

# "Standardization of Future Networks and Emerging Network Technologies: African perspectives"

**Abidjan, Côte d'Ivoire, 19-20 September 2023**



# Keynote Presentation: Importance of African Involvement in ITU-T standardization activities

## Takeaways and Conclusions

1. It is very important to African countries to participate in the development of ICT standards in order to ensure that their specific concerns and perspectives are taken into account, to stay updated on the latest technological advancements and industry trends and to enhance their technical skills and knowledge in the ICT field.
2. African involvement in SG13 is improving progressively, both in terms of number of participants, contributions and proposed new work items.

## Suggestions to ITU-T

- To continue raising awareness regarding the importance of standards for African countries in order to increase their participation in the standardization activities of SG13 while continuing discussions on the necessary mechanisms to encourage the participation of SMEs, start-ups and Academia.
- To encourage the establishment of national standards bodies in African countries.
- To encourage the creation of task forces in Africa on future networks and emerging technologies such as Cloud Computing, IMT-2020 and beyond, fixed-mobile convergence and Machine Learning.



# Keynote Presentation: Importance of African Involvement in ITU-T standardization activities

## Takeaways and Conclusions

3. Many initiatives were taken to increase African participation in the work of SG13, mainly the establishment of SG13RG-AFR during WTSA-12, the organization of 9 SG13 regional workshops for Africa since 2013, and the organization of BSG trainings alongside SG13RG-AFR meetings.

## Suggestions to ITU-T

- To continue organizing training sessions on how to prepare, submit and negotiate contributions which could help increase the number of contributions from Africa to upcoming SG13 and SG13RG-AFR meetings.
- To encourage African countries to host SG13 meetings to help promote SG13 activities in Africa and increase African participation and contributions.
- To disseminate Surveys at the end of regional workshops to collect feedback from participants (ITU members and non-ITU members) and to identify standardization priorities for African countries in relation to SG13 topics



# Session 1: Standardization Hot Topics 1, IMT-2020 & Beyond IMT-2020 Networks

## Takeaways and Conclusions

1. Given the large number of underserved population in rural areas in Africa, Direct satellite-to-device (standard devices) connectivity can be a solution for rural connectivity.
2. Developing countries have specific challenges : Limitation on radio coverage and network connections, limitation on infrastructure and energy supply, under deployment of IMT-2020 network, limitation on technical capabilities.
3. Energy saving is a promising technology. Energy saving supports to reduce energy use and improve energy efficiency, while guarantying Quality Of Service is a key concern.

## Suggestions to ITU-T

- Accelerate non-terrestrial networks (satellite telecommunications) standards in the definition of IMT-2020 and beyond IMT-2020.
- African countries encourage the standardization of FMSC (Fixed, mobile and satellite convergence) in order to provide “Ubiquitous Connectivity” usage scenario in IMT-2030.
- Developing Countries need an efficient and customized IMT-2030 network.
- Energy saving is a promising technology to support the IMT-2030 “Sustainability” features in the non-radio part.



# Session 1: Standardization Hot Topics 1, IMT-2020 & Beyond IMT-2020 Networks

## Takeaways and Conclusions

4. 5G deployment journey in Africa. Example of Nigeria :
  - a) 3500–3600 MHz and 3700–3800 MHz were freed for 5G.
  - b) There are currently 833 5G sites deployed in Nigeria and covering 33 cities across the country. 1 000 sites are expected by the end of year 2023.
  - c) The key challenge experienced in Nigeria with regards to 5G adoption was in use of the services by Samsung and Apple devices within the Country. It is worth mentioning that Both Apple and Samsung are currently in engagement with the Mobile Network Operators within the country to foster a way forward.
  - d) IMT-2020 Networks are introducing new challenges in terms of QoS and QoE. New QoS and QoE metrics and measurement procedures are under development in Nigeria.

## Suggestions to ITU-T

- The Issues experienced with Apple and Samsung devices in Nigerian 5G Networks, brings to bear the inherent challenges and importance of Standardization for developing nations. ITU-T should consider these specific standardization issues for developing countries.



# Session 2: Standardization Hot Topics 2, Machine Learning and Artificial Intelligence for future Networks

## Takeaways and Conclusions

1. Innovations are evolving rapidly. That's why we now see 6G as the future.
2. Artificial Intelligence and machine learning can help Africa catch up and compete with other developed nations.
3. Artificial Intelligence is already having an impact in Nigeria, particularly in the health, education, agriculture and finance sectors. However, its use is not yet widespread, and challenges remain in terms of infrastructure and connectivity.
4. The Focus Group on Autonomous Networks (FGAN) was established under the ITU (International Telecommunication Union) and aims to develop technical reports and recommendations for autonomous networks.

## Suggestions to ITU-T

- Put in place the right policies, build skills, educate the population and ensure that AI is adapted to African needs.
- Join FGAN efforts to contribute to the creation of regional knowledge bases for autonomous networks.



# Session 3: Standardization Hot Topics 3, Network Evolution, Trust and Quantum Enhanced Networking

## Takeaways and Conclusions

1. Quantum Key Distribution Networks (QKDN) consist in procedures or methods for generating and distributing symmetrical cryptographic keys with information theoretical security based on quantum information theory (by ETSI).
2. Quantum computing is a scientific field that brings together classical computing, mathematics and the principles of quantum mechanics to solve complex problems faster than classical computing.

## Suggestions to ITU-T

- Due to importance of quantum technologies, African countries should play a greater role in ITU standardization work.
- African countries should step up research based on quantum computing to profit benefits for better ICT development in Africa.
- Kick off relevant studies and discussions of trust topics for AI and relevant technologies.



# Session 3: Standardization Hot Topics 3, Network Evolution, Trust and Quantum Enhanced Networking

## Takeaways and Conclusions

3. Quantum entanglement and quantum superposition offers new opportunity in terms of massive data processing capacity.
4. SDN programmable networks offer a new paradigm for managing data transmission (routing, etc.).

### SDN challenges :

- Performance ;
- Scalability;
- Security.

## Suggestions to ITU-T

- Make trust more objective and quantifiable in the future.
- Cooperate with more groups and SDOs.





## Takeaways and Conclusions

1. Cloud computing deployment is imperative in Africa; though, a number of concerns or challenges ought to be addressed, including the following:
  - a) Security aspects in cloud computing to ensure safeguards against intrusion, data integrity, data leakages, data sovereignty, etc;
  - b) Energy availability concerns;
  - c) Investment concerns;

## Suggestions to ITU-T

- The need to harmonize data protection laws and regulations, to ensure data sovereignty.
- The need to pursue a regional level negotiated approaches with the tech- giants, e.g. Meta (Facebook), Instagram, et al. (Case example of Malabo Convention for cybersecurity).
- The need to examine 5G impact on the 4IR in Africa, especially its influences on manufacturing.
- The need to have appropriate type approval regulation/standardization (e.g. to avoid the Nigerian devices issues with Apple and Samsung).



## Takeaways and Conclusions

d) Human capital to develop and support the various emerging technologies;

e) Huge data gathered with many actors/or aggregators with the view to standardize.

2. Protocols are established for cloud computing to address aviation data.

3. The benefits of Open RAN /Cloud RAN should be explored in Africa.

## Suggestions to ITU-T

- The need to review some standards in cloud computing, including terminologies, for the African region.
- The need to make cloud services scalable.
- The need to create African based CSP Hub, from which other countries could patronize.
- The need to encourage a PPP investment arrangements or models for the deployment of 5G Cloud-aligned services, as accelerated deployment



## Session 5: Experiences & Successful Stories from Africa

### Takeaways and Conclusions

1. Nearly 300 million Africans live more than 50 kilometers from a fiber or cable broadband connection, hence the lack of widespread availability of high-speed internet remains a significant hurdle for Africa to fully harness the potential of digital transformation.
2. Africa's \$180B Internet economy future.
3. To support Africa in its digital transition, it is essential to invest in promoting hyperconnectivity, the adoption of artificial intelligence, and quantum technology, while placing a particular emphasis on security.

### Suggestions to ITU-T

- With a significant number of Africans living far from fiber or cable broadband, ITU-T should prioritize initiatives that focus on expanding rural connectivity. Exploring alternative, cost-effective technologies like satellite-based internet or wireless broadband solutions can help bridge this gap.
- Collaborate with governments, private sector, and international donors to create a funding pool dedicated to improving internet infrastructure across the continent.



# Session 5: Experiences & Successful Stories from Africa

## Takeaways and Conclusions

4. Nigeria's telecommunications sector is a major driving force, significantly influencing and aiding the integration of modern technologies across various sectors, notably agriculture and entertainment.
5. With substantial investments in blockchain and increasing collaborations with OTT platforms like Amazon Prime and Netflix, Nigeria is embracing emerging technologies and establishing itself as a pivotal player in both the regional and global tech arenas.
6. WINEST, FUT Minna, Nigeria stands out as a crucial local partner, making notable contributions to ITU and other regional groups, emphasizing the value of local expertise.

## Suggestions to ITU-T

- Recognize and support local success stories like Nigeria's NigComSat. ITU-T can help expand such initiatives or replicate their success in other African nations.
- It is important that ITU continues its initiatives for academia, bringing pre-standards research.
- It is high time to start a focus group for machine learning in 6G. WINEST group will collaborate with ITU to contribute to such efforts.



# Session 5: Experiences & Successful Stories from Africa

## Takeaways and Conclusions

7. There are immense opportunities presented by ITU-T standardization for African countries. Embracing technological innovation, fostering international partnerships, and focusing on digital inclusion can pave the way for sustainable development and enhanced cross-border connectivity.

8. African nations have adeptly integrated ITU-T standards across various sectors like rural connectivity, e-governance, and online education. This is evident in the success stories of several countries such as Kenya's M-Pesa, Ivory Coast's E-gouv Portal, and Rwanda's Connect Rwanda Project.

9. Despite the successes, African nations face challenges in adopting ITU-T standards. These challenges range from high initial costs and the need for education and training to issues of unequal internet access and data security concerns.

## Suggestions to ITU-T

- ITU-T could establish regional training centers in Africa to facilitate the adoption and implementation of standards. These centers might offer technical training, workshops, and certification programs.
- In collaboration with governments and local partners, ITU-T could implement initiatives aiming to increase internet coverage in underserved and rural areas.
- ITU-T should provide guidance and resources to African countries to enhance data security, focusing on standards and best practices.



## Session 5: Experiences & Successful Stories from Africa

### Takeaways and Conclusions

10. There are immense opportunities presented by ITU-T standardization for African countries. Embracing technological innovation, fostering international partnerships, and focusing on digital inclusion can pave the way for sustainable development and enhanced cross-border connectivity.

### Suggestions to ITU-T

- Encouraging and facilitating cooperation among African nations regarding ITU-T standards can boost technological innovation and enhance cross-border connectivity.



# Panel Discussion: Importance of standardization of SG13 hot topics for African countries

## Takeaways and Conclusions

1. ITU-T standards are of high importance and usefulness for African countries and cover interesting technologies and services for Africa such as the digital financial services
2. African countries' participation in the work of ITU-T is deemed insufficient and needs to be further improved
3. Need for the African countries to see the issue of standardization not as a country problem and to collaborate together to enhance their participation in ITU-T's activities
4. Africa is not yet ready to embrace some new technologies; a strong involvement of the entire ecosystem is needed in order to create the necessary framework for an acceleration program with financial support
5. There is a need to further harmonize African ICT markets in order to benefit from economies of scale
6. The high cost of end user equipment is a barrier to the adoption of future technologies

## Suggestions to ITU-T

- To focus on studies related to the interoperability between future networks and legacy networks (2G, 3G and 4G).
- To focus on studies related to energy efficiency and security issues of future networks.



# Panel Discussion: Importance of standardization of SG13 hot topics for African countries

## Takeaways and Conclusions

7. Future networks can't be deployed without the availability of adequate human resources with the needed skills to understand and manage these networks, thus the importance of capacity building with regards to future networks and the integration of ICTs into the curricula of secondary schools and universities
8. The elaboration of an inventory of the needs of rural and remote areas in terms of connectivity is needed to set priorities and involve relevant stakeholders (government, operators, financial sponsors, etc.) The requirements for migration to IMT-2020 networks include the proposal of new Business models for spectrum allocation, the availability of low-cost terminals, increasing fiberization and the education of the market regarding mobile data usage.

## Suggestions to ITU-T





# Panel Discussion: Importance of standardization of SG13 hot topics for African countries

## Takeaways and Conclusions

9. Establishing national standardization committees can help to enhance African countries participation in ITU-T work and to improve the quality of contributions
10. There is a need to support young people in entrepreneurship
11. African countries need to set up a roadmap for the adoption of new technologies

## Suggestions to ITU-T