledge and expertise required for developing the economy".

- The Bill of Rights in the South African Constitution (RSA, 1996) 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".

- The Zambian Ministry of Education has drafted a policy on ICT in Education (2007), whose vision reads, 'Information and communication technology that will contribute to reach the objective of providing innovative and productive life long education and training accessible to all by 2030."

Infrastructure & ICT

In all country reports governments are giving top priority to the *development of ICT as a critical pillar for socio economic development*.

- In Mauritius the National Information Infrastructure has evolved from an obsolete network mainly used for data processing operations into a modern and fully digitized backbone.

- South Africa views the ICT potential as a critical pillar for efforts to restructure and build robust infrastructure for socio-economic development.

- Tanzania has achieved notable progress in deploying ICT in terms of infrastructure, Internet access, human capacities, and education opportunities, mainly due to the implementation of various national policies and strategies.

- Zambia policy initiatives in the ICT sector has developed into four main sub-sectors: telecommunications, information technology, electronic media, and postal communication However, low penetration rates and high prices prevailing in the market place suggest that the market is still largely underdeveloped and that there is room for improvement.

ICT and Education

The country reports describe a diversity of initiatives *that are heralding changes in education and training* systems while there are initiatives where real change does not yet apply.

- The Government of Mauritius is working on a programme to give students and teachers access to the most modern tools of learning and teaching, including IT. However, while schools have received some equipment, more needs to be done in terms of action and implementation. The Government has continued to confirm its determination to effectively steer the country into the global economy by developing a diversified, sustainable, knowledge-based economy and a highly trained and adaptive workforce in the 21st century.

- In South Africa the concept of e-Education revolves around the use of ICTs to accelerate the achievement of national education goals. The provision of a telecommunication infrastructure for learning and teaching is gradually increasing, and many schools are exploiting the benefits of ICTs to enhance the quality of teaching and learning. The introduction of ICT in education and training presents three major challenges, namely: equitable participation in information society, how ICT impacts on access, cost effectiveness and quality of education; and how ICT affects the education system.

- In Tanzania the ICT Policy for Basic Education was launched in 2007 to guide the integration of ICTs in basic education to address issues of access, equity, quality and to build "a highly skilled and educated workforce with aptitude and skills in the application of ICT in everyday life".

- In Zambia the Ministry of Education developed a draft policy on ICT (2007), whose vision reads, 'Information and communication technology that will contribute to reach the objective of providing Innovative and productive life long education and training accessible to all by 2030." The policy has remained in draft format for over three years. The Ministry of Education's ICT in Education activities have centred on the development of curriculum materials, e-learning, classroom teaching and learning, delivery of education through radio and television, development of teacher capacities and development (digitalisation) of distance learning materials, all focused on ICT integration in education to improve quality and increase access.

Science & Technology

There is consensus throughout all reports on the critical role of Science and Technology both in the socio-economic development of a country and in raising the standard of living and improving the life quality of people.

- In Mauritius the Ministry of Tertiary Education, Science, Research and Technology has embarked on a process to develop a science and research policy framework.
- The South Africa country report records the prospects for improved competitiveness and economic growth which rely, to a great degree, on science and technology. The requirement is for more focus on long-range objectives, including urgently confronting South Africa's apparent failure to commercialize the results of scientific research, and address inadequate production.
- The Tanzania country report presents the observation that realistic science and technology policy should reflect the key role that science and technology will play in bringing about a rapid socio-economic development and subsequent realization of self reliance.
- In Zambia the mission of the Science and Technology policy (1996) is to promote and exploit science and technology as an instrument for developing an environmentally friendly indigenous technological capacity in sustainable socio-economic development in order to improve the quality of life for Zambia.

See also four Country summary tables on **1) ICT4ED, 2) Education, Science, Technology & Innovation, 3) Teacher Professional Development & Information Literacy and 4) Key Actors** in Appendix 1

iii.   Leadership Competency Importance-Prioritisation Survey

During the field research a Leadership Competency importance-prioritization survey was conducted with senior and middle level officials in Ministries and organizations visited in each of the four selected countries. In all one hundred and three (103) questionnaires were completed and returned to field teams on the days of the visits in the four countries. Table 3 presents a profile of the survey respondents.

Mauritius, South Africa, Tanzania and Zambia Combined Respondents

Table 3: Profile of the respondents (N=103)

Profile	No of Respondents
Senior Level Management	41
Middle level Management	62

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.

Key findings – Importance Analysis

Senior Level Leadership Competency Rankings

- Senior level officials ranked the following as the three most important competencies for a KS leader (as indicated in Table four):

    - the *environmental level KS Vision competency* on national leadership capacity to develop, communicate and give direction to Knowledge Society vision, mission and values;

    - the *environmental level KS Policy and Strategy competency* on national leadership ability to develop inter-related policies, strategies and plans on the KS and its pillars of Education, ICT and STI;

    - the *individual level KS Creativity and Innovation competency* related to leadership ability to plan and encourage organisational modernization, creativity and innovation related to KS and pillars of ICT, Education and STI.

- In contrast the following competencies were perceived as having less importance by senior officials:

    - the *organisational level KS Dialogue competency* related to organisational leadership ability to manage dialogue and relations with key internal and external stakeholders on the KS and pillars;

    - the *organisational level KS Vision competency* on organisational leadership capacity to develop organisational vision, mission and values based on national KS vision and policy;

    - the *organisational level KS M&E competency* related to organisational leadership ability 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; were perceived as having less importance by senior managers.

- A noteworthy finding was the low importance attributed by senior level managers to M&E competencies both at environmental level and organisational levels related to national and organisational leadership capacity to use M&E systems as an evidence-based foundation for planning, decision-making and learning on inter-related ICT, Education and STI policy and strategy.

- These findings would suggest that the focus for senior level management in importance attribution is on competencies for the development of leadership skills in KS policy vision, strategy and planning and less on leadership skills for implementation and monitoring, for building organisational learning and for developing policy on the basis of the monitoring and evaluation feedback loop.

- This pattern would seem to be mirrored in the results of the overall weighted mean scores of each of the three competency level domains where senior managers attribute *environmental level*

competencies (environmental Level KS vision, policy & strategy, system management and M&E) as the most important competency domain and *organisational level competencies* (organisational level KS vision, policy & strategy, system management and M&E) as the least.

Middle Level Leadership Competency Rankings

- Middle level officials ranked the following as the three most important competency domains for a KS leader (as indicated in Table four):
  - ➢ the *individual level KS Effective Communication competency* on individual leadership ability to develop key messages about the significance and parameters of KS pillars of ICT, Education and STI for organisational and national development;
  - ➢ the *organisational level KS Policy and Strategy competency* for organisational leadership ability to translate the KS (ICT, Education, STI) vision, mission, value framework into strategic (medium term) and operational (concrete and short term) objectives and actions;
  - ➢ the *environmental level M&E competency* related to national leadership capacity to use M&E systems and practices as an evidence-based foundation to planning, decision-making and learning on inter-related ICT, Education and STI policy and strategy.
- In contrast the following competencies were perceived by middle level managers as having less importance:
  - ➢ the *organisational level KS M&E competency* related to 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;
  - ➢ the *organisational level KS Vision competency* on leadership capacity to develop organisational vision, mission and values based on national KS vision and policy;
  - ➢ the *environmental level KS Vision competency* related to national leadership ability to develop 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; were perceived as having less importance by middle level managers and officials.
- A noteworthy finding at middle management level was the low importance attributed to KS system management competencies both at environmental level and organisational levels related to leadership capacity to manage implementation of inter-related plans, strategies, and programmes on KS and ICT, Education and STI pillars.

- These findings would suggest that the focus for middle level management in importance attribution is on competencies for the development of leadership skills at an individual level to communicate KS vision, at an organisational level to translate that vision into short and medium term action plans and at a national level to monitor and evaluate institutional initiatives that might serve as conceptual models for policy revision and structural transformation.
- The overall weighted mean scores reflect a middle management ranking of individual leadership competencies (individual level effective communication, creativity and innovation, motivation and collaboration) as the most important competency domain while *organisational level competencies* (organisational level KS vision, policy & strategy, system management and M&E) as the least important competency domain.

Senior Vs Middle Level Importance Rankings

- The Zambia report provided insights from focus group discussion on the apparent conflict between senior and middle management importance perception of the leadership competencies. The report suggests that differences may be arising from the fact that middle management believe that although the policies and strategies may be in place, senior management has not effectively communicated the strategies for implementing the existing policies. On the other hand, inadequate expertise and lack of dialogue among the government ministries, agencies and civil society have robbed key institutions of the opportunity to work towards a shared vision in the light of the KS and its pillars.
- The South Africa report describes a major concern presented by senior managers during the interviews as related to the presence of good policies at national level without proper implementation strategies. A critical commentary that emerged from focus groups discussions with middle managers was the observation that although the government has clear mandates and visions for building a knowledge society, they seemed to be borrowed ideas that are not contextualised to the South African environment. There seemed not to be enabling structures and programmes for the implementation of the mandates. The senior managers attributed failure in implementation as largely due to the lack of visioning at national level and the lack of dialogue among stakeholders on strategies to contextualise imported policies. A consistent report emerging from the South Africa interviews and focus group discussions revealed 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.

Table 4: Leadership Competency Importance Rankings

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	**2.73**		**1**		**2.57**		**2**	
KS dialogue: National leadership capacity to establish inter-ministerial & inter-sectoral coordination mechanisms on KS pillars of Education, ICT and STI	2.76	0.24		four	2.53	0.52		6
KS Vision: National leadership capacity to develop, communicate and give direction to Knowledge Society (KS) vision, mission and values	2.80	0.21		1	2.48	0.61		11
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	2.80	0.16		1	2.65	0.40		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	2.66	0.23		8	2.52	0.38		7
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	2.63	0.34		9	2.66	0.36		3
Organisational	**2.61**		**3**		**2.56**		**3**	
KS dialogue: 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	2.54	0.40		13	2.66	0.34		four
KS Vision: Organisational leadership capacity to develop its vision, mission and values based on national Knowledge Society (KS) vision and policy	2.60	0.30		11	2.48	0.52		11
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	2.71	0.26		5	2.69	0.35		2
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	2.63	0.34		10	2.52	0.58		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	0.35		11	2.47	0.61		13
Individual	**2.73**		**2**		**2.61**		**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	2.68	0.28		7	2.79	0.23		1
KS Creativity and innovation: Leadership capacity to plan, manage and encourage organisational modernization, creativiey and innovation related to KS and pillars of ICT, Education and/or STI	2.80	0.16		3	2.52	0.45		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	2.70	0.22		6	2.52	0.52		7

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

Key Findings – Priority Analysis

Senior and Middle Level Manager Priorities

- Senior and middle level managers identified priorities in the *environmental and organisational KS policy and strategy competency domains* as the primary focus areas for the pilot ALICT capacity building project (Figure 4).

- This would correlate with the importance rankings where the national and organisational leadership capacity to develop inter-related policies, strategies and plans on the KS and its pillars of Education, ICT and STI emerged as the most important leadership competency domains for engagement.

- It would also correlate with focus group discussion insights where

  - in the Tanzania country report stakeholders highlighted the leadership competency to translate vision or strategy and communicate appropriately with staff as mostly lacking; and where the capacity to translate plans into implementation activities was also a challenge in many of the MDAs.

  - in the Mauritius country report stakeholders identified the lack of a coordinated and coherent inter-organisational model of collaboration, communication and common vision of the KS pillars; and the lack of autonomy of some institutions and their high degree of coupling where it is unclear which specific roles any particular organisation, department or ministry has in a project.

- It would seem from these patterns that senior and middle level managers are ranking competency domains that are focused on down to earth translation of the knowledge society concepts into practical strategies and plans that are related to each country's needs and context. These survey results would challenge the assumptions and emphasis in much Leadership in ICT programmes on a techno-centric approach for acquiring skills and competencies that have little application to participant working contexts. The survey would suggest that what leaders really need is to develop their professional capability to both use ICT and apply it in their professional practice.

- The Mauritius report identifies practical application of leadership competencies in the KS policy and strategy domains as the capacity to enable and facilitate consultation, collaboration, coordination and communication processes across the public sector; to convene multi-stakeholder forums, cross-sectoral coordination, planning and preparation for implementation and effective communication within the organisation and its institutions but also with the external partners; to build capacity to develop coherent and mutually beneficial partnerships between government institutions but also between government and the private sector to more effectively implement projects in pursuit of skills development and lifelong learning.
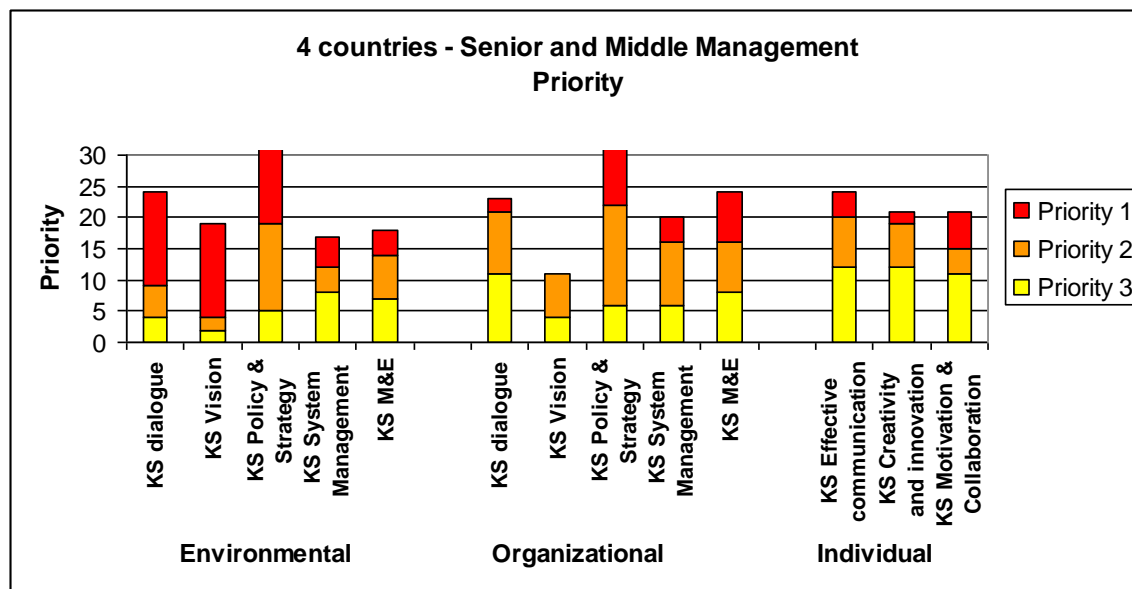
Figure 4: Leadership Competency Priority Rankings

Key Findings – IMPORTANCE-PRIORITY QUADRANT MAPPING

In an attempt to further clarify the importance-prioritization competency relationship and the opportunities and gap areas for capacity building, an importance-prioritization quadrant mapping was conducted. Also known as quadrant analysis, the importance-prioritization quadrant mapping is a popular diagrammatic technique allowing the mean importance and prioritization results to be graphically illustrated on a two dimensional grid (Table 5).

The analysis is divided into four quadrants that distinguish leadership competencies according to the low and high importance and the low and high levels of priorities expressed by senior and middle level managers.

Quadrant I displays issues that are considered low in both importance and priority. Based on the findings, such competencies include the *organization level domains* on leadership capability for KS dialogue & vision, *organisational and environmental level domains* on leadership capacity for system management and the *individual level domain* of leadership ability for motivation and collaboration.

Quadrant II contains competencies that are perceived as having a low level of importance and a high level of priority. The *environmental level competency domain* of leadership capacity for KS vision and the *organisational level competency domain* related to leadership ability to use M&E to inform planning and policy development were considered by respondents to be of low importance but still a high priority for capacity building.

Quadrant III includes competencies that are perceived high in the level of importance but low in terms of priority. *Environmental level* leadership competencies for KS M&E*, individual level competency domains* for leadership capacity in effective communication, innovation & creativity are all leadership issues exhibited in the third quadrant.

Quadrant IV requires the immediate attention of the ALICT programme for capacity building and modular development. The quadrant contains the priorities that are considered by managers to be both high in importance and high in priority for capacity building. These competencies are *environmental level competency domains* for leadership capacity for KS dialogue, policy and strategy as well as the *organisational level domain* for leadership capacity to translate KS policy into organisational KS policy and strategy.

Table 5 : Leadership Competency Importance-Priority Quadrant Mapping

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

iv. Factors Enabling and Constraining Transition towards Knowledge Societies and Economies

The factors enabling and constraining development towards Knowledge-based Societies and Economies are similar across the four countries surveyed and are essentially similar to other regions in the world. While there are differences in relation to the KS vision and objectives, there are several common factors which have underpinned KS development in each of the four countries. What differentiates the rate of transition towards knowledge-based economic development in each country is the degree to which the KS agenda is articulated from national to local levels in the various faces of national policy, strategy and implementation in the KS Education, ICT, Science and Technology and Innovation pillars.

Table 6 presents a general picture of factors enabling and constraining KS development in Education, ICT and Science & Technology and Innovation pillars based on the country reports:

Table 6: KS Enabling and Constraining Factors

Factors	Enabling Features / Opportunities	Constraining Features / Challenges
Knowledge Society	Most of the countries have developed, or are in the process of developing, policies and plans that contain several facets of Knowledge Society development. Policy goals for Knowledge Society development include: • coordinated strategy to transition towards inclusive Information and Knowledge Societies that are recognised as drivers of economic and societal development • human resource development and lifelong learning for building creative and competent Human Resource capacity • transition to knowledge based societies and economies that are supported by consistent development and pervasive access to ICT's by all citizens	The status of the Knowledge Society development in the countries surveyed can be said to be at an early stage There is a general lack of cross-sectoral coordination and policy coherence across Knowledge Society pillars of Education, ICT, Science and technology and Innovation A country's prospects for improved competitiveness and economic growth rely, to a great degree, on science, technology and innovation capacity that is embodied in the technological and scientific knowledge of its citizenry. There is a need for human capital development that is conducive for building robust Science Technology and Innovation sectors to support KS development.
Infrastructure	Governments are recognizing the need to prioritise the development of ICT The potential of ICT is immense for supporting national policies and efforts for institutional restructuring, reform and transformation National information infrastructures are evolving rapidly from obsolete networks into modern and	A combination of low penetration rates and high prices prevailing in the market places in some countries would suggest that markets are still largely underdeveloped and that there is room for improvement. Competition in telecommunications services is lagging behind and services are still relatively highly priced.

Factors	Enabling Features / Opportunities	Constraining Features / Challenges
	fully digitized backbones with outreach to provide coverage to even the remotest zones Countries have achieved notable progress in ICT deployment in terms of infrastructure, internet access, human capacities, and education opportunities, as a result of new technology affordances and the implementation of various national policies and strategies ICT sectors are developing into various sub-sectors inclusive of: telecommunications, information technology, electronic media, and postal communication. The ICT landscape is changing rapidly through new innovative technology and solutions. This provides new opportunities for end users and service providers.	
Education	Education is considered to be a strategic agent for mindset transformation and knowledge creation. There has been considerable investment, in terms of both human and material resources, in education sectors and impressive progress has been achieved in all countries in terms of free, universal and inclusive primary education provision with improvement in access extending to secondary and tertiary education levels. A new model of education and training is emerging, a model of lifelong learning that encompasses in various formats learning from early childhood through to retirement.	There is acknowledgement that the issue of access to education has taken precedence over quality. The challenge is in how to balance access with quality of provision. Improving the quality of education in basic education is a must. Early childhood care is also emerging as a priority area. Strengthening and supporting curriculum implementation in schools, textbooks and other educational resources are crucial factors in ensuring improved educational performance. At tertiary level the requirement is for building capacity in science & technology and discipline specific skills, research and development.
ICT in Education	Governments are working to give students and teachers access to new and modern technologies and tools for teaching and learning, inclusive of ICT. All countries have developed some form of policy or strategy for information and communication technologies in education in order to: • guide ICT integration • address issues of access, equity, quality • develop a flexible, adaptive, responsive and educated workforce with aptitude and skills to compete in a 21st century global economy that is increasingly dominated by knowledge-based industries	Strategies for ICT integration in education present major challenges for education systems in relation to: participation in and access to the world of diverse knowledges; how ICT impacts on access, cost effectiveness and quality of education; and how ICT affects the education system. Some ministries have developed fine ICT policies and strategies which have either remained in draft or have been insufficiently implemented. While schools and institutions in all countries have received or are receiving ICT equipment,

Factors	Enabling Features / Opportunities	Constraining Features / Challenges
	• contribute to the objective of providing innovative and productive life long education and training that is accessible to all The provision of telecommunication infrastructures for learning and teaching is gradually increasing in all countries, and schools and institutions are exploiting the benefits of ICTs to enhance the quality of teaching and learning. The focus for ICT in Education in countries has been related to : • development of curriculum materials • e-learning • e-content • ICT in classroom teaching and learning • delivery of education through radio and television • development of teacher capacities • development (digitalisation) of distance learning materials • ICT integration to improve quality and increase access • development of mobile technology platforms for educational delivery	more needs to be done in terms of developing teachers' competencies and building capacity to use ICT effectively in teaching and learning.
Science, Technology and Innovation	There is a consensus in all countries that Science, Technology & Innovation play a vital role in the socio-economic development of a country by: • raising the standard of living and improving the quality of life of the people • improving the prospects for economic growth and competiveness Most countries are developing some form of science, technology, innovation and research policy frameworks. The purpose of Science, Technology& Innovation (STI), Information Communication and Technology (ICT) and Research & Development (R&D) expressed in strategies is to: • create an enabling system for the advancement of an ICT, STI and R&D inter-related agenda in the context of knowledge-based economic development • promote and exploit STI, ICT and R&D as instruments for developing environmentally friendly indigenous technological capacity in sustainable socio-economic development in order to improve the quality of life	Realistic Science, Technology & Innovation (STI) policies should reflect the key role that STI will play in bringing about rapid socio-economic development and subsequent realization of self-reliance. There is a need for more focus on long-range objectives, including confronting failure to commercialize the results of scientific research that is already happening in surveyed countries STI development is limited by inadequate research and documentation skills Opportunities for sharing information, research and development are under-utilised

v. Synthesis of Conclusions & Recommendations

The country reports have demonstrated the progress that has been made in the development of Knowledge Society agendas related to the pillars of Education, ICT, Science and Technology and Innovation in the four African countries surveyed. The progress that has been achieved in each country particularly over the first decade of the 21st century has been remarkable. However, in terms of broad development towards Knowledge Society status, the process is still at an early stage. The country reports present a picture of diverging understandings of key Knowledge Society concepts at all system levels. The need is for a comprehensive approach to address the human capital development challenges as well as the structural transformation that development towards a knowledge-led future will entail. In this regard the ALICT programme presents a timely intervention for developing core leadership competencies as well as a flexible and responsive programme to meet the needs and shared vision for continent wide development towards Knowledge-Based Economies and Societies.

General Recommendations for Leadership Development

The following section presents a summary of the key recommendations for leadership development identified in the country reports and that emerged from the leadership competency survey analysis.

The country reports point to a need for drivers and managers with expertise in the KS pillars of ICT, Education and Science and Technology, especially at senior and middle management levels. National level strategy and coordination mechanisms, interrelationships among sector and ministry based policies and strategies, capacity to translate the vision, mission and value frameworks into strategies and activities and to develop messages about the significance of the KS pillars for organisational and national development are generally lacking.

Based on such gaps/challenges identified in the four country reports, the following recommendations are made for general leadership development:

- Develop the ability of organisational leaders to transform policy frameworks into operational models for improved implementation of programmes.
- Develop capacity to address the gaps identified in relation to research and development in the science and technology field.

- Enhance the understanding of how the pillars of the knowledge society interrelate and impact on one another with the view to develop the necessary mechanisms to create synergies and leverage opportunities across the pillars
- Build capacity to assess industry and community requirements for socio-economic development and to re-engineer education and training systems to equip students/graduates with the required 21st century skills as demanded.
- Create an enabling environment to develop basic ICT skills for leaders as well as impart knowledge on the potential of ICTs to accelerate socio-economic development.
- Identify activists/change agents/champions among the leaders/future leaders in the public service.
- Develop capacity to implement policy and strategic documents that have been developed in the participating country education, ICT, Science, technology and innovation sectors.
- Support individual leaders and facilitate capacity building for decision making that does not necessarily reflect the past ways of doing things.
- Give leaders room to innovate through support and facilitation to ensure increased productivity.

General Leadership Capacity Needs related to KS
- Leadership competency to translate a Knowledge Society vision, strategy and plans into implementation activities and communicate appropriately with staff
- Performance management skills (and system) that could make leaders take decisions and risks
- Change management knowledge and skills to address the mind set against the use of ICT in work practices
- Skills to relate global knowledge issues and apply them to local environments and dynamics

Specific Leadership Capacity Needs related to KS
- Broad awareness of KS issues, the pillars and how they are inter-linked to foster development
- Understanding the Innovation Eco-system and linkages between Research and Innovation, S&T, Education and Development
- Understanding ICT/STI/KS issues, framing emerging issues and communicating these clearly to subordinates
- ICT investment decision making- cost benefit analysis of ICTs

- The role and importance of public private partnerships that will fast track implementation of ICT and KS initiatives

Specific Recommendations for Modular Development for the First ALICT Pilot

- A core module should be on the Knowledge Society to build a common understanding of what it entails and how the different pillars should work together in a synergistic way to build sustainable and inclusive knowledge societies appropriate for different contexts. The concept of the knowledge society should be well defined and introduced in a manner that is related to the context and development settings of participants. The pillars of knowledge society should be well explained as well as the indicators for each pillar.

- A core module for all participants should focus on change management as a critical element of the course. Change management should be dealt with at the individual, organisational and environmental level for leaders to understand the interplay between these levels and what would be required at each level to bring about transformation from the current state of affairs to the desired state.

- The modules should be structured in a way to include both theory and practice to build understanding of phenomena and issues and to apply the knowledge and insights gained from the theory practically to address real problems faced in the execution of participant daily activities in terms of planning, budgeting, implementation and evaluation. In this regard the technology tools to facilitate the more efficient execution of such tasks should be integrated in the module.

- A collaborative/team assessment of issues hindering implementation of projects in a particular country: 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 has hindered implementation and suggest how best this can be addressed; for improvement, there should be thorough analysis of activities in the different government departments; capacity building activities should include gathering of data to support decision making; developing appropriate strategies to operationalise policies and overcome hindrances; identification and assigning of roles and responsibilities to the various ministries/institutions and the development of responsive M&E systems to keep implementation on track; tools for monitoring and evaluation of projects should be introduced to the participants. This should include the outcome mapping tools.

- Modules should build foresighting, forecasting and scenario building skills in all participants.
- Capacity building should focus on information sharing and dissemination of information related to creation of an information society should be included.
- Leaders should be encouraged to access online journals to keep pace with developments in the global society through training on online searches.
- Communication skills among leaders should also be key to ensure that policies and strategy documents are understood at all levels through the most effective and efficient communication method.
- Personal development and management module; that a Self-awareness / Emotional Intelligence topic needs to be included as it is fundamental in development of leadership capability through self-realization and ability to understand the people they lead.

Priority areas for modular development emerging from survey of high level/ middle level officials

Modules	Learning Objectives	Topics
Environmental Level KS Dialogue	- To establish and strengthen the capacities of senior and middle management staff to dialogue on KS and its pillars of ICTs, Education, Science and Technology and Innovation; - To strengthen capacity for Ministries to engage partners.	1. Participating country policies on the knowledge society and its pillars of ICTs, Education , Science and Technology and Innovation 2. Identifying key players in KS and its pillars and the need for dialogue 3. Establishing inter-ministerial and inter-sectoral coordination mechanisms 4. Managing dialogue and relations with key internal and external stakeholders on KS or its pillars inclusively and constructively
Environmental and organisational level policy and strategy	To strengthen the capacities of senior and middle management staff to develop inter-related policies and, strategies and plans on KS and its pillars;	1. Developing inter-related policies, strategies and plans 2. Translating the KS vision, mission, value framework into strategic (medium term) and operational (concrete and short term) objectives and actions 3. KS Activity planning and budgeting
Environmental and organisational level monitoring & Evaluation	To develop and strengthen national and organisational level capacities to establish, implement and use M&E systems and practices as evidence based foundation for KS planning, decision making and learning	1. Project proposal writing 2. Project planning and management 3. Developing project indicators 4. Defining monitoring and evaluation 5. M&E systems design and development 6. Using M&E information for planning and decision making 7. Developing a learning product
Personal development and management	To develop and strengthen national, organisational and individual capacities to communicate effectively on the KS progress in pillars of ICT, Education, Science and Technology and innovation	1. Self awareness , Emotional Intelligence development. 2. Effective communication; the need to develop key messages about the significance and parameters of KS and its pillars 3. Creativity and innovation; the need to plan, manage and encourage organisational modernization, creativity and innovation related to KS and its pillars of ICT, Education, Science and Technology and Innovation; 4. Motivation and collaboration; the need to create organisational environment that is conducive to achieving KS progress in pillars of ICT, Education, Science and Technology and Innovation

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Annex 1: Summary Tables

Table 1: ICT4D

	ICT4D policies & plans
Mauritius	The National IT Strategy Plan 2007 – 2011 (NICTSP). a comprehensive ICT policy to realise the vision of government in the making of an information based economy and of an information society
South Africa	- Information Society Plan: Presidential National Commission on the Information Society and Development Strategic Plan 2010-2013 objective: "To establish South Africa as an advanced information-based society in which information and ICT tools are key drivers of economic and societal development." - Innovation towards a Knowledge-Based Economy, Ten-Year Plan for South Africa (2008-2018) is the national innovation plan.
Tanzania	- The Tanzania Development Vision 2025 document. Vision 2025 lays out three principal objectives11: (1) achieving quality and good life for all, (2) good governance, and the rule of law and, (3) building a strong and resilient economy that can effectively withstand global competition. The Vision recognises the role of ICTs in accelerating socio-economic development and poverty reduction and calls for promoting ICTs and making investments in infrastructure and solutions that would make Tanzania an ICT Hub - The National Strategy for Growth and Reduction of Poverty (NSGRP) of 2005 - Tanzania envisions itself to become an "ICT Hub" which vision is at the centre of the National ICT Policy
Zambia	Zambia Telecommunications Act of 1994; The Zambia Science and Technology Policy (1996); The Zambia Vision 2030 (in 2005); The Zambia National ICT Policy(Launched 2007); The Ministry of Education ICT Policy; The Zambia ICT Act of 2009; The Computer Crimes and misuse Act and other policy and regulatory framework documents.

Table 2: Education

	Education General Policies, Strategies & Frameworks – Access, Quality, Equity, Curriculum	Education ICT Policies & Initiatives
Mauritius	Education and Human Resource Strategy Plan (EHRSP) 2008 -2020	
South Africa	- Bill of Rights in the South African Constitution12 (RSA, 1996a) access to basic education South African Schools Act (RSA, 1996), schooling is compulsory for children aged 7-15 or attendance in Grades 1 to 9, whichever comes first. - Ministerial Committee for Learner Teacher Support Material (LTSM) was constituted to strengthen and support curriculum implementation - action plan to 2014 "Towards realisation of Schooling 2025" - strategic plan 2010 to 2015	- strategy for information and communication technologies in education developed in 2001. - draft white e-education paper (2004) "Transforming Learning and Teaching through Information and Communication Technologies (ICTs)" - Thutong is the Department of Education portal for all educators and learners
Tanzania	Education and Training Policy of 1995 and the Education Sector Development Programme (ESDP) of 2001 also clearly envision education as key to socio-economic development.	National ICT Policy of 2003 recognises that ICTs can enhance and improve education opportunities. It advocates for the introduction of an e-education system ICT Policy for Basic Education which was launched in 2007 to guide the integration of ICTs in basic education to address issues of access, equity, quality and to build "a highly skilled and educated workforce with aptitude and skills in the application of ICT in everyday life.
Zambia		Draft policy on ICT (2007), whose vision reads, 'Information and communication technology that will contribute to reach the objective of providing Innovative and productive life long education and training accessible to all by 2030."

Table 3: Science, Teacher Professional Development, Literacy

	Science & Technology, Innovation and Research & Development Policies and Initiatives	Professional Development in Education, ICT and STI	Informational Literacy
Mauritius	The Ministry of Tertiary Education, Science, Research and Technology has embarked on a process to develop a science and research policy framework.		Universal ICT Education Programme (UIEP) offered under the aegis of the NCB to align Mauritius to international benchmarking in ICT literacy
South Africa	- ICT R&D Strategy for South Africa was finalised in 2007 - 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 ICT R&D Strategy13 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 Strategy was published in August 2002. The Department of Science and Technology published the Ten-Year Innovation Plan in 2007.	- 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 government is providing incentives to the teachers through the Teacher Laptop Initiative	E-literacy and skills development report
Tanzania	The Vision further recognises the need to promote Science and Technology alongside investments in ICTs as critical to achieving the target for a competitive economy. National Science and Technology Policy (1985, revised 1996) and the National Higher Education	Education and Training Sector Development Programme in 2001 Technical Education and Training Policy (1995), National Science and Technology Policy (1996) and the National Higher Education Policy in (1999).	

	Science & Technology, Innovation and Research & Development Policies and Initiatives	Professional Development in Education, ICT and STI	Informational Literacy
	Policy of 1996		
Zambia	Policy on Science and Technology (1996) is to promote and exploit science and technology as an instrument for developing an environmentally friendly indigenous technological capacity in sustainable socio-economic development in order to improve the quality of life for Zambia		

Table 4: Key Actors

	Government	Donors/International	Others
Mauritius	Education and Human Resources Ministry Tertiary Education, Science Research and Technology Ministry Information and Communication Ministry Technology A National Computer Board (NCB) Prime Minister's Office Ministry of Education and Human Resources Ministry of Tertiary Education, Science, Research and Technology Ministry of Information Communication Technology Ministry of Finance and Economic Development Ministry of Public Infrastructure, National Development Unit, Land Transport and Shipping Information and Communication Technologies Authority National Computer Board		Mauritius Research Council Rajiv Gandhi Science Centre The Mauritius Institute of Education Human Resources Development Council Mauritius qualification Authority The Regional Multidisciplinary Centre of Excellence Mauritius Institute of Training and Development

South Africa	Department of Science and Technology (DST)
	Department of Higher Education and Training,
	Department of Basic Education
	Department of Communication -National Research Foundation (NRF),
	  - Technology Innovation Agency (TIA)
	  - Universities and Research Councils
		European Union	The National System of Innovation (NSI)
			National Advisory Council on Innovation (NACI)
			South African Agency for S&T Advancement (SAASTA

Tanzania	Ministry of education and Vocational training Ministry of Communication, Science and Technology (MCST Tanzania Communication Regulatory Authority (TCRA) COSTECH, which promotes Science, Technology and Innovation The Directorate of Management Information Systems, President's Office –Public Service Management		Economic and Social Research Foundation (ESRF) Tanzania Development Learning Centre (TGDLC),
Zambia	ZICTA Ministry of Information and Broadcasting Ministry of Education Science, Technology and	USAID Flemish Office for development	National Science and Technology council Computers for Zambia e-Brain Zambia

	Government	Donors/International	Others
	Vocational Training; Ministry of Communication and Transport University of Zambia	cooperation and technical assistance (VVoB) UNESCO IICD	Schoolnet Zambia Onewold Africa

Annex 2: End-notes

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