African Leadership in ICT

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

A Situational and Needs Analysis

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

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Acronyms

ALICT	African Leaders in ICT
COSTECH	Commission for Science and Technology
EFA	Education for All
EMIS	Education Management Information Systems
ESDP	Education Sector Development Plan
ESRF	Economic and Social Research Foundation
GESCI	Global e-Schools and Communities Initiative
GDLN	Global Development Learning Network
GDP	Gross Domestic Product
ICT	Information and Communication Technology
ICT4D	Information and Communication for Development
IPR	Intellectual Property Rights
KEI	Knowledge Economy Index
KS	Knowledge Society
MCST	Ministry of Communication, Science and Technology
MDA	Ministries, Departments and Agencies
MoEVT	Ministry of Education and Vocational Training
MoU	Memorandum of Understanding
NGOs	Non-Governmental Organisations
NREN	National Education and Research Network
NRI	Networked Readiness Index
NSGRP	National Strategy for Growth and Reduction of Poverty
PEDP	Primary Education Development Plan
PRSP	Poverty Reduction Strategy Paper
R&D	Research and Development
SEDP	Secondary Education Development Plan
S&T	Science and Technology
SME	Small and Medium Enterprises
STI	Small and Medium Enterprise
TAKNET	Tanzania Knowledge Network
TBT	Tanzania Beyond Tomorrow
TCRA	Tanzania Communication and Regulatory Authority
TDIC	Tanzania Development Information Centre
TGDLC	Tanzania Global Development Learning Centre
TEHAMA	Teknolojia ya Habari na Mawasiliano
TERNET	Tanzania Education and Research Network
Tz-CLK-NET	Tanzania Country Level Knowledge Network

1. Introduction

This report presents the results of a study to assess the institutional and leadership capacities critical to developing the knowledge society in Tanzania. The study was conducted from February to March 2011 as part of a needs assessment for the African Leadership for ICT (ALICT) programme involving four countries: Tanzania, South Africa, Mauritius and Zambia. The report also attempts to develop a general understanding of the status of the knowledge society in Tanzania with a focus on four of the most important pillars in the development of knowledge societies. These four pillars are Education, Information and Communication Technologies (ICT), Science and Technology (S&T) and Innovation.

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

- 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.
- 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.
- 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.
- 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.

Leadership capacity is especially critical because it underpins or can be considered the foundation for any sort of development. As such, the main area of focus of the African Leadership for ICT (ALICT) programme is to build the capacity of current and potential future African leaders to understand the interplay of knowledge, ICT and development and strategically

position their organisations to contribute or coordinate to building societies for national socio-economic development.

2. Methodology

The study was conducted in two-stages: a desk study phase which reviewed available documentation online and a one-week field visit to Dar es Salaam carried out in March of 2011.

The field visit involved gathering information through interviews, meetings and focus group discussions 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, Research & Development initiatives at national, regional and district levels in Tanzania. Finally, a one day round-table was held at the end of the visit where GESCI staff and consultants presented initial findings for discussion and validation to a cross section of actors. The various stakeholders interviewed are presented in appendix 1.

3. Profile of Tanzania

The United Republic of Tanzania (also known simply as Tanzania) is a union of Tanganyika and the off-shore islands of Zanzibar and Pemba covering an area of 945,087 sq km with a population estimated at 43.7 million in 2009 (World Bank)[1]. Administratively, the country is divided into 26 administrative regions (21 mainland and 5 Zanzibar) and 130 administrative districts (Zanzibar has 10 and Mainland has 120 administrative districts) (Government of Tanzania)[2]. Dodoma is the official capital and home to the 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 language of commerce administration and higher education.

In Tanzania, 45% of the population is between 0 and14 years, 52% between 15 and64 years and 3% above 65 years of age with a projected annual growth rate of 2.9% in 2009[3]. The literacy level for the total population has been recorded at 73% (World Bank 2009)[4]. Tanzania is classified as a “low income” country with a GDP of $21.4 billion and a GDP per capita of $503

with Agriculture playing an important role in the economy employing about 74.6% of the labour force (World Bank)[5].

The countries long-term strategic vision is laid down in the Tanzania Development Vision 2025 document. Vision 2025 lays out three principal objectives[6]: (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. ICT is being recognised as a major driving force for the realisation 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.

4. Overview of the status of Knowledge Society development in Tanzania

To assess the status of the knowledge society in Tanzania, we look more closely at the four domains of education, ICT, Science and Technology and Innovation. There have been a number of research attempts to determine countries' status in developing knowledge societies. Two good measures are the Networked Readiness Index and the Knowledge Index and the data for Tanzania is provided below.

In addition to these measures, this study also reviewed these four domains, by focusing on:

- The overall regulatory and policy environment which will review the education, science and technology and innovation (STI) and ICT policies and laws.
- The various actors and stakeholders responsible for policy development, regulation or implementation of policy under the four main strands of the knowledge society under review as well as their mandates.
- The various initiatives related to building the knowledge society in the four main domains.
- The inter-relatedness of policy making and execution, cross sectoral networks and partnerships including private-public partnerships.

i. General Overview

The status of the Knowledge Society development in Tanzania can be said to be at a very early stage. The Knowledge Economy Index (KEI) which "represents the overall level of development of a country or region towards the Knowledge Economy" is one good measure to use to gauge knowledge society development[7]. The KEI is particularly useful in this case because it looks at three of the four domains namely, Education, ICT and Innovation, in addition to another domain of economic incentive regime. The latest (2009) index ranks Tanzania at position 122 globally. The Tanzania score is below average for Africa. The Knowledge Index which focuses only on the domains of Education, ICT and Innovation ranks Tanzania 133 globally with a score also below the average for Africa. To put this in perspective, consider that Mauritius the top ranked country in Africa is ranked 64th on the KEI index. However, the latest KEI shows that Tanzania ranking has improved by 8 places since 2000 showing that some significant positive developments have been made. Comparison of the most recent (2009) scores for Tanzania with Mauritius and average for Africa are shown in Table 1 below.

Country	KEI	Economic Incentive and Institutiona Regime	Innovation	Education	ICT
Mauritius	5.48	8.01	3.63	4.03	6.23
Africa	2.71	2.68	4.31	1.38	2.45
Tanzania	2.17	4.05	2.1	1.17	1.36

Table 1: Knowledge Economy Index Source: KAM (2009)[8]

Another important measure is the networked readiness index (NRI)[9] which looks at the ability of countries to exploit ICT for socio-economic development. The latest Global Informational Technology Report 2010-11[10] ranks Tanzania at position 118 overall and position 13 among low income countries on the NRI.

Clearly, from these measures, Tanzania still has some distance to go to become a knowledge-based society or economy. Nevertheless, our study reveals that important strategic building blocks are being put in place to accelerate the development of the country as a knowledge society.

ii. Knowledge Society Vision

At the highest level, the Vision 2025 lays out the aspiration of Tanzania to develop into a knowledge society. This vision and the various strategies are further enshrined in various national and sectoral policies, strategies and plans. Vision 2025 lays out a future in which Tanzania will have five main attributes: high quality livelihoods; peace, stability and unity; good governance; a well educated and learning society; and a competitive economy capable of producing sustainable growth and shared benefits. The latter two attributes focus on developing a knowledge society. To this end, education is considered "a strategic agent for mindset transformation and knowledge creation" (United Republic of Tanzania, 2000). The Vision recognises the role of ICT in accelerating socio-economic development and poverty reduction and calls for promoting ICT and making investments in infrastructure and solutions that would make Tanzania an ICT Hub. The Vision further recognises the need to promote Science and Technology alongside investments in ICT as critical to achieving the target for a competitive economy.

The National Strategy for Growth and Reduction of Poverty (NSGRP) of 2005 pays greater attention to among others, infrastructure development, human resource development, increased investments in quality education, science and technology and use of ICT, and a competitive knowledge -based economy and an efficient government. The strategy clearly highlights the needs to invest in ICT for development noting that "efforts need to be stepped up in support of increased access and application of Information and Communication Technologies (ICT) as a critical "soft" infrastructure that accelerates productivity in the productive and service sectors, in government, business, teaching and SMEs development." (United Republic of Tanzania, 2005) It also acknowledges that making investments, issues of human capacity and equity especially the urban-rural divide should be tackled. The strategy in addition calls for increased investments in Science and Technology noting that "Higher education and Science and Technology (S&T) are vital for innovative technological advances that increase returns and productivity in all sectors."

iii. Supporting Legal and Policy Framework

A number of legislation and policies, summarized in the table below have been put in place. It is clear that the four main pillars of the knowledge society under consideration are fairly well covered by the regulatory and policy environment. Further there have been recent and on-going efforts to amend some of these laws and policies to align with global developments over the last few years (Table 2).

	Education	ICT	STI
Laws	• Education Act (1978, several amendments) • Vocational Education and Training Act (1994) • Education Fund Act (2001)	• Communication Act (1993) • Broadcasting Services Act (1993)	• Tanzania Commission for Science and Technology Act No. 7 of 1986
Policies	• Education and Training Policy (1995, under review), • ESDP (2001, revised 2008), • ICT Policy for Basic Education (2007) • National Higher Education Policy	• National ICT Policy (2003, under review) • National Telecommunication Policy (1997)	• National Science and Technology Policy (1985, revised 1995) • National Higher Education Policy

Table 2: Knowledge Society Pillars - National Legislation and Policies Source: Authors (2011)

From the review above of the national vision, it is clear that the linkages between education, ICT, science and technology are fairly well articulated, at least on paper. The policies attempt to concretize these linkages.

ICT4D Policies & Plans

Tanzania has one of the more liberal ICT sectors in Africa as a result of enabling government laws and policies. The laws and policies clearly articulate the role of ICT in fostering national development, socio-economic growth, poverty reduction and global competitiveness. Tanzania envisions itself to become an "ICT Hub" whose vision is at the centre of the National ICT Policy. The National ICT policy's objectives are:

- Provide a national framework that will enable ICT to contribute towards achieving national development goals; and

- Transform Tanzania into a knowledge-based society through the application of ICT.

The ICT policies clearly articulate the role that ICT plays in improving education and the contribution of ICT to the economy and other facets of society. In addition, the government established the Ministry of Communication, Science and Technology (MCST), which among other tasks, has to create a conducive environment for investment, introduction and use of ICT in national development efforts and government operations.

On the whole Tanzania has achieved notable progress in deploying ICT in terms of infrastructure, Internet access, human capacities, and education opportunities, mainly due to implementation of various national policies and strategies. The private sector has also made significant contributions by investing in among others, mobile communication infrastructure, data centres, support facilities, training centres and sales outlets. According to the latest statistics (December 2010) from the Tanzania Communication Regulatory Authority (TCRA), there were 174,511 fixed phone subscribers and 21,158,364 mobile phone subscribers in Tanzania[11]. The report captures the status of Internet capacity and usage as of June 2010 elaborately: there were estimated 4.8 million Internet users in Tanzania of whom 40% accessed the Internet at home. The country was estimated to have total Internet bandwidth of 3,459 Mbps. These are remarkable development when compared to the situation 10 years ago (TCRA, 2010). Barely 2 years ago, Tanzania did not have access to any international submarine cables and all international traffic was via satellite. Currently, Tanzania has direct access to two cables: Seacom and EASSy cables which have led to capacity increased of over 1,000% from two years ago. Another significant development has been the development and implementation of a national fibre backbone with phase 1 covering the northern, eastern and western parts already operational.

Education General Policies, Strategies & Frameworks

The National Strategy for Growth and Reduction of Poverty (NSGRP)[12] of 2005 positions education as one of the keys to poverty reduction and improvement of quality of life and social well-being. The 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. The national and sector policies and strategies all highlight priority objectives and targets for the education sector which broadly are: to increase equitable access and improve quality, and strengthen overall management of the education system. The strategies also call for the strengthening of Science and Technology through promotion of technical, vocational training and higher education. Indications are that significant progress has been made in increasing access but quality remains a major challenge.

Education ICT Policies & Initiatives

The National ICT Policy of 2003 recognises that ICT can enhance and improve education opportunities. It advocates for the introduction of an e-education system. The ESDP recognises the role of computer studies in fostering technological and scientific developments, with the education sector review reiterating the need to expand the use of ICT to improve on the quality of education (Swartz and Wachira, 2010).

Following the national ICT policy, the MoEVT developed the ICT Policy for Basic Education which was launched in 2007 mainly covering; Pre-primary, Primary, Secondary and Teacher Education, as well as non-formal and adult education. This policy aims to guide the integration of ICT 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."[13]

Following the development of this policy, investments have been focused on teacher education at the basic education level. Plans are also underway to invest in ICT at the primary and secondary levels through the Tanzania Beyond Tomorrow (TBT) Project. TBT is aimed at transforming the secondary school system across Tanzania by bringing in the best technologies and partners together to make learning more effective and accessible to all environments across Tanzania.

Science & Technology, Innovation and Research & Development Policies and Initiatives

The main policies guiding STI are the National Science and Technology Policy (1985, revised 1996) and the National Higher Education Policy of 1996. Tanzanian government recognises that a 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 realisation of self reliance. In 1986, the Tanzania National Scientific and Technology Research Council was transformed into the Tanzania Commission for Science and Technology with wider and clearer mandate in coordinating and promoting science and technology in the country.

Some of the broad objectives of The National Science and Technology Policy are;

- Establish and /or strengthen national science and technology institutions through provision of adequate facilities.
- Promote science and technology as tools for economic development, the improvement of human, physical and social well-being, and for the protection of national sovereignty.
- Promote the scientific and technological self-reliance in support of economic activities through the upgrading of R & D capacities by creation of an environment conducing to scientific and technological creativity and improvement of relevant scientific infrastructures.
- Stimulate the generation of scientific and technological knowledge which is to be applied in social-economic development.
- Inculcate a Science and Technology culture in the Tanzanian society.
- Provide attractive terms and conditions of service including adequate research facilities and conducive research environment in order to motivate and retain good scientist and technologist making them give their best services to the country.
- Establish appropriate legal framework for the development and transfer of technology including intellectual property rights, monitoring and controlling of the choice and transfer of technology as well as bio-safety.
- Institute a mechanism for identification, promotion and development of special talents and aptitudes in science and technology among Tanzanians, especially youths, in order to benefit from the rich tapestry of human intellectual capabilities which are necessary of national development.
- Promote active participation of women in science and technology by creating enabling environment for them to be innovative and conscious of Science and Technology in their everyday life.

Professional Development in Education, ICT and STI

The government of Tanzania formulated the Education and Training Sector Development Programme in 2001 as an attempt to realise the objectives of Education Sector Policies. It was formulated to address critical issues and problems facing the education and training sector in general. The Programme entailed many fundamental changes including Information, Communication and Technology (ICT) as well as the participation of many and varied actors in the education and training sector[14]. Further, the Ministry of Science, Technology and Higher Education formulated the Technical Education and Training Policy (1995), National Science and Technology Policy (1996) and the National Higher Education Policy in (1999).

In the education sector, there are concerted and on-going efforts to develop teacher knowledge and skills. The GESCI situational analysis in Tanzania (Swarts and Wachira 2010) had this to say about teacher professional development:

> *According to Komba and Nkumbi (2008), the in-servicing of teachers has so far not been regularized and is reported to be taking place in an ad hoc, and uncoordinated manner. There are no predefined periods of time at which teachers are expected to attend certain courses for upgrading of skills and competencies. It is noted that the professional development of teachers has not been incorporated in the strategic plans at any level and has not been budgeted for. This includes the training in emerging skills for example the use of ICT in education. The skills upgrading that is currently taking place is based on individual efforts but not geared towards addressing the identified needs of practicing teachers.*
> *In order to address the above challenges, the MoEVT is currently focusing on teacher education in the following areas:*
>
> - *Addressing the scarcity of teachers in Science, Maths and English*
> - *In-service training of teachers*
> - *Upgrading licensed teachers*
> - *Upgrading non-education professionals to full-time teachers*
> - *Structuring the professional development of teachers.*

On the ICT front, the MoEVT has made some important investments and has on-going plans to strengthen ICT teacher professional development. As of the end of 2008, all 34 public Teacher Colleges had computer labs installed and teacher tutors given basic ICT skills in partnership with Sida. The MoEVT is also exploring ways of using ICT to enhance teacher professional development.

On the general ICT front, the MCST has ICT human resources development as a key priority with the Directorate of Management Information Systems in the President's Office focusing on ICT professional development in the public sector. COSTECH, which promotes Science, Technology and Innovation has several programmes aimed at funding research and providing advisory and capacity building services.

Other actors (explored in more detail below) provide professional and leadership development courses to the public sector.

Informational Literacy

There is no available information online that could help assess the situation of information literacy in Tanzania. Lwehabura (2008) did a study on Information literacy in Tanzanian universities and noted that the concept was new even at the University level posed with many challenges including lack of adequate resources, and Information literacy policies.

iv. Actors and Mandates

The main actors behind policy making and execution are government bodies including Ministries, Departments and Agencies (MDAs). At the policy level, the main actors are:

- The Ministry of Education and Vocational Training (MoEVT) and its agencies which is responsible for the education and vocational training sector.
- The Ministry of Communication, Science and Technology (MCST), which among other tasks, has to create a conducive environment for investment, introduction and use of ICT in national development efforts and government operations as well as the promotion of science, technology and innovation.

Other important actors at this level are:

- COSTECH which is a parastatal under the MCST with the mandate to coordinate and promote science, technology, innovation and research. As such, COSTECH is a key player in the development of the knowledge society in Tanzania.

- The Directorate of Management Information Systems, President's Office –Public Service Management which is responsible for e-government and introduction and use of ICT in the public service.

Academic, training and research institutions also play a role in building the requisite capacities, undertaking research as well as influencing policies in ICT, leadership development and the creation of knowledge society in Tanzania. Some key institutions include:

- The Economic and Social Research Foundation (ESRF) conducts policy-related research and organizes workshops, which enhance the understanding of policy options within the government, the business community, the development partners' community, the civil society and the private sector. ESRF is also hosting 'Tanzania on Line Gateway' which is a gateway to information on development issues in Tanzania and Tanzania Knowledge Network (TAKNET), a platform for professionals and experts to meet, share and exchange experiences. These forums/platforms are aimed at enhancing the availability and accessibility of information with a view towards building an information society in Tanzania.

- Tanzania Global Development Learning Centre (TGDLC), established in 2000 to develop skills and competences of the public servants, private sector and civil society for the delivery of excellent services through distance learning using cost-effective state of the art technology. The Centre enables decision makers and mid-level professionals and practitioners to access and share the wealth of knowledge and experiences available in the world through a global network of over 120 ICT hubs across the world under the GDLN.[15] It also hosts the TZ-CLK-NET, a platform that will facilitate policy dialogues to inform policy development and reviews, and the TDIC, a multi partner development Information Centre.

- Tanzania Public Service College, established in 2000 to fill an extant void in terms of a comprehensive training facility for the Public Service.

- Institute of African Leadership for Sustainable Development (Uongozi Institute) which is a newly established institute which will focus on enhancing capacities of the top

leadership in the public service and politicians. It aims at delivering leadership development programs; establish leadership networks; and provide a conducive environment for strategic thinking and reflection by leaders.

- Other important actors include Tanzania Development Information Centre (TDIC), Universities and other research institutions, Educational and training institutions and civil society.

The private sector is also instrumental in education, ICT, and STI initiatives tapping into the enabling environment posed by the Government in actively being engaged in providing primary and secondary education, teachers training and higher education; and brings potentials as drivers of the ICT industry. The private sector has also been a player in implementing leadership programmes such as CEO scholarship fund for public service,[16] designed to induce significant improvement amongst civil servants in service delivery.

v. Networks and Partnerships

The national strategy articulates the need for multi-stakeholder partnerships and coordinated approach to development for the knowledge society while noting that "links between higher education, S&T and R&D institutions and local communities in agriculture, industry, SMEs, trade and social development etc. have been weak and need to be strengthened." Further it acknowledges the need to link innovation, science and technology closely to education fostering this at every level of the education level.

On a practical level, broad linkages and networks are starting to emerge and public-private partnerships are under consideration.

There is also increasing development and use of online portals and websites to disseminate, share, exchange and collect information as well as support community networking. These include:

- Increasing number of up to date websites, Government MDAs,[17] Business Registration and Licensing Agency,[18] and Tanzania Investment Centre.[19]

- Formal portals established in partnership with the government. These include: Tanzania Online,[20] Tanzania Development Gateway,[21] Tanzania Development Information Centre,[22] Tanzania Knowledge Network (TAKNET) www.taknet.or.tz, Tanzania Country Level Knowledge Network (Tz-CLK-NET), and the Parliamentary Online Information System[23] just to mention a few, give assurance of existing communities that generate and disseminate knowledge.

These initiatives bring great value in creating buy in to the community through gradual adaptations that will ultimately contribute to a collective national knowledge base.

vi. On-going and Planned Initiatives

There have been a large number of programs and initiatives aimed at creating an enabling environment to broaden education at primary, secondary and higher levels, promote the use of ICT in government operations, promote science and technology and promote innovations. Some of the notable programmes and projects are outlined below:

- Education and training
    - Primary education and secondary development programs which sought to increase access, improve quality and to improve management capacity of the education system at the primary and secondary levels of education.
    - Higher Education Development Program that has just been launched in 2011.
    - Introduction of a syllabus for Computer Studies in secondary schools.
    - Online registration for national examination.
    - Online access of examination results.
    - Online application for university admission.

- ICT
    - Establishment of tele-centres in rural areas and the Universal Communication Access Fund (UCAF) to increase penetration of ICT in rural areas.
    - Zero VAT on computers.

- ICT and public management/ e-government
    - Integrated Financial Management System (IFMS).
    - Human Resource and Payroll Management System (HRPMS).
    - Strategic Budget Allocation Information System (SBAS).
    - Local Government Monitoring Database (LGMD).
    - Government Planning and Reporting Information System (PlanRep).

- Science, Technology and Innovation (STI)

COSTECH has a number of initiatives that include:

- Support of small businesses that lack start up funds to attain global marketing capacity.
- Establishment of ICT innovative incubators providing space, mentorship and global linkages through a selection of initiatives with growth potential.
- Establishment of the Tanzanian Intellectual Property Advisory Services and Information Centre (TIPASIC) to educate innovators and support in getting their patents.
- Promote public private partnership in technology based initiatives.
- Fund for promoting STI research which involves grant competitions for innovations, infrastructure and human resources development as well as skills development (graduate and post-graduate training).

The following initiatives are in the pipeline:

- E-government initiatives
    - E-Procurement System.
    - National ID System.
    - National Payment System
    - Establishment of the e Government Agency with a comprehensive e-government strategy.

- ICT initiatives

- Installation of a national information and communication backbone across the country. Phase 1 is now functional and roll out of the second phase is expected to be completed by December 2011.

- Science, Technology, Innovation and Research
  - National Education and Research Network (NREN) under development to be coordinated by Commission for Science and Technology (COSTECH).
  - Establishment of a Data Centre in a "smart village" through a public-private partnership.

- ICT in Education
  - E-schools initiative aimed at developing ICT capacity of teachers and students in 6 pilot schools run by the MCST.
  - Tanzania Beyond Tomorrow programme to integrate ICT within the education system by the MoEVT.

- General Knowledge Society
  - Information Society project to be financed by the Finnish government. It will focus on review of National ICT policy; building MCST's capacity in ICT skills and support for innovation program for the local private sector.

5. Institutional and Leadership Capacity Assessment- findings from Field Research

i. Capacity Gaps and Challenges

The field visit was used for interviews and focus group discussions with senior and middle level managers in MDAs and other key actors. Survey questionnaires were also administered mainly to middle level managers in the MDAs and other key actors (see Appendices 2, 3 and 4).

Findings from the interviews, focus group discussions and surveys revealed that there is remarkable progress in deploying ICT and implementation of ICT policies on national infrastructure, institutional arrangements, regulations and creation of a supportive environment for adoption of ICT in the government. The education sector is also putting in place ambitious plans to leverage the potential of ICT for teaching and learning through the TBT programme. It is also worth noting that Tanzania is among a few countries with a broadband backbone in place with the recent completion of the backbone first phase. However it is not clear whether government leaders and other stakeholders are aware of the opportunities offered by such an infrastructure, in as much as the backbone is seen as a "magic bullet" to propel Tanzania's ICT agenda forward.

The initiatives notwithstanding, interviews and discussions with various stakeholders in MDAs, literature review and findings of various studies revealed a number of capacity challenges faced in undertaking leadership functions and other government operations as far as ICT for national development is concerned. These capacity challenges have been divided into two categories: institutional/ organisational capacity gaps and individual capacity gaps.

Institutional/ organisational challenges

Some of the key findings from the interviews and focus group discussions that related to institutional capacity gaps and challenges are:

a) Lack of systematic national coordination and collaboration mechanisms

Most of the official interviewed revealed a clear gap existing at the institutional level where initiatives in the four pillars of the knowledge society were implemented without a multi-sectoral body overseeing coordination of initiatives. This was attributed to the limited systematic coordination and information sharing systems/mechanism/structures and hence a need for a coordinating entity to monitor and facilitate information sharing and exchange. Lack of coordination and fragmentation in the implementation of the National ICT Policy was identified as a clear example. COSTECH was identified as being best positioned to spearhead the facilitation role.

Related to lack of overall coordination, the issue of inadequate collaboration among the stakeholder of ICT themselves, whether within or among institutions of the public administration, the communities and the private sector was also raised several times.

b) Legal and regulatory barriers to use of ICT within government

Almost every official interviewed highlighted the absence of legislative and policy framework permitting the use of ICT for official communication. The officials point out that this makes it difficult to adopt ICT fully within MDAs and thus to lead by doing. Our conclusion is that there are thus legal, regulatory and policy barriers that need to be streamlined to pave way for a thriving knowledge society such as the use of electronic documents in the government

Gap between policies and implementation

It was noted that while the national vision 2025, development strategy, policies and strategies highlight the importance of ICT, there was insufficient or sporadic interest and involvement in ICT issues from higher political and administrative levels in government, civil society groups and the private sector leading to a gap between what is in the policies and "what is on the ground". This gap between policies and implementation was frequently linked to "lack of leadership" and not so much to lack of financing which is an interesting finding. As several officials interviewed remarked, "money is not the problem ..." In fact, one of the individual leadership capacity deficiencies indentified relates to lack of capacity "to translate plans into implementation activities." Some of the leadership challenges may stem from the lack of a systematic leadership development strategy that includes such facets as leadership development approaches (mentoring, coaching, etc) and systematic succession planning for future leaders hinders leadership development for the future. It was also frequently mentioned that capacity building is often underfunded. Thus limited financial resources for capacity building may make it difficult to engage in comprehensive leadership development especially in the pillars critical to the knowledge such as ICT.

One factor that was attributed to the gap between policy and implementation was the unreliable and limited coverage national electricity supply which is seen as a serious constraining factor to the widespread use and adoption of ICT.

c) Limited awareness raising with the public

Some officials interviewed noted that there was inadequate appropriate literacy and guidance for the general public on the potential and use of ICT in development and on the cultural dimensions of ICT-induced societal change.

Individual Capacity Challenges

Some of the main findings from the interviews and focus group discussions that related to individual leaders' and future leaders' capacity challenges in the context of the knowledge society include:

a) A lack of clarity and understanding of Knowledge Society concepts

Most officials interviewed indicated that there was limited understanding by the leaders and senior policy makers of key knowledge society concepts or the linkages between components such as ICT and Innovation and socio-economic development. Particular mention was made on the limited understanding of the "innovation eco-system" as hampering concerted and coordinated approaches to building a knowledge society.

b) Lack of strategic management skills

Interviewees mostly at the middle management level expressed their concerns on what can be termed as lack of strategic management skills at the higher levels:

- Limited competencies to translate vision or strategy into action.
- Poor communicate skills with technical, junior and implementing staff.
- Inadequate performance management skills (and system) that could make leaders take quick decisions and risks.

c) Inadequate ICT competencies

ICT competencies are said to be lacking at two level: among leaders in MDAs with leadership development programs mainly focusing on leadership and very few on ICT knowledge and

skills and among technical personnel with both a lack of advanced technical ICT skills as well as a lack of qualified people (in terms of advanced ICT skills) in the government.

d) Mindsets against use of ICT

Another often voiced challenge was that of "mindsets" especially among the old leaders and policy makers who do not "appreciate" or understand ICT. Some interviewees proposed the need to change of mindset and attitudes against use of ICT through the development of change management knowledge and skills.

Leadership Competency Importance-prioritisation Survey Findings

To establish leadership importance and priority of leadership competencies, a questionnaire with two main questions groups was administered. Nine officials at middle and senior levels from MDAs responsible for education, STI and ICT responded. The questionnaire involved two questions groups:

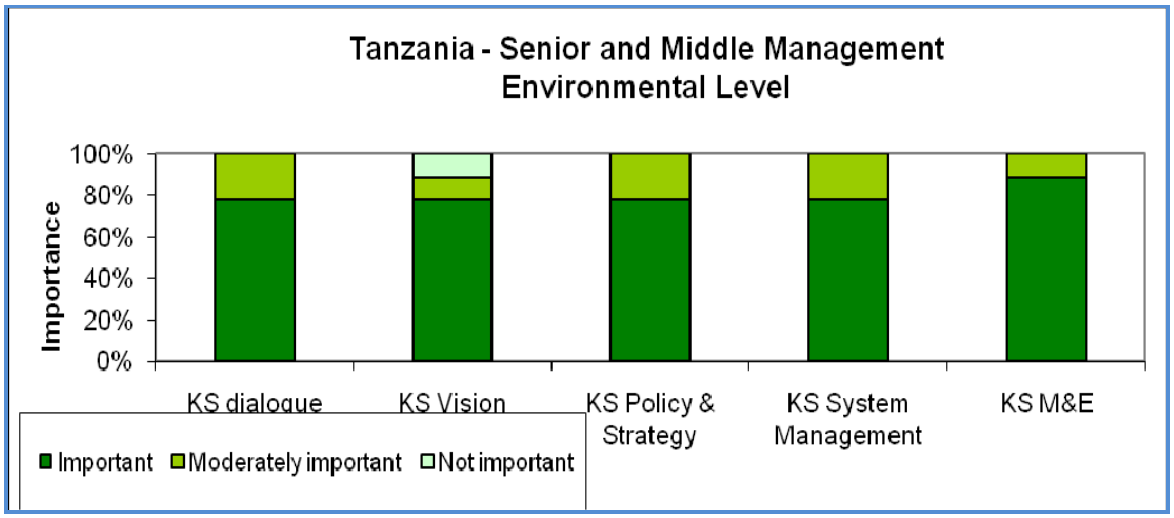
- In the first question group, the senior and middle level officials were asked to indicate their perceived level of importance on each of thirteen ICT & Knowledge Society competency standards for leaders drawn from the three domains comprising the environmental (national), organisational (MDAs) & individual 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.

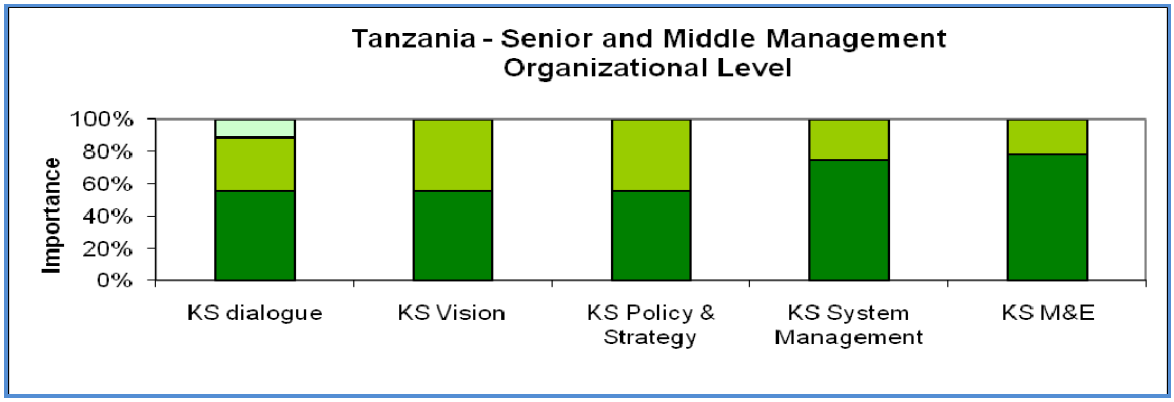
- In the second question group, senior and middle level officials were asked to identify three leadership competencies that would require priority development for the pilot phase. For this question, the officials used numbers (No. 1 for 1st priority, No. 2 for 2nd priority and No. 3 for 3rd priority)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

The results and findings from analysis of the completed questionnaires are presented in the figures below and discussed in more detail here In general, national and individual leadership competencies were considered critical for the development of knowledge society.

- At the national level, leaders are expected to:
    - Promote inter-ministerial and inter-sectoral dialogue and to put in place coordination mechanisms on KS pillars of Education, ICT and STI.
    - Develop, communicate and give direction to Knowledge Society (KS) vision, mission and values.
    - Develop inter-related policies, strategies and plans on the KS and its pillars of Education, ICT and STI.
    - Manage implementation of inter-related plans, strategies, and programmes on KS and ICT, Education and STI pillars.
    - 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 leaders should have the ability to:
    - Communicate effectively by developing and delivering key messages about the significance and parameters of KS pillars of ICT, Education and STI for organisational and national development regularly.
    - Be innovative and creative and to promote creativity and innovation in their organisations.
    - To motivate their staff and promote collaboration (Table 3).





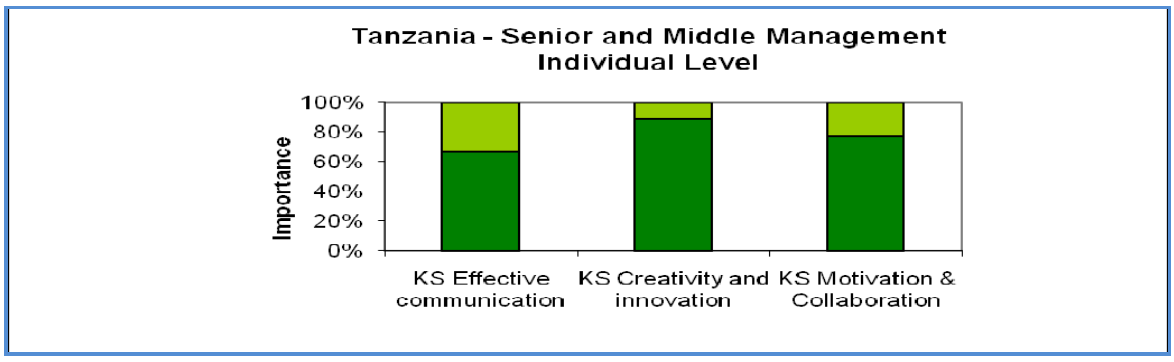
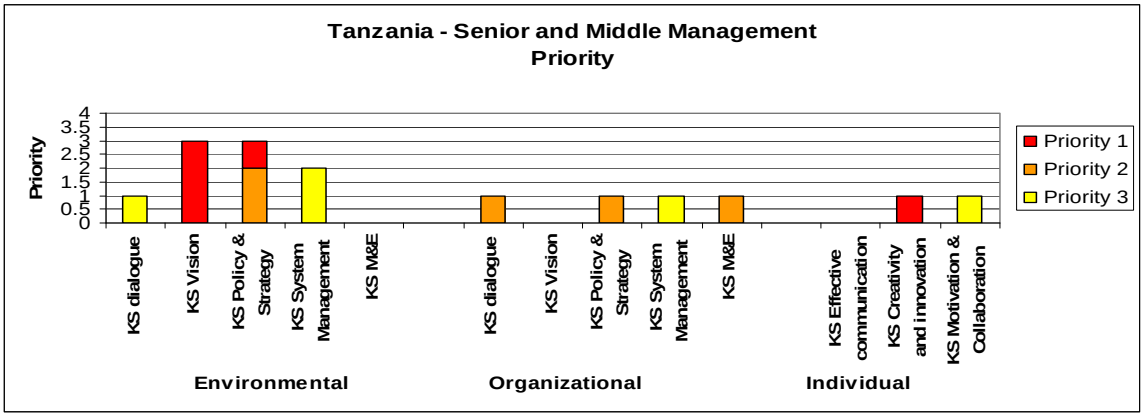


Table 3: Senior and middle management responses to leadership in ICT and KS competency domains in order of importance

Among the competency priorities for capacity building, the most important (considered high priority) by survey respondents were:

- Visionary leadership at the national level, able to articulate the vision, give direction and set values.

- Leadership ability to develop and drive policies, strategies and plans.
- Innovative and creative leadership.



Please refer to Appendix 4 "Importance – Prioritisation of Leadership in ICT & KS Competency Analysis" for a detailed summary tables analysis of the collected data.

ii. Emerging opportunities

For ALICT, it is interesting that there are existing and emerging initiatives to kick-start developing leadership capacities on one hand, and the desire for the private sector to collaborate with the government in addressing leadership gaps pose. This poses a great potential to ALICT initiative to contribute to these growing efforts to strengthen leadership capacities.

Two initiatives that ALICT programme could collaborate with are:

a) The Information Society and ICT Sector Development Project – TANZICT project about to start, will provide another opportunity for harnessing interventions through the Ministry of Communication, Science and Technology.

b) Institute of African Leadership for Sustainable Development (Uongozi Institute) which was discussed earlier under the section on actors and mandates.

6. Conclusions and Recommendations

The findings from the desk study, interviews and focus group discussions show that the development of the Knowledge Society in Tanzania is in its infancy, giving an advantage for the country to re-direct its interests and aspirations from the very beginning in the right direction. There is potential and there are individuals and organisations who could act as agents of change.

The situational and needs analysis gave an opportunity for key players to reflect on the status of Tanzania in relation to Education, ICT and STI and the development of knowledge societies. There are diverging understandings of the key concepts at all levels demanding for a comprehensive approach to address the situation and re-direct the vision and implementation strategies, and hence a need for an intervention in creating core leadership competencies to address the situation. Therefore, the ALICT programme appears both welcome and timely in this regard.

There is a notable existence of many initiatives operating in silos, and a need to have in place a coordinating mechanism that will put in place a platform to coordinate Education, ICT and STI initiatives.

i. General Recommendations

The proceeding section has assessed the development of knowledge society in Tanzania and identified challenges and gaps including leadership capacities. Following this assessment, a number of general recommendations to accelerate the development of knowledge societies in Tanzania can be detailed.

- There is a need to create an enabling environment for the use of ICT in the public service. It was noted that enabling laws or policies are lacking and this should be addressed as a priority. The government in advocating for the use of ICT should lead by example. ICT can play an important role in improving work processes and creating efficiency gains in MDAs.

- Concerted efforts should be made to develop basic ICT skills for leaders as well as impart knowledge on the potential of ICT to accelerate socio-economic development.

- The role of various actors including Uongozi institute in leadership development for ICT, STI and knowledge management needs to be defined.

- There is a need to identify activists/change agents/champions among the leaders/future leaders in the public service.

ii. Specific Recommendations for the ALICT Leadership Development

To be successful, ALICT must address general leadership knowledge and skills gaps as well as specific capacity gaps related to the development of the knowledge society. To this end, the following section details of the specific recommendations of this report arising out of the desk study and field visits for Tanzania.

General leadership capacity needs identified include:

- Leadership competency to translate vision or strategy and communicate appropriately with staff. This ranked high in prioritisation of Leadership in ICT & KS Competency Domains.
- Capacity to translate plans into implementation activities.
- Performance management skills (and system) that could make leaders take decisions and risks.
- Change management knowledge and skills to address the mind set against use of ICT.
- Skills to relate global knowledge issues and apply them to local environments and dynamics.

Specific leadership capacity needs related to KS identified include:

- Broad awareness of KS issues, the pillars and how they are inter-linked to foster development.
- Understanding 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 ICT.

- Understanding Intellectual Property Rights (IPR) issues addressing the needs of the youth.
- The role and importance of public private partnerships that will fast track implementation of ICT and KS initiatives.
- Underpinning the existing Leadership Competency Framework to the Knowledge Society needs.

These general and specific leadership competencies would be addressed in the course modules of ALICT.

iii. Other Recommendations for Consideration by the ALICT Programme

In the implementation of the ALICT programme, the following considerations should also be made:

- It is worth considering feasible options for eLearning which are applicable to local conditions and requirements e.g. in the case of unreliable electricity the use of print media, radio, mobile phones and other forms of communication.

  Governments in Africa that have invested in establishing GDLN Centres with videoconferencing and multimedia support facility have an advantage as recipient of possible courses and / or support services from proposed ALICT programme.

- It would also be valuable to consider bringing the private sector on board and to explore ways through Public Private Partnerships in complementing and sustaining the ALICT initiative.
- ALICT programme should find ways of working with and through existing initiatives and leadership training institutions to expand access to the capacity building programme to a large number of current and future leaders across the board.
- Personal development and management module; that a sSelf-awareness / Emotional Intelligence topic needs to be included as it is fundamental in development of leadership capability through self-realisation and ability to understand the people they lead.

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Appendices

Appendix 1: People Interviewed

Name	Title/ Ministry/ Department
Prof. Hamisi O. Dihenga	Permanent Secretary, Ministry of Education and Vocational Training (MoEVT)
Mr. Bakari G. Issa	TED, Ministry of Education and Vocational Training (MoEVT)
Mr. Samuel Makundi	TED, Ministry of Education and Vocational Training (MoEVT)
Mr. Abdallah S. Ngodu	Policy and Planning, Ministry of Education and Vocational Training (MoEVT)
Ms. Esther J	Department of Secondary Education, Ministry of Education and Vocational Training (MoEVT)
Mr. Lazaro M. Malili	Higher Education Department, Ministry of Education and Vocational Training (MoEVT)
Ms. Naomi V. Swai	TED, Ministry of Education and Vocational Training (MoEVT)
Mr. Richard Nzoka	TED, Ministry of Education and Vocational Training (MoEVT)
Mr. Jumanne K. Shauro	Primary Education, Ministry of Education and Vocational Training (MoEVT)
Mr. Nicholaus Moshi	Teacher Education, Ministry of Education and Vocational Training (MoEVT)
Ms. Tulinagwe Ngonile	School Inspectorate, Ministry of Education and Vocational Training (MoEVT)
Mr. Tassilo B. Milliwga	School Inspectorate Department, Ministry of Education and Vocational Training (MoEVT)
Ms. Bahati Zuberi	Telecommunication Engineer, Department of Communications Ministry of Communications, Science and Technology (MCST)
Dina Machuve	Assistant Director, ICT HR Development, MCST
Eng. Isack Manyiri	Department of ICT, MCST

Kamulika Masegese	IT Officer, Ministry of Communications, Science and Technology (MCST)
Priscus Kiwango	Director, Directorate of Management Information Systems, President's Office –Public Service Management.
Arnold Matoyo	Assistant Director, Directorate of Management Information Systems, President's Office –Public Service Management.
Frank Shame	Principle Systems Analyst, Directorate of management Information Systems, President's Office –Public Service Management.
Mrs. Margareth Nzuki	Director, Economic and Social Research Foundation (ESRF)
Abdalla.K. Hassan	Senior Information Officer, Economic and Social Research Foundation (ESRF)
Dr. Raphael Mmasi	Commission for Science and Technology (COSTECH)
Prof. D. Iwisi	Interim Director, National Leadership Institute
Prof. J. Semboja	Institute of African Leadership for Sustainable Development (UONGOZI Institute)
Dr. Tapani Vaahtoranta	Institute of African Leadership for Sustainable Development (UONGOZI Institute)
Ali Mufuruki	CEO, Infotech Investment Group
Tomi Särkioja	Counsellor (Economic Affairs) Embassy of Finland in Tanzania

Appendix 2: Leadership capacity questionnaire

African Leadership in ICT (ALICT)

Survey on Leadership Competencies

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

Importance – Prioritisation of Leadership in ICT & KS Competency Domains

1. How important are each of the Leadership in ICT & KS competencies? (Please tick as appropriate).

2. Identify the *top three priorities* you would like the African Leadership in ICT (ALICT) programme to focus on in the pilot phase
(Write the no. 1 beside the 1st priority competency; the no. 2 beside the 2nd priority competency; and the no. 3 beside the 3rd priority competency)

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

Leadership in ICT and Knowledge Society (KS) Competency Domains		Important	Moderately important	Not important
	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, creativiey 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			

Appendix 3: Importance – Prioritisation of Leadership in ICT & KS Competency Analysis

Table 1: Profile of the respondents (N=9)

Profile	No of Respondents
Senior Level Management	9
Middle level Management	0

The survey involved two questions.

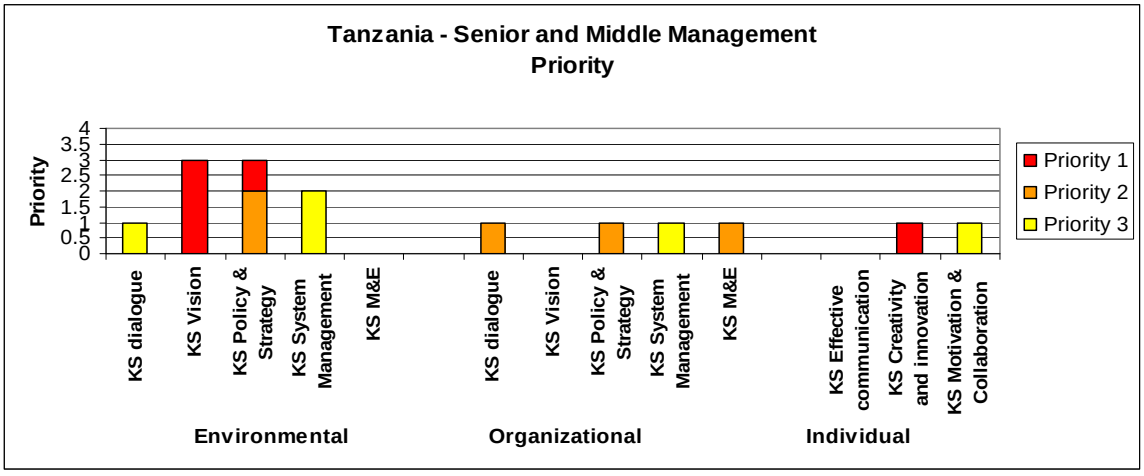
- In the first question, the senior and middle level officials were asked to indicate their perceived level of importance on each of thirteen ICT & KS competency standards for leaders drawn from the three environmental, organisational & individual level domains of the ALICT leadership framework. They used a three-point Likert scale (1 for unimportant, 2 for moderately important and 3 for important) to rate the competencies.

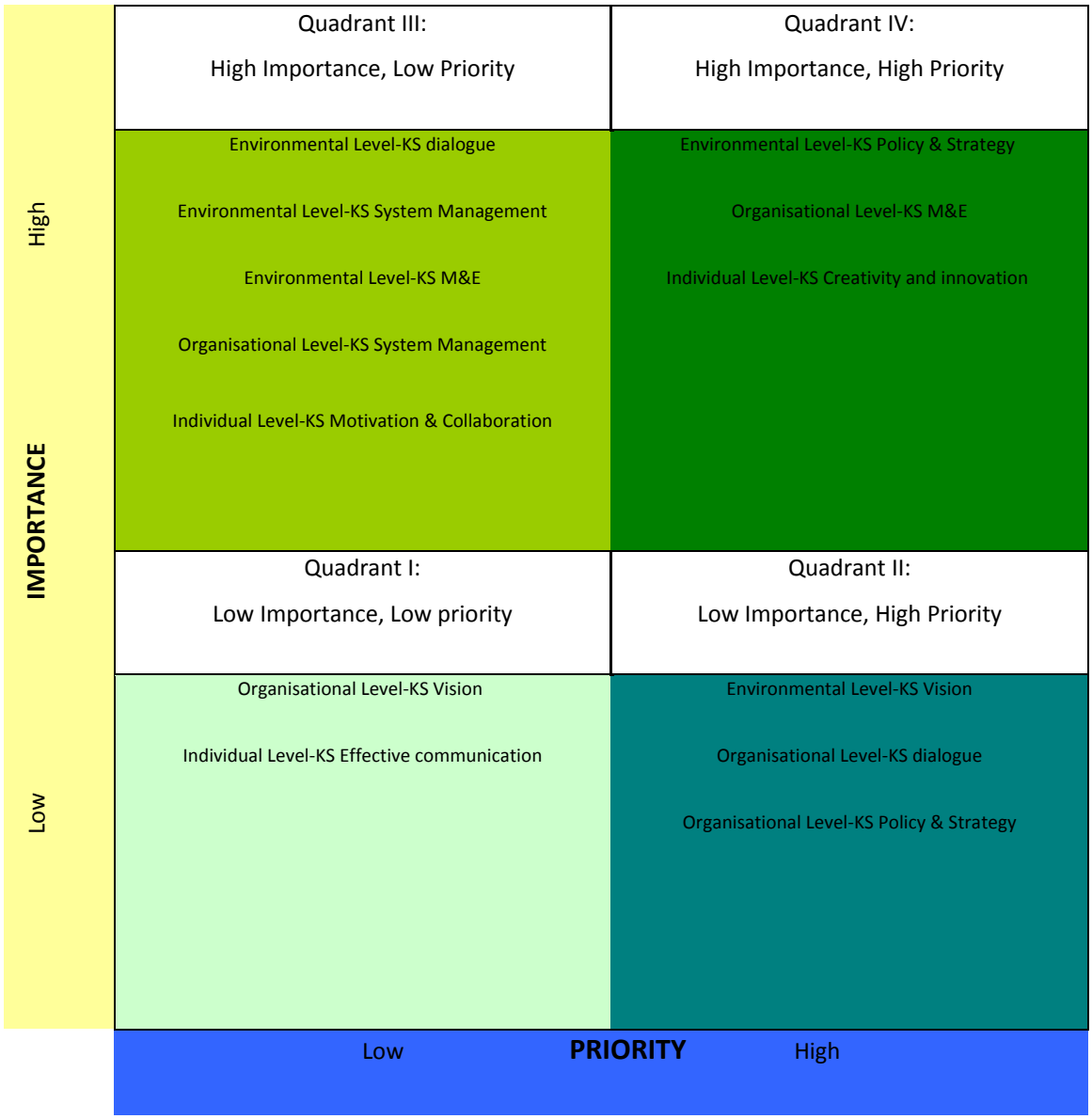
- In the second question, senior and middle level officials were asked to identify three leadership competencies that would require priority development for the pilot phase. For this question, the officials used numbers (No. 1 for 1st priority, No. 2 for 2nd priority and No. 3 for 3rd priority) to identify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

Competency areas of the KS	Senior Level Officials			
	Mean	SD	Overall Rank	Rank (out of 13)
Environmental	**2.78**		1	
KS dialogue: National leadership capacity to establish inter-ministerial & inter-sectoral coordination mechanisms on KS pillars of Education, ICT and STI	2.78	0.19		3
KS Vision: National leadership capacity to develop, communicate and give direction to Knowledge Society (KS) vision, mission and values	2.67	0.50		9
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	2.78	0.19		3
KS System Management: National leadership capacity to manage implementation of inter-related plans, strategies, and programmes on KS and ICT, Education and STI pillars	2.78	0.19		3
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	2.89	0.11		1
Organisational	**2.62**		**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	2.44	0.53		13
KS Vision: Organisational leadership capacity to develop its vision, mission	2.56	0.28		11

Competency areas of the KS	Senior Level Officials			
	Mean	SD	Overall Rank	Rank (out of 13)
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	2.56	0.28		11
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	2.75	0.21		8
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	2.78	0.19		3
Individual	**2.78**		**2**	
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	2.67	0.25		9
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	2.89	0.11		1
KS Motivation & Collaboration: Leadership capacity to create organisational environment that is conducive to achieving KS progress in pillars of ICT, Education and /or STI	2.78	0.19		3

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




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

Appendix 4 - Factors Enabling & Constraining Development towards a Knowledge Society in Tanzania

Factors	*Enabling Features / Opportunities*	*Constraining Features / Challenges*
Knowledge Society	Vision 2025 lays out the aspiration of Tanzania to develop into a knowledge society	The status of the Knowledge Society development in Tanzania can be said to be at a very early stage
Infrastructure	Tanzania has achieved notable progress in deploying ICT in terms of infrastructure, Internet access, human capacities, and education opportunities, mainly due to implementation of various national policies and strategies	
Education	education is considered “a strategic agent for mindset transformation and knowledge creation”	
ICT In education	ICT Policy for Basic Education was launched in 2007 to guide the integration of ICT 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.	
Science and Innovation	Existing National Science and Technology Policy	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 realisation of self reliance.

Appendix 5 – End Notes

[1] WorldBank Development Indicators, http://data.worldbank.org/country/tanzania

[2] Government of United Republic of Tanzania, National Website, http://www.tanzania.go.tz/profilef.html

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[22] Tanzania Development Information Centre: www.tdic.or.tz

[23] Parliamentary Online Information System: http://parliament.go.tz/POLIS/bunge/polis.asp