



**Seventh SG13 Regional Workshop on
“Standardization of Future Networks towards
Building a Better Connected Africa”**

**FACILITATING SMART AFRICA
ON THE PLATFORM OF 5G**

Held in Abuja, Nigeria

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Abuja, Nigeria, 3-4 February 2020



Content

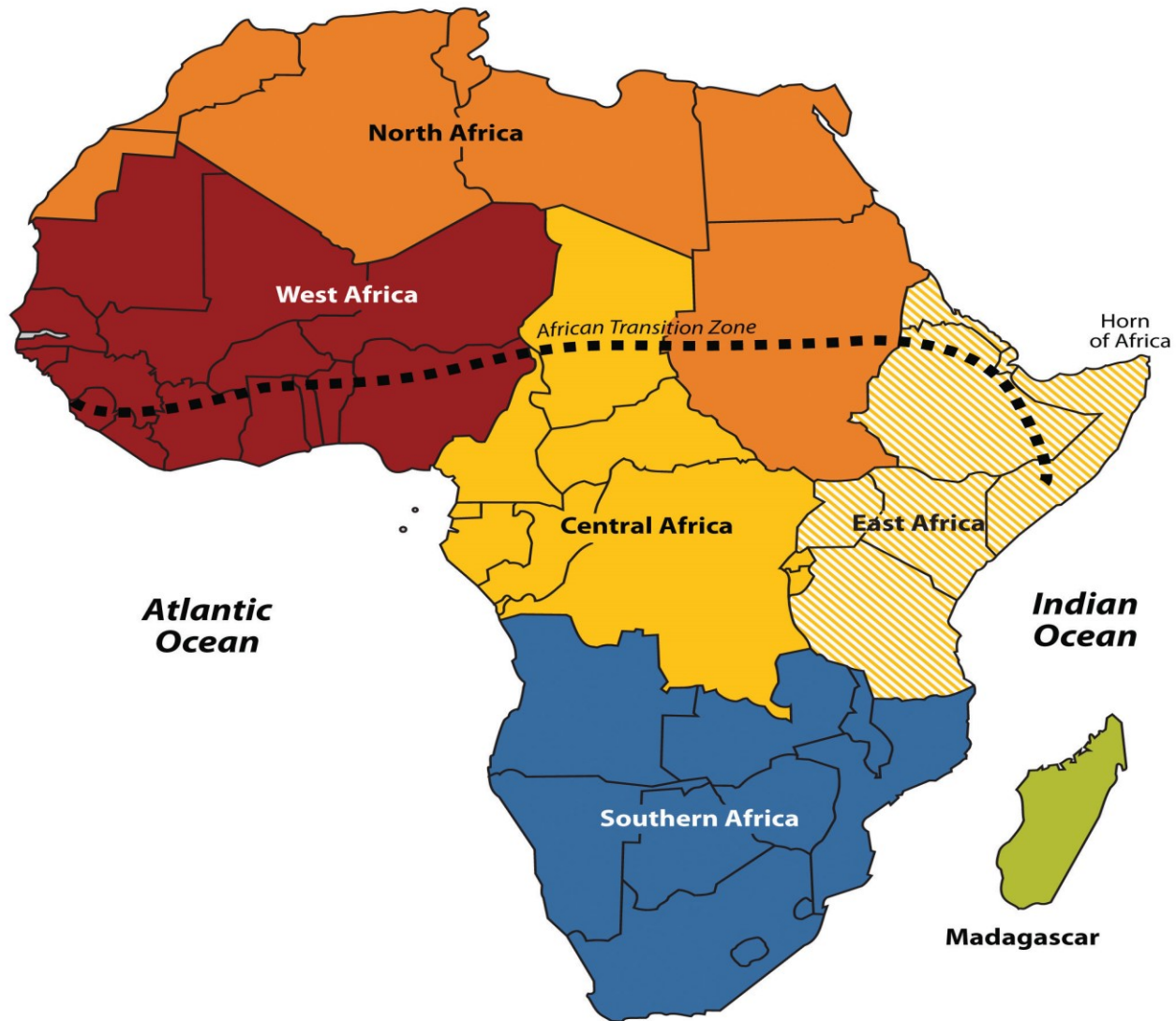
- Introduction
- Smart Africa/Digital Economy
- Digital Inclusion
- Smart Systems
- 5G Technology
- Application of Local Content
- Africa Application
- Conclusion

INTRODUCTION - CONTINENT OF AFRICA

- 54 Countries
- Population of Africa approximately 1.34billion
- Good arable land mass and rich mineral resources
- Mostly herdsmen and farmers with non-mechanised tools
- Economically and commercially unviable rural areas
- Undeveloped, underdeveloped, developing rural areas
- Unfathomable wasted solar energy
- Politically fragmented as structured by former different colonial masters
- Africa suffering from self-inflicted jetlag



REGIONAL MAP OF AFRICA



Challenges of Africa

- Politics – Political crisis
- Funding issues
- Policy Instability
- Energy Crisis
- Human Capital
- Education
- Health
- Low fixed line coverage, Low fibre link penetration
- In-efficient spectrum utilisation
- Lack of both regional and sub-regional intra- and inter-connectivity
- Poor infrastructural development
- Dividing and Uniting Factors

REGIONAL MAP OF AFRICA



Smart Africa Initiative

- The Transform Africa Summit held in Kigali, Rwanda on 28th-31st October 2013 led to the initial adoption of the Smart Africa Manifesto by Seven (7) African Heads of States.
- At the 22nd Ordinary Session, of the Assembly of the African Union in Addis Ababa, 30th-31st January 2014, all African Union Heads of State and Government endorsed the SMART Africa Manifesto.
- Smart Africa Initiative is developed to assist in overcoming digital and economic challenges



Declaration by African Heads of State, the AU

- **We, the Heads of State and Governments here present, commit support the socioeconomic transformation of Africa through smart implementation and application of Information and Communication Technologies**
- **We will provide leadership in the implementation of SMART country programs and hereby invite our development partners and private sector to join us in this endeavor.**
- **We, the Heads of State and Governments here present, commit to the following principles.**



The Smart Africa Principles/Manifesto

Principle 1:

- *To put ICT at the centre of our national socio-economic development agenda*

Principle 2:

- *To improve access to ICT especially Broadband*

Principle 3:

- *To improve accountability, efficiency and openness through ICT*

Principle 4:

- *To put the Private Sector First*

Principle 5:

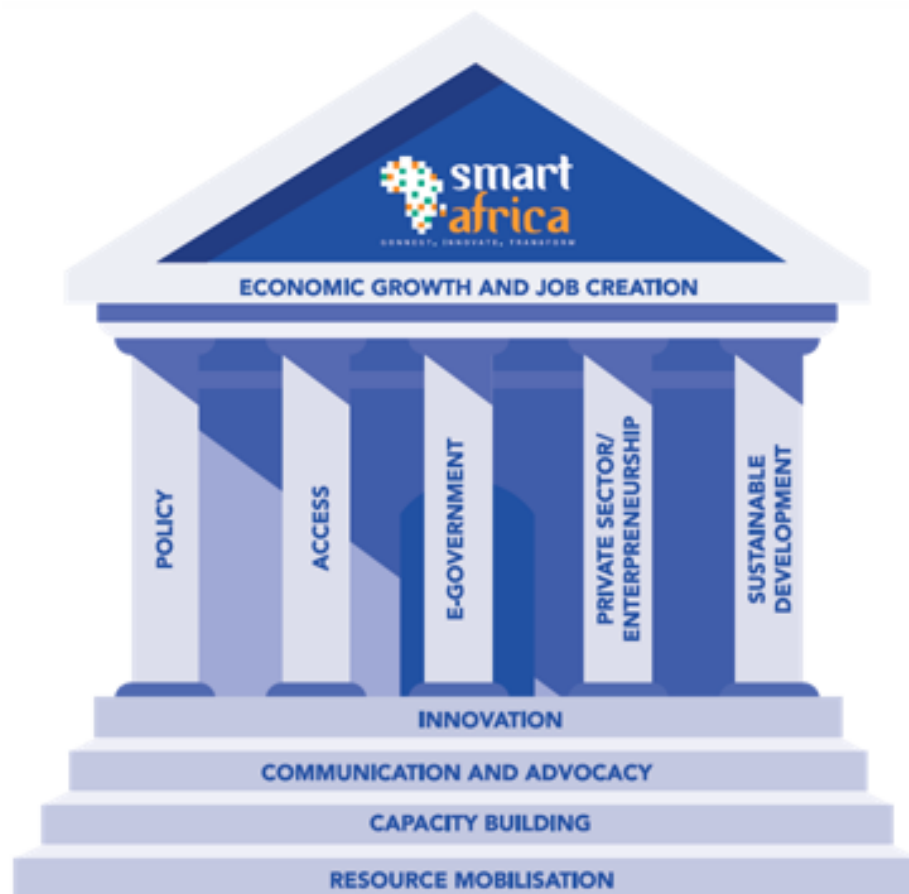
- *To leverage ICT to promote sustainable development*

Smart Africa Strategy

- Alliance –a framework for implementation, monitoring and evaluation of the SMART Africa Manifesto, designed to make it actionable.
- Pillars: reflect the 5 principles of the Smart Africa Manifesto
- Enablers: support the implementation of SMART Africa.



Smart Africa Pillars



PILLARS

The SMART Africa has 5 pillars which reflect the 5 principles of the Smart Africa Manifesto. These pillars are:

- (1) Policy,
- (2) Access,
- (3) e-Government,
- (4) Private Sector / Entrepreneurship
- (5) Sustainable Development.

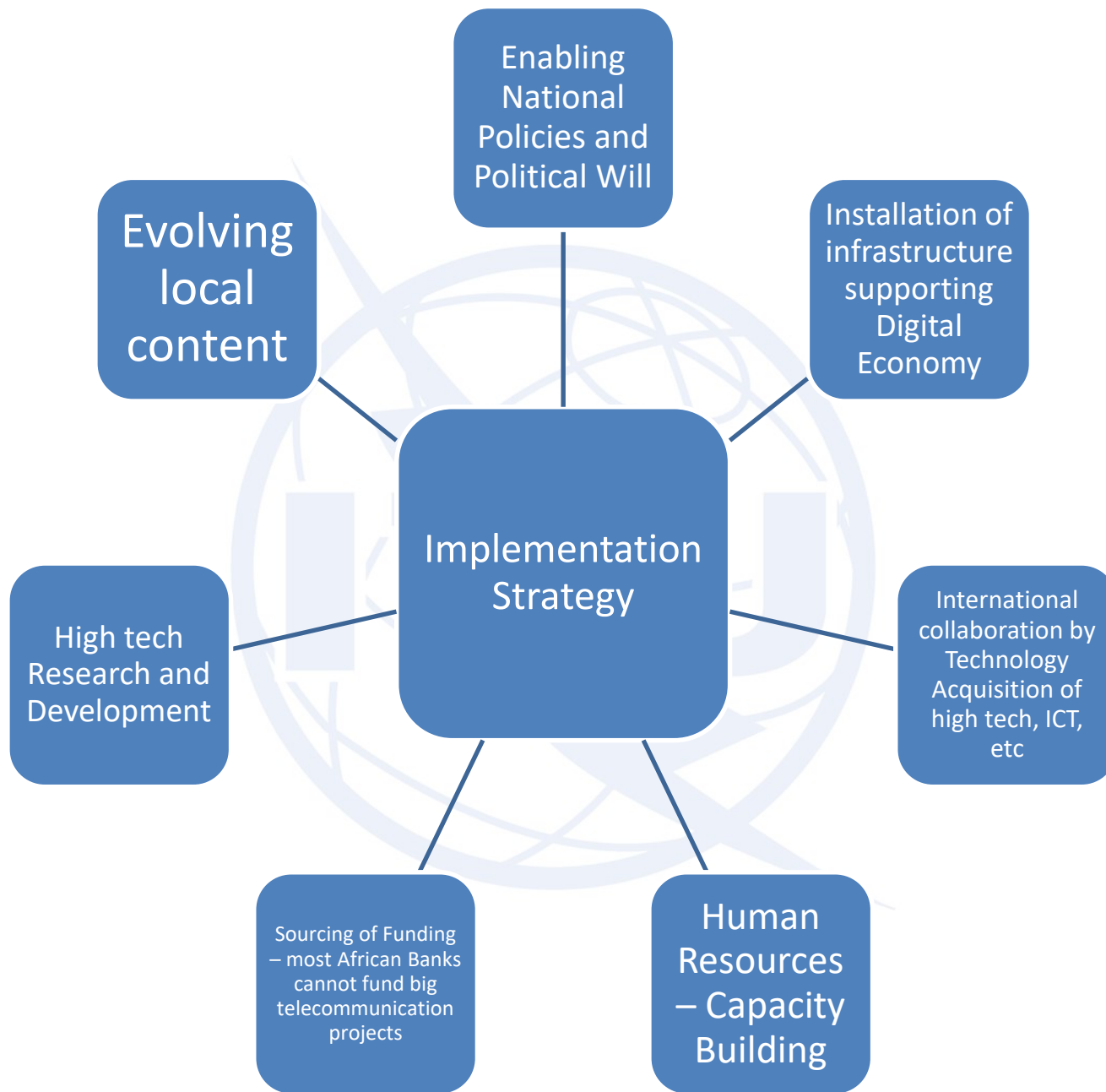


ENABLERS

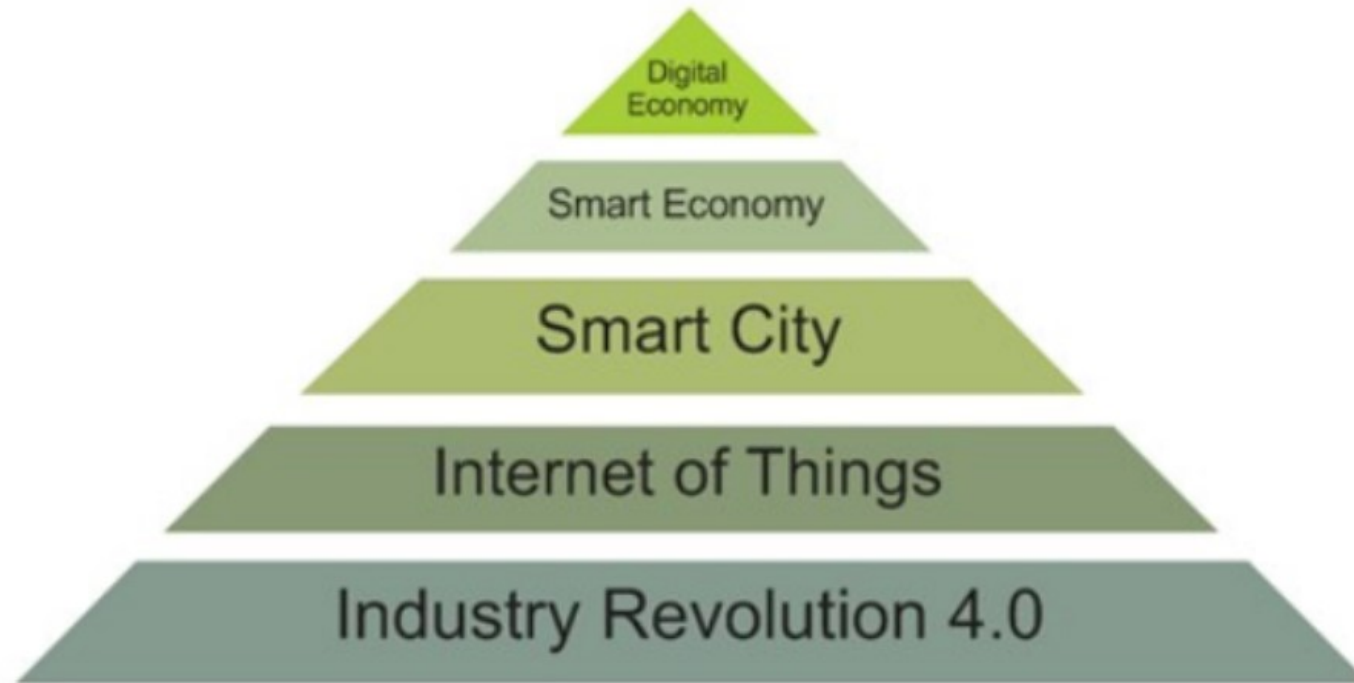
- The pillars are built on four, cross-cutting enablers which will support the implementation of SMART Africa. These enablers are
 - (1) Innovation;
 - (2) Communications and Advocacy;
 - (3) Capacity Building; and
 - (4) Resource Mobilization.
- The 5 pillars and 4 enablers effectively developed and combined will contribute to Economic Growth and Job creation, which remains the ultimate goal of the Smart Africa Manifesto.

Digital transformation

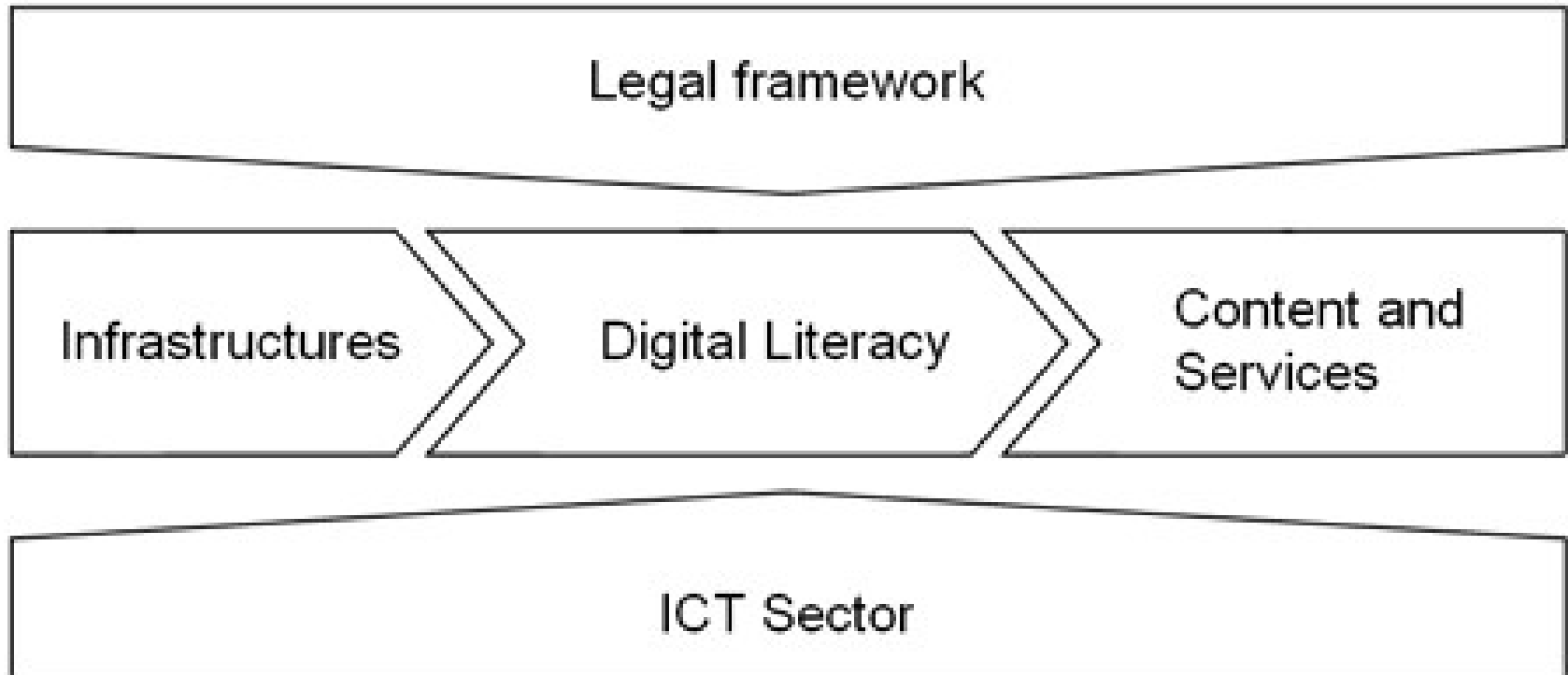
- Digital Economy
- Smart City,
- Smart Everything
- The Internet of Things (IoT)
- Digital Africa



Digital Economy refers to an economy that is based on digital technologies.



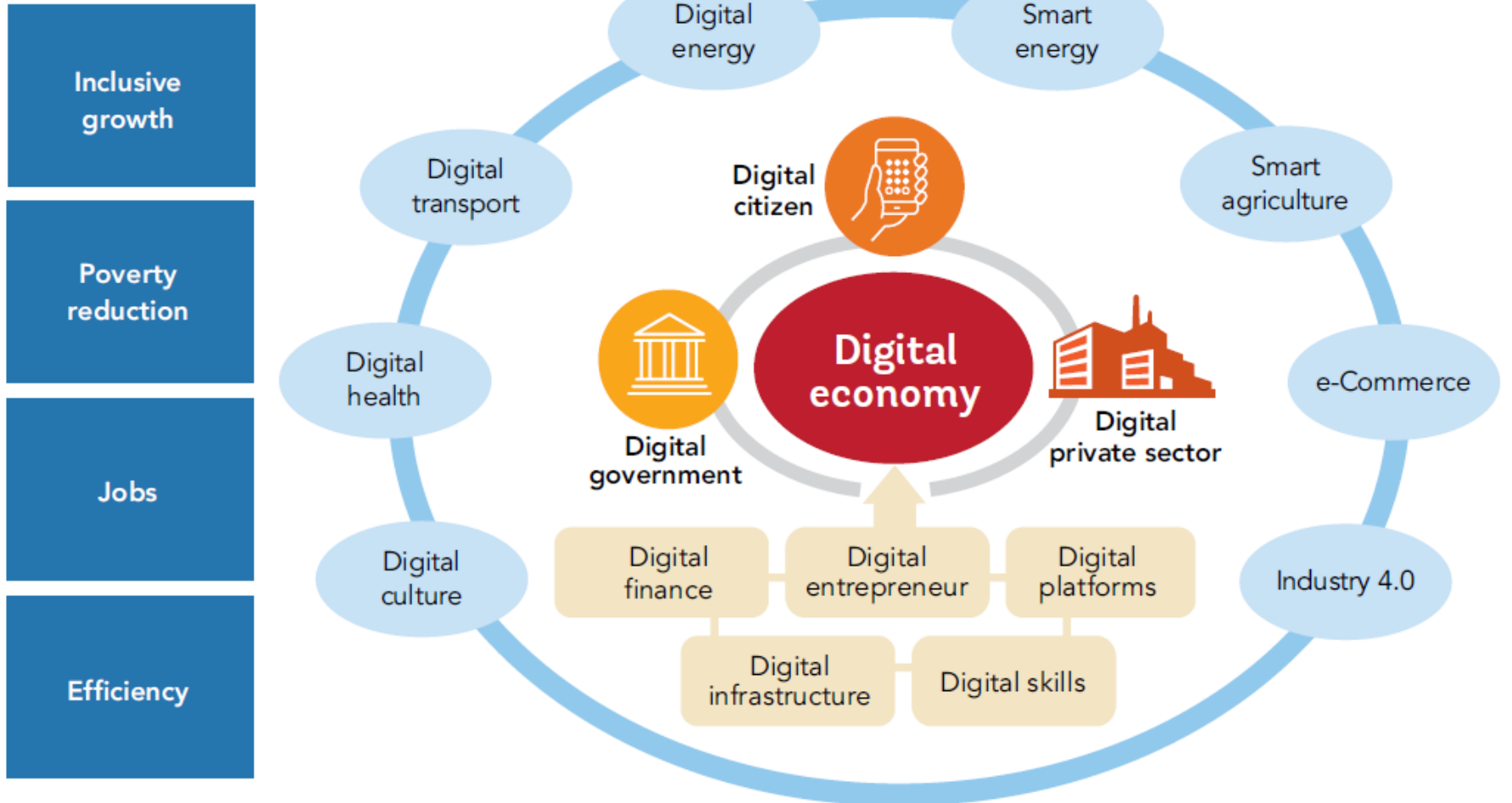
Digital Economy



5 step approach to the Information Society development – ICTlogy.net

Digital economy can bring shared prosperity and reduced poverty

- Nigeria Digital Economy Diagnostic Report



- The term 'Digital Economy' was coined in Don Tapscott's 1995 best-seller *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*.



Building Smart Africa

- Digital Inclusion
- Smart Economy
- Smart City
- Smart Everything
- e-Governance
- e-Government

Digital Business

- Recently, TechCrunch, a digital economy news site, noted, *“Uber, the world’s largest taxi company, owns no vehicles. Facebook, the world’s most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world’s largest accommodation provider, owns no real estate... Something interesting is happening.”*

Digital Business

- Online business: Konga, Yudala, Jumia, Amazon, eBay
- Cashless economy, ATM, Provision of on-line Banking, Mobile banking
- Clearing goods (e-government business)
- VAS provision – games, video streaming, on-line advertisement,
- Hulu, NETFLIX, IFLIX



e-Transactions Part of Daily Process

People will grow intolerant of outages
disappointment if not successful



**Tired of online businesses
THAT DON'T WORK?**

CLICK HERE >>

The image shows a woman with long brown hair, wearing a white shirt and a watch, sitting at a desk with a laptop. She has a frustrated expression, resting her head on her hand. The background is a collage of US dollar bills. A large green button with a white border and a white underline is positioned to the right of the woman, with the text 'CLICK HERE >>' in white, bold, italicized font. The button is surrounded by a glowing orange aura.

Digital Inclusion

The empowerment includes: Affordable, robust broadband Internet services
Internet-enabled devices that meet the needs of the user,
Quality technical support,
Pervasive infrastructural development

3 ASPECTS of DIGITAL INCLUSION

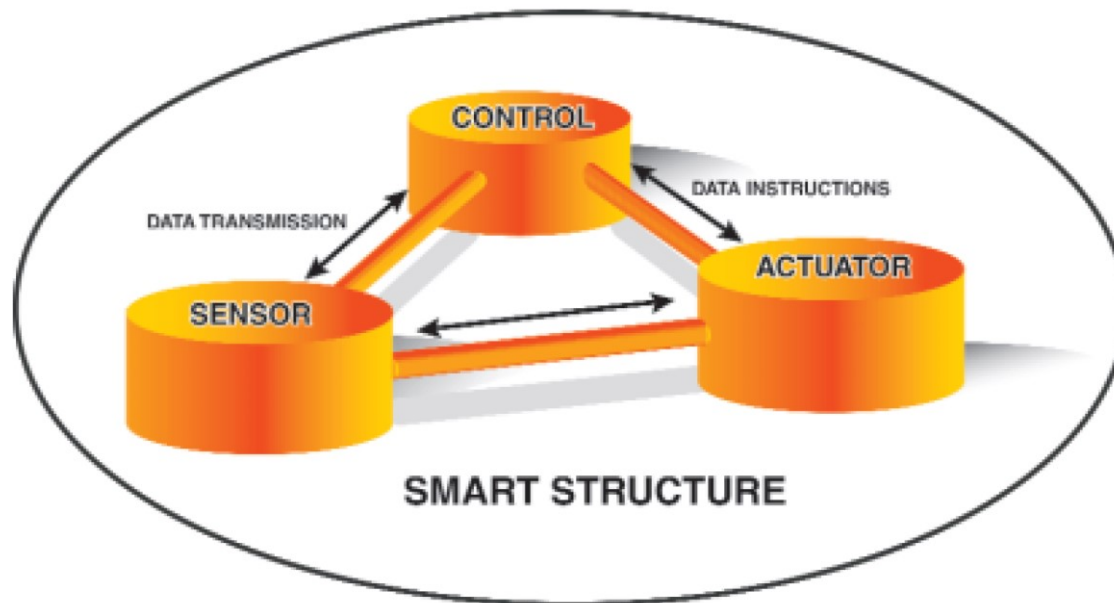


ACCESS: availability and affordability
ADOPTION: digital literacy
APPLICATION: workforce development, education, health care, civic engagement

Digital inclusion refers to the empowerment of individuals and communities, including the most disadvantaged, to have access through Information and Communications Technology, having the skills and motivation to confidently go online to access the opportunities of the internet.

Smart Systems

- Smart systems consist of systems with sensors and actuators that are either embedded in or attached to the system to form an integral part of it.



Smart Systems

Canadian Military Journal, 08/2000 describes smart systems:

- Smart systems envisioned devices and materials that could mimic human muscular and nervous systems.
- Non-biological systems that will achieve the optimum functionality observed in biological systems through emulation of their adaptive capabilities and integrated design.

Smart Economy

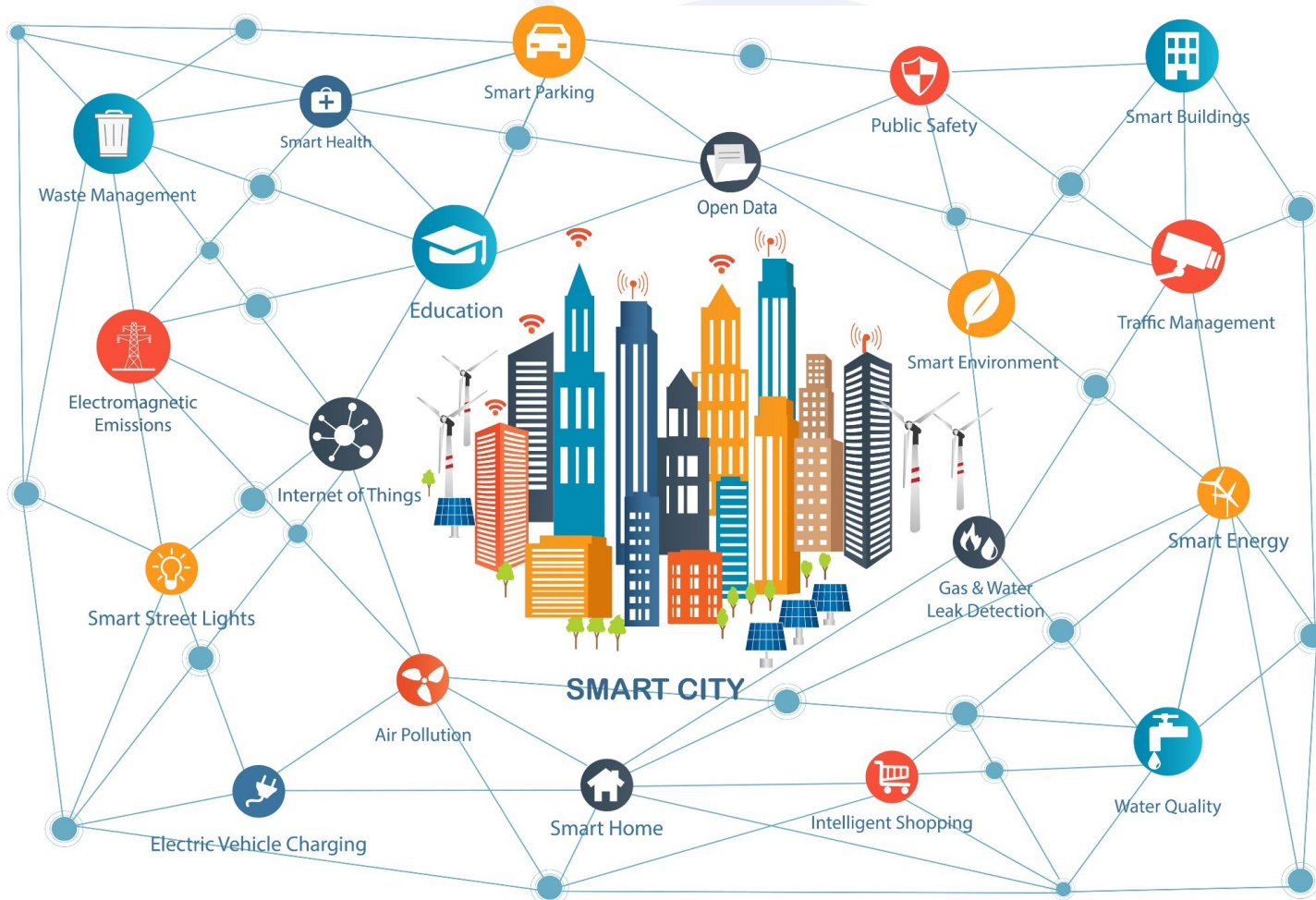
- Application of Smart Systems and utilizing digital technology in decision making lead to Smart Economy.



A SMART CITY

- A smart city is a designation given to a city that incorporates information and communication technologies (ICT) to enhance the quality and performance of urban services such as energy, transportation and utilities in order to reduce resource consumption, wastage and overall costs.

Smart City



Smart city six dimensions

- Smart city is formed from six development dimensions that represent elements of urban governance activities, namely:
- smart people,
- smart government,
- smart economy,
- smart living,
- smart mobility, and
- smart environment.
- These six dimensions are the basic elements that exist in the wheel of city life.

How to make a Smart City

- A **smart city should** have a **smart** infrastructure, that **should** respond in real-time to the **needs** of the users.
- Smart Energy
- Smart Transportation
- Smart Communication System
- Smart data
- Smart Internet of Things (IoT) devices
- Smart infrastructure

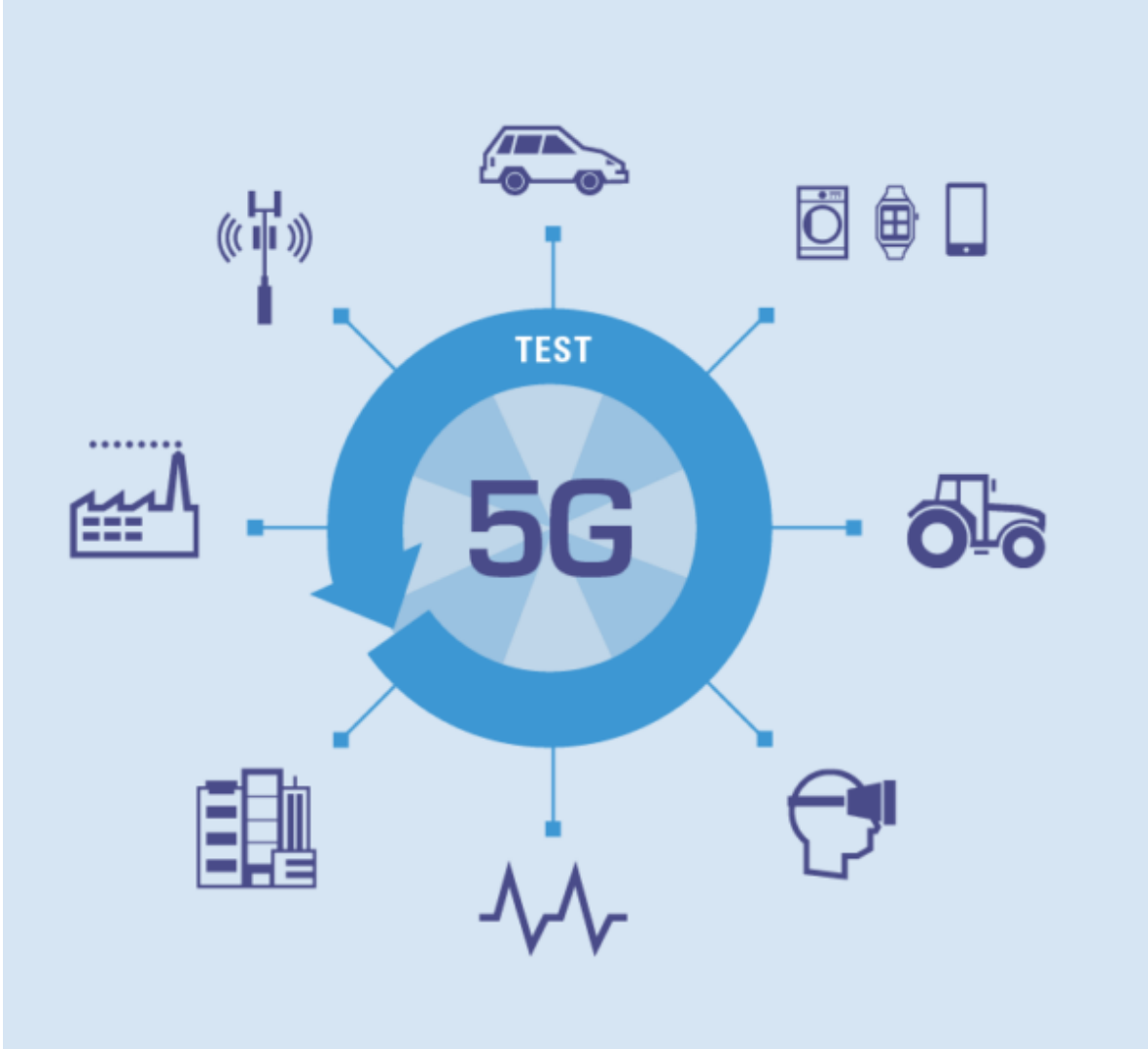
5G Networks Concept

- 5G networks will not only be faster than any previous mobile technology family, but they will also be more agile and easier to manage, catering for a range of use cases and requirements under a single unified physical network.

International Mobile Telecommunications- 2020 (IMT-2020) - 5G

- 5G provides innovative platform for growth,
- Speed/bandwidth
- Low latency
- Adaptable interface – Slicing
- Network Function Virtualisation (NFV) and Software Defined Network (SDN)
- Energy efficiency
- Capacity
- Mobility
- High connectivity rate

5G Versatile Interconnectivity

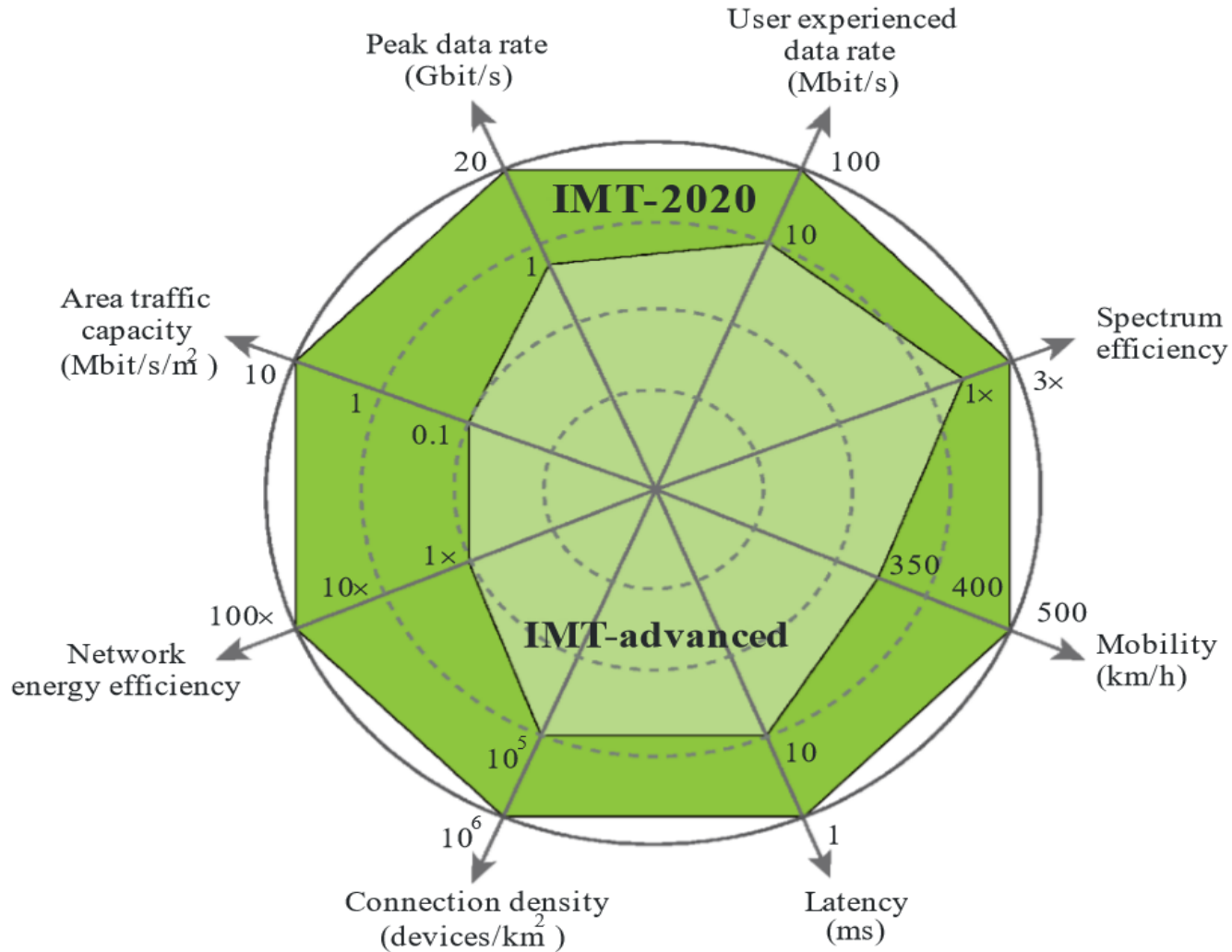


5G Technology

- 5G Technologies
 - System on Chip, Massive MIMO, Massive Carrier Aggregation, Slicing, virtualisation, softwarisation, ICN, Beam forming, Intelligence, Smartness, Massive Sensors,
- Infrastructural needs of 5G
 - Densification of Cells (NR), Ubiquity of service
- Applications and Use cases, IoT, M2M, Autonomous Vehicles,
- 5G Launched in many parts of the world

Rec. ITU-R M.2083-0

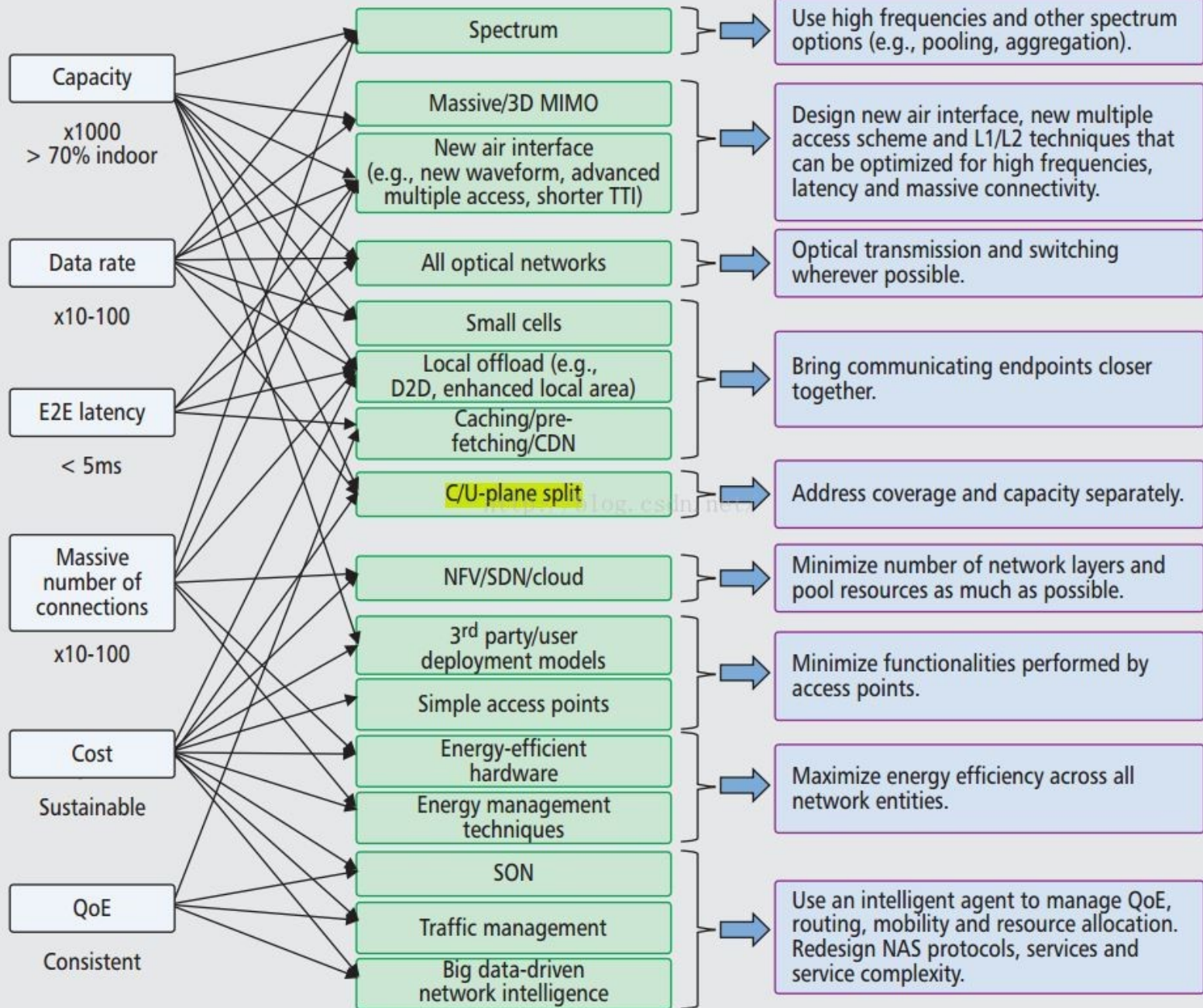
Enhancement of key capabilities from IMT-Advanced to IMT-2020



Challenges

Enablers to address challenges

5G design principles



**Collaboration among nations
towards successful roll out of
5G.**



LEADING 5G VISIONARY ORGANIZATIONS IN EUROPE, USA, JAPAN, SOUTH KOREA AND CHINA SIGN MULTI-LATERAL MEMORANDUM OF UNDERSTANDING FOR “GLOBAL 5G EVENTS”






- In **LISBON, Portugal** –on **October 20, 2015** – many of the world’s leading national and regional associations for the development of future 5G mobile technology, announced their Memorandum of Understanding (MoU) to cooperate on the organization of a series of “*Global 5G Events*” in the interest of efficiency and building global consensus on 5G.

(ref: published by 5G PPP)



Cross-Regional Arrangements to facilitate 5G Rollout

5G Programmes around the world

| Program | Launch date | Country of origin |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------|
|  | May 2013 | South Korea |
|  <small>The Fifth Generation Mobile Communications Promotion Forum</small> | September 2014 | Japan |
|  | January 2002 February 2014 (for 5G) | USA |
|  | February 2013 | China |
|  | December 2013 | Europe |

Vision of Collaboration

The “*Global 5G Events*” intend to support multilateral collaboration on 5G systems across continents and countries. Basic areas of interest for the “*Global 5G Events*” include, but are not limited to:

- Vision and requirements of 5G systems and networks
- Basic system concepts
- Spectrum bands to support the global regulatory process
- Future 5G global standards
- Promotion of 5G ecosystem growth

(ref: published by 5G PPP)



Regional Preparations

- **4G/5G Americas: Unifying the Americas Through Mobile Broadband Technology**
 - 4G Americas is an industry trade organization composed of leading telecommunications service providers and manufacturers.
- **IMT-2020 (5G) Promotion Group: the major platform to promote 5G technology research in China**
 - IMT-2020 (5G) Promotion Group has been jointly established by three ministries in China (the Ministry of Industry and Information Technology, the National Development and Reform Commission and the Ministry of Science and Technology) in February 2013, based on the original IMT-Advanced Promotion Group.
- **The 5G Mobile Communications Promotion Forum (5GMF) Japan**
 - 5GMF was created to conduct research & development concerning the fifth Generation Mobile Communications Systems and research and study pertaining to standardization thereof, along with liaison and coordination with related organizations.
- **The 5G Forum, South Korea**
 - 5G Forum members consists of public and private sectors, including mobile telecommunication carriers, manufacturers and academic professionals.
- **The 5G Infrastructure Association – Public Private Partnership, 5G PPP, EU**
 - 5G PPP is a collaborative research program that is organized as part of the European Commission's Horizon 2020 program – The European Union Program for Research and Innovation. It is aimed at fostering industry-driven research.

(ref: published by 5G PPP)



Regional and National OTT

- none in Africa

- Skype Luxembourg
- WhatsApp USA
- Viber Luxembourg
- Kakao Talk South Korea
- Imo Cuba
- We Chat China
- Telegram Berlin, Dubai
- Line Japan
- Zalo Vietnam
- Chat on Samsung
- BBM Canada
- Facebook USA

Business Sustainability

- Enabling environment – Government Laws, Policies, Regulations
- Socio-Economic system
- Appropriate Business Models
- Economies of scale

How 5G Benefits Smart Africa

- 5G is smart, supports cities with Smart Utilities
- Supports e-Government, e-Governance,
- Supports smart homes, interconnected vehicles, Internet of Things, IoT, smart energy grid
- Near-instant access to most files online
- Minimal lag when streaming videos and playing games
- Smaller devices that offload hardware requirements to remote servers
- Reliable internet in remote areas

How will 5G Facilitate Smart Africa

- Provides intelligent network
- Programmable, intelligent and Connects anything
- Fast with low latency for critical missions
- High Connection density per km²
- It is scalable
- Improved Energy efficiency

Slicing, SDN, NFV

- Network slicing allows the network operator to 'slice' the physical network into smaller virtual networks,
- Software Defined Networking is an emerging technology that allows the separation of the network management from the physical network infrastructure for applications and network services.
- Network Function Virtualisation is a technology which allows network operators to virtualise network functions

Proper Positioning of 5G Platform

- Allocation of adequate spectrum
- Building out enough cellsites for the NRs to achieve high densification
- Ensuring ubiquitous backbone fibre network to achieve the needed broadband penetration

e-Government Imperatives

- Government web services should be fully executable online,
- Government websites should be accessible (through personal digital assistants (PDAs), pagers or mobile phones, computers, or any digital means.
- National (Federal) websites and state websites are to be accessible to the disabled.
- Government websites to have some form of privacy policy available online, and to have a visible security policy.
- Government websites to offer some type of foreign language translation.
- Government websites to be written at the reading level which is within that of the average citizens.
- Government websites not to have user fees.



Imperatives

- Proper planning and coordination by dedicated Body
- Computer literacy should be far reaching
- Strict Identification Model/Biometrics, facial recognition
- Government structure and Political Economy
- Local Content reflecting the local needs
- Regulatory Framework in line with emerging trends
- Harmonised Platforms for interoperability
- Cybersecurity as e-transactions engage cyberspace
- Convergence
- Technology, fixed lines, postal codes
- Human Resources development
- Energy and alternative sources
- Private Public Partnership

Imperatives - Regional consideration

- African Continental International Exchange and Gateway
- Free roaming arrangement for Africa
- Collaboration
- Harness common features
- Develop peculiar features
- Individual implementation

Nigerian Government Initiatives towards Digital Economy

- Nigeria launch of e-Government Master Plan 2018
- Nigeria ICT Roadmap 2017 – 2020
- Nigeria's National Broadband Plan 2013 – 2018
- The e-Government Department of the Ministry of Communications has been working on this project
- Master Plan and Roadmap for the Implementation of Information and Communications Technology for National Development 2012
- Nigeria launched National Digital Economy Policy and Strategy for a Digital Nigeria on Nov 28, 2019
- NITDA is in the process of developing a six-year strategic roadmap and implementation plan to provide strategic direction for facilitating and coordinating e-government development and IT regulations
- Other agencies are developing for themselves
- Ease of doing business



GAPS IDENTIFIED IN ICT DEVELOPMENT

- The major challenges militating against the growth and wide spread use and applications of ICT include:
 - Uncoordinated and inadequate policies coupled with the absence of legal and regulatory frameworks;
 - Mild or non enforcement of, and in some cases non-compliance with existing ICT policies;
 - Inadequate and weak institutional framework precluding seamless synergy between existing ICT implementing institutions and lack of requisite ICT infrastructure;

GAPS IDENTIFIED IN ICT DEVELOPMENT

- Poor efforts in mobilising the citizenry and fast-track ICT penetration, access and affordability;
- Weak Public Private Partnership framework militating against active participation of the Private Sector;
- Poor state of the nation's economic infrastructure, particularly energy, power; and
- Inappropriate costing and poor funding of projects and programmes.

Local Content

- Government structure
- Culture and tradition
- Educational system
- Agriculture – terrain, mode of farming,
- Social life and lifestyle, population
- Local products and raw materials
- Capability to Locally manufacture equipment
- Digital Finance/Money
- Mobile money
- Type of Government

Local Content

- Government Structure
 - Statutes and the Legislative processes
 - Government organisational structure – Federal, State, Local Government and Councils
 - Government administrative structure and processes
 - Peculiarity of sovereign nations
 - Government initiatives and policies

African Content Needs

- Energy
- Funding
- Education
- Health care
- Safety and Security
- Development of local content
 - Games, Entertainment, Tourism, Technology, Talents, OTT
- Agriculture,
- Websites to be hosted in Africa
- Capacity building
- Building out Infrastructure that will carry 5G

Infrastructural Needs

- Core network switching
- Backbone/Long Distance Transmission
- Access Network
- Gateways – domestic and international
- Interconnection Clearing House/Internet Exchange
- Human Capital
- Indirect substructures and support services
- Ancilliary services

Suggested African Future Action

- Relevant enabling policies should be developed
- Establish legal framework and standard systems for e-government services
- Pervasive digital or e-business, e-transaction
- Improve infrastructure and information services
- Development of national strategy for e-government
- Establish governance structure for e-government
- Development of implementation plan for Smart Cities
- Enhance ICT training and education

Conclusion

- 5G features allow flexibility and adaptability
- Any country that does not see the reality of transforming to e-Governance and the ultimate e-Government, will be forced to it at a much higher cost.
- Achieving a strong e-Government in Africa and successful implementation of Smart Africa, effective e-Governance is not a one day tariff.

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