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Emerging Trends in ICT

Application of Artificial Intelligence, Internet of Things, Machine Learning in Tanzania
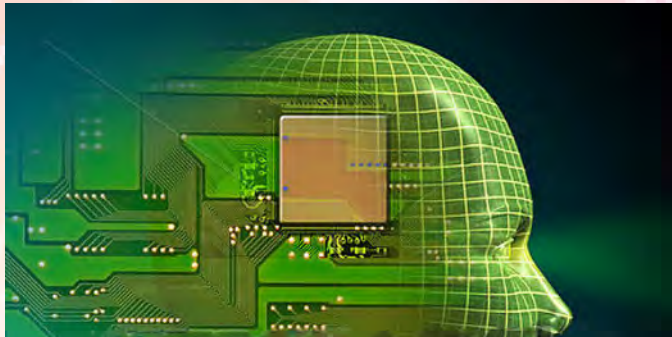
Tanzania hosts Green Standards forum

KISWAHILI SUPPLEMENT
Mwongozo wa Watumiaji

Postal Delivery in the Digital Era

TZ-CERT
TANZANIA COMPUTER EMERGENCY RESPONSE TEAM

The Tanzania Communications Regulatory Authority (TCRA) is a Government body responsible for regulating the Communications and Broadcasting sectors in Tanzania. It was established under the Tanzania Communications Regulatory Act No.12 of 2003 to regulate electronic communications, Postal services and management of the national frequency spectrum in the United Republic of Tanzania. The Authority became operational on 1st November 2003.

Core Values

TCRA has a set of core values as outlined below:-

Professionalism
We maintain the highest degree of professionalism and ethical standards, building value-added relationships with customers and stakeholders to deliver quality services.

Respect
We are an organisation that values its employees and respects its customers.

Empowerment
We believe in empowerment and effective delegation enabling employees to make decisions and take challenges commensurate with their own levels of responsibility.

Innovation
We encourage creativity and innovation leading to enhancement of our capacity in handling regulatory issues.

Integrity
We believe in integrity and we are determined to treat customers and each other with trust, confidentiality and honesty.

Accountability
We are accountable, undertaking our duties fairly, with care and transparency.

Teamwork
We benefit from teamwork, putting together diverse expertise to achieve success.

Objectivity
We undertake our activities objectively and we are result oriented

Efficiency
We believe in providing our regulatory services in an efficient way.

Non-discrimination
We believe in equal opportunity and treatment for our internal and external Stakeholders and do not discriminate against Gender, Religion, race, affiliation and origin.

Tanzania Computer Emergency Response Team (TZ-CERT) is a team within the structure of the Tanzania Communications Regulatory Authority (TCRA), with national responsibility for coordinating responses to cyber security incidents at the national level. It cooperates with regional and international entities involved in the management of cyber security incidents. TZ-CERT was established under section 124 of the Electronic and Postal Communications Act (EPOCA) of 2010.

TZ-CERT provides the following services to its constituencies and the general public.

1. Alerts and Warning
With the growth in cyber threats and vulnerabilities, TZ-CERT constantly monitors cyber security threats and vulnerabilities and advises both its constituencies and the general public.

2. Incidents Response
With expertise in cyber security, TZ-CERT can now work with constituency organizations to respond to all cyber security incidents in their respective networks. TZ-CERT provides step by step assistance to organizations facing cyber security attacks.

3. Cyber Security Awareness
With the mandate of improving cyber security posture in the country, TZ-CERT disseminates cyber security information to the public. This includes promoting cyber security best practices to users of information and communications technologies.

TZ-CERT will improve its services and focus on providing other cyber security services to the community including:

Security audits and assessments
Malware analysis
Intrusion detection
Risk analysis
Security Consulting.

For more information and to report cyber security incidents please contact TZ-CERT:

Mawasiliano Towers, 20 Sam Nujoma Road,

P.O.Box 474, 14414 Dar Es Salaam.

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Email: info@tzcert.go.tz   incidents@tzcert.go.tz

Letter from the Editor

This edition has an extensive coverage of issues from local and international events to developments in the sector and emerging technologies.

Artificial intelligence, machine learning, Internet of Things and big data analytics will transform the way we live - from the delivery of social services to commuting.

We have special articles on these; and short reports on action underway in Tanzania and in the Southern African Development Community (SADC) region to embrace the new ICT revolution.

In a clear demonstration of proactive regulation, TCRA has developed a numbering plan for machine to machine communication and has invited stakeholders comments.

The Authority has introduced a new system to enhance SIM card registration; by capturing subscribers biometric features; Tanzania hosted the 8th green standards forum in April and joined the rest of the world in marking Girls in ICT Day and the World Communications and Information Society Day. We have statements and pictorial reports of the events.

Although electronic communications has affected the traditional operations of the post, it has not replaced last mile mail and parcels delivery; and we have a piece on postal delivery in the digital era. The Kiswahili supplement carries the last installment of the guidebook for consumers which was launched last quarter.

We invite contributions in the form of articles and photographs, or comments, for subsequent issues of the Regulator. Contributions, in font size 12, single-spacing, up to four A4 pages, may be submitted to: *regulator.magazine@tcra.go.tz*

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Members of the Content Committee with the Mwanza Regional Commissioner, John Mongela (centre) during their visit to the Lake Zone. They are Committee chairperson Valerie Msoka (second left), Mr. Joseph Mapunda (left), Abdul Ngarawa (second right) and Derek Murusuri (right).

From The Director General's Desk

Biometrics to Enhance SIM Card Registration

Bio-metric SIM card registration was launched in Dar es Salaam early March 2018 as pilot project in a ceremony in which TCRA Board members, a representative of the National Identification Authority (NIDA) and CEOs of mobile phone companies participated. The event was officiated by the Human Resources Director in the Ministry of Works, Transport and Communications, Ms. Kitolima Kippi (seated, center); who represented the Permanent Secretary in the Ministry Dr. Mary Sasabo. Second left is TCRA Board Chairman, Dr. Jones Killimbe, the Authority's Director General, Eng. James Kilaba (third left).

Tanzania has introduced a new system of SIM card registration which entails the capture of potential subscribers' biometric features and the use of verifiable identity documents.

The registration of SIM cards started in 2009 following a TCRA administrative order and was made mandatory under the Electronic and Postal Communications Act (EPOCA) of 2010.

The objectives then and now are to mitigate security concerns. Availability of subscriber data enables security bodies to investigate and resolve crimes including mobile fraud. Registration has enabled TCRA to control fraudulent local termination of international traffic through SIM boxing.

Registration protects innocent consumers against crimes and anti social behaviour perpetrated through mobile phones. It facilitates the collection of mobile phone subscription data as both an economic and regulatory input. It contributes to the success of the mobile number portability system.

It also builds consumer confidence in mobile communications. It has enabled consumers to access value added services and to effectively lodge their complaints. Mobile service providers know their customers through sold and registered subscribers.

EPOCA Licencing regulations require any person who sells or, in any other manner provides detachable SIM card or built-in SIM card mobile telephone to any potential subscriber to register subscribers.

EPOCA Consumer Protection regulation 10 (2) requires any person who owns or intends to use a detachable SIM card or built-in SIM card mobile telephone to register the SIM card or built in SIM card mobile telephone with their respective application service licensees, operators or authorized distributors, agents or dealers.

Eng. James Kilaba and Ms. Kippi append their signatures to a symbolic board to formalize the launch. (Photographs by Semu Mwakyanjala)

Dar Girls for STEM, 2018

TCRA celebrated this year's international girls in ICT Day with a seminar on consumer issues and presentations in Dar Es Salaam on the potential of Science, Technology, Engineering and Mathematics (STEM). Girls were awarded for outstanding initiatives in promoting ICTs.

TCRA Director of Information technologies, Ms. Connie Francis addresses students at the College of Information and Communications Technologies, Dar Es Salaam.

TCRA Director of Consumer and Industry Affairs, Dr Raynold Mfungahema presenting a paper at the event.

Deputy Permanent Secretary, Ministry of Education and Technology, Ave-Maria Semakafu presents an award to a winner of a competition around STEM.

The events were managed by TCRA ladies - posing at the Mwalimu Nyerere Convention Centre, Dar es Salaam.
Photographs by Semu Mwakyanjala, TCRA

Artificial Intelligence

Big Data Analytics

Internet of Things

Machine Learning

EMERGING TECHNOLOGIES FOR SMART SUSTAINABLE CITIES

Dr. Emmanuel C. Manasseh

Improving cities is a pressing global need as the world's population grows and our species becomes rapidly more urbanized. The combination of high-speed, resilient, low-latency connectivity and technologies such as Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT) and big data analytics, is enabling the transformation towards smart sustainable cities. This article highlights the role of artificial intelligence and IoT in shaping smarter and more sustainable cities and in addressing urban challenges, with the final goal of improving people's quality of life.

Introduction

A large population of Tanzanians live in cities; and the urbanization trend is in constant growth. Cities are hubs for economic growth, job creation, new ideas, technological evolution, communication and networking, information and social transformation.

However, cities are also origins of climatic, environmental, and economic challenges; making them both the sources and, at the same time, potential causes of these challenges.

To address these challenges; the latest information and communication technology (ICT), including its available services is needed. ICT fuels sustainable economic development and a high quality of life.

A valuable smart city ICT infrastructure must be able to integrate the smart homes into a coherent smart city concept. Vital elements in this are Internet of Things (IoT), Big data analytics, Machine Learning (ML) and Artificial Intelligence (AI).

A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve the quality of life, efficiency of urban operation and services, and competitiveness; while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects.

The Main Goal of a smart sustainable city is to enhance the quality of life of its citizens across multiple, interrelated dimensions, including the provision and access to water resources, energy, transportation and mobility, education, environment, waste management, etc.

Specification for a Smart Sustainable City

A smart sustainable city is a city that leverages the ICT infrastructure into an adaptable, reliable, scalable, accessible, secure, safe and resilient manner in order to:

a. Improve the quality of life of its citizens;

b. Ensure tangible economic growth such as higher standards of living and employment;

c. Create opportunities for its citizens;

d. Improve the well-being of its citizens including medical care, welfare, physical safety and education;

e. Establish an environmentally responsible and sustainable approach which "meets the needs of today without sacrificing the needs of future generations";

f. Streamline physical infrastructure based services such as transportation (mobility), water, utilities (energy), telecommunications and manufacturing sectors;

g. Reinforce prevention and handling functionality for natural and man-made disasters including the ability to address the impacts of climate change;

h. Provide an effective and well balanced regulatory, compliance

and governance mechanisms with appropriate and equitable policies and processes in a standardized manner.

When a city is not Smart and Sustainable there is a possibility that infrastructure grows but because it is not well connected, it may resulting in traffic jams, missed buses, trains and flights as well as shortages of supply of electricity, water and food, etc.

It should be noted that smart sustainable cities cannot be built in a day. The first and foremost thing is to put in place a master plan for the city and identify key areas that have significant impact on citizens and society and can be influenced by the use of ICT. The next step is to set priority areas and then streamline physical infrastructure based services such as transportation (mobility), water, utilities (energy), telecommunications and manufacturing sectors.

The role of IoT, Artificial Intelligence (AI) and ML in Smart Sustainable cities

Artificial intelligence, IoT and big data applications can play a key role in catalysing and improving the process of environmentally sustainable development. Artificial intelligence and IoT are able to provide more environmentally friendly and more economically viable solutions to some of the problems faced in cities. Potential areas where AI and IoT can assist include management of water sources, energy efficiency, education, and public transport infrastructure including reducing traffic congestion.

Artificial intelligence is the intelligence demonstrated by machines, in contrast to the natural intelligence (NI) displayed by humans and other animals. AI emphasizes the creation of

Smart and sustainable cities are solutions for traffic jams

Senses

IoT

Command

Save

AI/ML

Train

Big Data

Decides

Remembers

Why IoT and AI need each other

intelligent machines that work and act like humans. AI perceives its environment and takes actions that maximize its chance of successfully achieving its goals.

Internet of things (IoT) refers to a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies. While IoT is quite impressive, it really doesn't amount to much without a good-enough AI system. Both IoT and AI need to reach the same level of development in order to function as perfectly as we believe they should and would. In addition, Smart cities demand extensive data management. Consistent data integration from multiple locations and sectors is necessary to enable interoperability between systems. Smart cities need granular data governance for long-term sustainability. This necessitates open standards to future-proof their perpetual utility.

Artificial intelligence is hot in cyber security

As the number of IoT devices is projected to reach tens of billions in coming years, enterprise companies will be compelled to embrace artificial intelligence, machine learning and automation tools to help secure and manage their networks. In fact new

technologies are changing the cyber landscape. They bring benefits and challenges as well.

While industry must be prepared to take advantage of the opportunities presented by machine learning, AI and IoT, it is of utmost importance that security by design and privacy by design be considered in the cyber world of today and tomorrow. To prevent a global catastrophe, experts from different fields must focus on hacking prevention. Artificial intelligence cyber security must be both preventive and proactive.

Artificial Intelligence is the study of how to make ICTs do things that people are better at

A Call for Industry, Academia, and Government Collaboration

It is widely accepted that higher education is critical for economic growth and national competitiveness. Universities should be well placed to generate research that underpins these technological advances. There is a need for our universities to produce enough graduates in relevant subject areas to meet current and future industry demands.

Conclusion

Technologies such as Artificial Intelligence (AI) and Internet of Things (IoT) have a potential to transform cities into sustainable smart cities. This results in new opportunities for collaboration in the fields of mobility, healthcare, industry, and the development of digital infrastructure. The real concern is how IoT and AI will be able to defend itself from threats. The development and adoption of secure standards for artificial intelligence security is of utmost importance.

Applying Artificial Intelligence in Tanzania

Eng. Dr. John Andrew Mpapalika; Dr. Jane John Mpapalika; Andrew John Mpapalika – PhD candidate

1 INTRODUCTION

Advances in Information and Communications Technologies (ICTs) which have been taking place simultaneously with the Internet of Things (IoT), Cloud Computing (CC), Big Data Analytics (BDA), Artificial Intelligence (AI) and Machine Learning (ML), have brought tremendous new innovations and applications in the Information Age. The potential socio-economic benefits of these innovations and applications are great, and they can be harnessed fully to achieve the Tanzania Development Vision (TDV) 2025 and the Second Five Year Development Plan 2016/2017 to 2020/2021 (FYDP II).

In June 1999 the government of Tanzania launched TDV 2025; which envisages the transformation of the country's economy into a middle income and semi-industrialized state by 2025. The TDV 2025 has five main objectives, as follows:

- High quality livelihood;
- Peace, stability and unity;
- Good governance;
- A well-educated and learning society; and
- A strong and competitive economy.

The principal objective of TDV 2025 is to attain high quality health and education for all; good governance and rule of law; and building a strong and competitive economy.

In June 2016, the government of the United Republic of Tanzania also launched FYDP II; which intends to realize the five main objectives of TDV 2025, mentioned above. The theme of FYDP II is "Nurturing Industrialization for Economic Transformation and Human Development". The theme, among other efforts, calls for technology innovations to implement FYDP II. Technology innovations that can be used to implement FYDP II fully include IoT, CC, BDA, AI and ML. However, this article starts with presentation of AI technology innovation, and how it can be harnessed fully in Tanzania to achieve the objectives of TDV 2025. Other technology innovations mentioned above will be presented separately later in the forthcoming articles.

2 OVERVIEW OF ARTIFICIAL INTELLIGENCE TECHNOLOGY

Artificial Intelligence can be defined as a field of computer science that deals with the creation of intelligent machines that work and react like humans. It covers a wide spectrum from speech recognition and visual perception up to natural language processing and decision-making, which normally require human intelligence. The human intelligence includes learning, reasoning and problem solving, which is accomplished by studying how the human brain thinks; and how humans learn, decide and work while trying to solve a problem. Then, outcomes of this study form a basis of developing intelligent algorithms and subsequent machines. Fundamental objectives of developing Artificial Intelligence are twofold:

- To create Expert Systems which exhibit intelligent behaviour, learn, demonstrate, explain, and advise its users accordingly; and
- To implement Human Intelligence in Machines, which create machines that understand, think, learn, and behave like humans.

The main differences between a machine programmed with and without Artificial Intelligence can be explained in table 1:

Artificial Intelligence though is a young and new technology innovation; it has transformed the society beyond imagination. Main areas of Artificial Intelligent include the following:

- *Natural Language Processing* – It is possible to interact with the computer that understands natural language spoken by humans;

- *Expert Systems* – There are some applications which integrate machine, software, and special information to impart reasoning and advising. They provide explanation and advice to the users;

- *Vision Systems* – These systems understand, interpret, and comprehend visual input on the computer. For example,
- A spying drone takes photographs, which are used to figure out spatial information or map of the areas.
- Doctors use clinical expert systems to diagnose a patient.
- Police use facial recognition software to capture criminals with a stored portrait drawn by a forensic artist.

- *Speech Recognition* – Some intelligent systems are capable

A machine programmed without AI	A machined programmed with AI
Answers only the specific questions it is meant to solve	The machine can answer generic questions using well integrated neural networks
Modifications to the program lead to inherent changes in its structure	Easy and independent assimilation of modifications by putting highly specialised pieces of information together
Modification requires programming knowledge. It may affect the program functions adversely	Quick and easy program modification

Table 1: Differences between a machine programmed with and without AI

of hearing and comprehending the language in terms of sentences and their meanings while a human talks to it. It can handle different accents, slang, background noise, change in human's noise due to cold, etc.

• *Handwriting Recognition* – Handwriting recognition software reads the text written on paper by a pen or on screen by a stylus. It can recognize the shapes of the letters and convert it into editable text.

• *Intelligent Robots* – Robots are able to perform the tasks given by a human. They have sensors to detect physical data from the real world such as light, heat, temperature, movement, sound, bump, and pressure. They have efficient processors, multiple sensors and a huge memory, to exhibit intelligence. In addition, they are capable of learning from their mistakes and they can adapt to the new environment.

Although Artificial Intelligence demonstrates a powerful technology innovation, it has advantages and disadvantages, which can be explained in table 2:

3. APPLICATIONS OF ARTIFICIAL INTELLIGENCE TO TANZANIA

3.1. *AI in the Transport and Automotive Sector*

Around the world, road traffic accidents kill 1.25 million people every year and injure 20 to 50 million. Road traffic accidents are predicted to be the fifth leading cause of death in the world by 2030. In Tanzania road traffic accidents on average kill about 2,500 and injure about 8,000 people a year. Most road traffic accidents are caused by careless drivers. Therefore, full AI driven autonomous cars attached with sensors including intelligent cameras can be used to track their surroundings as they move from one point to another. The information gathered by these sensors is processed and interpreted in real time so that the cars can stop, accelerate, detect obstacles and avoid potential collisions without the need for direct human control. The most obvious important application of AI in the transport and automotive sector is the use of the "self-driving cars". Soon, drivers will turn into passengers of their own cars by introducing Artificially Intelligent Drivers (AIDs); AIDs will never get tired and make mistakes. Hence, they can drastically reduce road traffic accidents. Artificial intelligence can be used to intelligently control traffic lights and reduce the critical problem of traffic jams in Dar Es Salaam. AI enabled traffic lights can replace traffic police who now control traffic during jams in peak hours, in mornings and evenings.

3.2. *AI in Healthcare*

Provision of high quality standard of healthcare for all is one of the principal objectives of TDV 2025; and can be attained by deploying Artificial Intelligence innovations and applications in the following areas:

• *Creation of an Artificially Intelligent Doctor*
One of the best known AI healthcare technologies for the creation of the Artificially Intelligent Doctor is the IBM WATSON. The latter understands natural language and is capable of responding to questions asked of it. The IBM Watson mines patient data and other available data sources to form a hypothesis, which it then presents with a confidence scoring schema. The Artificially Intelligent Doctor like the IBM Watson can treat patients tirelessly and intelligently without making mistakes like human doctors. Hence, Artificially Intelligent doctors can provide high quality standard healthcare services for all unlike the present situation whereby high quality standard healthcare services are provided only in urban areas.

• *Diagnosis*
One of the most advanced applications of AI in healthcare is in the diagnosis of diseases. With AI, machines are supercharged with the ability to analyse voluminous data from medical images, prompting early diagnosis of many disorders. AI provides an easy solution through intelligent diagnostic imaging. This approach has multiple applications in a proactive diagnosis of the possibility of a stroke, tumour growth, and certain types of cancer; giving the physician the chance to derive comprehensive treatment plans for patients well ahead of time.

• *Prediction of Outbreak of Epidemic Diseases*
Some AI models such as the Artificial Neural Networks (ANN) can be used to predict an outbreak of epidemic diseases like cholera, malaria, dengue fever and Ebola. ANNs are biologically inspired computer programs designed to simulate the way in which the human brain processes information. They gather their knowledge by detecting patterns and relationships in data and learn (are trained) through experience, not from programming. Early prediction of the outbreak of epidemic diseases is key for the control of morbidity, mortality as well as reducing the risk of transmission of diseases in the community. This control can help policymakers, health providers, medical officers, ministry of health and other health organizations to better target medical resources to areas of greatest need.

• *Virtual Nursing Assistance (VNA)*
Artificial intelligence applications support healthcare providers in delivering nursing assistance after a patient's discharge from hospital. VNA helps the provision of outpatient services and increases the accuracy of monitoring patient compliance after discharge. Some patients do not properly use medicine prescribed by their doctors. To solve this problem, some AI applications can be available on smart phones and act as Virtual Health Assistants

ADVANTAGES	DISADVANTAGES
Performs complex tasks too difficult for humans	Lacks the *"human touch"*
Can complete tasks faster than a human being	Has the ability to replace jobs
Makes less errors and defects	Misuse may lead to mass scale destruction

Table 2: Advantages and Disadvantages of Artificial Intelligence

(VHAs) that remind patients to take medicines in accordance with the doctors' medical prescriptions.

3.3   AI in Education

Like in healthcare, TDV 2025 also targets the attainment of high quality standard of education for all. This can be attained by deploying the AI innovations and applications in the following areas:

- *Automation of Administrative Educational Tasks*
AI can be used to speed up the administrative process both for institutions and educators. The tedious process of grading homework, evaluating essays and measuring student responses can be done by the AI technology to save valuable time from lecturers and teachers who would prefer to focus on their lesson planning and one-on-one time with students.

- *Inside the Classroom Education Support*
Currently, teachers find very difficult to support every student in a class, with the students' individualized educational needs. That becomes incredibly tough in a class of more than 100 students; all required to pass the same standardized examinations. The use of Artificial Intelligence technology innovations related to Machine Learning algorithms can help teachers to fill the gaps and provide high quality standard education for all, even in a classroom of more than 100 students, in line with requirements of the principal objective of TDV 2025.

- *Outside the Classroom Support*
Currently, students are forced to rely on their teachers and parents, who have limited time and availability, when assistance is needed. Currently, there is an Intelligent Tutoring System (ITS) in the market such as the Carnegie Learning that can directly provide tutorial support to students. The ITS is an AI driven computer system that aims at providing immediate and customized instruction or feedback to learners, usually without requiring intervention from a human teacher. The ITSs have the common goal of providing high quality standard education by using a variety of AI technology innovations.

3.4   AI in Agriculture

The applications of Artificial Intelligence in agriculture appears to fall into three major categories:
- *Agricultural Robots* – Companies have been developing artificially intelligent and autonomous robots to handle essential agricultural tasks such as harvesting crops at a higher volume and faster pace than human labourers.
- *Crop and Soil Monitoring* – Companies have been leveraging computer vision and deep-learning algorithms to process data captured by drones and/or software-based technology to monitor crop and soil health.
- *Predictive Analytics* – Companies have been developing Machine learning models to predict various environmental impacts, such as weather changes, on crop yield.

3.5   AI in Criminal Identification

Artificial Intelligence can be used to identify criminals with an accuracy of around 90 percent. It achieves this by using machine-vision algorithms. AI uses still photos of suspects and real criminals all without facial hair. Not only can AI identify criminals with a high success rate but can also manage to provide typical facial features that might indicate that a person is likely to be a criminal. This application can completely eliminate criminals in the country; and it can become smart Tanzania.

3.6   AI in Weather Forecasting

Weather forecasting is a task of predicting the state of the atmosphere at a future time and a specified location. Traditionally, this task has been done through physical simulations in which the atmosphere is modelled as a fluid. The present state of the atmosphere is sampled, and the future state is computed by numerically solving the equations of fluid dynamics and thermodynamics. However, the system of ordinary differential equations that govern this physical model is unstable under perturbations, and uncertainties in the initial measurements of the atmospheric conditions and an incomplete understanding of complex atmospheric processes restrict the extent of accurate weather forecasting to a 10-day period; beyond which the weather forecasts become significantly unreliable and invalid.
Artificial Intelligence can be used for predicting accurately the weather beyond the 10-day period. Artificial Intelligence includes models such as Artificial Neural Networks (ANN), Probabilistic model Bayesian Network (PMBN) and Support Vector Machines (SVM). Among these models the ANN is widely used because of its ability to capture non-linear dependencies of past weather trends and future weather conditions.
Artificial Intelligence technology has greatly changed the paradigm of weather forecasting with high accuracy and prediction. Within the next few years, more advanced technology innovations will be developed by using the AI models to accurately predict weather and mitigate against disasters like hurricanes, tornados, and thunderstorms.

3.7   AI in the Manufacturing Industry

Unlike general artificial intelligence which is a frontier research discipline to build computerized systems that perform tasks requiring human intelligence, industrial AI is more concerned with the application of such technologies to address industrial pain-points for customer value creation, productivity improvement, and insight discovery.

Although there is fear that AI applications and intelligent machines may take away jobs currently undertaken by humans and cause social and ethical issues, industry in general holds a more positive view of AI and sees this transformation of the economy as unstoppable; and expects huge business opportunities in this process. The manufacturing industries will be driven towards higher productivity and increased efficiency with the help of AI. The workforce can focus more on innovation and new operations, and contribute to the growth and bright future of the Tanzanian manufacturing industry.

3.8   AI in Telecommunications Industry

3.8.1   No More SIM Card Registration

Introduction of AI enabled SIM cards will eradicate the problems of registration upon purchase of pre-paid SIM cards.
Mobile phones can be used by fraudsters, criminals and terrorists to commit illegal acts, and so it is useful for law enforcement to prevent people from committing these acts. Many governments like Tanzania have put mandatory requirements for the registration, upon purchase, of prepaid SIM cards. This helps to prevent someone from using a mobile device to commit a crime anonymously because the user can be identified. Biometrics are becoming increasingly used as a Know Your Customer (KYC) tool to control crimes. However, spoofing is also a challenge in SIM card registration; where identity information and biometrics are falsified during the enrolment process; e.g. Capture of biometric facial image using videos or photographs instead of a live image. Therefore, SIM card registration can not completely solve the problems of committing illegal acts using unregistered SIM cards. The right solution is to use AI enabled SIM cards, which can capture live images, and recognize natural language by using the algorithms of Artificial Intelligence and Deep Learning technologies. Globally, AI enabled SIM cards will be released for commercial use soon.

3.8.2   No More International Roaming

One of the most problems with a mobile network is the high international roaming charges. A user needs to pay high roaming charges even when receiving or making local calls while roaming on a foreign mobile network. It is one of the major setbacks in this technology and has been overlooked over the years. The introduction of AI enabled SIM cards will also eradicate the problems of high international roaming charges and will help travellers abroad to make or receive calls on a foreign mobile telecommunications network at local mobile rates. The AI enabled SIM cards can create the One Network Area (ONA) in East Africa. The ONA initiative for the first time was launched in Tanzania by Airtel, then Celtel Tanzania, in September 2006.

3.8.3   AI Enabled Financial Services

Advances in AI and Deep Learning technologies can enable the transfer of money in banking and Mobile Money Transfer Services by using voice control algorithms. The voice control algorithms combine AI and biometric voice identification that can transfer money from one account to another, fast and very efficiently, by using even a single sentence. This means that AI enabled financial services will replace the password needed for ATM transactions and a customer can draw money from the ATM by using natural spoken languages. Similarly mobile money transfer services will be effected through voice identification instead of the current digit dialing method.

3.8.4   Mobile Healthcare

Artificial intelligence enabled smart phones can be used as Virtual Mobile Doctors (VMD) that diagnose and treat patients. Virtual Mobile Nursing Assistants (VMNA) can help outpatients to get medical services and increase the accuracy of monitoring patient post discharge compliance. Virtual Mobile Health Assistants (VMHAs) can remind patients to take medications appropriately as per medical prescriptions from their doctors. VMD, VMNHA and VMHA mobile healthcare can easily provide very high quality standard health services for all in both urban and rural areas.

3.9   AI in a Digital Economy

Increasingly, the economy is becoming digital. M Pesa, Airtel Money and Tigo Pesa have showed that money transfers can be made much easier with mobiles phones. The next level is to make every person in Tanzania have a bank in their pocket, through their smart phones. This will enable everyone to participate fully in the financial system at a local and global level.

It will enable people to grow economically and secure funding and capital required to start their businesses. To achieve this, most of the people have to have a connection to the internet. There are several new companies that are starting to provide internet broadband through the constellation of satellites. This will revolutionize the internet broadband sector, the way mobile phone did to the telecommunication sector.

With high speed internet available everywhere, everyone will be able to fully participate in the digital economy. Block chain technology allows records and information to be kept digitally, securely and in a distributed ledger format. Crop harvests can be digitally recorded on the Block chain and then sold locally and internationally. This will reduce transaction costs of food production and open up a global market for Tanzanian farmers. Agricultural supply chain will also be made more efficient, transparent, traceable and trustworthy. It will eliminate middlemen by using Block chain technology. With the agricultural data being available in a distributed format and shared with everyone, AI technology can be used to improve logistics by efficiently moving goods from one place to another. Logistics

costs are very high in developing countries, and that can make it infeasible to move crops from one part of the country to another. High logistics costs eventually end up being passed to consumers; who pay high prices for commodities. Applying AI and Block chain technologies to food production will increase yields and reduce prices for consumers.

4.0. RECOMMENDATIONS

Action to fully harness the potential of AI includes launching a national AI strategy; building capacity for AI; building Smart Cities and Smart Tanzania by using AI enabled Traffic Lights and Sensors; provision of Universal High Quality Education and Healthcare in the Country; introducing online SIM Card Registration; addressing international Roaming Issues; addressing financial inclusion through the use of AI and reviewing the legal and regulatory framework to provide for AI applications.

4.1 Launch of a National Artificial Intelligence Strategy

It is recommended that a National Artificial Intelligence Strategy (NAIS) be launched in Tanzania to strategies the country to move towards an industry economy and beyond as envisioned by TDV 2025. NAIS should aim, amongst others, to achieve the following:

- Objectives of TDV 2025 and FYDP II;
- Building an Information society,
- Building smart cities and smart Tanzania;
- Improvement of government performance at all levels;
- Provision of high quality standard of education and health for all; and
- Creation of a new digital economy with high economic value.

4.2 Capacity Building on Artificial Intelligence

The government ought to embark aggressively on capacity building programmes of AI technologies. These are technologies that can easily transform the country and lead it to the "Digital Economy". Universities should start developing and running AI degree programmes besides their normal computer science, statistics, mathematics and engineering courses.

The government should allocate enough budget for the Research and Development for the AI technology innovations. Research and development activities for AI technology can be done in collaboration with the Big Five IT Companies in the world: namely, Apple, Google, Amazon, IBM and Microsoft; and with global Universities such as Oxford, Cambridge, MIT, Stanford and Harvard.

4.3 Building Smart Cities and Smart Tanzania by using AI enabled Traffic Lights and Sensors

Big cities in most of the developing countries including Dar Es Salaam experience problems of heavy traffic jams in such a way that they cannot be controlled by present traffic lights. Inspite of the deployment of traffic police to control the jams, the problem remains unresolved. To reduce traffic jams in big cities like Dar Es Salaam, it is recommended that present traffic lights be replaced by AI enabled traffic lights using algorithms of AI and Deep Learning technologies. AI enabled traffic lights work tirelessly and intelligently without mistake; hence they reduce jams and enable traffic to move smoothly.

Some big cities also experience major crimes that can be completely removed by AI enabled sensors.

Smart cities and smart Tanzania can be attained by removing traffic road accidents. To avoid accidents the government through the Ministry of Works, Transport and Communications; Ministry of Home Affairs, and the Surface and Marine Transport Regulatory Authority (SUMATRA) are urged to consider deploying AI enabled sensors in buses, trucks and trains to monitor their surroundings.

Government should also consider introducing full AI driven cars, also known as self-driving cars to eliminate road accidents and build a smart Tanzania.

The government and SUMATRA should also consider putting specifications of AI and Machine Learning technologies for the Standard Gauge Railway (SGR), now under construction, for reasons of safety and security control.

4.4 Provision of Universal High Quality Education and Healthcare in the Country

Applications of AI technology innovations have been proved to provide high quality standard of education and health for all in both urban and rural areas. The ministries responsible for education and for health are urged fully harness the potential socio-economic benefits of the applications of AI technology innovations in order to provide high quality standard education and health for people in both urban and rural areas.

4.5 On-line SIM Card Registration

The current manual SIM Card Registration process has proved a failure due to spoofing; where the identity, information and biometrics are falsified during the enrolment process. TCRA is urged to direct all operators to start consider the introduction of AI enabled SIM cards which can capture online live images of a user while they making a call. On-line SIM Card registration will replace manual registration.

4.6 International Roaming Issues

TCRA is also urged to direct operators to start looking for AI enabled SIM Cards; which removes international roaming charges for making or receiving calls on foreign mobile telecommunications networks.

4.7 Study on the implications of AI and Blockchain Technologies in Financial Services in the Digital Economy

TCRA is further urged to study and discuss with the Bank of Tanzania (BoT), mobile network operators and other stakeholders the implications of AI and Block Chain technologies in Financial Services; which make is possible for mobile phone users in Tanzania to have a bank in their pockets through their smart phones.

Block chain technology allows records and information to be kept digitally, securely and in a distributed ledger format. The application of the AI and Block Chain technology innovations will enable every person in Tanzania to participate fully in the Digital Economy and in the financial system.

4.8 Review of the Legal and Regulatory Framework

TCRA should review the current legal and regulatory framework in order to accommodate the 10 key applications of AI technology innovations presented in this article; especially the applications of AI and Block Chain Technology innovations in financial services.

5. CONCLUSION

Ten key applications of Artificial Intelligence technology innovations to Tanzania have been presented in detail in this article. Based on this presentation, it is evident that fully harnessing the potential socio-economic benefits of the 10 key applications of AI technology innovations can transform Tanzania into a "Digital Economy" as envisioned by the Tanzania Development Vision 2025. Therefore, the government should fully harness the potential socio-economic benefits of the above mentioned 10 key applications of the Artificial Intelligence technology innovations in order to achieve the Digital economy.

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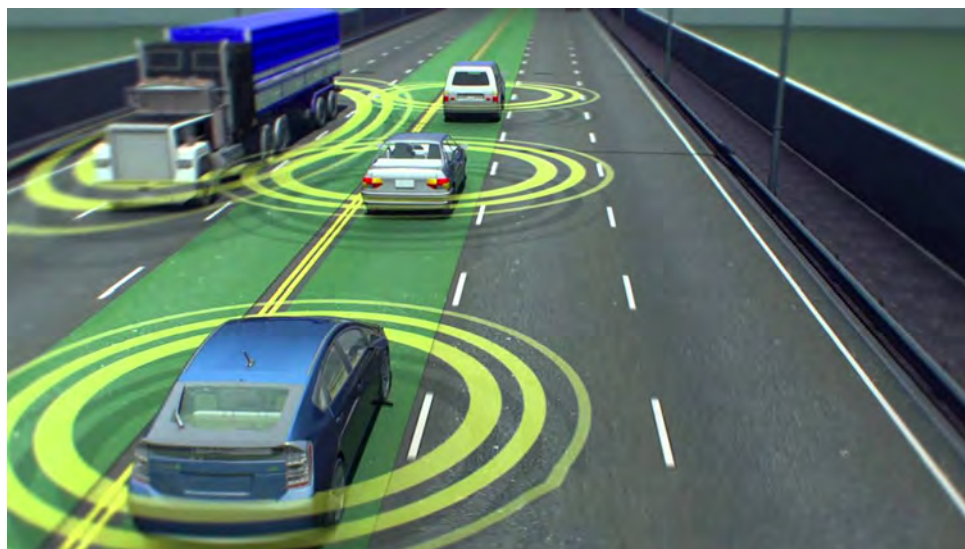
APPLICATION GUIDELINES AND FEES FOR NUMBERING RESOURCES

Sixth Issue: April, 2018

1.0 APPLICATION, PROCEDURE AND CRITERIA FOR ASSIGNMENT OF NUMBERING RESOURCES

1.1 The management, procedure and criteria for assignments of electronic communication numbers as well as the Assignee's obligations are provided for under PART II Sections 4 - 9 of the Electronic and Postal Communications (Electronic Communication Numbering and Addressing) Regulations of 2018. The electronic form of the Regulations is available on line at: www.tcra.go.tz.

The following are conditions for Assignment of Numbering Resources:

1. The Assignee is authorized to use the assigned Electronic Communication Number (Numbering Resource) from the date of assignment up to a period of **twelve months** which will be renewed again, upon payment of Maintenance Fee one month before expiry of the given assignment certificate.
2. The Assignee shall pay Maintenance Fee even where the Assignee does not utilize the assigned numbers during the assigned period.
3. A Mobile Network Destination Code Assignee shall submit in writing to the Authority by **30th May** each year, the utilized subscriber's numbers for the purposes of auditing and billing.
4. Where an Assignee to whom electronic communication numbers were assigned fails to utilized the assigned numbers in accordance with the plans for provision of the intended communication services or where they abolish use of the said electronic communication numbers, he shall notify the Authority without delay, failure of which the Authority will take necessary regulatory measures including cancellation of the assignment.
5. Where the Assignee does not wish to maintain the Assigned number after expiry of the given assignment certificate he shall notify the Authority in writing one month prior to its expiration;
6. The Assignee shall ensure that the assigned numbers are utilized efficiently, for provision of communication services only, in a manner that the electronic 3 communication facilities or services may be identified and paid for as designated by the Authority in accordance with the application guidelines.
7. The assignee shall: - a) Not transfer, re-sell or trade any part of the assigned number; b) Not use the number for purpose other than that which it is assigned for; c) Be responsible to discontinue traffic related to a number whose service has ended.
8. In the event that the Electronic Communication Number has been cancelled, the assignee shall have to re-apply for Numbering Registration, of which the same number will not be guaranteed.
9. The Authority may at any time, after the date of issue, CANCEL this certificate where the Assignee fails to comply with the Laws, Regulation, Guidelines for Numbering Resources or these conditions, without refund of any fees paid.

1.2. Any eligible applicant requiring numbering resources are obligated to submit to the Authority appropriate application form(s) and documents required for the application with reasons for use of the said numbers, estimated demand as the grounds for said request and plans for provision of telecommunication services for the numbers required. The application forms are available at the Authority's front desk upon payment of the application-processing fee or online at www.tcra.go.tz with application processing fee payable on submission of the application. When applying for numbering resources the applicant as to submit the following:

1. Duly filled application form.
2. Receipt of the processing fee payable at TCRA offices.
3. Company /organization profile.
4. Certified copy of Certificate of incorporation or registration.
5. Certified copy of Tax Identification Number (TIN) Certificate.
6. Certified copy of Memorandum of Articles of Association.
7. Detailed description of the service to be provided using the number applied for.

1.3 Change of Assigned Electronic Communication Numbers

Normally, Numbering Plans are made to avoid as much as possible the change of electronic communication numbers. However, in such case that the Numbering Plan is changed or numbers are to be cancelled, the Authority in the process will be guided by PART II Sections 12 and 13 (1) of the Electronic and Postal Communications (Electronic Communication Numbering and Addressing) Regulations of 2018.

2.0 NUMBERING RESOURCES FEES

2.1. Reasoning for the Numbering Fees

The scarce numbering resource and rising amount of electronic communication users and services, presumes an effective control and supervision of numbers. The introduction of numbering fees promotes fairness and efficient use of the electronic communication numbering resources.

Numbers have been chosen as the object for the fees because the operation of telecommunications generally demands numbers. All numbering related activities of the Authority and Standardization will be covered by numbering fees.

2.2 Number categories

Numbering resources are divided in various categories including the following:

(a) Subscriber Numbers.
(b) Prefixes for networks.
(c) Service numbers (like free phone numbers, premium rate numbers, etc.).
(d) VAS short Codes (USSD and SMS).
(e) National Portable Network Access Numbers.
(f) National Signalling Point Codes (SPCs).
(g) International Signalling Point Codes (ISPCs).
(h) Mobile Network Identification Codes (MNIC).
(i) Data Network Identification Codes (DNICs).
(j) Corporate Services Numbers, e.g. VoIP Number ranges.
(k) Carrier Selection and pre-selection codes.
(l) SIM Headers.

2.3 Fees to be paid for Telecommunications Numbers

There will be two categories of Numbering Fees, namely: **REGISTRATION FEE** and **ANNUAL MAINTENANCE FEE.**

2.3.1. Registration Fee

The registration fee will be a onetime payment to be made upon successful application of a numbering resource with eventual issuance of certificate of number allocation.

2.3.2. Annual Maintenance Fee

Annual maintenance fee for utilized subscriber numbers of Fixed, Cellular Network Operators and any other Assignee having Subscribers shall be computed according to the formula below and shall be payable on every 1st July of each year after service launch.

$$F = B \times C$$

Where:- **F** is the annual fee; **B** is the utilized number; and **C** is the cost per utilized number.

To start with, **C** has been set at US$ 0.20, and may be reviewed as deemed necessary. The annual maintenance fee for other numbering resources shall at least one month before expiry of the given current assignment certificate. The current applicable fees for both categories are provided.

3.0 THE ROLE OF THE AUTHORITY

The Authority is the sole custodian of the National Numbering Resources. Use of any electronic communication Numbering and/or Electronic Address without the consent of the Authority is against "Electronic and Postal Communications (electronic communication Numbering and Addressing) Regulations, 2018, and therefore liable to regulatory measures.

APPLICABLE FEES

S/N	Type of Numbering Resource	Application Fees (US$)	Registration Fees (US $)	Annual Maintenance Fees (US $) - payable one year after registration	Duration of license (years)
1	Prefix for Networks (NDC & MNDC)	10	2,000	2,000	
2	Subscriber Numbers	N/A	N/A	US$ 0.20 Per Subscriber Number	1
3	National Signalling Point Codes (SPC)	10	2,000	2,000	1
4	International Signalling Point Codes (ISPC)	10	2,000	2,000	1
5	Mobile Network Identification Codes (MNIC)	10	2,000	2,000	1
6	SIM Header	10	2,000	2,000	1
7	Data Network Identification Codes (DNIC)	10	2,000	2,000	1
8	Corporate Services Network Access Numbers	10	2,000	2,000	1
9	Carrier Selection/Pre-selection Codes	10	10,000	5,000	1
10	Premium Rate Access Codes (block)	10	2,000	5,000	1
11	Special & Fixed Rate Access Codes (block)	10	2,000	5,000	1
12	Special & Fixed Rate Access Codes Premium Rate Access Codes (Single number)	10	1,000	2,000	1
13	USSD Short Codes	10	2,000	2,500	1
14	**VAS SMS & Special Services Short Codes**				
	- GOLD	10	4,000	2,500	
	- SILVER	10	3,000	2,500	1
	- BRONZE	10	2,000	2,500	1
	- ORDINARY	10	1,000	2,500	1

SADC Gears for Fourth Industrial Revolution

Tanzania's delegation was led by the Deputy Permanent Secretary, Ministry of Works, Transport and Communcations; Eng. Angelina Madete (center). Right is TCRA Director of Information and Communication Technology, Ms. Connie Francis

The Southern African Development Community (SADC) is formulating strategies for its full participation in the fourth industrial revolution – the application of cyber systems in production.

Regional Integration as the context for industrial development and economic prosperity.

Dr. George Ah-Thew, SADC Acting Senior Programme Officer Communications and ICT reminded the meeting that the region would be left behind if it did not respond to FIR.

Participants in a group photograph

A March 2018 meeting of SADC senior officials responsible for communication and ICT, in Pretoria, South Africa discussed the SADC Declaration on the Fourth Industrial Revolution (FIR).

Guiding principles were laid out and a pre-selection of ten (10) projects from the list were identified. A FIR Task Team has been setup to finalise this work, including the selection and profiling of the ICT Projects to support the implementation of the FIR.
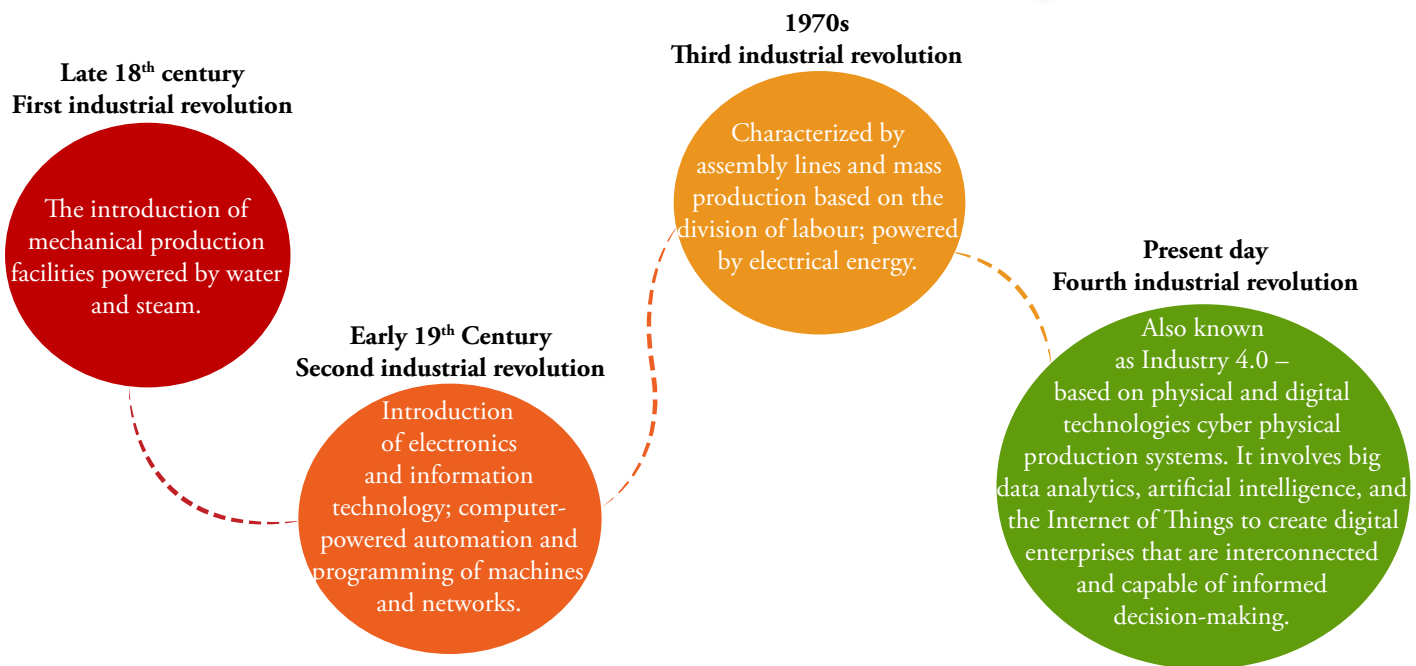
The SADC Strategy to implement the Fourth Industrial Revolution (FIR) is anchored on three pillars. These are Industrialization as a champion of economic and technological transformation; Competitiveness as an active process to move from comparative advantage to competitive advantage; and

"Developed countries are ahead of us and can transfer innovation and technology into commercialisation very rapidly."

Mr. Thabiso Thiti, Acting DG of the Department of Communications (DoC) stated that the region should bridge the digital divide before it embarked on FIR.

"At the core, the SADC region must promote innovation from its grass roots and refrain from always being a consumer of imported technologies. In this manner, even our citizens in the rural areas can participate in contributing towards economic developing and regional integration of SADC", he said.

Evolution of Production Systems

Late 18th century
First industrial revolution

The introduction of mechanical production facilities powered by water and steam.

Early 19th Century
Second industrial revolution

Introduction of electronics and information technology; computer-powered automation and programming of machines and networks.

1970s
Third industrial revolution

Characterized by assembly lines and mass production based on the division of labour; powered by electrical energy.

Present day
Fourth industrial revolution

Also known as Industry 4.0 – based on physical and digital technologies cyber physical production systems. It involves big data analytics, artificial intelligence, and the Internet of Things to create digital enterprises that are interconnected and capable of informed decision-making.

Tanzania Set for New ICT Possibilities

TCRA has invited stakeholders' comments on a proposed numbering plan for machine to machine communication (M2M) and Internet of Things (IOT) applications

The Communication sector is growing fast and there are several emerging information communication technologies such as Internet of Things (IoT), Machine-to-Machine (M2M) communications and Clouding computing are in use in the country. Whereas M2M communication is through mobile network and SIM card (be soft or hard SIM) is required, there is a need to have numbering plan for such service for identification and communication. This includes automobile communication, device tracking, medical devices, weather etc. The advantages of M2M/IoT applications are great for both business and consumer purposes.

The sector has been growing drastically; use of M2M devices and related applications cannot be ignored. Both devices and applications will require identifiers; telephone numbers (E.164 numbers) or naming addresses (IP addresses). These developments call for dedicated number range different from the traditional currently used for voice and data services.

M2M devices could be large and some applications may need numbers (e.g. E.164 numbers) or addresses (e.g. IPv6 addresses), thus there is a potential need for a large amount of identifiers. The dramatic increase in the amount of M2M devices and IoT applications being deployed as well as the expected growth in the market with reference to the growth of the sector has made it necessary to create a dedicated number range in order to free up numbers in the traditional voice and data number ranges which are 12-digits.

As indicated above, alternatives like IP addresses may be used,

but as well it should be noted that not all applications can or need to be connected to the internet at all times, hence numbers will be used in such cases.

The Authority proposes the following measures:
1. M2M devices and IoT applications utilizing E.164 numbers shall be assigned numbers in accordance with the Electronic and Postal Communication (Numbering and Addressing) Regulations, 2018.
2. The numbers to be assigned for M2M communication devices/IoT applications shall be on a 15-digit numbering range (+255 3YY XXX XXX XXX). This should not worry subscribers, as there will be no need to call the device and user friendliness and recognizability of the number is not a priority. The 15-digit range will provide enough numbers to ensure availability to meet public requirements.
3. The 15-digit number will be in accordance with ITU-T Recommendation E.164 shall have provisions for all subscriber facilities including but not limited to number portability, caller line identification (CLI) and access to emergency services especially when there will be human interaction.
4. The activation of M2M devices and all other devices with eSIM shall be subject to Electronic and Postal Communications (SIM Card Registration) Regulations,5. Application and assignment to these numbers shall be guided by the National Numbering Guidelines as publish by the Authority and reviewed from time to time.

Mwongozo wa Watumiaji wa Huduma na Bidhaa za Mawasiliano

Mamlaka ya Mawasiliano Tanzania imeandaa na kuchapisha vidokezo vya kumuongoza mtumiaji wa huduma na bidhaa za mawasiliano katika masuala mbalimbali. Nakala za Mwongozo huo zimesambazwa sehemu mbalimbali na zinapatikana kwenye tovuti ya TCRA - www.tcra.go.tz. Tunachapisha sehemu ya pili na ya mwisho ya Mwongozo huo. Sehemu ya kwanza ilichapishwa kwenye toleo la Januari- Machi, 2018.

10.8. Unaponunua kifaa cha mawasiliano kupata huduma za intaneti

Pamoja na simu za kiganjani, tekinolojia imewezesha kutumika kwa vifaa vingine vya mawasiliano kwa ajili ya kupata huduma za intaneti, yaani kujiunga na mfumo wa mawasiliano uliounganisha kompyuta mbalimbali duniani. Vifaa hivyo ni pamoja na modems, routers, n.k.

Mambo ya kuzingatia unaponunua vifaa hivyo hayana tofauti na yale ya kuzingatia unaponunua simu ya kiganjani. Pamoja na hayo inashauriwa kununua kifaa ambacho matumizi yake ni rahisi na ambacho kinakidhi mahitaji yako ya huduma husika.

10.9. Unapotumia kifaa cha mawasiliano kupata intaneti

Matumizi ya vifaa vinavyokuwezesha kupata huduma za intaneti, ikiwa ni pamoja na simu za kiganjani, yanatakiwa pia kuzingatia sheria na staha na pia kumhakikishia mtumiaji faragha. Mitandao ya kijamii kama vile WhatsApp, Facebook, Twitter na Instagram na mingineyo inawezeshwa kupitia intaneti.

Mtumiaji wa intaneti kwa ujumla wake anashauriwa kuzingatia yafuatayo: -

1. Kutokuweka taarifa nyingi za binafsi na za undani kwenye mitandao ya jamii.

2. Kuwa makini kwenye matumizi ya neno la siri. Neno la siri ni muhimu sana katika kutunza anwani ya barua pepe au akaunti yako ya mtandao wa kijamii. Chagua neno la siri ambalo linachanganya maneno na tarakimu. Badilisha neno la siri mara kwa mara. Muda unaopendekezwa ni angalau kila baada ya siku 90.

3. Kutokurudia kutumia neno la siri ulilowahi kulitumia siku za nyuma. Iwapo una anwani ya barua pepe au akaunti ya mtandao wa jamii zaidi ya moja, tumia maneno ya siri tofauti kwa kila akaunti.

4. Ukisaidiwa kuanzisha akaunti ya mtandao wa kijamii au anwani ya baruapepe, hakikisha unabadilisha neno la siri baada ya kukabidhiwa akaunti na anwani.

5. Kutokutoa kwa mtu yeyote, hata wa karibu, neno la siri unalotumia kwenye anwani au akaunti zako.

6. Usiandike mahali popote neno la siri unalotumia. Tumia maneno ambayo ni rahisi kwako wewe kukumbuka lakini magumu kwa mtu mwingine kukisia.

7. Usijibu ujumbe mfupi unaopokea kwenye akaunti yako ya barua pepe au simu unaokutaka kutuma taarifa zako ili zihakikiwe.

8. Usijibu ujumbe wowote wa barua pepe unaokueleza kuwa umeshinda "Bahati Nasibu" ambayo hukushiriki kucheza.

10.10. Unapotumia mitandao ya kijamii

10.10.1 Masuala ya jumla

Intaneti imewezesha kuenea na kupanuka kwa mitandao ya kijamii. Mitandao ya kijamii ambayo imewezeshwa na kuwepo kwa intaneti imechangia katika kubadilishana taarifa, kufungua

fursa za kujiendeleza na kwa namna hiyo kuongeza kujiamini kwa watumiaji wake. Mitandao imekuwa chombo cha kupata na kubadilishana elimu, masuala ya kijamii na pia kama chanzo cha kipato kwa wajasiriamali. Inawezesha watumiaji kusoma magazeti, kusikiliza redio na kutazama televisheni kupitia mitandao ya kijamii.

Yafuatayo ni baadhi ya mambo ambayo watumiaji wa mitandao ya kijamii, wanatakiwa kuzingatia:

1. Sheria, kanuni, miongozo na maelekezo kuhusu matumizi ya mitandao ya mawasiliano kama inavyotolewa mara kwa mara ya vyombo husika.

2. Kanuni za taasisi husika kuhusiana na matumizi ya mitandao ya kijamii.

3. Miiko ya taaluma husika. Kila taaluma ina miiko yake ambayo inatakiwa kuzingatiwa wakati mitandao inatumika kuendeleza taaluma husika. Kwa mfano, iwapo mtumiaji anajihusisha na usambazaji wa habari mtandaoni, anatakiwa kuchuja habari, kujali faragha binafsi za watu, kutumia lugha stahiki na kuwa na vyanzo vya habari zinavyoaminika.

4. Kuwa na staha na heshima kwa wahusika wa taarifa zinazosambazwa. Kwa mfano kutokusambaza taarifa ambazo zinatia simanzi na taharuki kama picha zinazonyesha kwa karibu sura au miili ya waathirika wa ajali au majanga.

5. Kutokusambaza picha au video za matukio ambayo yanachangia kuharibu maadili na kujenga misingi potofu kwa watoto.

6.Kutokujiingiza kwenye mijadala ya masuala yenye viashiria vya kuvunja amani, kujenga na kuchochea chuki za aina yoyote, kuleta mtafaruku katika jamii na kuendeleza picha potofu kuhusu masuala au makundi mbalimbali.

7. Kutokuamini kila taarifa zinazosambazwa kwenye mitandao.

8. Kutokusambaza taarifa ambazo huna uhakika nazo.

9. Kutumia mitandao ya kijamii kwa uangalifu ili isije kukupa athari na mazoea ambayo ni vigumu kuyaacha.

10.10.2. Namna ya kutambua habari na taarifa za uongo na uzushi

Mitandao ya kijamii imejitokeza na kuendelea kuwa vyombo vya kusambaza habari na taarifa mbalimbali na kwa mifumo mbalimbali. Ili kupata habari na taarifa zilizo sahihi, watumiaji wa mitandao ya jamii wanapaswa kujilinda dhidi ya habari na taarifa za uongo na uzushi.

Watumiaji wanaotegemea mitandao kama vyanzo vya habari au taarifa wanaweza kutambua iwapo habari na taarifa hizi ni za uongo, uchochezi,uzushi au za kutusi watu wengine. Kuna namna za kugundua iwapo habari ni ya ukweli au la.

1. Kuwa na mashaka na vichwa vya habari vyenye mbwembwe: Habari nyingi za uongo zinakuwa na vichwa vya habari vilivyoandikwa kwa maneno na mpangilio unaoonyesha mbwembwe. Iwapo utaona kichwa cha habari chenye maneno ambayo kwa upesi unashuku ukweli wake, kuna uwezekano mkubwa kwamba habari hiyo sio ya kuaminika.

2. Angalia vizuri anwani ya tovuti inayotumika: Kila tovuti ina anwani inayotambulika kimataifa na inaanza na herufi 'www'. Angalia kwa makini anwani ya tovuti yenye habari. Iwapo habari iko kwenye anwani ya uongo au ambayo imeghushiwa ni dhahiri kwamba ni ya uongo. Mitandao mingi yenye habari za uongo inatumia anwani ambazo kwa haraka unaweza kudhania kwamba ni za mitandao ya habari inayoaminika. Ukiona hili, tembelea anwani ya uhakika na linganisha na ya mtandao wenye habari unayoishuku.

3. Chunguza chanzo cha habari: Hakikisha kwamba habari imeandikwa na mwandishi ambaye unamwamini kwamba ana sifa ya kuandika ukweli. Kama habari inatokana na taarifa za taasisi ambayo huifahamu, chukua hatua za kujiridhisha.

4. Angalia usanifu au mpangilio usio wa kawaida: Tovuti nyingi za kughushi zinakuwa na mpangilio wa maneno na usanifu usio wa kawaida. Kuwa macho ukiona hizi dalili.

5. Angalia picha vizuri: Mara nyingi habari za uongo zinakuwa na picha za kawaida na za video ambazo zimechakachuliwa. Inawezekana picha au video vikawa ni vya kweli lakini vikawekwa kwa mpangilio ambao unaleta maana tofauti na ile ya awali. Ukiona hili tafuta

chanzo cha picha ili kuhakikisha ilikotoka.

6. Kagua/chunguza tarehe: Habari za uongo zinaweza kuwa na tarehe ambazo hazina mantiki au hata tarehe ambazo zimebadilishwa.

7. Thibitisha vyanzo vya habari: Chunguza vyanzo vya mwandishi wa habari husika ili kuthibitisha uhakika.
Habari ambayo haina maelezo ya kuthibitisha uhalisia wake auinanukuu wahusika ambao hawatajwi ina kila dalili ya kuwa ni ya uongo.

8. Linganisha na taarifa za vyombo vingine: Iwapo hakuna chombo kingine chochote kinachotoa taarifa hiyo, ni dalili kwamba habari hiyo ni ya uongo. Habari inayoandikwa na vyombo vingi ina kila dalili ya kuwa ya kweli.

9. Je habari hiyo ni utani? Wakati mwingine inakuwa vigumu kutofautisha kati ya habari za uongo na utani, vichekesho au dhihaka. Thibitisha iwapo chanzo cha habari hiyo kinajulikana kwa vichekesho na iwapo habari yenyewe imeandikwa kwa namna ambayo inaonyesha kwamba suala linalozungumziwa ni la kufurahisha tu.

10. Habari nyingine zinakuwa za uongo makusudi: Soma habari kwa namna ambayo unaipima ukweli wake na usisambaze kwa wengine habari ambayo unatambua kuwa sio ya kuaminika.
Kwa pamoja, tunaweza kuondoa usambazaji wa habari za uongo.

10.11. Unaponunua televisheni/luninga au redio

Televisheni inatuwezesha kuona picha na kusikia sauti ya maudhui yanayorushwa kutoka kwenye vituo vya kurushia maudhui ya utangazaji (matangazo ya televisheni na redio). Ingawaje vifaa vingi vya mawasiliano hasa simu za kiganjani vina uwezo wa kupokea maudhui ya utangazaji, bado kuna wakati ambapo mtu anahitaji kuwa na televisheni au redio kama kifaa peke yake. Televisheni na redio vinaweza kutumika kwenye vyombo vya usafiri, majumbani na maeneo ya mikusanyiko ya jamii.
Ni vyema unaponunua vifaa hivi uhakikishe kwamba vinakidhi vigezo vifuatavyo:

1. Hakikisha kifaa chako unachonunua kinaweza kufanya kazi kwenye mazingira unayokusudia na kinakidhi mahitaji yako.

2. Hakikisha kiasi cha umeme kinachotumika kwenye kifaa husika kinaweza kutumika kwenye mifumo ya umeme kwenye eneo lako.

3. Hakikisha unapata risiti inayokutambulisha duka ulilonunulia.

4. Hakikisha umepewa waranti wa kifaa hicho ili kukulinda kwa kipindi kisichopungua miezi kumi na miwili (12) kwa tatizo lolote la kiutendaji na matatizo ya utengenezaji.

5. Televisheni na redio ni sehemu ya samani ya nyumba hivyo ni vyema viwe na muonekano mzuri.

6. Nunua televisheni au redio ambayo itaweza kukaa mahali unapotaka kuiweka bila usumbufu.

7. Televisheni iwe na ukubwa unaokuridhisha. Kama lengo ni kutazamwa na familia au kundi la watu, ni vyema iwe na ukubwa wa angalau 32 au zaidi.

10.12. Unapotumia televisheni/luninga au redio

Ili uweze kuona televisheni au kusikiliza redio, ni lazima kuwe na maudhui ambayo yameandaliwa, kutengenezwa na kurushwa na kituo husika. Ili kufaidi televisheni na redio yako kwa kuwa nautazamaji na usikilizaji unaokidhi mahitaji yako, zingatia yafuatayo:

1. Kuwa na ratiba ya wiki ya kituo cha televisheni unachokipenda.

2. Usiwabughudhi watu wengine kutokana na matumizi yako ya televisheni na redio. Kuwa na staha kwa kutokufungulia vyombo hivyo kwa sauti kubwa na muda ambao kwa kawaida unajulikana kama sio wa kistaarabu.

3. Iwapo unatazama televisheni pamoja na jamii ya watu wengine, ndugu, familia, wafanyakazi wenzako au jamaa na washirika wako, jitahidi kuelewa mahitaji ya watazamaji wenzako.

4. Ingawaje kuna kanuni za utangazaji zinazosimamia maudhui ya redio na televisheni yanayofaa kwa vipindi na makundi fulani, kuwa makini na hakikisha kwamba watoto hawaangalii vipindi

vyenye maudhui yanayofaa watu wazima tu.

5. Ukiona au kusikia maudhui yasiyofaa kwenye televisheni na redio toa taarifa Mamlaka ya Mawasiliano Tanzania.

10.13. Unaponunua na kutumia shitariki ya televisheni

Maudhui ya televisheni yanaweza kupatikana kwa kupitia ving'amuzi; ama moja kwa moja bila kulipia au kwa kulipia shitariki. Chini ya mfumo wa utangazaji wa televisheni wa kidijitali, maudhui ya moja kwa moja yanaweza kupatikana kupitia ving'amuzi ambavyo baadhi vinapatikana kama kifaa pekee na vingine vipo ndani ya televisheni zenyewe. Kuna ving'amuzi vyenye uwezo wa kurekodi maudhui na kuyaonyesha baadae. Kwa vyovyote vile, iwapo unatumia televisheni kwa utaratibu wa kulipia maudhui, inashauriwa kuzingatia yafuatayo:

1. Linganisha bei za vifurushi vinavyotolewa kutokana na mahitaji yako.

2. Ngazi za maudhui ili maudhui yasiyofaa kwa rika mbalimbali yasionekane wakati usiotakiwa.

3. Staha na faragha za watu wengine unapotazama au kusikiliza televisheni.

10.14. Unapochagua mtoa huduma za posta na usafirishaji vifurushi

Ingawaje maendeleo ya teknolojia yamepunguza utamaduni wa kuandika na kutuma barua za binafsi na idadi ya barua, kumekuwa na ongezeko la vifurushi ambavyo vinapitia posta au kwa watoa huduma wengine wenye leseni za kusafirisha vifurushi. Unapochagua mtoa huduma za kutuma na kupokea barua na vifurushi zingatia yafuayayo:

1. Tumia mtoa huduma mwenye ofisi au eneo la biashara ndani ya jengo lenye namba ya nyumba au alama ya kudumu ya utambulisho.

2. Tumia watoa huduma wenye leseni halali kutoka Mamlaka ya Mawasiliano Tanzania. Hii ni kwa ajili ya usalama wa barua/kifurushi chako na uhakika wa kushughulikiwa malalamiko yako na Mamlaka iwapo kutakuwa na tatizo.

3. Tumia mtoa huduma ambaye unaridhika na rekodi yake ya ufanisi na uaminifu.

10.15. Unapotuma na kupokea barua na vifurushi

Yafuatayo yanapendekezwa wakati wa kutuma au kupokea barua au vifurushi:

1. Weka bayana kwa mtoa huduma maelezo ya vitu vilivyomo ndani ya kifurushi husika.

2. Andika anwani inayoeleweka ya mpokeaji na mtumaji wa barua/kifurushi chako na pale ambapo postikodi na anwani ya makazi ipo ni vyema kuitumia kwa uhakika zaidi.

3. Iwapo unasafirisha kitu cha thamani, muombe mtoa huduma wako akupe ushauri kuhusu aina ya bima kwa kifurushi hicho na ukiwekee bima.

4. Unapopokea kifurushi, hakikisha kwamba unakifungua mbele ya mtoa huduma na kuhakiki vilivyomo mbele yake. Kama kuna upungufu, anzisha mchakato wa kulalamika.

5. Zingatia sheria za nchi kuhusu aina ya vitu vinavyoruhusiwa kutumwa kwa posta au kama vifurushi.

6. Hakikisha unapata risiti unapokabidhi kifurushi.

10.16. Unapotaka huduma za kiufundi kuhusiana na mawasiliano

Mamlaka ya Mawasiliano Tanzania inatoa leseni kwa makandarasi wanaoweka na kufunga mifumo na mitandao ya mawasiliano katika majengo na kwenye miundombinu mingine. Leseni zinazotolewa ni kwa ajili ya kuweka miundombinu ya mawasiliano, kutengeneza vifaa vya kielektroniki na kuweka mifumo inayotumia miundombinu ya mawasiliano. Unapohitaji huduma hizi hakikisha kwanza kwamba wana leseni halali kutoka TCRA. Mafundi hufanyiwa uhakiki na Mamlaka kuhusu weledi wao katika kutekeleza majukumu yao na iwapo patatokea tatizo,Mamlaka huingilia kati kutatua migogoro kati ya mtoa huduma na anayepokea huduma husika.

11.0. Mambo ya jumla kuhusu vifaa vya mawasiliano na elektroniki

Vifaa vya mawasiliano na vya kielektroniki vimetengenezwa kwa kuzingatia viwango vilivyoidhinishwa kimataifa kuhusiana na usalama wa afya za watumiaji. Vifaa hivi ni pamoja na simu za mkononi na mezani,betri za simu, makasha ya kuhifadhia simu, televisheni, redio, ving'amuzi, antena, nyungo za satelaiti, vifaa vya mawasiliano ya intaneti (mfano modems na routers), kompyuta na kompyuta mpakato, kompyuta ndogo za kiganjani na waya. Kama tunavyofahamu, kila kifaa kina mwisho wa matumizi yake - ama kwa kuharibika kwa namna ambayo havitengenezeki, kuchakaa au kupitwa na wakati. Hali hii ikitokea, inashauriwa kwamba mtumiaji avihihifadhi vifaa visivyotumika na avitupe. kwa utaratibu ambao umeainishwa na kuendelea kutolewa na vyombo husika vinavyosimamia mazingira na utupaji wa bidhaa za elektroniki.

12.0. Malalamiko

Mojawapo kati ya haki na wajibu wa watumiaji wa huduma na bidhaa za mawasiliano ni kulalamika. Mtumiaji ambaye hakuridhika na huduma au bidhaa au ambaye amegundua kasoro katika matumizi anatakiwa kulalamika ili suala husika lifanyiwe kazi na kupatiwa ufumbuzi au mlalamikaji apatiwe maelezo yatakayomwezesha kuelewa zaidi huduma au bidhaa husika.

12.1 Maana ya malalamiko

Malalamiko ni hoja ambazo zinawasilishwa na mhusika kwenye ngazi stahiki kutokana na ama kasoro au kutokukamilika kwa huduma au bidhaa husika alivyotarajia. Kulalamika ni tofauti na kunung'unika; ambako ni hali ya kutokuridhishwa na jambo na kutoa maelezo yako kwa asiyehusika, au kuanza kulisema bila ya kuchukua hatua. Unatakiwa kulalamika badala ya kunung'unika ili kutokuridhika kwako kumfikie mtoa huduma wako wa huduma husika.

Kulalamika kunaonyesha umakini wa mtumiaji na wala kusichukuliwe kama vile kunaonyesha upungufu au kutokufahamu wa upande wa mtumiaji. Tusione aibu kulalamika.

12.2. Aina ya malalamiko

Jambo lolote ambalo linaonyesha kasoro katika utoaji wa huduma au bidhaa husika linaweza kulalamikiwa. Masuala yenye sura ya jinai hushughulikiwa na Jeshi la Polisi na masuala ya miamala ya kifedha hushughulikiwa na Benki Kuu ya Tanzania (BoT). Pamoja na hayo watumiaji wanaokumbana na kasoro kwenye matumizi wanatakiwa kulalamika au kutoa taarifa ili waweze kupata maelekezo sahihi.

12.3. Utaratibu na hatua za kuwasilisha malalamiko

Sheria iliyoanzisha Mamlaka ya Mawasiliano Tanzania na Kanuni za Kumlinda Mtumiaji vimeainisha utaratibu wa kuwasilisha malalamiko. Utaratibu huu una hatua nne ambazo ni kuwasilisha malalamiko kwa mtoa huduma, kuwasilisha malalamiko kitengo cha malalamiko TCRA, kukata rufaa kwa Kamati ya Malalamiko iwapo kitengo hakikupata suluhu na kukata rufaa kwa Tume ya Ushindani wa Haki iwapo upande wowote haujaridhika na maamuzi yaliyotolewa na Kamati ya Malalamiko.

12.3.1. Kuwasilisha Malalamiko kwa Mtoa Huduma

Hii ni hatua ya kwanza na ya muhimu kwenye mtiririko wa kuwasilisha malalamiko. Mlalamikaji anatakiwa kutoa taarifa kwa mtoa huduma wake
na kuweka kumbukumbu ya malalamiko yake kwa maandishi. Inashauriwa kwamba iwapo baada ya siku 30 Mlalamikaji hajajibiwa au hajaridhika na majibu ya Mtoa huduma, anatakiwa kuwasilisha rufaa ya malalamiko yake TCRA.

12.3.2. Kuwasilisha malalamiko TCRA

Mlalamikaji anapowasilisha malalamiko TCRA anatakiwa kuambatanisha nakala ya mawasiliano ya barua au baruapepe kati yake na mtoa huduma wake pamoja na vielelezo vingine vyovyote vinavyohusu shauri husika. Malalamiko yanaweza kuwasilishwa kwa barua, kwa barua pepe, au kwa kufika kwenye ofisi za TCRA, makao makuu Dar Es Salaam, ofisi ya Zanzibar na kwenye ofisi za kanda ambazo ziko Arusha, Mbeya, Dodoma, Mwanza na Dar es Salaam.

Baada ya kupokea malalamiko kitengo cha kushughulikia malalamiko cha Mamlaka kitafuatilia kwa mtoa huduma na kumjulisha mlalamikaji kila hatua. Mamlaka itawakutanisha mlalamikaji na mtoa huduma kutafuta suluhu na suluhu ikishindikana mlalamikaji atajaza fomu ya malalamiko ili suala lake lisikilizwe na Kamati ya Malalamiko.

12.3.3. Kusikilizwa kwa shauri na Kamati ya Malalamiko

Kamati ya Malalamiko imeundwa kutokana na kifungu cha 20 (1) cha sheria iliyounda Mamlaka
ya Mawasiliano Tanzania ya mwaka 2003 ambacho kinatoa fursa ya kuundwa kwa kamati ndani ya Mamlaka kusimamia masuala

mbalimbali. Baada ya kupokea malalamiko Kamati itaita pande zote na kuzisikiliza na itatoa uamuzi ndani ya siku 30 hadi 60. Upande ambao hauridhiki na uamuzi wa Kamati unaweza kukata rufaa kwenye Baraza la Uamuzi wa Haki (Fair Competition Tribunal–FCT).
Utaratibu unataka Mamlaka ijulishwe juu ya uamuzi wa kukata rufaa.
Malalamiko yanayohusiana na maudhui ya utangazaji yatasikilizwa na Kamati ya Maudhui.

12.3.4. Kukata Rufaa Baraza la Uamuzi wa Haki (FCT)

Upande ambao haukuridhika na uamuzi wa Kamati ya Malalamiko au Kamati ya Maudhui unaweza kukata rufaa kwenye Baraza La Uamuzi Wa Haki (Fair Competition Tribunal - FCT) ndani ya siku 21 baadaya kupokea uamuzi wa Kamati. Baraza litafanya utaratibu wa kusikiliza shauri na kulifanyia maamuzi. Ifahamike kuwa FCT ni chombo kilicho nje ya mfumo wa sekta ya mawasiliano na hivyo watatoa utaratibu wao kwa wahusika.

12.4. Kamati ya Maudhui

Kamati ya Maudhui imeundwa chini ya kifungu 26 (I) cha Sheria ya Mamlaka ya Mawasiliano Tanzania ya 2003. Kamati hii huteuliwa na Waziri mwenye dhamana ya mambo ya utangazaji. Kamati hii inasikiliza malalamiko yanayohusiana na maudhui ya utangazaji.
Pamoja na utaratibu huu, malalamiko yanayohusiana na maudhui pia yanafuata hatua nne zilizoainishwa hapo juu.

12.5. Shufaa nyingine kwa Mlalamikaji

Pamoja na utaratibu wa kuwasilisha malalamiko kuhusiana na huduma na bidhaa za mawasiliano, watumiaji/walaji wana haki nyingine za kuwasilisha malalamiko yao kwenye vyombo vingine vya kutoa haki baada ya kukamilika kwa utaratibu wa kulalamika pale ambapo suala litakalolalamikiwa halihusu huduma au bidhaa za mawasiliano.

13.0. Sheria na Kanuni

13.1 Sheria na Kanuni zinazomlinda mtumiaji

Masuala ya watumiaji yamewekwa bayana kwenye sheria mama na kanuni mbalimbali ambazo ni:

1. Sheria ya Mamlaka ya Mawasiliano Tanzania ya 2003.44 Sheria hii imefafanua majukumu na kazi za TCRA kuhusiana na watumiaji. Aidha kifungu cha 20 kimeweka utaratibu wa kuanzisha Kamati ya Malalamiko na kifungu 40 kinaweka utaratibu wa kuwasilisha malalamiko na kifungu kidogo cha saba (7) kinaelezea kuwepo, ndani ya TCRA, kwa kitengo maalum cha kushughulikia malalamiko.

2. Sheria ya Mawasiliano ya Kielektroniki na Posta (EPOCA). Sheria hii inaelezea haki na wajibu wa watumiaji katika masuala mbalimbali kuhusiana na umilki na matumizi ya vifaa na huduma za mawasiliano. Aidha kifungu cha 98 na 99 kimeweka utaratibu wa kulinda faragha za watumiaji.

3. Sheria ya Makosa ya Mtandao ya 2015 ina vifungu 59 ambavyo kati yake vifungu 19 vya sheria hiyo vinahusu namna ambavyo mtumiaji analindwa.

4. Kanuni za EPOCA za kumlinda mtumiaji.

5. Kanuni za Maudhui.

6. Kanuni za EPOCA za Leseni.

7. Kanuni za EPOCA za Ubora wa huduma.

8. Kanuni za EPOCA za Huduma za ziada.

9. Kanuni ndogo za kusimamia matumizi ya huduma na bidhaa za mawasiliano kwa watumiaji wenye ulemavu.

13.2. Makosa na Adhabu

Pamoja na sheria kumlinda mtumiaji, pia zinatoa adhabu kwa makosa yanayotokana na matumizi mabaya ya huduma na bidhaa za mawasiliano. Matumizi mabaya ni pamoja na wizi na utapeli, vitisho na unyanyasaji na kutumia huduma kinyume cha sheria.

Baadhi ya makosa na adhabu zake kama zilivyo kwenye Sheria ni pamoja na kifungo jela, faini au vyote kwa matumizi ya laini ya simu bila kuisajili, kutoa taarifa za uongo wakati wa kusajili laini, kuruhusu laini itumike bila kusajiliwa, kutokutoa taarifa za kupotea au kuibiwa kwa simu au laini ya simu na kutumia simu na laini ya simu ambavyo vimeibiwa.

Sheria pia imeweka adhabu kwa wanaochakachua simu ili kuzibadili uhalisi wake; wanaofungulia simu zilizofungwa chini ya utaratibu wa Rajisi Kuu ya Namba Tambulishi na wanaotuma ujumbe wa vitisho, kunyanyasa, kunyanyapaa na kuudhi.

14.0. Masuala mtambuka yanayomhusu mtumiaji

Ili kuendelea kumlinda mtumiaji wa huduma za mawasiliano, Serikali kupitia TCRA inatekeleza mambo mtambuka ambayo ni pamoja na kitengo cha kitaifa cha kushughulikia masuala ya usalama wa mitandao, mfumo wa anwani mpya za kitaifa na postikodi, mfumo wa rajisi kuu ya namba tambulishi na huduma ya kuhamia mtandao mwingine wa simu bila kubadili namba ya simu ya kiganjani.

14.1. Kitengo cha dharura cha kitaifa cha kushughulikia masuala ya usalama wa mitandao (Tanzania Computer Emergency Response Team - TZ-CERT.

Kitengo hiki ni timu yenye jukumu la kitaifa katika kuratibu matukio ya usalama katika mitandao na pia kushirikiana na vyombo vingine vya kikanda na kimataifa katika kusimamia matukio ya usalama mitandaoni. TZ-CERT inatoa huduma zifuatazo:
1. Kushughulikia matukio ya kiusalama yaliyotokea na kuzuia madhara zaidi.
2. Uchambuzi wa taarifa kutoka vyanzo mbalimbali.
3. Kutoa taarifa kwa umma na wadau kwa maeneo ambayo yameonekana kuwa na udhaifu.

14.2. Mfumo wa anwani mpya za kitaifa na postikodi

Tanzania imeanzisha mfumo wa anwani mpya za kitaifa na postikodi ambao ni mfumo maalum wa alama, tarakimu na herufi inayotambulisha eneo au mahali mtu anapoishi au kufanyia shughuli zake. Kama sehemu ya utekelezaji wa mfumo huu, makazi ya watu yanapewa namba ili kutambulika na kufikiwa kwa urahisi.

Baadhi ya faida za mfumo huu ni:

1. Kurahisisha kufikiwa kwa maeneo mengi kwa ajili ya huduma mbalimbali.

2. Kuwezesha kupanga na kusimamia mipango mahsusi ya kutoa huduma kwa wananchi.

3. Kurahisisha utoaji wa huduma za dharura kama vile uokoaji na kukabiliana na maafa.

4. Kuongeza ufanisi katika usimamizi wa makazi ya watu.

5. Kurahisisha mawasiliano kati ya Serikali na wananchi kwa makusudi mbali mbali.

6. Kuimarisha utawala bora.

Katika mfumo huu, Tanzania imegawanywa katika zoni au kanda saba na kila moja ina namba yake. Anwani chini ya mfumo huu zinakuwa na namba tano ambazo ni ya kanda, ya mkoa, ya wilaya na ya Kata/ Kijiji/Mtaa.

Mfano

Na. 20 Barabara ya Sam Nujoma
SLP 474
14414
Dar es Salaam

Namba 14414 inaonyesha kanda, mkoa, wilaya na kata yalipo makao makuu ya TCRA mjini Dar es Salaam.

Orodha kamili ya postikodi kwa Tanzania nzima inapatikana katika tovuti ya TCRA- www.tcra.go.tz.

14.3. Mfumo wa Rajisi Kuu ya Namba Tambulishi

1. Ni mfumo wa kielektroniki unaohifadhi kumbukumbu za namba tambulishi za vifaa vya mawasiliano vya mkononi.

2. Lengo ni kufuatilia namba tambulishi za vifaa vinavyoibiwa, kuharibika, kupotea au ambavyo havikidhi viwango vya matumizi katika soko la mawasiliano.

3. Mfumo huu unafanya kazi kwa watoa huduma wote wa mawasiliano ya simu za mkononi nchini.

Faida za Mfumo huu:
1. Kuwezesha kuwa na taarifa sahihi za watumiaji wa simu za mkononi nchini.

2. Kufanikisha upelelezi wa matukio ya uhalifu.

3. Kudhibiti ubora wa simu za mkononi na vifaa vingine vya Mawasiliano vinavyoingia nchini ili kulinda afya za wananchi na kuimarisha uchumi.

4. Kudhibiti wizi wa simu za mkononi. Mtumiaji akipoteza au kuibiwa simu yake na kutoa taarifa kwa mtoa huduma simu itafungiwa isitumike kwenye mtandao wowote.

Iwapo mtumiaji atapoteza au kuibiwa simu anatakiwa kutoa taarifa Polisi na kupata nyaraka ambazo atatakiwa kwenda nazo kwa mtoa huduma wake. Hizi ni pamoja na taarifa ya kupotelewa kitu (Loss Report au taarifa ya uchunguzi wa awali (Preliminary Investigation Report). Mtoa huduma ataifungia simu iliyoibiwa isiweze kutumika kisha ataiarifu TCRA ili simu ifungiwe kwenye mitandao mingine.

Kila simu halisi ya kiganjani ina namba ya pekee ya utambulisho. Hii inaitwa IMEI ambacho ni kifupisho cha maneno ya kiingereza - International Mobile Equipment Identity. Namba hii haifanani na nyingine duniani kote.

Kila mtumiaji wa simu anatakiwa kuthibitisha ubora wa simu yake kwa njia zifuatazo:
(i) Ili kupata IMEI abonyeze *#06#.
(ii) Kuingia tovuti ya Mamlaka ya Mawasiliano (http://www.tcra.go.tz/index.php/imei-code-verification) na

kufuata maelekezo.

(ii) Kutuma ujumbe kwenda namba maalum 15090 (bure) ambayo imeunganishwa na mitandao yote ya simu za kiganjani nchini.

Kila mtoa huduma ya mawasiliano ya simu za mkononi atazitambua namba tambulishi za vifaa vya mawasiliano ya mkononi kwenye mtandao wake. Namba tambulishi za vifaa vilivyopotea, kuharibika au kuibiwa na ambavyo vimetolewa taarifa kwa mitandao husika vitafungiwa visiweze kutumika kwenye mtandao wowote wa simu za mkononi nchini.

14.4. Huduma ya kuhamia mtandao mwingine wa simu bila kubadili namba ya simu ya kiganjani

Huduma ya kuhamia mtandao mwingine bila kubadili namba ya simu ya kiganjani au MNP, ambacho ni kifupisho cha Mobile Number Portability, ina maana kuwa mtumiaji anabaki na namba yake ya awali iwapo ataamua kuhamia mtandao mwingine wa simu za kiganjani nchini Tanzania. Kimsingi, ni huduma ambayo inakuwezesha kubakia na namba yako bila kujali unatumia mtandao gani. Hivyo, iwapo utabadilisha mtoa huduma wa simu za kiganjani hutakuwa na haja ya kusumbuka kuwataarifu watu wako wa karibu – marafiki, familia na wafanyakazi wenzako au washirika wako kwamba umebadilisha namba kwani inabakia ileile.

Faida za huduma hii kwa mtumiaji ni kama ifuatavyo:

1. Ataendelea kutumia namba yake ya awali anapohama kutoka mtoa huduma mmoja kwenda mwingine na hivyo kufurahia uhuru na utulivu katika matumizi.

2. Atapokea simu na meseji bila kujali ni mtandao upi amehamia na bila kuwa na haja ya kuwataarifu marafiki, familia na wafanyakazi wenzake au washiriki wake kwamba amebadilisha mtoa huduma wake.

3. Ataokoa fedha kwa kuwa hatakuwa na haja ya kununua laini mpya kwa kila mtoa huduma au kuwa na simu ya kiganjani zaidi ya moja.

4. Ataweza kuchagua mtoa huduma ambaye anaona anatoa huduma bora zaidi, anakidhi matarajio yake na ana ubunifu katika kutoa huduma.

15. Hitimisho

Mwongozo huu ni kwa watumiaji wa huduma na bidhaa za mawasiliano. Wajibu mmojawapo wa watumiaji wa huduma ni kuunga mkono usimamizi; ambao kwa sekta ya mawasiliano hapa Tanzania unafanywa na TCRA. Mamlaka imetoa Mwongozo huu kama sehemu ya utekelezaji wa majukumu ya Mamlaka katika kutoa elimu kwa watumiaji wa huduma na bidhaa za mawasiliano kwa wakati huu.

Sekta ya mawasiliano inakua na kubadilika; ikiwa ni pamoja na kuongezeka kwa huduma na bidhaa na kwa mantiki hiyo pia watoa huduma na watumiaji na kutokuwepo kwa baadhi ya huduma na bidhaa. Kasi ya kukua na kubadilika kwa tekinolojia ya mawasiliano ni kubwa; na msimamizi, mtoa huduma na mtumiaji hawana budi kuendana nayo. Huduma na bidhaa zilizotolewa maelekezo ya matumizi katika Mwongozo huu zinabadilika.

Hivi sasa, tekinolojia inaelekea kwenye matumizi makubwa ya mtandao wa intaneti kwa shughuli nyingi za kibinafsi na kitaasisi. Kupitia intaneti, watu na taasisi wanaweza kuwasiliana na vifaa vya mawasiliano nakuvipa vyombo hivyo maelekezo ya kitu cha kufanya. Miaka michache ijayo kutakuwa na ongezeko la mitandao ya vyombo vinayowasiliana baina yao moja kwa moja kupitia intaneti. Hali hii italeta fursa na changamoto nyingi kwa watumiaji na watoa huduma. Kutakuwa na fursa za kiuchumi na kuongezeka kwa ufanisi.

Baadhi ya changamoto zitatokana na fursa zenyewe, matumizi ya huduma na bidhaa hizi na upeo wa uelewa wa jamii. Katika hali hii, kutakuwa na umuhimu wa kutoa elimu ya ziada kwa wadau.

Masuala yaliyozungumziwa kwenye Mwongozo huu yameelezewa kwa kirefu kwenye maandishi mbalimbali ambayo TCRA inayatumia kama sehemu ya kutoa elimu kwa umma na kwa watumiaji. Aidha machapisho yanayofafanua kwa undani vipengele vyote kwenye Mwongozo huu yanapatikana makao makuu ya Mamlaka Dar es Salaam, Ofisi ya Zanzibar, ofisi za Kanda na pia kwenye tovuti ya TCRA ambayo ni

Mwongozo huu utapitiwa mara kwa mara ili uweze kukidhi matarajio ya watumiaji na matakwa ya usimamizi kwa wakati husika.

Enabling the Positive Use of Artificial Intelligence for All

ITU Secretary-General's Call for Action

The theme for WTISD-18 (17 May 2018), "Enabling the positive use of Artificial Intelligence for all", focuses on the potential of Artificial Intelligence (AI) to accelerate the United Nations' Sustainable Development Goals (SDGs).

In recent years there has been significant progress in AI technology, made possible by tremendous advances in contributing fields, such as Big Data, machine learning, computing power, storage capacity and cloud computing, among others.

AI-based technologies are already emerging as a key component of proactive tools and applications being used to help people lead better lives by improving healthcare, education, finance, agriculture, transportation, and a wide range of other services.
The 2018 theme will allow ITU Membership and other key stakeholders to focus on the opportunities for how AI can help accelerate the achievement of the SDGs by 2030.

About the World Telecommunication and Information Society Day

The purpose of WTISD is to help raise awareness of the possibilities that the use of the Internet and other information and communication technologies (ICT) can bring to societies and economies, as well as of ways to bridge the digital divide.
17 May marks the anniversary of the signing of the first International Telegraph Convention and the creation of the International Telecommunication Union.

World Telecommunication Day

World Telecommunication Day has been celebrated annually on 17 May since 1969, marking the founding of ITU and the signing of the first International Telegraph Convention in 1865. It was instituted by the Plenipotentiary Conference in Malaga-Torremolinos in 1973.

World Information Society Day

In November 2005, the World Summit on the Information Society called upon the UN General Assembly to declare 17 May as World Information Society Day to focus on the importance of ICT and the wide range of issues related to the Information Society raised by WSIS. The General Assembly adopted a resolution (A/RES/60/252) in March 2006 stipulating that World Information Society Day shall be celebrated every year on 17 May.

World Telecommunication and Information Society Day

In November 2006, the ITU Plenipotentiary Conference in Antalya, Turkey, decided to celebrate both events on 17 May as World Telecommunication and Information Society Day.

The updated Resolution 68 invites Member States and Sector Members to celebrate the day annually by organizing appropriate national programmes with a view to:
• Stimulating reflection and exchanges of ideas on the theme adopted by the Council.
• Debating the various aspects of the theme with all partners in society.
• Formulating a report reflecting national discussions on the issues underlying the theme, to be fed back to ITU and the rest of its membership.


INTERNATIONAL EVENTS CALENDAR, 2018

APR 26

International Girls in ICT Day. The event is celebrated every fourth Thursday In April as one of the efforts to encourage girls and young women to pursue studies in science, technology,engineering and mathematics (STEM). The International Telecommunication Union (ITU) encourages ICT stakeholders to organize events involving girls and young women around the theme *'Expanding horizons, changing attitudes'.*

MAY 17

World Information Society Day. The event aims at raising awareness on ICTs. Previously it was celebrated as World Telecommunication Day. May 17 commemorates the founding of ITU in 1865. Tanzania has been celebrating the day through focussed public education campaigns including seminars, the airing of radio and television programmes and the publication of special supplements in newspapers.

SEPT 10-13
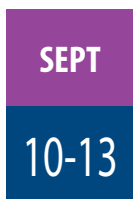
ITU Telecom World 2018, Durban South Africa. The event will feature an exhibition of ICT products and services and a forum in which experts from Governments, businesses and international organizations will debate policies, strategies, business models and technologies shaping the industry. The theme is: better, sooner; underlining speedier innovations to bridge differences in access and to improve lives.

OCT 9

World Postal Day. It marks the creation of the Universal Postal Union in 1874. Governments, postal services providers and regulators organize activities to raise public awareness to the role of the Post in social and economic development. UPU has organized an international letter writing competition for young people in which they are required to think of a message likely to be conveyed by a letter travelling through time.

OCT 29 to NOV 16

ITU Plenipotentiary Conference, PP 18, Dubai, UAE. The Plenipotentiary conference is ITU's top policy-making body. It meets every four years. The last PP conference was held in Busan, Korea in which Tanzania was elected member of the 48-member ITU Governing Council; the governing body between PP conferences. Africa has 13 seats in the Council. Tanzania is seeking re-election.

DEC 17
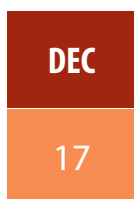
African Telecommunications and ICT Day. It marks the founding of the African Telecommunications Union (ATU) in 1977 as a specialised agency of the African Union for ICTs. Two reports released in 2017 by ITU and the UN Broadband Commission show the widening of the gap between the Continent and the rest of the world in access and use of the internet.

ICT for Tanzania's Industrialization Agenda

World Telecommunication and Information Society Day (WTISD) is commemorated on 17th May every year. The main objective of the day is to raise global awareness on societal changes brought about by the internet and new technologies. It also aims to help reduce the digital divide, which refers to the gap between demographics, and regions that have access to modern information and communications technology, and those that do not or have restricted access. *TCRA Director General, Eng. James Kilaba discusses the relevance of the World Telecommunication and Information Society Day (WTISD) to Tanzania's current development agenda.*

Could you please explain the theme of this year's WTISD?

The theme of WTISD-2018 is "Enabling the positive use of Artificial Intelligence for All". It focusses on the potential of Artificial Intelligence (AI) to accelerate the United Nation's Sustainable Development Goals (SDGs). The theme allows ITU Members including Tanzania and other key stakeholders to focus on the opportunities for how AI can help to accelerate achievement of the SDGs by 2030.

In recent years there has been significant progress in AI technology, made possible by tremendous advances in contributing fields such as big data, machine learning, computing power, storage capacity and cloud computing, among others. AI-based technologies are already emerging as a key component of proactive tools and applications being used to help people lead better lives by improving healthcare.

What is Artificial Intelligence?

Artificial intelligence is an area of computer science that emphasizes the creation of intelligent machines that work and reacts like humans. Some of the activities computers with artificial intelligence are designed for include reasoning, knowledge, perception, speech recognition, learning, planning, problem solving and ability to manipulate and move objects. Knowledge engineering, machine learning and robotics are also a core part of AI.

Is AI viable in developing countries like Tanzania?

There is no doubt that Artificial Intelligence can sound as something new in developing countries like Tanzania. It is viable if we look at it in a positive manner; through its capability to augment human capacity by processing and analysing large data much faster than humans. It can be used to process and analyse information in different sectors such as health, agriculture, finance, wildlife protection, telecommunication and transport; and come up with solutions to problems, which can lead to efficient use of resources and support the delivery of SDG's.

AI is capable of increasing the yield of farmland in developing countries like ours, with machine learning algorithms used in drone technology to both plant and fertilize seeds at a speed beyond human abilities. Another application of AI for food management in developing economies is the identification of crop diseases so they can be more easily treated. For example with AI a network of computers can be fed with photos of both healthy and unhealthy plants in an attempt to recognize specific plant diseases.

In our country we have started using drones in farming, land survey, drug delivery and other activities which need aerial pictorial or surveys. Since September 2016, Tanzania has deployed drones for land mapping in rural areas in order to stop frequent clashes between farmers and cattle herders over land and scarce water resources. These are some of the initial stages in the use of AI.

AI can also play a great role in resource provision, healthcare and other areas which touch human life in order to bring positive impact to communities. It can be used to help conserve our national parks and game reserves to control poaching and other conservation activities.

How are you prepared to implement the theme of WTISD 2018 - Enabling the positive use of Artificial Intelligence for All?

TCRA agrees that we cannot evade developments in technology. Initiatives have therefore started, by working with other national and international stakeholders to come up with practical applications of AI and develop strategies that will ensure trusted, safe and inclusive development of AI technologies and equitable access to their benefits.

This involves having appropriate strategies, regulations, guidelines and policies in place to support AI in the country. As AI also uses cloud infrastructure with the help of internet of things (IoT), TCRA has already issued a public consultation document on the proposed numbering plan for machine-to-machine communication (M2M) and IoT applications.

In April 2018, TCRA and the Universal Communication Services Access Fund (UCSAF) hosted ITU meeting on Green Standards Week in Zanzibar and one full day forum on AI and IoT in the development of Smart Sustainable Cities and Communities was held among other activities in the whole week, but mainly focussing on emerging technologies.

What could be the setbacks to the realization of the SDG plan by 2030 and what is your plan to overcome them?

While they are critical for achieving sustainable development, operationalizing the 17 Goals presents considerable challenges to many countries and organizations.
TCRA has incorporated SDGs in the current strategic plan 2016/17 – 2020/21 which includes good health and well-being, quality education, decent work and economic growth, industry innovation and infrastructure, sustainable cities and communities; and life on land.

We have also started engaging the public through consultation on the numbering plan for M2M and IoT which we believe is a good start in moving to AI. Preparing data and indicators; and establishing processes and structures to measure SDG progress is also key. TCRA through its quality management system monitors the performance of its activities including the SDGs mentioned above.

Where can we see ourselves in 10 years with Artificial Intelligence?

The digital transformation of Government; which is a major employer in our country is already on-going; with a widening scope for e-governance that increases transparency, simplifies and streamlines regulations and facilitates reporting, registration, licensing and filing. Once governance becomes digitally mature, productivity and efficiency will increase.
After 10 years with Artificial Intelligence we see ourselves in the changing environment in all the development sectors.

We foresee rapid structural change that transfers AI in agricultural activities; which will in turn increase yields and hence result lead to a boost in productivity. Modernizing agriculture, which is the backbone of our country's economy, and developing agro industries with supporting physical, financial, extension, and research infrastructures might offer better growth prospects.

Manufacturing will remain a driver of growth for our country and because of advances in technology; manufacturing can potentially deliver large gains in productivity. This is now evident with the Government's current industrialisation strategies. Industrialisation will ultimately strengthen our economy.

With AI we foresee improvement in the health and education sector. Artificial intelligence is coming to our cities, roads, and homes. It will open opportunities to improve human welfare and quality of life. AI can deliver medical diagnosis at a fraction of the cost of traditional methods, bringing advanced health care to developing countries and remote communities.

It will begin with personal assistants guiding our online and offline experiences. It will offer us more satisfying jobs and free us from monotonous tasks, allowing us to focus on the creative and social tasks that AI is incapable of.

What is the Relationship between TCRA and the International Telecommunication Union (ITU)?

TCRA, among other things, is responsible for enhancing the welfare of Tanzanians through promotion of effective competition and economic efficiency, protecting the interests of consumers and promoting the availability of regulated services in the country. TCRA is also responsible for managing the country's telecommunication numbering and frequency spectrum resources, which are scarce resources.
The functions of the Authority are to issue, renew and cancel licenses, to establish standards for regulated goods and services, establish standards for the terms and conditions of supply of the regulated goods and services, regulate rates and charges, monitor the performance of the regulated sectors in relation to levels of investment, availability of communication services, quality and standards of services, the cost of services and the efficiency of production and distribution of services. It also facilitates the resolutions of complaints and disputes between operators, operators and consumers and to disseminate information about matters relevant to the functions of the Authority.

The International Telecommunication Union is a specialized agency of the United Nations (UN) whose purpose is to coordinate telecommunication/ICT operations and services throughout the world.

The ITU sets and publishes regulations and standards relevant to electronic communication and broadcasting technologies of all kinds including radio, television, satellite, telephone and the internet. It also conducts study groups meetings and other meetings to address current and future issues and to resolve disputes and helping countries to establish and develop telecommunication systems of their own.

What does Tanzania benefit from this membership?

Tanzania has benefited a lot since joining ITU, and participating in its activities. It has benefited from unique capacity to bring together representatives from competing companies and governments of all ideological persuasions, share wealth of experience and creative ideas and to establish partnerships between private and public sectors. It has enabled us to access the ITU vast range of publications as well as restricted documentation/information and statistics.

Apart from these general benefits, Tanzania has benefited a lot in different areas. Tanzania has been able to manage scarce resources with increased demand like the radio-frequency spectrum. This has enabled the introduction of a number of different services such as fixed and mobile telephony, broadcasting and other communications services.

Tanzania has successfully migrated from analogue to digital broadcasting; which has also released frequencies (digital dividend band II) which will be utilized for other services like broadband, and thus increase the deployment of more services within the country.

Tanzania established her network information centre (tzNIC) – the omain names administrator - as a result of Tunis WSIS, 2005 declarations.

We have also established the National Computer Emergency Response Team (TZ- CERT) with the responsibility of coordinating responses to cyber security incidents at the national level. It cooperates with regional and international entities involved in the management of cyber security incidents.

The country has benefited from the ITU recommendations on standards which act as defining elements in the global infrastructure of ICTs.

Tanzania has also been able to benefit by establishing policies, regulations and guidelines that are suitable for the country and thus led to the promotion of efficient,

reliable and affordable communications infrastructure and applications. This has also contributed to the growth of ICT services in the country.

How far has Tanzania gone to bridge the digital divide?

The focus of much of telecommunications activities worldwide is to harmonize national policies, bridge technological differences, foster interconnectivity and interoperability of systems on a global scale. The result is to bring the world closer - through a phone call, via an email, by watching television, listening to the radio or surfing the web.

One of the key objectives of the World Telecommunications Day is to increase global awareness of the advantages that information and communications technologies have to offer and increase access to ICTs for a greater percentage of the population, especially the lower income groups in developing countries.

The number of licensed operators under the converged licencing framework (CLF) in the respective segments by March 2018 was: 14 Network facilities, 22 Network services, 14 Application service and 154 Content Service Licensees.

There were 40,251,356 mobile, and 126,087 fixed telephony, subscription, and 22,995,109 internet users. Mobile network coverage in the country is 95 per cent, and internet penetration of 45 per cent.

The landing of two international submarine cables - SEACOM and EASSY have the potential to transform Tanzania into a hub of communications in the Eastern and Southern Africa region. Our geographical position and the link of the cables to the national ICT backbone have made our country a transit point for terrestrial communications traffic from our nine neighbours.

What message do you want to share to Tanzanians on WTISD?

TCRA's message to Tanzanians is that we cannot run away from technological development. We have to embrace them for our social economic development. As we celebrate this day with other countries we would like us to see the positive side of ICT's in our lives.

TCRA will continue to ensure that there are appropriate instruments to ensure the growth of ICT in the country and that Tanzanians are able to enjoy its benefits.

TCRA Director General, Eng. James Kilaba hands over an application services license to an operator; witnessed by the Authority's Ms. Fortunata Mdachi and Eng. Felician Mwesiga

The national ICT broadband backbone network and submarine cables

Tanzania Hosts Internation

The fourth industrial revolution was theme of an international, four-day high level experts forum in Zanzibar in April this year.

Participants discussed the importance of and opportunities for using information and communication technologies (ICTs) to protect the environment, unlock the potential of circular economy and expedite the transition to smart sustainable cities. The meeting was the 8th edition of the Green Standards week, adopted by the International Telecommunications Union (ITU) to discuss current ICT trends. It was opened by the Minister for Works, Transport and Communications; Professor Makame Mbarawa.

It was organized by ITU, UN Habitat, United Nations University (UNU), United Nations Industrial Development Organization (UNIDO), Basel Convention and UN Environment and hosted by TCRA and the Universal Communications Service Access Fund (UCSAF).

The Green Standards Week acts as a global platform for discussion and knowledge-sharing in order to raise awareness of the importance of and opportunities for using information and communication technologies (ICTs) to protect the environment, unlock the potential of circular economy and expedite the transition to smart sustainable cities. The Green Standards Week brings together leading specialists in the field, from top policy-makers to engineers, designers, smart city planners, government officials, regulators, standards experts, academia and others. Discussions were held in English, French and Arabic.

This year's theme was "Linking circular economy and industry 4.0".

The programme included an ITU Symposium on ICT, Environment and Climate Change; meeting of the ITU-T Study Group 5 Regional Group for Africa (SG5RG-AFR), Study Group 20 Regional Group for Africa (SG20RG-AFR) and a forum and training around the safety of electromagnetic frequencies; and on e-waste.

There was a forum on Artificial Intelligence and Internet of Things in the development of Smart Sustainable Cities.

Permanent Secretary, Ministry of Works, Transport and Communications; Dr. Maria Sasabo (right) with the ITU Area Manager for Southern Africa, Anne Rita at the forum.

TCRA Board members, Dr. Mzee Suleiman Mndewa and Prof. Justinian Anatory from the University of Dodoma

Opening speech by the Minister for Works, Transport and Communications, Hon. Prof. Makame Mbarawa

Since the Green Standards Week is a global platform for discussion and knowledge-sharing; I would like each participant to use this forum to raise awareness on importance and opportunities for using information and communication technologies (ICTs) to protect the environment, unlock the potential of circular economy and expedite the transition to smart sustainable cities.

As ICT stakeholders, therefore, our main task should be to ensure that ICT support efforts of environmental conservation and that no one is left behind when it comes to effective utilization of ICT for eradication of negative impacts associated with use of ICT including; Carbon emissions, radiation and e-waste.

This year's theme "Linking of Circular economy and industry 4.0" has come at the right time when Tanzania is embracing nationwide policy "Nurturing Industrialization for Economic Transformation and Human Development".
Allow me to share briefly Tanzania's efforts and experiences towards the development of ICT and facilitation of Linking Circular Economy and Industry 4.0.

The Government of the United Republic of Tanzania recognizes the important role of ICT for rapid socio-economic growth in its aspiration to become a middle

income economy by 2025 and attain the Government policy on industrialization. To facilitate effective adoption and utilization of ICTs, the Government has been setting pro-ICT policies and supportive legal, regulatory and institutional frameworks.

The National ICT Policy 2016 provides a comprehensive framework for guiding the development and growth of the sector to ensure optimal benefits to the nation and its citizens. This policy addresses a wide range of issues including of e-waste management, environment conservation, ICT safety, ICT Human Capital Development

and raising awareness to the public on different matters pertaining to ICTs. Specifically, the Policy states that "the Government shall put in place appropriate mechanisms for electronic waste (e-waste) management for safety of people and environment protection".

In addition, National Environment Policy (1997) and associated regulations sets overall framework for environmental management issues in the country that includes e-waste management.

In total, the National policies, legal, regulatory, institutional and converged licensing framework have served as a catalyst for stimulating the ICT development and economic growth.

To promote growth in ICT, Tanzania adopted a technology neutral license framework. This resulted in Construction of broadband infrastructure with over 25,000 kilometres of optic fibre cable connects all regions with links to neighbouring countries as well as to the undersea cables of SEACOM and EASSy; landing on the shores. Tanzanians are already enjoying the benefits, as prices of internet access and core transmission have dropped significantly.

Furthermore, the licencing of nine mobile network operators in the country, has proven to be an important tool in bridging the digital gap between rural and urban areas. We are working hard to make sure the few remaining unconnected areas will be connected soon as we need to see all people in the country participate fully in the digital economy.

Accompanying the deployment and utilization of ICTs within the economy and society we have experienced some challenges in the areas of e-Waste, security safety and health related risks from radiation. With a highly competition environment, erection of towers and related equipment are not avoidable. From the rapid change of technologies, including migration to digital TV transmission, evolution of mobile phone from analogue in the beginning of 2000 to Internet IP based smart gadgets within a short period has left a number of unused electronic equipment.

Frequent changes is seen as providing a safe environment for digital participation is crucial in facilitating effective use of ICT for sustainable development. Moreover, Frequent change in technology provide little time for field testing before mass marketing and if not closely monitored may result in health related risk, while wide capabilities of tools may infringe the security and safety if not well managed. These challenges becomes of high concern for developing countries that depend on imports for most of ICT solutions.

Provision of a safe environment for digital participation is crucial in facilitating effective use of ICT for sustainable development. Efforts that the Government of Tanzania has taken to address this issues include putting in place Electronic and Postal Communications Regulations on Equipment Standards and establishment of Central Equipment Identification Register (CEIR).

Furthermore, The quality of service regulations address radiation Protection. The Government has banned usage in

The Minister for Works, Transport and Communications; Prof. Makame Mbarawa (second right) with ITU Director of Standardization, Dr. Chaesub Lee (right) TCRA Director General, Eng. James Kilaba (left) and .... (second left) (Photographs by Semu Mwakyanjala, TCRA)

Tanzania of counterfeit equipment from 2016 to address for security, safety and environmental concerns.

Despite these efforts and commitments, there are still challenges such as public understanding of e-waste management and safety related issues; lack of appropriate frameworks that address disposing electronic products after its use; and information treatment; with the industrialization initiative being implemented, we look forward to establish recycling industries and building necessary capacity for e-waste management so as to curb the situation.

We look forward in this forum to share experience and expertise and through networking and discussions. I urge the forum to contemplate on how we could establish a centralized resource in the region for efficient utilization of resources to a viable project in e-waste management.

In line with all the above, It is crucial to increase local skilled and competent ICT human resources base in our countries. The skills will lead to; Innovation and Entrepreneurship in ICTs; Research and Development in ICT; Development of industries to manufacture and assemble ICT products; and Proper policies for adoption of new emerging technologies and solutions like Internet of Things (IoT) and Over the Top (OTT).

It is through the ITU that we will continue to get a frameworks and standards. All that is required is to be ready to collaborate and share experiences with the ITU and each other member in order to make the initiatives a reality.

This forum is important for deliberating and knowledge-sharing in raising awareness on environmental protection, circular economy and the transition to smart sustainable cities. It is my great expectation that as a team the experiences we share will help in implementation of the UN 2030 Agenda for Sustainable Development as well as the ITU's Connect 2020 Agenda for Global Telecommunication/ ICT Development and the National and sector specific policies in our countries.

I believe, these will be attainable through (i) Human and institutional capacity development; (ii) Fostering innovation and industrialization especially in developing countries.
Finally, I wish to reiterate Tanzania's commitment to co-operate with other members and the ITU in enhancing socio-economic development of all member states through ICT.

Tanzania acts on Human Exposure to EMFs

Events in the recent green standard week, held in Tanzania included a forum and training on electromagnetic fields (EMFs). Discussions were made around the question: "with ICTs everywhere - how safe are EMFs?". This is a summary of a presentation by Dr Emmanuel Manasseh of TCRA.

Public concerns over possible adverse health effects due to exposure from base stations and associated equipment are being addressed by activities that Tanzania is carrying out on human exposure to electromagnetic fields (EMFs) from radio systems and mobile equipment.
The activities carried include:

1) EMF measurements to assess radiation levels from base stations;

2) Public awareness on EMF radiation and environmental protection issues through the media, including radio and television programmes, seminars and workshops;

3) Handling complaints related to EMF;

4) Preparation of research areas related to human exposure EMF;

5) Follow up on releases World health Organizations (WHO) fact sheets regarding EMF and public health.

As part of its regulatory function, TCRA performs measurements of EMF radiation levels to monitor compliance with regulations; and results have been made available to the public as per ITU recommendations.
Tanzania has been implementing recommendations on EMF radiation. The country has a committee to assess EMF radiation levels in Tanzania. It is composed of members from TCRA, Tanzania Atomic Energy Commission (TAEC), universities of Dar Es Salaam and Dodoma.
The aim is to collaborate in non-ionizing radiations issues especially in regulatory control; inspections; and enforcement.
Tanzania will continue to participate and follow ongoing studies by international organizations such as ICNIRP, ITU and WHO.

Dr Manasseh presenting

Rethinking Media Professionalism

Some broadcasting stations were, unknowingly, influenced by non-media advertising practitioners to decide the content and programme format for their media. While this could be part of sheer lack of creativity, innovation and research capability; it is very much an issue of professionalism. Outlets which maximize on profit and seek their survival compromise their professionalism. The regulator has to tighten its grip and enforce compliance with broadcasting content regulations in order to protect consumers and provide an enabling environment for the sustainable growth and development of local media. When editors are forced by circumstances to swap some of their editorial decisions to advertising agents, who lack knowledge of industry ethical practices, one must expect gross ethical violations. The TCRA Content Committee has been urging the media to rethink professionalism.

Derek Murusuri reports on the recent working visit of the TCRA Content Committee to Mwanza.

"*Independence cannot be real if a nation depends upon gifts and loans from another for its development. Even if there was a nation, or nations, prepared to give us all the money we need for our development, it would be improper for us to accept such assistance without asking ourselves how this would affect our independence and our very survival as a nation.*"
Mwalimu Julius K. Nyerere

When the founding President of the United Republic of Tanzania Mwalimu Julius K. Nyerere said that independence could not be real if a nation depended on gifts and loans from another for its development, by extension this could also apply to media content. Foreign broadcasting content dominates our local television stations despite their probable effects on Tanzania's culture.

The TCRA Content Committee, led by its Chairperson Valerie Msoka, recently visited Mwanza where they met media owners, media stakeholders - viewers and listeners; and editors and senior broadcast journalists the Lake Zone.

These are stakeholders mentioned in Section 27 (1) of TCRA Act No 12 of 2003 under which the Content Committee is established.

The five-day visit was an opportunity for the Committee to listen to the stakeholders, to educate them on broadcasting content regulations. Other Committee Members are Joseph Mapunda who is also the Committee's Vice Chairman, Abdul Ngarawa and Derek Murusuri.

The Committee has been imparting knowledge and reminding the practitioners of their obligation to uphold professional ethics. During these visits, the Committee also teaches, instructs, coaches, mentors and train the broadcasting stakeholders on the

best practices. In every newsroom they visit, they promote the mastery of the Broadcasting (Content) regulations.

The TCRA Content Committee is an organ of the Authority's Board which deals with analysis of content in broadcasting as well as dealing with disputes that arises due to content issues. According to section 27 (1) of the Tanzania Communications Regulatory Authority Act of 2003, the Committee advises the sector Minister on broadcasting policy; monitors and regulates broadcast content; handles complaints from operators and consumers and monitors compliance to broadcasting ethics.

Committee Chairperson, Valerie Msoka, assured the participants that the Committee were working day and night to protect the Tanzanians from unsolicited bad taste materials and those that were dangerous to the wellbeing of our society. She said the Committee were not acting in the spirit of 'trigger happy merry go round' in fining or shutting down the stations. She said due consideration was taken and all procedures followed depending on the nature of the nature of the violation.

The chairperson, a former BBC producer and war reporter, reminded all stations to adhere to their licensing conditions and ethical practices reminded the participants to improve their planning culture; since planning was critical to any media practitioner and was central in improving performance.

A quick survey of the media under the Organizational Capacity Assessment (OCA) would strongly suggest serious mishap in the planning regime of our local media. How could you develop with planning aside? How do you set priorities, allocate resources and focus attention to critical areas if planning takes a back seat? A quick survey indicates that this is another barrier.

Growth and development were possible because of careful planning and effective implementation.
Ms. Msoka who is also TCRA Board Member, had to insisted that the participants ought to keep news diaries for operational planning and also prepare annual calendars that would track all important events right from regional to global stage. The practice would help them plan to develop relevant and development content in time.

A newsroom that does not have a news diary would report anything that comes along and it will definitely lack depth. A significant story with potential to impact is likely to receive a lip service because of pressure of time. BBC would spend six months or more researching the subject. However, a simple reasoning could put 12 months of research for some stories. A good example is an Independence celebration which can be assigned to someone in January 2018 for running in December 2018.

No wonder a story could help the authorities make informed decisions. The media becomes partners with the authorities because they respect their researched stories. Without research, which also requires time resource, it is hard to mine the data which add insights to a story. It is said, failing to plan is planning to fail.

In order to present a coherent and pleasant content upon which the audience would rely in making informed decisions on various development issues, research and planning would not be bypassed. Lack of these important elements roll the media down into accepting anything that comes on its way to fill in the air time. The situation would make it easy to mislead the media and reduce the scope of its relevancy to the society.

As a result, it has been established that the Media Audit Companies hold significant influence on choice of content. This is true for print and especially electronic media. Everybody in upcountry regions is directed to imitate a content, style and format of one leading media to access ads and sponsorship.

Three years ago, when publishing SHUHUDA newspaper, both newspaper vendors and advertising agencies were trying to influence which type of stories should be published. If you did not listen, the vendor would either refuse to accept selling your newspaper or accept it with dissatisfaction but later hide the copies below other titles, because they believe the newspaper would not sell and they need their sales commissions.

Now, the advertising agent simply denies you with ads unless you listen to what they tell you. If you want to survive then you heed their command. Most outlets were balancing on a sharp edge and in most cases they choose to compromise their professionalism stance for survival, adverts. What a swap. The vendors, advertising agents take the driver's seat. They fill the places of learned editors.

Once the media surrenders decision making in the hands of the vendors and advertising agencies to choose the best content for their radio or television, no one would expect to see creativity and innovation being harnessed for growth and development of the ethical media in Tanzania being the dire need of TCRA Committee.

In most cases brought before the Content Committee, some outlets admit violating the regulations in the spirit of creativity that would make the programme appealing. For example hosting a homosexual or a sex worker to parade their experiences, showcasing how they earn their living through such illegal businesses, would not prudently be appreciated as creativity or a 'new normal'.

Homosexuality is prohibited by law and so is prostitution. This is part of bad taste and indecent content which does not uphold public morality, does not protect children from negative influences. A number of television stations continued to maintain that the content reflected the real situation in the society, claiming it is a new normal.

The Committee which is quasi-judicial, received a dozen of complaints over some licensees in the industry, opinions and encouragement to continue doing the good work to elicit professionalism in the broadcasting sector and help promote Tanzania's culture. They cited a radio which they claimed had orientation which contributed to serious erosion of broadcasting professional ethics.

In the meeting, members requested the Government to regulate online content providers in order to ensure a level playing field. They said convention electronic media no longer enjoyed the protection earlier afforded to them as online practitioners were currently fighting for the same adverting sources. The Chairperson confirmed that online regulations were still on the drawing board and would be released soon for effective regulation.

Mail Delivery Options in the Digital Era

Abel John, TCRA

The postal network is a key linkage that facilitates a country's economic and social development. The postal sector is a core infrastructure sector of the economy as it provides a wide range of services; from basic to modern, through its domestic and cross border networks.

Posts around the world are focused on ways to create new value for their customers. As e-commerce matures and competition intensifies in the delivery market, consumers quickly become the key to market share. With mail volumes in a slow decline, posts are adopting new technologies that bridge physical and digital to enhance the value of mail, and improve delivery at the convenience of their customers.

The theme of the 2017 World Postal Day, commemorating the founding of the Universal Postal Union (UPU), was "Serving a new society: delivering beyond your doorstep"; which is in line with the introduction, by Tanzania's government, of the National Addressing and Postcode System in the country. The system is one of the basic items envisaged in the National Postal Policy of 2003; its aim being to meet the diversified needs of consumers.

The National Addressing and Postcode System will provide a physical address to every citizen in order to allow them to participate fully in socio-economic activities. These include accessing various government, public and private services such as emergency and rescue services, revenue collection, logistical and mail delivery services. It also facilitates online business and banking services - where people can access information on their financial status. The post office also acts as a payment agent for pensions and social grants, and provides agency services for different organizations such as the National Examination Council of Tanzania (NECTA).

Customers' needs are dynamically changing according to the development of the information and communications technology (ICT) sector. ICT based products and services; which are used without physical movement and direct human interaction, are continuously being created and modified to attract more users. Challenges to the traditional postal sector players, especially those who depend on the basic postal services have led postal sector players to think ahead of their customers' expectations and convert those challenges into opportunities. Furthermore, customers'

demands are dynamic and complex. Today's customers require more personalized services than just delivering their parcels or letters to the doorstep.

Unprecedented changes, characterized by rapid technological development, globalisation of postal markets and increased competition are deriving the post to come up with new ways of doing business in order to remain relevant for their customers. The new shift calls for greater innovation and diversification of products to match the changing needs and expectations of customers.

Postal sector players' consideration towards e-commerce as the priority area of growth for the sector, while adopting new technologies and upgrade logistics, are inevitable through designing new lines of business such the new brand of business by the Tanzania Posts Corporation named Posta Mlangoni; through which the organization has started door to door delivery of services to their clients through the use of the new addressing and postcode system.

The sector also need to be more innovative and focus on new initiatives towards forming synergies with companies which are already in online business. Through its wide network, the post can use the established physical addressing infrastructure to offer services which fulfil its customers' needs including the delivery of goods procured online. It needs to embark on a major transformation to make postal operations more flexible and adaptive to new ways of doing business.

Besides other improvements, responsiveness and efficiency in customer services has the potential to stimulate growth, promote globalization and facilitate the growth of e-commerce. Clear policies, laws, regulations and guidelines which address the ever-changing needs of Tanzanians and the global community create a conducive environment for the postal sector to be innovative.

Increased competition will bring about innovation, inclusion and a diversity of services available to different consumers. As the industry expands with the introduction new technology, an important opportunity arises for TPC and courier operators to collaborate in identifying synergies in technological solutions and to reinforce cooperation in market research for sustainability.

New technologies have posed a great challenge to the postal industry, with pessimists even predicting the death of the industry. However, trends and the UPU studies show an increase in the demand of postal sector services.

Even though e-mail and e-messaging are replacing some personal messages sent as physical items, virtual transactions via the internet are also bringing new business for the post. In other parts of the world new and more innovative solutions have increased the opportunities for improving business processes in the post and courier operations. Electronic commerce is steadily taking root in Tanzania, with the facilitation of the linkage between traders and consumers.

Improved efficiency and customer responsiveness in this sector has the potential to stimulate growth, to promote globalization and to facilitate the growth of e-commerce.
Stakeholders' attention to ensure that postal services offered by different actors in the market continue to improve; so as to contribute to the development of accessible, efficient and innovative postal services which comply with international standards.

In the commercial sphere, e commerce through the postal sector has been increasing in all parts of the world. Studies show an increase in the uptake and access to electronic information as the key driver of this.

This combination has helped to spur e-commerce. Postal stakeholders need to embrace this trend in economic growth, although there are challenges that call for a review of postal infrastructure and change of mode of operations in order to ensure more efficient management of end-to-end transactions.

Postal players need to be transparent about rules and regulations; redundant and lengthy clearance processes need to be reviewed so as to smoothen business operations through cost minimization and increase timely delivery of service.

Nonetheless, this new direction of trade; by making market focused rules and regulations to bring about conducive regulatory and customs framework to allow more innovations, especially on way of addressing ever changing demands; involves stakeholders at various stages of a business line.

It also calls for industry stakeholders' strategic relationships with a broad range of partners and relevant institutions worldwide on transporting mail items to promote innovative products and services, especially those aimed at facilitating e-commerce.

To instil and continue building the confidence of online retailers on using post services, the post will highly depend on efficient and effective partnerships among the various collaborators involved.

In this regard, sector players have to start by reforming the working environment at their work stations to make it more result driven; and to encourage innovation. This can be done by not only aligning with the posts business on the ground but also by making the business efficient and more responsive to the changing trends in the market, while embracing transformation.

Arguably the postal industry is vulnerable than ever before and is at the risk of becoming irrelevant. TPC and other postal stakeholders will only survive from vulnerability by changing the way of doing things; through reforming the postal processes and transforming every employee to embrace changes in a positive way.
Regardless of the substantial current temporal advantages that postal industry players claim over competitors, they need well thought-out strategies; including working collectively and focusing on rapidly changing customer needs and expectations in order to maintain the relevancy of the post. To fulfil this, postal market trends need to be studied continuously since the new working environment is not static.
The contribution the postal industry is paramount towards making the world a better place to live. It delivers sustainable communications services to all, promotes economic and social development, and enhances inclusion. These support the national development agenda 2030 and the global sustainable development goals.
All this will be made relevant by the postal sector becoming modernized, competitive, diversified and better tailored to meet the demands of customers; and in building the core skills of its employees. It needs to embark on a major transformation to make postal operations more flexible and adaptive to new ways of doing business.
The real challenge facing the players in the postal industry is making sure that physical mail remain relevant in the digital age.

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Mkapa Commends TCRA for Supporting Health Sector

Text and photographs by Semu Mwakyanjala

Hon. Mkapa in a group photo with representatives of institutions which contributed support to the Aids Trust Fund.

Fourth President Benjamin William Mkapa has expressed gratitude to the Tanzania Communications Regulatory Authority (TCRA) for its commitment to worthy social causes, including supporting initiatives promoting access to essential medical services by the needy.
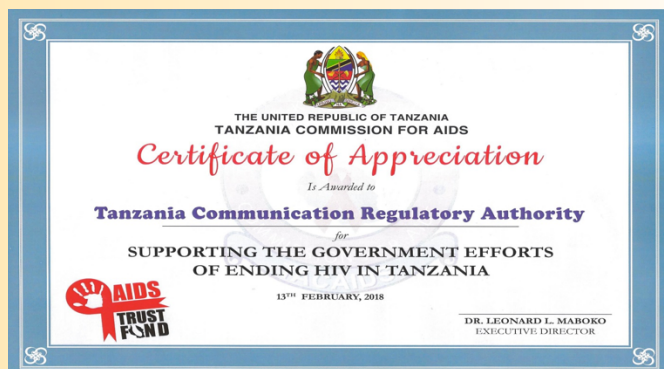
The Former President made the commendation at a fund raising dinner hosted in Dar es Salaam recently by the Tanzania Commission for AIDS (TACAIDS) in which TCRA donated five million shillings to support the AIDS Trust Fund (ATF). The HIV/ AIDS pandemic infects 48,000 people in the country every year.

A total of TZS 292,680,000 was raised in cash, pledges and through the auctions of various items including paintings. Hon. Mkapa, who was the guest of honour, presented TCRA with a certificate of appreciation; which was received by the Authority's Acting Corporate Communication Manager, Semu Mwakyanjala who represented the Director General Eng. James Kilaba.

TCRA has a Corporate Social Responsibility (CSR) Fund which supports communications sector development, education-mostly ICT development, health and economic empowerment; areas which are in line with Tanzania's National Development Priorities.

TCRA Acting Corporate Communications Manager Mr. Semu Mwakyanjala receives the award from Hon. Mkapa. Center is the Minister of State in the Prime Minister's Office Ms. Jenister Mhagama.
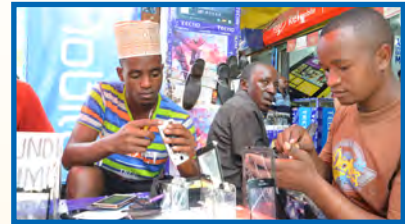
MAMLAKA YA MAWASILIANO TANZANIA

ISO 9001:2015 CERTIFIED

Mamlaka ya Mawasiliano Tanzania(TCRA) ni taasisi ya Serikali inayosimamia sekta ya mawasiliano. TCRA ilianzishwa chini ya Sheria ya Udhibiti wa Mawasiliano Tanzania Na 12 ya 2003. TCRA ina viwango vya ISO 9001:2015.

Maeneo yanayosimamiwa

Mitandao ya simu na intaneti, masafa ya mawasiliano,huduma za Posta na usafirishaji wa vipeto katika Jamhuri ya Muungano wa Tanzania na huduma za utangazaji (kama vile redio na televisheni) kwa Tanzania Bara tu. Zanzibar ina Tume inayosimamia utangazaji.

Kazi za TCRA

- Kutoa leseni, kuongeza muda wa leseni na kufuta leseni

- Kuweka viwango kwa bidhaa na huduma zinazosimamiwa

- Kuweka viwango vya kanuni na masharti ya kusambaza bidhaa na huduma zinazosimamiwa

- Kudhibiti viwango na bei

- Kufuatilia utendaji wa sekta ya mawasiliano kuhusiana na viwango vya uwekezaji; upatikanaji wa huduma, ubora na viwango vya huduma; gharama za huduma; ufanisi wa bidhaa na usambazaji wa huduma.

- Kufanikisha utatuzi wa malalamiko na migogoro baina ya watoa huduma na kati ya mtoa huduma na mtumiaji wa huduma.

- Kufanya kazi na kutekeleza majukumu mengine kwa mujibu wa sheria husika

- Kusambaza taarifa kuhusu mambo ambayo ni muhimu kwa ajili ya shughuli za Mamlaka.

TCRA na ustawi wa Watanzania

Katika kufanya kazi zake, Mamlaka inajitahidi kuendeleza ustawi wa jamii ya Tanzania kwa:-

- Kukuza ushindani unaofaa na ufanisi wa uchumi

- Kuendeleza upatikanaji wa huduma zilizodhibitiwa kwa watumiaji wote ikiwa ni pamoja na wenye kipato kidogo waliopo vijijini na wateja walio katika mazingira magumu.

- Kulinda maslahi ya watumiaji

- Kuendeleza elimu kwa wananchi kuhusu utambuzi na uelewa wa sekta zilizodhibitiwa ikiwa ni pamoja na haki na wajibu wa watumiaji;namna ambavyo malalamiko yanaweza kuwasilishwa na kutatuliwa na kuhusu majukumu, kazi na shughuli za Mamlaka.

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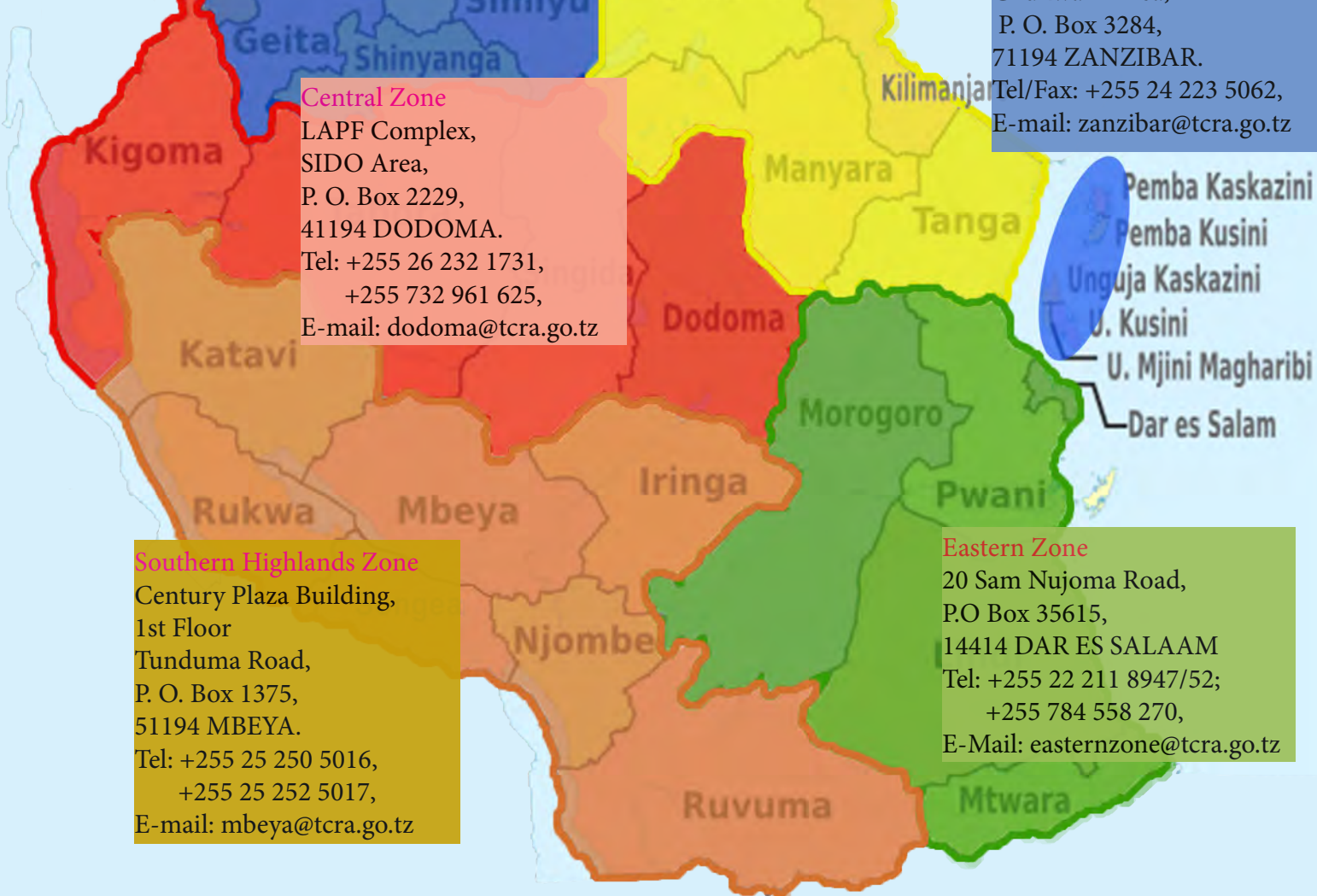
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