Commonwealth ICT Forum '19 Report

31 July – 2 August, 2019

Executive summary

The 3-day Commonwealth Telecommunications Organization Forum 2019 brought representatives from African countries together to discuss and share experiences on the topic of Broadband for Inclusive Digital Transformation

Experts and stakeholders from the public and private sectors of various countries were given a platform to share advancements, challenges and opportunities, and also engage with each other in an open forum. Numerous recommendations were put forward as to how Sierra Leone can move past its current level of digital transformation.

Those recommendations and experiences are compiled in this report, to serve as a reference document for intended next-step endeavours by stakeholders who attended the forum or were unable to do so.

Spirited discussions centered on Internet Governance, Cybersecurity, Digital Transformation, Digital Inclusion and many others. The need for increased infrastructure to enable rural connectivity, featured prominently in many of the conversations. Other important aspects of the discussions were the need for increased awareness raising, the formulation of better regulatory frameworks and the necessity of building local capacity.

Opening Ceremony

Master of Ceremonies:

Isatu Harrison, Ex Broadcaster and Entrepreneur, Sierra Leone

1.1. Goodwill Address

Akim Falou-Dine, Head of the Reference File Section and Satellite Network Registration, International Telecommunication Union.

On behalf of the Director of the Radiocommunication Bureau, International Telecommunication Union (ITU), Mr. Falou-Dine outlined the importance of the World Radiocommunication Conference 2019 set to take place from October 28 to November 22 this year in Sharm el-Sheikh, Egypt. The conference is expected to have an impact on issues such as rural broadband and the future of 5G. It will, for example, make decisions regarding the identification of millimetre wave spectrum for mobile networks, as part of Agenda Item 1.13. Mr. Falou-Dine noted that the Commonwealth ICT Forum was "a great opportunity to discuss more about the services and applications that compose the Agenda of the World Radiocommunication Conference 2019). He expressed hope that within the Forum, "commonalities in the positions of the countries within the Commonwealth" would be found and he stressed on the need to continue to build a sustainable radiocommunication ecosystem by ensuring the required protection for all services.

1.2. Opening Remarks

Maxwell Massaquoi, Director General, National Telecommunications Commission (NATCOM)

Referencing the theme of the Forum, *Broadband for Inclusive Digital Transformation,* Mr. Massaquoi declared that "Broadband is the future and the future is today" and observed that the hosting of the forum shows the government's commitment to embracing the use of ICT and enhancing the country's socioeconomic development. As further evidence of the government's commitment to ICT, he highlighted the recent conclusion of a roadmap towards digital transformation showcased at a conference chaired by **Honourable Mohamed Rahman Swaray**, Minister of Information and Communications, Republic of Sierra Leone.

Referencing a nationwide broadband initiative as a means of bringing all Sierra Leoneans together, Mr. Massaquoi remarked that "we must ensure, as we build the infrastructure for this technology, that it is accessible, affordable and secure for our people." He said that the government will continue to put the requisite policies in place to ensure that not only internet is available but faster internet is available and secure to the populace and especially the children. "Despite challenges along the way," he said, "the government will not relent in ensuring that the best technology out there is implemented." Mr. Massaquoi expressed optimism that by the end of the Forum, government would be in the position to" enhance the nation's broadband strategy and by so doing come up with a tenable broadband policy document and this will be in collusion with all stakeholders."

1.3. Welcome Address

Gisa Fuatai Purcell, Acting Secretary General of Commonwealth Telecommunication Organization

The Acting Secretary General gave some background to CTO and its role which, she said, "is to help its

members to address each other's priority needs in terms of information and communication technologies." She went on to use anecdotes from her lengthy career to illustrate the concept and necessity of digital transformation. "For any country to move ahead, we need to provide access for everybody," she said. "We need to develop broadband so that we can provide coverage for everyone all over the country. I am proud to say that this conference today signifies the will and the commitment of the government of Sierra Leone to move Sierra Leone and her people where the rest of the world is." The assembly of professionals and government leaders from other countries that have made remarkable strides in digital transformation, was the first step towards catching Sierra Leone up with the rest of the world.

1.4. Official Opening

Minister of Information and Communication, Honorable Mohamed Rahman Swaray

Honourable Swaray He expressed confidence that through interactive sessions, the forum would provide an excellent opportunity for participants to learn from global experts as well as share the experiences of success and challenges in the deployment and utilization of broadband. He discussed the potential impact of nationwide deployment of broadband in Sierra Leone, noting such advantages as increased job creation, better community and civic engagement, better trade and commerce, better government services, facilitation of social interactions, increased access to improved agriculture and health services and an overall impact on the Gross Domestic Product. "Our investment in broadband will generate a transformative route, that will create sustainable pathways out of poverty for millions of citizens," he said. He supported this declaration by quoting a World Bank study, which indicates that every 10% increase in broadband penetration boosts GDP by an average 1.3% every year. The study also indicates that 10% increase in mobile teledensity will result in 0.7% GDP growth. Honourable Swaray promised policies and strategies to ensure that the digital transformation of government, businesses and the society in general would occur within the lifespan of the current administration.

He revealed that despite efforts towards the rollout of broadband services in Sierra Leone, challenges such as the high cost and poor quality of broadband services persist, as well as a significant amount of unconnected areas. Mobile voice connectivity, he said, is at an encouraging 88.5%, whereas broadband penetration is at a 'dismal and disappointing' 3.5% with only about 6% of households having access to computers. He assured the room that the government is currently engaging partners in the building of ICT infrastructures such as the National Metrofibre Ring, which will improve access to ICT telecom services. There are active discussions on the adoption of sustainable cost-effective solutions for rural connectivity as well as the design and roll out of a national digital terrestrial platform for digital broadcasting, in fulfilment of IT requirements to make the shift from analog to digital. Government is also making strides in addressing the foundations for digital transformation, that include the following:

- For advanced digital payments, the Bank of Sierra Leone is working with the World Bank to develop a national payment switch.
- To improve digital identity, the National Civil Registration Authority is working with a number of partners and donors to improve civil registration and national identification.
- Better digital literacy and skills are being prioritized. The creation of the Directorate of Science, Technology and Innovation by President Julius Maada Bio shows his commitment towards enhancing human capital development and creating an enabling environment for innovation.

He expressed the need for government to develop a national digital transformation strategy that will provide strong leadership with appropriate government mechanisms supported and facilitated by appropriate legal provisions, regulatory frameworks as well as structures that are needed to ensure that broadband technologies are fully realized and contribute to socioeconomic development. "We must also identify strategies to strengthen various sector players through skills development as well as decisional capacity building to be able to provide the leadership role required for the growth of the sector."

He concluded his statement by inviting all participants to take a collaborative approach towards using the 3-day event to come up with innovative ideas to better serve the aforementioned national development aspirations.

After declaring the Commonwealth ICT Forum open, representatives of organizing institutions posed with

foreign delegates for a group photo.

1. DIGITAL TRANSFORMATION

Chair: Gisa Fuatai Purcell, Acting Secretary General of Commonwealth Telecommunication organization

Headline: Digital Transformation and the Massive ICT Investment it Requires

1.1. Ensuring Digital Transformation at National Level

Honourable Mark Botomani, Minister of Information, Civic Education and Communications Technology, Republic of Malawi.

WHAT MALAWI HAS DONE

Major investments have been made towards ICT development.

- About 11,000km fiber backbone investment
- Telecenters—this is currently ongoing, particularly in the remote areas, so that as many people as possible can access ICT services with ease.
- Encouraging public private partnerships—the fibre for example is driven through public private partnerships
- Introduced universal service and access fund— through laws passed in parliament, a universal service and access fund was established wherein all service providers pool their funds together to further expand ICT service. This resulted in the construction of towers in the remote areas.

Putting in place the right policies, regulatory and legal framework has been key.

- Cybersecurity strategy – Ensuring trust and safety in ICT usage
- Broadband strategy—that ensures effective investment and direction
- The country has established converged Licensing framework to ease entrance into the ICT market

E-government services have been introduced.

- Most of the public services are being digitized e.g Business registration, processing of driving licenses, processing of passports. In the past the processing of passports, for instance, took about four months. With the implementation of e-government services, process now takes a few hours.

Financial Technology(fintech) is being employed throughout the country.

- A National Payment Switch now connects financial institutions. These days offices have no difficulty processing payment with the Central Bank because they are all connected through a digital system.
- Mobile financial services are helping a lot of people, especially in the rural areas

There has been full migration from analogue to digital terrestrial television

- Malawi continues to take advantage of digital transformation to unleash social economic benefits that digital transformation affords. Malawi has been able to learn a lot from strides that other countries have made and this has contributed a series of advancements that the country now enjoys.

1.2. Panel: Digital Economy – What needs to be done to encourage transformation and growth

Panellists:

- **Honourable Vincent Odotei Sowah,** Deputy Minister, Ministry of Communications, Republic of Ghana
- **Aminata Kane Ndiaye**, Chief Executive Officer, Orange (Sierra Leone)
- **Joe Abass Bangura**, Chief Corporate Affairs Officer, Africell (Sierra Leone) ltd
- **Blaise Azitemina Fundji** Senior Advisor to the Minister of Post, Telecommunication and ICT, Democratic Republic of Congo

Honourable Vincent Odotei Sowah said that in his country's pursuit of fiscal independence, digital transformation has been front and center and has made the following advancements:

- There has been massive investment in fibre optics throughout the country
- Mobile operators have their own fibreoptic backbone
- Ghana is working towards 95% of the country having access to 4G by December 2020
- 3,000 communities have been brought onto the network.

- Private sector has been encouraged to contribute to the Universal Access Fund
- There is currently an ongoing process to give every citizen of Ghana a unique digital ID that will consolidate individual information such as health insurance, birth certificate, driver's license etc. By mid-2020 all government transactions will be conducted via the ID, which will also be used to vote.
- The digitalization of every property in Ghana.
- Mobile money accounts have been linked to bank accounts and to non-bank account debit cards
- Because of proper financial inclusion, currently up to 1.14% of the population are mobile money agents.
- The amount of transactions conducted via mobile money exceeds the amount of transactions conducted via fixed accounts in the banks. Shares can be bought via mobile money.
- Money can also be moved across the three mobile operators, which was previously not possible
- Government is setting up a National Cyber Security Centre as an authority similar to the regulator of the telecoms. Major strides have been made towards securing a sustainable means of finance for cyber security

To encourage the growth of a digital economy in Sierra Leone, panellists offered the following focus areas:

Ensure Digital literacy – An ICT favoured education curriculum will deliver digital skills to children in schools. Coding should be taught in schools nationwide. Orange (Sierra Leone) says it has begun a Support for the Free Quality Education Program in conjunction with the Ministry of Basic and Senior Secondary Education. Through this programme, Orange will provide coding lessons for over a thousand schools in the coming years. By the end of 2019 a coding school will be launched in conjunction with the Directorate of Science, Technology and Innovation. Older students can expect support in the form of start-ups.

Transparent policy and legal framework—Malawi has moved towards putting policies to support ICT expansion In Sierra Leone, all key players were involved in the review of the Telecommunications Act. The unavailability of devices has contributed to low levels of connectivity in the country. To reverse this, there have been discussions with NATCOM about removing Customs and GST on smartphones. This will make the devices more affordable and will increase ownership of devices around the country and by extension, access to the internet. Africell says it is working with the Ministry of Information and Communication and NATCOM to review the Telecommunications Act and similar regulations, to ensure that they fully support the growth of the digital economy, whilst protecting subscribers against risks like cyber-crimes, data theft, invasion of privacy, among other ethical issues to which the digital space may be susceptible.

Collaboration – There needs to be a collaborative environment in which all players (ministry, regulators, civil society and operators) play their part. Players need to work together on spectrum management to ensure that there is enough spectrum to accommodate everyone.

Leadership/political will – Right from the top there should be a strong commitment towards achieving nationwide digitalization. Government should focus largely on investment, policy and innovation. Expanding access to the rural areas and increasing investment towards connectivity in those areas should be a priority. Digital access needs to be prioritized by all government ministries thus creating a more conducive environment for the players to operate. The creation of the Directorate of Science, Technology and Innovation is a solid step in this direction.

Investment in ICT Infrastructure – the need for public private partnerships. Long-term cooperative arrangements should be geared towards building the infrastructure such as roads that are needed to provide connectivity to remote areas. Also, energy is needed, as reliance on generators for energy greatly increases running costs for operators. The harnessing of solar energy for this purpose should be a priority of the Ministry of Energy.

Promote e-government services (e-agriculture, e-health etc.) Malawi and Ghana have successfully employed e-government services so that government transactions can be conducted digitally.

2. UNIVERSAL CONNECTIVITY

Chair: Marie Momoh, Chief Executive Officer, Universal Access Development Fund, Republic of Sierra Leone.

Headline: Addressing the 60% of Sierra Leone's population that Remains Unconnected.

2.1. Promoting Universal Access to Broadband in Sub-Saharan Africa

Fargani Tambeayuk, Africa Public Policy Manager, Facebook, United Kingdom of Great Britain and Northern Ireland.

Facebook has a roadmap that reflects its general trajectory over the next ten years. In the next three years, focus will be primarily on managing Instagram and Facebook, which are both doing well. In the next five years, new products will have taken off such as Workplace an online team collaboration tool, Video, Groups and more. By the end of the ten-year period, technologies such as Artificial Intelligence, Virtual Reality and Artificial Reality would have become more mainstream. For these technologies to improve quality of life in Africa, there would need to be much higher level of internet connectivity. For this purpose, Facebook is fully committed to ensuring access to faster internet for everyone including the farthest reaches of Africa.

Facebook's efforts towards increased connectivity in Africa include:

- Supporting businesses like AMN to grow to help scale connectivity in Africa.
- Investing in infrastructure and platforms to drive down the cost of internet bandwidth.
- Through investment, reducing costs of delivering data and improving network reliability and speeds, as well as encouraging open access infrastructure sharing and competition
- Facebook is making investments in all segments of the Internet Infrastructure Supply Chain
- Facebook are major investors in Sub Sea Cables and various options are currently being considered for subsea projects in Africa.

2.2. Theory & Practice towards Universal Connectivity – Introducing Connectivity in a Box

Professor Sama Nwana, Managing Partner, Cenerva Ltd & Director, Atlantic Telecoms & Media.

Professor Nwana prefaced his presentation by stating that his intention was to share "uncomfortable truths" regarding the state of connectivity on the continent.

- Less than 50% of African countries have a broadband plan that is actually being followed. Broadband plans tend to be developed and then shelved, which puts the continent at a disadvantage, since it has been discovered that every 10% increase in broadband penetration boosts GDP by an average 1.4% every year.
- In September 2015 world leaders agreed on a new global goal of "Affordable universal access internet in the world's least developed countries by 2020." Based on current trends the world will miss this goal by 22 years due in large part to the lack of basic infrastructure such as electricity.
- One of the real problems underpinning the Digital Divide in Africa is its size. Catering to the entirety of the continent would require the rollout of expensive expansive networks for which the financial resources are not there.
- Sierra Leone and Hong Kong have nearly identical population sizes but Sierra Leone's land mass is 71 times larger than that of Hong Kong. As such, catering to the entire population in Sierra Leone would require a much larger investment in networks than that of Hong Kong.
- The majority of Africa is poor, therefore very little is spent on networks. Given the continent's size, this is a serious impediment to the goal of building networks across the continent.
- 600 million Africans have little to no access to electricity, which is a key instrument.
- 2G networks have stopped expanding and 3G/LTE networks do not extend beyond urban cores. Most surveyed countries stop at 80% coverage or less
- Connectivity Access Gap Data is absolutely invaluable. Without it, you are flying blind. In some countries the current access is, say, 78% overall. Personal analysis suggests that if the regulator was doing his job well in that market, they could actually get to 88%. And they would need to spend 21million dollars, which would cover the remining 12% access gap. It is therefore necessary to get a connectivity access analysis on a region by region basis.
- An analysis was done in 2016 of most of the Universal Service and Access Funds (USAF) in the world and it was discovered that most of them are failing.

Professor Nwana went on to present his “Connectivity in a Box” idea as a potential solution for some of the aforementioned problems. What Civilization in a Box does is present a holistic, multi-utility approach for underserved communities, via single containers equipped with:

- solar panels and batteries for electric power
- “mini-grid” provides electricity for school, hospital, street lighting, BTS
- Network connectivity for internet access (WiFihotspots, 2G/4G)
- (Free) Terrestrial or Satellite TV for news, education and entertainment
- Ability to drill a well with electric pump for clean water supply
- Cache servers for relevant local IT content (Education, Agriculture)
- Financial services through mobile money
- Integrated kiosk for battery re-charging services, mobile money agent, solar lanterns & WiFi access vouchers (and cold drinks!)

A container (RPU) would be delivered to a village and installed in 2-3 days, thus providing all the main pillars of modern society to that village. Civilization in a Box was successfully implemented in Mauritania, where an installed container (RPU) provided better sanitation and access to water by powering electric pumps. A contract has been signed with the Mauritania Government for up to 1,000 RPU installations in the next 5 years.

2.3. Panel: Universal Access: How to Develop Sustainable Connectivity in Rural Areas

Panellists:

- Dawit Bekele, Director of the African Regional Bureau, Internet Society
- Professor Sama Nwana, Managing Partner, Cenerva Ltd & Director, Atlantic Telecoms & Media.
- Augustine Kwadwo Baffo Ag Deputy Administrator, Ghana Investment Fund for Electronic Communications (GIFEC)

Key points

- On the topic of rural connectivity, Mr. Bekele offered the solution of community networks. Local groups of people who want to bring communications to their local village or town combine their resources and organize their efforts to close connectivity and cultural gaps. To truly connect everyone, everywhere, community networks must be recognized as a viable way for the unconnected to connect their communities. The focus should be on allowing communities to actively connect themselves. Community networks are complementary to traditional, commercial telecommunications networks. Policy and regulatory factors to enable community networks to succeed include, innovative licensing, funding opportunities that can include, but are not limited to traditional universal service funds (USF), and access to spectrum.
- Professor Nwana, noted that “connectivity in a box”, which he referenced in his presentation, has been implemented in Mauritania with great success. He likened it to the Eko-center idea by Coca Cola, which are distributions of kiosks in developing countries that provide numerous amenities including wifi.
- He added that regulators must regulate better in order to cross market gaps and get to the Market Efficiency Frontier.
- Regulators and Governments MUST be clear on the characterizations of their access gaps, which is why accurate Connectivity Access Gap Data is invaluable.
- Mr Baffo said that the Universal Service Fund should be applied in what he called “smart subsidy zones” via a one-time subsidy in conjunction with a private partner. In “true access gap zones” the Universal Service Fund can be brought in to make it possible to reduce the cost of deploying

infrastructure in rural areas by way of waiving taxation and offering incentives to private partners to be involved in the process.

- Speaking on the experience of employing the Universal Service Fund in rural parts of Ghana, Mr Baffo said noted that community involvement in this process is key because it creates a sense of community ownership of the project, which ensures that community members will be vigilant in protecting the investments.

3. 5G Development

Chair: **Maxwell Massaquoi**, Director General, National Telecommunications Commission, Republic of Sierra Leone

Headline: 5G is Coming to Africa but is Africa Prepared?

3.1. Introducing 5G

David Harmon, Vice-President, Global Public Affairs, Huawei Technologies

- The reality is that having access to the internet at high speeds is very important for governments as they engage in economic and social planning. As such access it is just as important as access to water and electricity because it is so centrally engaged in terms of its involvement in national planning for governments.
- 5G has already been deployed in different parts of the world and 5G will come to Africa, bringing with it access to new products and services that cannot be delivered via 4G
- 5G will ensure that telcos can cope with ever increasing levels of internet use.
- New technologies connected to 5G are being used to support economic and social planning. It is therefore vital that governments prioritize connectivity in rural areas and underserved areas
- People in rural areas should be able to upload onto the internet at good speeds so that they can contribute to job creation and a better quality of life. It connects them to advances in the health and agriculture sectors
- African governments need to put in place Key ICT planning arrangements, as the technology now is modernizing all key industries whether it relates to financial services, the development of smart cities, development of rural areas and the agricultural sector.

3.2. WRC-19 and 5G Radio Spectrum Allocations

Akim Falou-Dine, Head of the Reference File Section and Satellite Network Registration, International Telecommunication Union.

Mr Falou-Dine share the purpose of the World Radiocommunications Conference which, he said, is to:

- Allocate **spectrum/orbit resources** for emerging radio applications, while protecting the existing usage
- Maintain the **right balance** between the spectrum requirements of all radiocommunication services
- Achieve **global spectrum harmonization** for economies of scale and interoperability of the equipment
- Create **regulatory certainty** for users, regulators and telecommunication industry
- The provisional Agenda for WRC-19 was established by WRC-12 and the **draft Agenda** was established by WRC-15 (Resolution 809)
- The **final Agenda** was adopted by ITU Council 2017 (Resolution 1380)
- **The Report of the CPM to WRC-19 contains, for each WRC-19 agenda Item:**

- Summary of the results of technical studies
- Regulatory text with examples of actions (i.e. ADD, MOD, SUP, NOC etc) to the Radio Regulations

On the subject of 5G Radio Spectrum Allocations Mr. Falou-Dine noted that:

- IMT-2020 (5G) needs spectrum within three key frequency ranges to deliver widespread coverage and support all use cases: Sub-1 GHz, 1-6 GHz and above 6 GHz
- **The scope of International Mobile Telecommunications-2020 (5G)** is much broader than previous generations of mobile broadband communication systems and specifications will be ready by 2020.
- **Growing consensus** of countries, regional groups and industry on some initial 5G bands: 700 MHz, 3.4 GHz, and 26 GHz in CEPT.
- Regional differences could be resolved by **harmonised tuning ranges**, e.g. a 40 GHz tuning range could cover the 38 GHz and 42 GHz bands.
- **Bands above 24 GHz** (worldwide development concentrates on 24.25-43.50 GHz) are critical for IMT-2020. They will provide wide channels, high data rates and backhaul links to base stations.

3.3. Panel: How Best Governments and Policy Makers can Support the Introduction of 5G

Panellists:

- David Harmon, Vice-President, Global Public Affairs, Huawei Technologies
- Akim Falou-Dine, Head, Reference File Section and Satellite Network Registration, Radiocommunication Bureau, ITU
- Matarr Touray, Senior Economist, Public Utilities Regulatory Authority, Republic of The Gambia

Key points

- African countries need to ensure that the local infrastructure be put in place so that the adoption of 5G will be immediate when it arrives.
- There needs to be consumer education to keep up with this evolution of technology
- Spectrum availability and cost will remain critical, as network operators determine the type and amount of spectrum, they can economically secure to support the rise of new use cases.
- At present, to rollout 5G networks it is necessary to first have 4G networks up and running. However, from the middle of next year it will be possible for countries to make the leap from 3G to5G
- Moving from 4G to 5G requires more than just the software upgrades that were required for the shift from 2g to 3g and from 3g to 4g. It requires the building of special antenna. A key challenge with regard 5G is to ensure that ICT infrastructure can manage the ever-increasing capacity loads and information levels that are thrown over telecom networks and the internet.
- Before the arrival of 5G, African regulators need to have robust infrastructure-sharing regimes in place to make it possible for towers and other infrastructure in close proximity to be shared, thereby maximizing efficiency.

4. LOCAL CONTENT: TECH HUB AND SMART CITIES INVESTMENT

Chair: **David Moinina Sengeh,** Chief Innovation Officer, Directorate of Science, Technology and Innovation, Government of Sierra Leone

Headline: Creating an Environment of Innovation that can Support the Building of Smart Cities and Smart Villages.

4.1. The Sensi Tech Innovation Hub: Developing National Expertise, Entrepreneurship and Innovation

Mohamed S. Hemoh, Programs Manager, Sensi Tech Innovation Hub, Sierra Leone
Sensi Tech Innovation Hub is the first Innovation Tech Hub established in Sierra Leone in 2016. Sensi Innovation Tech Hub mission is to create and support communities, industries and spaces where technology, innovation, and entrepreneurship intersect, to build the next generation of innovative solutions and businesses in Sierra Leone**.**

Among other things, Sensi Tech has:

- Provided grant management and M&E support for 90 Agribusiness entrepreneurs across 9 districts in Sierra Leone under the GIZ Facility for Innovation (F4I) Initiative
- Funded, Incubated or accelerated and mentored 30 local entrepreneurs and businesses under Sensi's Comic Relief funded Fire Starter Fund Program.
- Funded local entrepreneurs and developed ITC & management skills;
- Provided 100 hours of training per month;

But there are numerous challenges to contend with:

- Connectivity – The majority of primary and secondary schools in rural, for example, do not have connectivity or ICT equipment
- Awareness – Many do not understand what a mobile phone or the Internet can do for them, how to use a mobile for something other than a phone call, the kinds of information and services that can be accessed or delivered through a mobile phone or over the Internet, or how this information can be used to improve lives and livelihoods.
- Relevance – Information and content available by mobile phone or on the Internet is not always culturally relevant, appropriate, in local language, consumable by the illiterate, or produced locally.
- Affordability – The combined cost of a handset, airtime, mobile data services, charging and electricity can be very high, especially for those living in the rural areas. Youth who are unemployed or relying on parents may be even less able to afford mobile access

4.2. Panel: How to Ensure Local Investment and Content Creation in Smart Cities in the Future

Panellists:

- Mohamed S. Hemoh, Programs Manager, Sensi Tech Innovation Hub, Sierra Leone
- Haffie Haffner, General Secretary, Orange, Sierra Leone

Key points

- Rapidly increasing levels of urbanization leads to scarcity of resources, which makes it imperative that investments be made in the creation of content to ensure fair management of resources.
- As part of the building of human capacity in rural areas, Orange Sierra Leone intends to introduce coding to the curriculum of 100 schools.
- Investment in connectivity and innovation is key in the development of smart cities.
- In some countries there are policies in place for things like entrepreneurship and digital literacy and there are funds and opportunities being created by government. The same needs to be done in Sierra Leone

- Over the past two years, young people have benefited from massive amounts of training in the areas of ICT, business and innovation. In order to reach more people, support is needed from the private sector and government.

- It is important to identify and support young individuals who are skilled innovators that can contribute towards increased connectivity. The “Hackathon” for instance, is a platform that attracts young people with ideas to showcase and they actually stand a chance of gaining financial support for those ideas.

- In addition to smart cities there should be more discussion on the development of smart villages, since the majority of the population is in rural areas.

- A culture of collaboration needs to be enhanced among players within the innovation space in Sierra Leone.

- Innovation should be treated as a key driver towards the digital economy. Investments should be made towards supporting youthful ideas in the form of, (for example) laboratories where various applications can be developed and tested.

- Mobile operators require increased support by way of incentives from NATCOM and the government to help increase investments in connectivity in rural areas over the next 2-3 years.

- At present there’s no regulatory system in place for startup businesses. There needs to be a database for these individuals so there can be actual figures of how many there are. This information can help in the formulation of policies that will support the growth of these businesses.

5. INTERNET GOVERNANCE

Chair: **Tushyadev Jadunundun**, Board Member, ICT Authority, Republic of Mauritius

Headline: Breaking the Connectivity Barrier in Developing Countries

5.1. ICANN in the Ecosystem: Addressing Challenges in Developing Countries

Yaovi Atohoun, Stakeholder Engagement and Operations Manager, ICANN

Mr Atohoun spent the first half of the presentation discussing the role and internal structure of ICANN, as well its global reach.

- ICANN - Internet Corporation for Assigned Names and Numbers, is responsible for coordinating the maintenance and procedures of several databases related to the namespaces and numerical spaces of the Internet, ensuring the network's stable and secure operation.
- ICANN’s work ranges relate to a broad range of Internet challenges, including policies on generic names that affect network configurations and brand or business practices online.
- Remote participation is available in several languages at all ICANN’s Public Meetings.
- Not only is ICANN open to everyone, everyone participates on equal footing. This makes it a unique place to interact with and learn from representatives from different sectors such as academia and government.

He went on to highlight the challenges the organization faces in developing countries

- Connectivity issues
- Low participation in ICANN’s activities
- Limited knowledge on critical resources
- Limited use of local languages
- Limited knowledge on ICANN Ecosystem
- Low DNS marketplace

He also made note of some of the opportunities:

- Fellowship program / Remote participation tools
- Appropriate tools for participation in events
- Capacity building initiatives:

    - DNS
    - DNS/Abuse – Cybersecurity
    - GAC representatives
- New gTLD round in 2012
- DNS market studies
- Regional DNS Forums
- Engagement with stakeholders/regional strategies
- IDN and UA initiatives

5.2. Progress Made by CTO with regards Coordination of Internet Partners

Dr Martin Koyabe, Technical Support & Consultancy (TSC), Manager, Commonwealth Telecommunications Organisation

One of the main pillars of the CTO strategic plan is to look at Internet governance and coordination of the activities within the Commonwealth. This activity has been ongoing and some progress has been made.

Dr Koyabe went on to outline some specific challenges:

- Not all countries are members of Internet Governance
- Among IG member countries a challenge is that top level domain names are still owned by private entities. There must be some level of government involvement
- In developing countries statistics show that in some societies people hesitate to go online for fear of their information or transactions being monitored and traced. It is therefore necessary to build a level of trust in the internet in order to increase access.
- Cyber sovereignty threatens good internet governance. There have been cases in which governments have switched off connectivity to the internet for specific purposes. There have been specific cases during elections periods.

He proposed that:

- Steps should be taken to increase membership of countries
- Countries should organize activities to educate people on the importance of internet governance, thereby increasing goodwill towards the internet.
- There should also be increased coordination to ensure that member countries are aware of each other's activities.

DAY 2

6. ICTS AND THE SUSTAINABLE DEVELOPMENT GOALS

Chair: **Gisa Fuatai Purcell**, Acting Secretary General, CTO

Headline: ICTs and SDGs in Africa – The Road Travelled Thus Far

6.1. Panel: Achieving the SDGs through ICT application: Commonwealth updates

Panellists:

- **Mohammed Babajika**, Director, Policy Competition & Economic Analysis, Nigerian Communications Commission
- **Honourable Vincent Odotei Sowah**, Deputy Minister, Ministry of Communications, Republic of Ghana
- Dr Esmie Kainja, Permanent Secretary, Ministry of Information, Communication and Technology, Republic of Malawi
- **Ivan G Brown**, Chairperson, Board of Commissioners, Liberia Telecommunications Authority (LTA)

Key points

Honorable Vincent Odotei Sowah shared that:

For the past two years the Ghana National Budget has been driven by the SDGs, specifically targeted by the Ministries, Departments and Agencies responsible. There has been marked progress in the following SDGs:

1 – No Poverty – Financial Inclusion and mobile money is implemented as a way of ensuring that those in the rural areas and economically deprived urban areas are included in the digital revolution. Providing them with ICTs will help them to reduce poverty.

5 – Gender Equality – Every year 700 girls and women are taken from all parts of the country are given laptops and ICT training, digital literacy and digital hygiene. In December 2019 a coding competition will be organized among the women and girls. This should help bridge the gender digital divide.

9 – Industry, Innovation and Infrastructure – the target is that by the end of 2020 there will be 95% connectivity in Ghana. At present mobile penetration stands at 130% and internet penetration is at 60%. In terms of innovation a strategy was to target a certain percentage of deprived communities in Accra and provide subsidized accommodation for technological entrepreneurs and digital businesses. So far these have provided employment for about 2,000 people.

13 – Climate action – Meteorological service in Ghana has been equipped with 18 automatic weather stations across the country. Recently the West African Climate Services Corporation was launched to ensure that meteorology and disaster management security agencies were brought together to ensure that the impacts of climate change be mitigated if not prevented.

16 – Peace and Justice Strong Institutions - The development objective of the e-Transform Project for Ghana is to improve the efficiency and coverage of government service delivery using information and communication technologies (ICT).

17 – Partnerships to achieve the goal – one of the key ways the country has been able to make progress in rural connectivity is through partnership with the private sector. Ghana has also acceded to the Budapest Convention on Cybercrime and the Malibu Convention on Cyber Security and Data Protection. This has enabled the country to train judges and CID officials in handling such matters.

On Behalf of the Malawian government Dr Esmie Kainja shared Malawi's current status regarding the SDGs.

The Malawian Growth Development Strategy 3 is a medium strategy developed by Malawi to fulfill the umbrella SDGs. The **MGDS III** aims at moving Malawi to a productive, competitive and resilient nation

through sustainable agriculture, economic growth, energy, industrial and infrastructure development, while addressing water, climate change, and environmental management and population challenges.

- The **SDGs** incorporate Goal number **1, 2, 3, 8, 9 and 17** of industry, innovation and infrastructure, which trickles down to the need of ICT development in achieving the goal.
- In line with the **SDG** Goal 9, Malawi developed the **MGDS III** with Key Priority Areas among which is the **Transport and ICT infrastructure** which has a goal to develop safe, affordable, reliable, equitable and sustainable Transport and ICT infrastructure.
- Following the MGDS III, the implementing instruments include the following:
    - Ministry of Information, Civic Education and Communications Technology Strategic Plan
    - Communications Act
    - Electronic Transaction and Cyber Security Act
    - ICT Masterplan
    - Digital Broadcasting Policy
    - ICT Policy
    - Malawi Digital Government Strategy

SDG 1 – End poverty in all forms everywhere: In pursuit of this goal E-Money transactions have been instituted such as:

- Mobile Money Transfer initiatives that reduce transaction costs and time
- Cash Transfer to vulnerable Households that provide security and travel cost

The **500 villages** project has been introduced with the aim of increasing access to digital information services across the country targeting not less than **10,000 households**.

SDG 2; End hunger, achieve food security and improved nutrition and promote sustainable agriculture

In pursuit of this goal, an Agriculture Commodity Exchange platform has been set up to provide:

- Structured markets that present reliability of the market to poor farmers
- Market Transparency for informed decision making for the farmers
- Certainty of the market by producers and sellers

SDG 3; Ensure healthy lives and promote well-being for all at all ages.

ICT interventions include Various E-Health platforms that are providing health service seekers with an opportunity of accessing services quicker and at a reduced cost.

SDG 8; Promoted sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Here employment is being attained through ICT projects such as construction of telecommunication towers across the country, laying of a Fibre network across the country, domestic assembling of local STBs.

SDG 9; Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Here ICT interventions include:

- 1386 Kilometres of network Fibre laid across the country with aim of providing bandwidth utilization to Government and private institutions.
- 32 tele-centers set up that promote youth access to ICT services and strategically linked to vocationally training schools.

SDG 17; Strengthen the means of implementation and realize the Global Partnership for Sustainable Development.

Government is launching 136 Telecommunication towers across the country through a Last Mile Rural Connectivity Project in providing internet and signal coverage to the general population.

In terms of the way forward, the following gaps need to be supported for Malawi:

- More investment needed in areas that ICT is being implemented such as: Agriculture,

Health, ending poverty and hunger.

- Need for further plans of action for areas in which ICT is not presently being visibly addressed such as; sustainable cities and communities, affordable and clean energy, Quality education

Malawi says it is open for cooperation with other partners in enhancing ICT development domestically as well as international to successfully achieve the SDGs targets.

Mohammed Babajika stated that the ICT has fast tracked the achievement of the SDGs in Nigeria. SDGs impacted include:

SDG 4: Quality Education

SDG 8: Decent Work and Economic Growth

SDG 9: Industry, Innovation and Infrastructure

SDG 17: Partnerships to achieve the goal

- The Nigerian government has supported the development of ICT infrastructure the spectrum utilization for the deployment of broadband services by refarming and auctioning of new spectrum.

- Active infrastructure sharing and spectrum trading were put in place.
- Bridging Access Gaps by provision of DTSs through the Universal Service Fund is also ongoing so that the rural broadband initiatives, university inter-campus connectivities and backbone transmission infrastructure are put in place.

- Nigeria's National Broadband Plan is driven by the Nigerian Communication Commission and supported by the Vice President and National Economic Council to ensure that fiber optics are deployed throughout the country.

- The Infraco project is a subsidy-based initiative whereby government will support the infrastructure companies in areas where returns on investment are nil.

- ICT has contributed 10.11% to the GDP. This has created opportunities in the informal sector of the economy.

- The total fiber deployment backbone required to drive all broadband-based services stood at 65,058km excluding the metrofiber that was already there. Operators have thus far deployed 52,010km.

Mr. Ivan Brown shared Liberia's current status in terms of achieving SDGs through ICT application:

Legal, Policy and Regulatory framework

- The National Telecommunications & ICT Policy is undergoing review to take account of current realities
- A Cyber Security Strategy is also under review as a precursor for the establishment of a Computer Emergency Response Team
- Several regulatory instruments including Quality of Service, Infrastructure Sharing and Type Approval Regulations are being finalized

Access and Connectivity

- Deployment and Extension of Broadband Infrastructure
  a. A metro fibre ring has been deployed around Monrovia and extended 37 miles to the Roberts International Airport
  b. Fiber deployment is planned along the major economic corridors towards the Cote d'Ivoire in the east, Sierra Leone in the west and Guinea in the north of the country. This deployment will extend access to the rural population and provide redundancy via connection to other sub sea cables
- Mobile phone penetration rate stands at 79% and that of internet is 44%

Universal Access

- A regulatory framework has been put in place
- A strategic plan has been prepared and adopted

- Management structure has been put into place
- The UA fund has been established and contributions have begun coming from licensees
- Proof of concept pilot projects in progress
- Model is a rural telephony solution using cow orbit satellite connectivity and TV White Space.
- Pilot project located in faraway places to test connection throughout the country
- Pilot is in the rainy seasons to test connection throughout the year.

Collaborative efforts with neighboring countries for regulatory cooperation including the implementation of cross-border/frequency harmonization and best practices, cyber security etc. in line with the protocol signed April 2019 at a WATRA Conference in Burkina Faso.

Liberia is completing regulatory processes to join its Mano River Union neighbors and other ECOWAS countries to establish free roaming.

7. OVER THE TOP (OTT) SERVICES

Chair: **Marie Momoh**, Chief Executive Officer, Universal Access Development Fund, Republic of Sierra Leone

Headline: OTTs and the Regulation Debate.

7.1. Over the Top (OTT) Services: A Commonwealth Perspective

Dr Martin Koyabe, Technical Support & Consultancy (TSC), Manager, Commonwealth Telecommunications Organisation

Dr Koyabe talked about how OTT Services came into being, stating that CTO was mandated at an ICT Ministerial Forum to conduct an OTT study. The objective was to better understand, based on consultations with relevant stakeholders in a number of jurisdictions, the market dynamics, policy and regulatory challenges; and opportunities of Over-The-Top (OTT) services.

The following issues were highlighted in the report:

- Regulation & Licencing Obligations - Regulating disruptive ICT services is a challenge, especially to existing shared economy business models. There are disagreements among players as to whether or not OTTs should be regulated at all
- Taxation (Jurisdiction) - This challenge is cross jurisdictional in the sense that it requires international cooperation and it requires collaborative regulation as espoused by the ITU, which brings together regulators from various regulatory and administrative arms of national governments.
- Universal Service Fund (USF) – the report poses the question of whether OTT service providers should be required to contribute to the Universal Service Fund, given that once network is rolled out in unserved and underserved areas, OTT service providers will have new customers.
- Quality of Service/Quality of Experience – regulators and operators are still struggling to make sure that quality of service is maintained.
- Net Neutrality – India formed a committee on net neutrality that encourages the growth of OTTs and ensures that messaging OTT apps are not interfered with through regulation
- Data Protection & Privacy - Data security issues transverse national borders and are not limited by physical jurisdictions. They require international cooperation and harmonization of legislation on privacy and data protection frameworks is crucial.

Dr Koyabe presented the following as a consensus on the way forward:

- The results of the report should be used to create favourable ICT environment in terms of policies,

regulations and legislations

- OTT services should be adopted as being part of the App Economy. Innovation needs to be encouraged as well

- Countries are encouraged to determine suitable frameworks. This would require regional and international consideration

- To ensure data protection and privacy it is necessary to develop a national Cybersecurity strategy that includes robust legal structures/instruments and governance.

7.2. Panel: Over The Top (OTT) Services – What's Next?

Panellists:

Graham Butler, Chairman, Bitek Global Limited
Fargani Tambeayuk, Africa Public Policy Manager, Facebook, UK
Dr Martin Koyabe, Technical Support & Consultancy (TSC), Manager, Commonwealth Telecommunications Organisation

Key points:

- There is a significant number of traffic operators that are unlicensed and therefore have no obligation to the governments of the countries in which they operate.

- With the digitization of economies, traditional taxation rules are currently not fit for purpose. Facebook says it is contributing towards the development of new taxation rules that will allow such companies to pay taxes fairly.

- It is necessary for OTT regulations to be in place that ensure that consumers have access to choice and all stakeholders are fairly treated. Flat out taxation is a mistake.

- Some mobile operators in Sierra Leone report declining revenue due to the existence of OTTs but research shows an upward thrust in revenue for operators in other parts of Africa due to increased data consumption. Operators in Sierra Leone should, therefore come up with a way to transition from their current model which is based on voice SMS to a model that is based on data. Revenues will increase as applications require more data.

- In attempting to address the impact of OTT on the traditional services and operators, it is punitive and unfair to future generations, to try and inhibit innovation. It is also not right to keep increasing the increasing the digital divide that so desperately needs to be closed. Whether at regulatory stage or at policy level, this needs to be taken into consideration.

8. CYBERSECURITY

Chair: **Robert Collett**, Senior Advisor and UK Liaison, Global Forum on Cyber Expertise (GFCE), UK

Headline: Cybersecurity – Moving Beyond Adoption Stage

8.1. National Cybersecurity Strategies - *Development & Implementation*

Dr Martin Koyabe, Technical Support & Consultancy (TSC), Manager, Commonwealth Telecommunications Organization

Investment in cybersecurity determines how secure a country's citizens are. Sierra Leone is identified as a country where a lot of work needs to be done in terms of cybersecurity. Sierra Leone has been working towards a cybersecurity strategy and the objective of Dr Koyabe's presentation was to look at the issues that need to be considered in the designing of an effective strategy.

The basic stages of cybersecurity development are:

- NCS Development
- NCS Validation
- NCS Adoption by government
- NCS Implementation

An observation is that a number of countries tend to be stuck at the adoption stage.

It was also observed that since Sierra Leone shares a long border with Guinea and Liberia. Therefore, the security of the country is dependent on how secure neighboring countries are. As such it ceases to be a national issue.

The Sierra Leone National Cybersecurity and Data Protection Policy in its current draft form, has the following goals:

① Enhance the nation's cyber security posture in a manner that facilitates the country's growth, safety, and prosperity.

② Build national capability by raising cyber security awareness and partners with relevant institutions to develop Expert workforce to address cyber security needs.

③ Foster information sharing and collaboration among relevant stakeholders.

④ Provide national leadership by defining the national Cyber security vision, goals, and objectives by coordinating Cyber security initiatives at all levels.

⑤ Establish a cyber-crime legislation

In order to have an enhanced, focused cybersecurity strategy, it is necessary to consider the following:

- Governance & Organisation Structure: National leadership level support is a MUST as cybersecurity is important for a national vision.
- Legislation & Regulation: laws should be developed that are in line with good practice as well as regional & international conventions/treaties
- Incidence Response & Management: It is necessary to implement a national Computer Emergency Response Team as a first point of call at a country level (ownership is key). Also, a stakeholder engagement framework should be established for information sharing & coordinating actions.
- Awareness & Mindset: national awareness programmes should be established in order to encourage sharing of knowledge & expertise in the form of training, seminars or workshops
- Education, Training & Skills: Partnerships between academia & industry should be established on Cybersecurity in terms of expertise & knowledge. A national/internationally recognised certification should be developed through local institutions.
- R&D, Innovation & Emerging Technology: Cybersecurity should be introduced into the education curriculum at all levels of education. Cybersecurity centres of excellence should be developed to provide much needed expertise
- Standards & Technologies: The use of Information Security (IS) Standards should be promoted.
- Confidence & Trust: Use of Top-Level-Domain (TLD) & DNSSEC provides DNS authentication. A national Public Key Infrastructure (PKI) should be established
- Funding & Implementation: An NCS implementation plan should be developed with focus on key priority areas. Government led PPP initiatives should be built to explore funding resources.
- Alignment of work by development partners: There should be in-country coordination on Cybersecurity issues.

In Minimizing Adoption & Implementation Challenges, the following should be considered:

- Need for national-level leadership and support by government
- Establish/implement relevant regulation, legislation and policies
- Align CS policy & legal framework to national vision and goals
- National CS governance framework (involving National CERT)
- National CS awareness/capacity building programme & standards
- Secure adequate funding and resourcing
- Involvement in Regional & International cooperation

8.2. Developing a national Computer Emergency Response Team (CERT)

Sigitas Rokas, Information security advisor, International projects manager, NRD CS, Lithuania

Mr. Rokas shared the experiences of establishing Computer Security Incident Response Teams (CSIRT) in Bangladesh, Bhutan an Cyprus. From these he went on to share lessons learnt:

- Lesson #1 Mandate is the key enabler
    - The most difficult part is to get it signed/adopted
    - It empowers to do/act
    - Sometimes it comes only after tangible results have been achieved
        - Iterative approach then: data center -> gov -> national
    - It triggers related essential components to establish:
        - Technology
        - Processes
        - Skills
- Lesson #2: Leadership / passion inside CSIRT team is the second key enabler
    - Assigning a true leader is a big part of CSIRT success in short and long run
        - Seek for a real CISO (Chief Information Security Officer) to run CERT
        - Technical skills are essential for CERT leader
    - It enables cooperation with:
        - Related bodies inside the government (institutes for example)
        - Local cyber security community and key private players in market
        - Awareness raising (sectorial or eye-to-eye sessions)
        - Assistance from international organizations (CTO for example)
        - Assistance from international community (FIRST.Org for example)
- Lesson #3: Build trust with constituency and never ever compromise it
    - Building trust (and reputation) is very long task and sometimes difficult one
    - CSIRT will not be trusted and recognized as you want initially
    - True services, dedication, objective and timely detected security incidents accelerates trusted relationships
        - The right technology is very important factor (threat feeds, sensors, canaries, OSINT)

8.3. Panel: Enhancing Capacity Building through Collaboration and Partnerships

Panellists:

Dr Albert Antwi-Boasiako, National Cyber Security Advisor, Ministry for Communications, Republic of Ghana

Daniel Kaitibi, Deputy Director-General, National Telecommunications Commission, Republic of Sierra Leone

Key points

- In Ghana, a National Awareness Campaign was launched to provide the public with the necessary information to detect and prevent more than 75% of cybercrime-related cases.
- Also in Ghana, through engagement with UNICEF, advancements have been made in the area of child protection.
- Ghana is in the process of developing cyber security legislation. The intention is to license cybersecurity providers as a way of making sure the ecosystem is firmly placed in the development agenda
- The Ghanaian government recently announced a marginal tax increase that will go towards funding Ghana's cybersecurity development.
- In Sierra Leone, the Data Protection Policy is currently at the Law Officer stage and from there will go on to Cabinet.
- NATCOM needs to have computer use and internet policies that guide employees in the use of these facilities.
- NATCOM has asked NMOs to re-register every subscriber in order to ensure that all KYC (Know Your Customer) databases are complete
- With the prevalence of scammers in Sierra Leone, NATCOM has done some work in sensitizing the public but there needs to be increased vigilance on the part of the public in recognizing scammer activity.

9. EMERGING TECHNOLOGIES

Chair: **Graham Butler**, Chairman, Bitek Global Limited

Headline: The Internet of Things – The Essentiality of Regulation

9.1. Trust by Design: The Internet of Things – Security and Privacy of IoT

Dawit Bekele, Regional Bureau Director, Africa, Internet Society

The main thrust of the presentation was the opportunities and challenges related to the Internet of Things.

OPPORTUNITIES

- The number of IoT devices and systems connected to the Internet will be more than 5x the global population by 2022
- The IoT can create a new market of sophisticated solutions, fostering effectiveness and sustainability while creating new jobs
- the IoT can give rise to new applications and appliances that will make the lives of Africans simpler and easier. On the other hand, these are more advanced and extensive opportunities for local developers who have skills, knowledge, competence, and willingness to contribute to the IoT.

CHALLENGES

- As more and more devices are connected, privacy and security risks increase and most consumers don't even know it.
- Threats related to the Internet of Things can be categorized as internal and external.
- Examples of external security threats include denial of service (DoS) attacks, remote brute-force attacks and man-in-the middle attack. Password sniffing, Trojan horses, data tampering are

examples of internal security threats. Such attacks are a direct threat to the confidentiality, integrity, and availability of information assets

- IOT – related threats tend to make the headlines. E.g. Security Flaw in LG IOT Software Left Appliances Vulnerable
- The risk spectrum on the IOT ranges from annoying to creepy, to digital theft, to physical hazard.
- Challenges associated with the Internet of Things can be divided as:
    - Those faced by manufacturers – these include cost/size, limited functionality, time to market and future-proofing
    - Those faced by services – these include new uses, massive volume, naïve players and limited insight
    - Those faced by consumers – cost/convenience, naïve users, DIY approach and "flying blind"

9.2. Panel: What can be learnt in the promotion and regulation of disruptive technologies?

Panellists:

Abdul Aziz Jalloh, Office of National Security

David Harmon, Vice-President, Global Public Affairs, Huawei Technologies

Dawit Bekele, Regional Bureau Director, Africa, Internet Society

Key points:

- With increased interconnection of computing devices, if regulatory measures are not applied to the devices, it is likely that large amounts of personal information will end up in the wrong hands

- Some countries around the world are ensuring that various legislations to be put in place to guarantee that systems and processes are safe and secure. The US and Japan, for instance, have implemented Internet of Things Acts

- IOT regulation in Sierra Leone could prove difficult due to porous entry points but increased efforts should be made to ensure that hardware coming into the country is subjected to checks and approval

- Regulation of IOTs is an issue that requires dialogue at national level with customers and all other stakeholders.

- Special attention should be payed to mobile money transactions due to the fact that mobile money services could be used relatively easily for money laundering and terrorist financing.

DAY 3

10. THE DIGITAL TERRESTRIAL TELEVISION SWITCHOVER

Chair: **Honourable Mohamed Rahman Swaray**, Minister, Ministry of Information and Communications, Republic of Sierra Leone

Headline: The Practicality of Digital Switch Over in Sierra Leone

10.1. Analogue Terrestrial Television Switchover Status across Africa & Culture Preservation
Professor Sama Nwana, Managing Partner, Cenerva Ltd & Director, Atlantic Telecoms & Media

Why ASO?

- Redeem part of the ATT Spectrum in the UHF band (470 – 862 MHz) for mobile (in particular mobile broadband): the so-called digital dividend
- Modernize terrestrial television
- The analogue to digital switchover of TV should not just be an exercise in technocracy – it should and must be exploited as an opportunity to light the burners of the new multi-channel, multi-media, more interactive and more Social Media Sector.
- One of the real problems underpinning the digital divide in Africa is its size.
- Africa needs to use its UHF spectrum for broadband coverage
- TVWS-tests completed in Accra, showing no interference when transmitting on a channel between two live TV channels.
- Also, vast swathes of GSM whitespaces too
- Broadcast TV is still a relevant part of TV consumption but it is losing ground to online non-linear TV. Traditional pay tv revenues are also decreasing
- Non-linear (VOD) services are growing steadily. Total revenues of the VOD sector in Western Europe
- Radiocommunication Bureau, International Telecommunication Union will increase from the €6,225 million in 2018 to €8,816 million in 2021, with a double digit CAGR OF 12%
- Tech companies & fixed line operators having been prophesying the end of linear TV for years
    - A range of politicians, in love with the shiny and the new, have been receptive. Ditto some journalists.
    - Broadcasters haven't been especially effective at putting forward their case.

- This matters because broadcasting:
    - Has to cope with a considerable amount of legacy regulation (e.g. if broadcast TV went, would consumers still have access to with subtitles or audio description? Is news impartiality worth regulating to preserve?)
    - needs spectrum (a Crown/State asset)
    - Is universally available (not so for broadband)
    - Is free at the point of consumption for FTA (not so for broadband)
    - supports the Country film industry, and a vibrant range of technical & support skills

- And ironically, the largest source of broadband data demand is video commissioned by, and first shown on, “soon to be extinct” linear broadcast channels.
- Governments are working out how to take even more spectrum (after 5G) from broadcasters to auction for mobile. What vision for television are they working to?
- When Africa lobbies for sub-1GHz spectrum, and does not show any urgency clearing and using it – it makes us look as jokers
- Broadcasting sector is going/gone… New Media sector, including traditional broadcasting, SVOD, TVOD, OTTs, etc.
- The rise and rise of OTT Media behemoths (Netflix, Amazon, Now, etc.) – bringing in foreign cultures
- Radio is still the biggest media in Africa – and its role remains critical
- Africa/CTO Countries need to compete for their citizens’ media attention lest they lose their culture.

10.2. Digital Terrestrial TV Switchover

Akim Falou-Dine, Head, Reference File Section and Satellite Network Registration,

Why convert to digital TV?

- More digital broadcast content in same band – Comparison: where a single analogue program
- can be broadcast on one transmission channel of 6 MHz to 8 MHz bandwidth, the same transmission channel could carry a multiplex of up to 20 digital programmes of equivalent quality.
- Increased Spectrum Reuse – Digital TV standards allow the implementation of single frequency networks (SFN), thereby permitting the reuse of the same spectrum over much larger areas and further increasing spectrum efficiency compared to the analogue networks.
- Reduced Tx Power: Digital modulation (COFDM) minimizes the multipath interference effect and thus the required transmitting power is reduced and quality of service is improved.
- Wider choice in TV and radio channels;
- Improved picture and sound quality (depending on the system settings);
- Greater flexibility due to portable and mobile reception;
- Enhanced information services including the Electronic Programming Guide or enhanced ‘teletext’ services (with enhanced graphics);
- Increasing market competition and innovation thanks to the potential arrival of new
- entrants at different levels in the value-chain,
    - New service providers, broadcasters, multiplex operators or network operators.
    - Additional specific benefits for some categories of market players easier storage/processing of content and reduction of transmission costs.
- Digital terrestrial television brings in new industry which provides:
    - Lower prices (per channel) for broadcasters;
    - Pay-Tv services
    - Digital terrestrial television networks can easily facilitate a full bouquet of services and incorporate a paying/billing system (i.e. conditional access system (CAS)
- New transmitter networks Including new transmitters, antennas and transport networks;
- New receiver devices: set-top-boxes, PC-card integrated receivers, USB-based receivers and Integrated Digital Television sets (IDTVs);
- Conditional access systems:
    - Integrated systems (head-end encryption and smart-card decryption).

How

DSO normally involves the following steps:

- Simulcast – Establish the new digital services on temporary frequencies, if required, and operate both analogue and digital services for a period of time.
- Analogue Switch-off (ASO) - Switch off the analogue services
- Re-stacking – Change the frequencies of the digital services to their final frequencies, if required

What is needed

- Political decision
- Legal basis
- Regulatory framework
- Regional Frequency coordination
- National Implementation

Importance of RF coordination

Frequency Coordination is Key for both transition to digital TV and release of the digital dividend.

- Facilitate the transition from analog to Digital Television (DTT) and the use of the Digital Dividend.
- Avoid harmful interference
- Build informal consensus in the region towards the conclusion of formal agreements
- between the administrations involved before notification of the frequency assignments to the ITU
- Ensure the compatibility of the national frequency plans in support of terrestrial television broadcasting and mobile broadband
- Regional coordination initiatives successfully completed with the support of ITU:
- Sub-Sahara Africa (2011-13), Arab States (2014-15), Central America and Caribbean (2017-18).

10.3. Panel: Digital broadcasting and socioeconomic development - challenges and opportunities

Panellists:

- **Akim Falou-Dine**, Head, Reference File Section and Satellite Network Registration, Radiocommunication Bureau, International Telecommunication Union
- **Professor H Sama Nwana**, Managing Partner, Cenerva Ltd & Director, Atlantic Telecoms & Media
- **Nehemia Mwenisingole**, Principal Engineer, Tanzania Communications Regulatory Authority, Republic of Tanzania
- **John Konteh,** Station Manager, Afri Radio Sierra Leone

Key points

Discussing the benefits of switchover from analog to digital, panelists noted the following:

- The first country in Sub-Saharan Africa to make the switch from analog television, Tanzania reported the following:
    - Improved transmission capacity and quality of signal for television broadcasting
    - Increased market competition among more content service providers
    - Reduction of transmission cost for the CPS
    - Source of revenue for the government in terms of efficient use of spectrum as well as for the auction band
    - Promotion of investments and innovation for the content service providers as they are now concentrated on program creation and new enhanced services
    - Promotion benefits to consumers through a provision of sustainable widespread high-quality services with wider choices of TV programs for socioeconomic development.
    - Promotion of an efficient use of spectrum (assigning spectrum to those that will generate the greatest socioeconomic benefits from its use). After ASO, the previous analog (700MHz)

spectrum was auctioned in order to provide broadband services as per conditions above for the successful bidder.

- Sierra Leone can expect additional Revenue for government
    - Government/NATCOM and the Independent media commission will off course generate revenue from license fees from new TV.
    - Import and excise duties from companies bring in the Digiboxes

- Multiple channels and Programming Variation
    - The state broadcaster has a regional broadcast channel, now what the DSB will do for them is create space for those stations to be added so they'll be channels on the DSB
    - The existing TV stations will have dynamic programs to cater for multiple channel like, sports, local languages, news, entertainment – kids, music, adult etc so their content would not be compressed in to one channel
- The viewers are given options to choose from a vast array of content with higher quality
- Job creation for technicians and content providers
- Multiplexing - DSB will give at least 10 channels to SL (6 SLBC, 2 AYV, 2 Star, FTN)

Challenges experienced in Tanzania include the following:

- The High cost of STBs (around 50 to 75 USD) prompted the government to remove import duty and VAT on STBs
- Challenge in building transmission infrastructure specifically in rural areas – the government intervened by licensing the fourth MUX with special condition to reach the rural areas as well as to increase competition.
- Insufficient local content by CSP contrary to anticipation of producing and airing 60% of locally made programs as they were freed up with transmission activities of their signals. Reasons are weakness of infrastructure in producing local content high production costs.
- Obliged to air 5 free to air channels for free even when there is no bouquet subscribed or expired.
- Interoperability of STBs from the available MUX – final stages of introducing Conditional Access Module (CAM) to facilitate interoperability.
- Unwillingness of CSP to pay MUX the transmission fee
- Weak signal in uneven terrain – there is need to add more towers and repeaters
- Delay in building permits from local authorities and impact environmental assessment
- Lack of attractive content for consumers
- Over compression of MUX thus degrading QoS and QoE

The Way Forward

- The Sierra Leone government has already developed a road map that will inform the country's switch from analog to digital television.
- Funding of the switch over will require partnership with private sector players as well as other creative funding strategies
- It is unadvisable to license multiple broadcast signal distributors for digital transmission as the result can be chaotic. A single distributor is advised.
- Tanzania successfully implemented public education regarding the switchover. The same is advised for Sierra Leone.
- Intense consultation with stakeholders at all levels
- Availability of legal and regulatory instruments
- Communication strategy should be designed to include the print and electronic media, as well as road shows, talk shows, meetings and seminars.
- Generate goodwill among operators

11. DIGITAL INCLUSION AND ACCESSABILITY/ SOCIAL MEDIA AND SAFEGUARDING THE VULNERABLE

Chair: Isatu Harrison, Ex-broadcaster and Entrepreneur, Sierra Leone

11.1. Youth and ICTs: Using ICTs for Transformational Development

James Yorpoi, Hub Manager / Head of Trainer, Sensi Tech Innovation Hub, Sierra Leone

Empowerment

- ICTs are empowering the lives of Youth and are driving entrepreneurship, innovation and economic growth
- It's not about the phone or the computer. It's about the applications and the information they deliver to the youth that bring transformation.

ICT Programs

- Governments have an important role to play in creating an enabling environment and in acting as a lead client for large-scale ICT-based programs
- Effective use of ICTs requires cross-section collaboration and an multi-stakeholder approach, based on open data and open innovation

Community building

- Youth need peer and mentorship support networks that can help them communicate, draw inspiration and gather resources to take action.
- To facilitate the emergence of a global community and network of and for young people working on ICT policy and practice, Sensi Tech Hub have initiated and supported various youth networking and community-building initiatives involving face to face as well as online interactions.

ICT resources for youth Employment & Entrepreneurship

- Youth worldwide face challenges finding a job and earning a decent income.
- Youth are more likely to be unemployed than adults, or find themselves in low paying informal sector jobs
- Youth, however, have an advantage. They are quick to acquire ICT skills and lead the digital age.
- Today, organizations in the public, private and non-governmental sectors have made a wide range of resources available to help youth gain the skills they need to get a job or start a business.
- This database is for youth. It contains resources for finding employment, becoming an entrepreneur, learning technical and soft skills, finding a mentor, searching for funding, networking, and many other valuable services.
- Best of all, most of the resources are free, available in numerous countries around the world, and in many languages.

Sensi role (Innovation Hub)

- Experience in training – Sensi has a team of 30 employees including 10 ICT trainers with a combine experience of 50+ years in delivering ICT/Digital literacy training in sierra Leone and beyond on such programs as Women in Tech and via our Zumba Boxes in Makeni and Pujehun
- Space – Sensi has an open space in Freetown (that can host up to 150 people), a branch in Kabala, Makeni, Pujehun and Wellington combine can hold 400 people per session
- Expert Capabilities – Sensi has a pool of experts that can deliver training in software development, programing and coding with wealth of experience

11.2. Panel How should governments further reduce the digital gender gap?/How to safeguard social media and protect the vulnerable

Panellists:

James Yorpoi, Hub Manager / Head of Trainer, Sensi Tech Innovation Hub, Sierra Leone

Kippy Sessay, Customer Care Manager Africell

Shane O'Connor, Technology for Development Officer, UNICEF

David Mansaray, Chief Executive Officer, Orange Money, Orange Sierra Leone.

Mohammed Babajika, Director, Policy Competition and Economic Analysis, Nigerian Communications Commission

Key points

- Women, particularly in sub-Saharan Africa are lagging behind when it comes to accessing lifesaving information on the internet and lifesaving information
- Orange and Africell money services available in most parts of Sierra Leone encourage inclusivity of rural populations
- The Universal Service Provision Fund (USPF) facilitates universal access and universal service to ICTs in rural areas in Nigeria.
- It is advisable to reduce or remove taxes on smartphones coming into the country to make them more affordable for women
- While cyberbullying is not as prevalent in Sierra Leone as other countries, there have been reported cases. Increased sensitization in schools is advised.

Report submitted by FreeMedia Group