

# Building a Robust Digital Infrastructure Ecosystem:

*Perspectives from an Open-Access Infrastructure  
Provider*



Nigerian Peering & Interconnection Forum 2023

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WTES Ltd







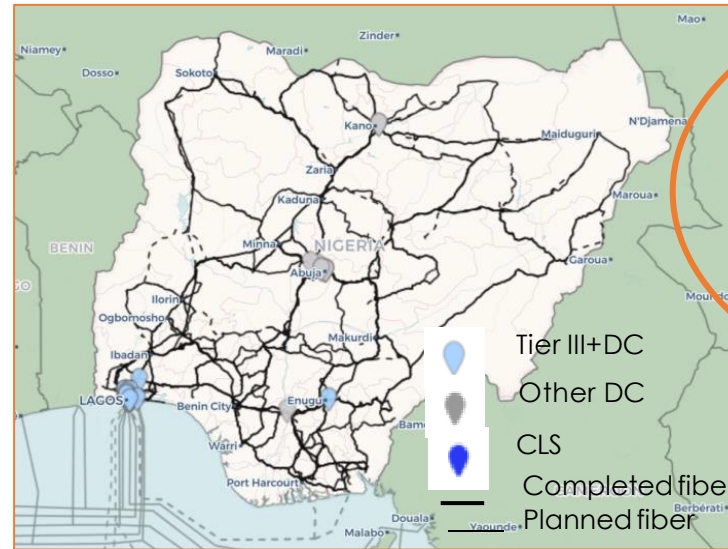




# Nigeria – Telecom & Digital Infrastructure Space

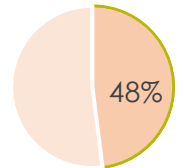
## High-level Overview of Operator Networks

-  6 active submarine cables, > 40 Tbps capacity
-  ~96,000 terrestrial fiber km reaching 48% of the population
-  Metro networks deployed in major cities
-  21+ Data centers



220 million subs (~116% Tele-density)  
 ~100 million Internet Users (~49% Pen.)  
 34,862 Towers  
 127,294 Base Stations  
 289,270 km Microwave links.  
 96,198 km terrestrial & submarine Fibre

Fiber Reach (5 km):  
96.4m people



## Infrastructure Layer Observations

### Int'l Connectivity

- 8 Submarine cables landing in Lagos
- Total Active Capacity > 40 Tbps
- Equiano and 2Africa cables will potentially add capacity of upwards of 300 Tbps

### LDN Backhaul

- MTN, Glo, Airtel, 9mobile, Phase3, WTES, BCN, and Galaxy Backbone have active long-haul fibre networks
- Mostly built for MNO traffic backhaul and switch interconnections
- VSAT and MW Radio Backhaul exist on few Operator routes.

### Metro / Access

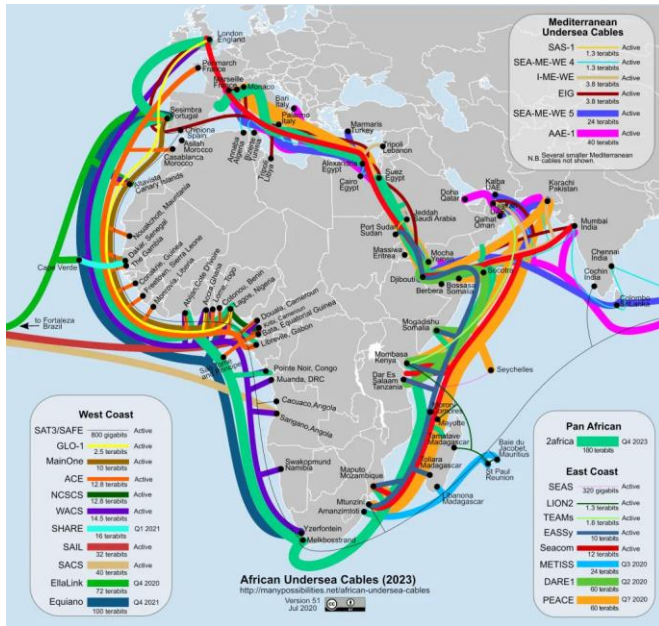
- Metro fiber networks available in most major cities
- Mostly built for mobile traffic backhaul, few on open access
- Last-mile access mostly delivered through dedicated and shared VSAT, FWA/WLL, MBB, Wired Enterprise

### Data Centers

- Many tiered data centers, some carrier neutral; mostly in Lagos and Abuja.
- MDXi, OADC, ADC, MTN, Medalion, GBB, CEWA, RackCenter etc



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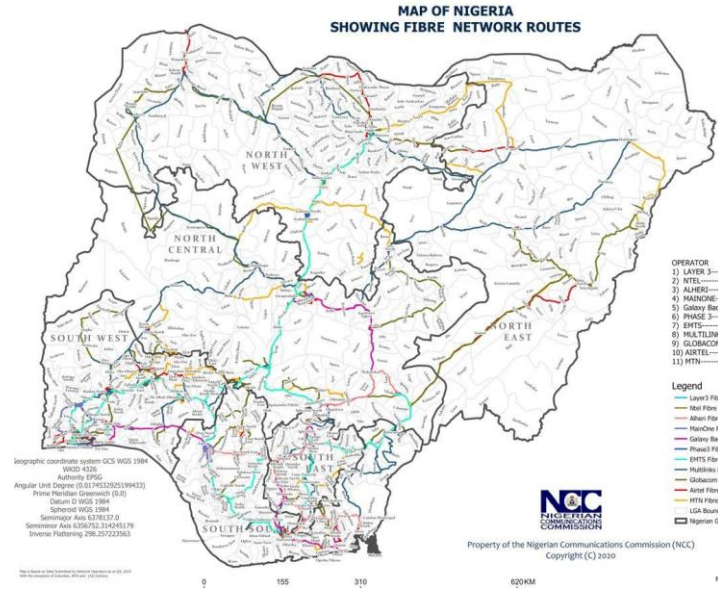
## 8 Submarine Cables

- SAT3/SAFE
- MainOne
- Glo-1
- ACE
- WACS
- Equiano
- 2Africa
- NCSCS

### Fiber Reach

• **Approximately 100 million people still live outside Fiber Reach**

## LD Backbone, Metropolitan Access and Last-Mile



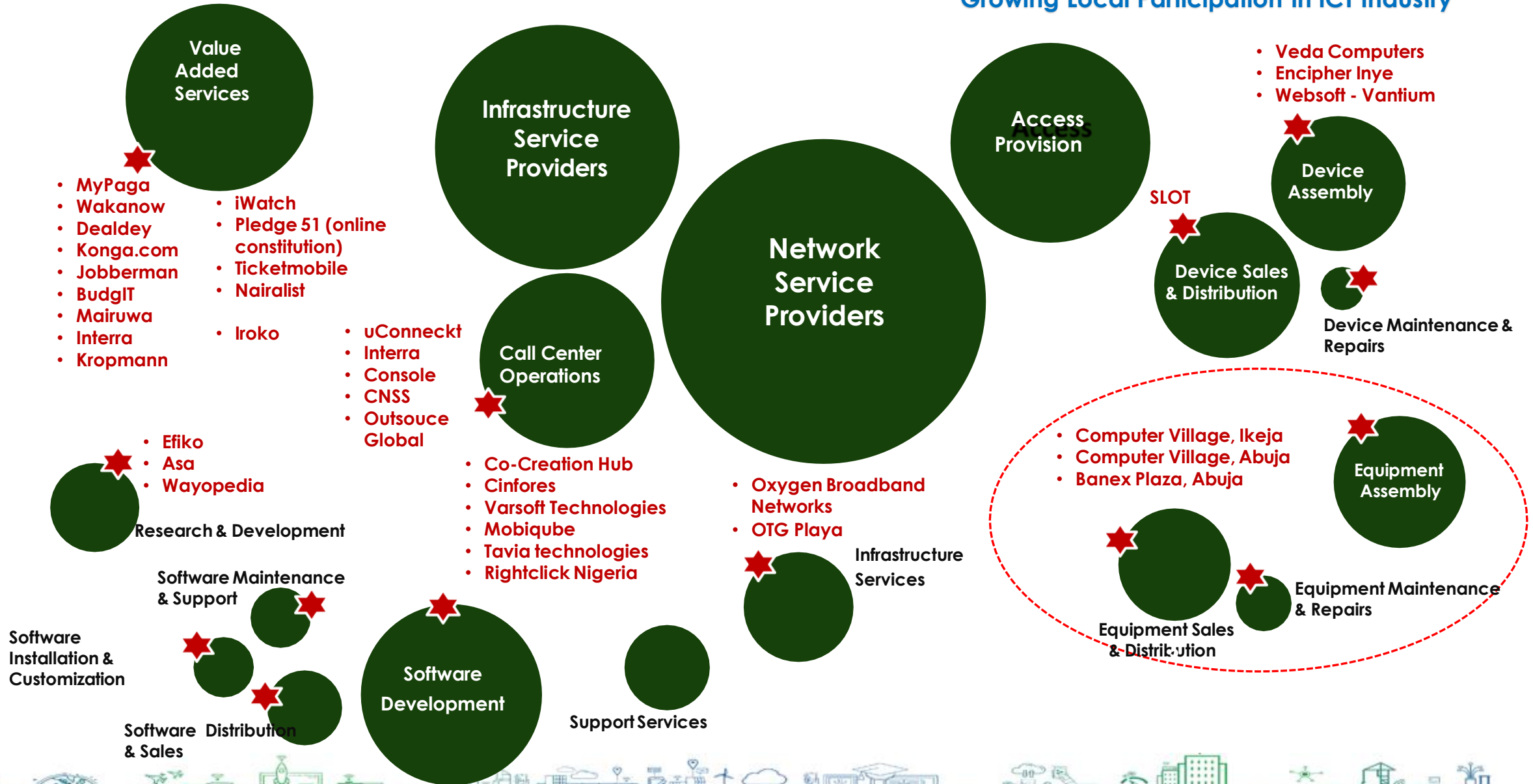
- 7 Distinct, active long haul networks (a handful of additional defunct networks)
- MNOs have metropolitan fiber networks in state capitals and major cities
- These metro fiber network are built for traffic backhaul and connect to hub sites
- Limited extension of the fiber network required to bring it closer to the customers

Limited infrastructure in this layer has resulted in the inability to effectively deliver ultra high broadband services to unlock socio-economic benefits



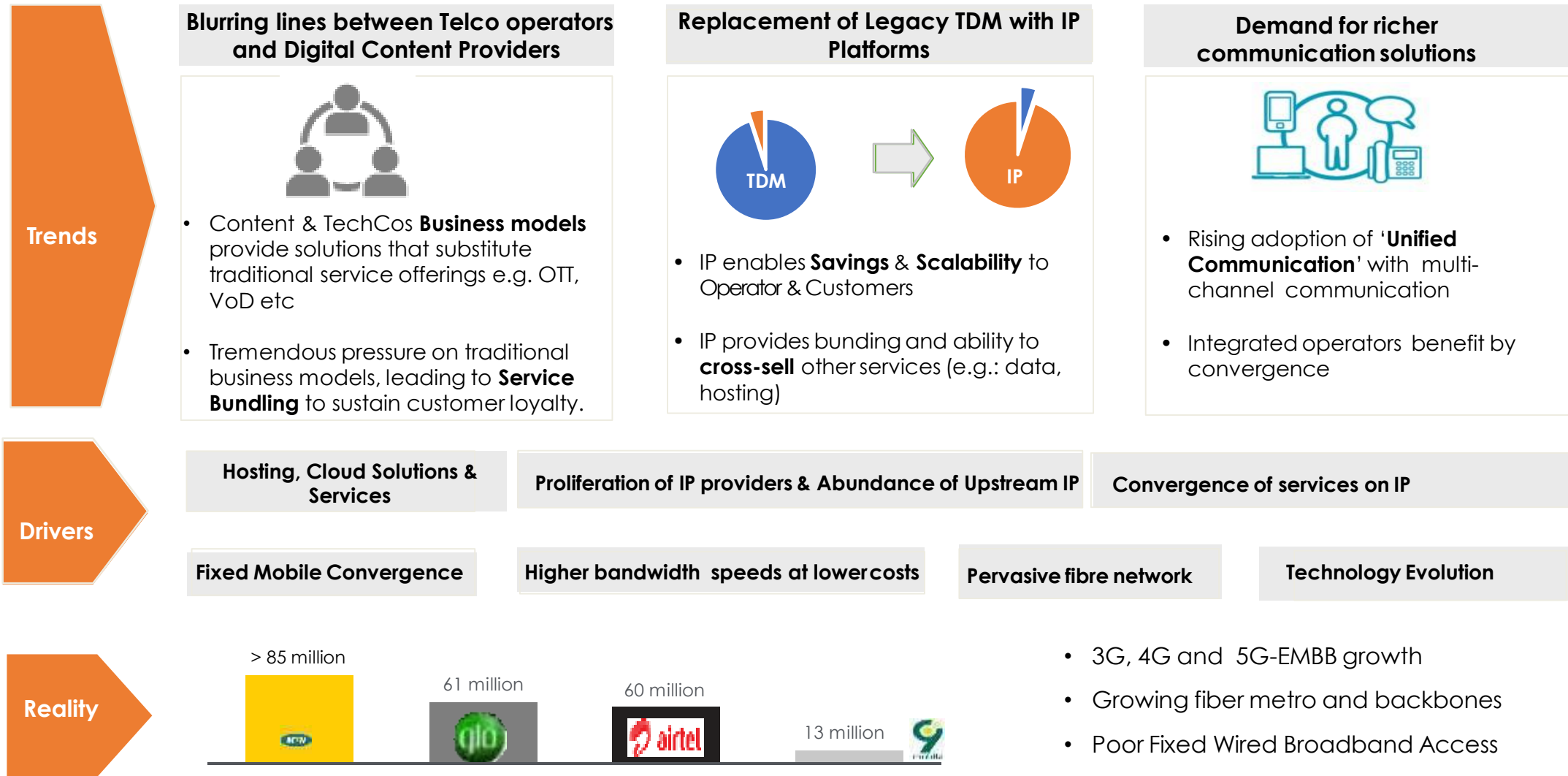
# Nigeria – Telecom & Digital Infrastructure Space

## Growing Local Participation in ICT Industry





# Nigeria – Telecom & Digital Infrastructure Space



## Digital Infrastructure Ecosystem

### *Essential Components*

**User Adoption:**

Government, Business and Citizens

**Broadband Infrastructure  
Build Out**

**Applications and  
Content**

**Facilitating Environment:**

Strategy, Policy, Legal & Regulatory



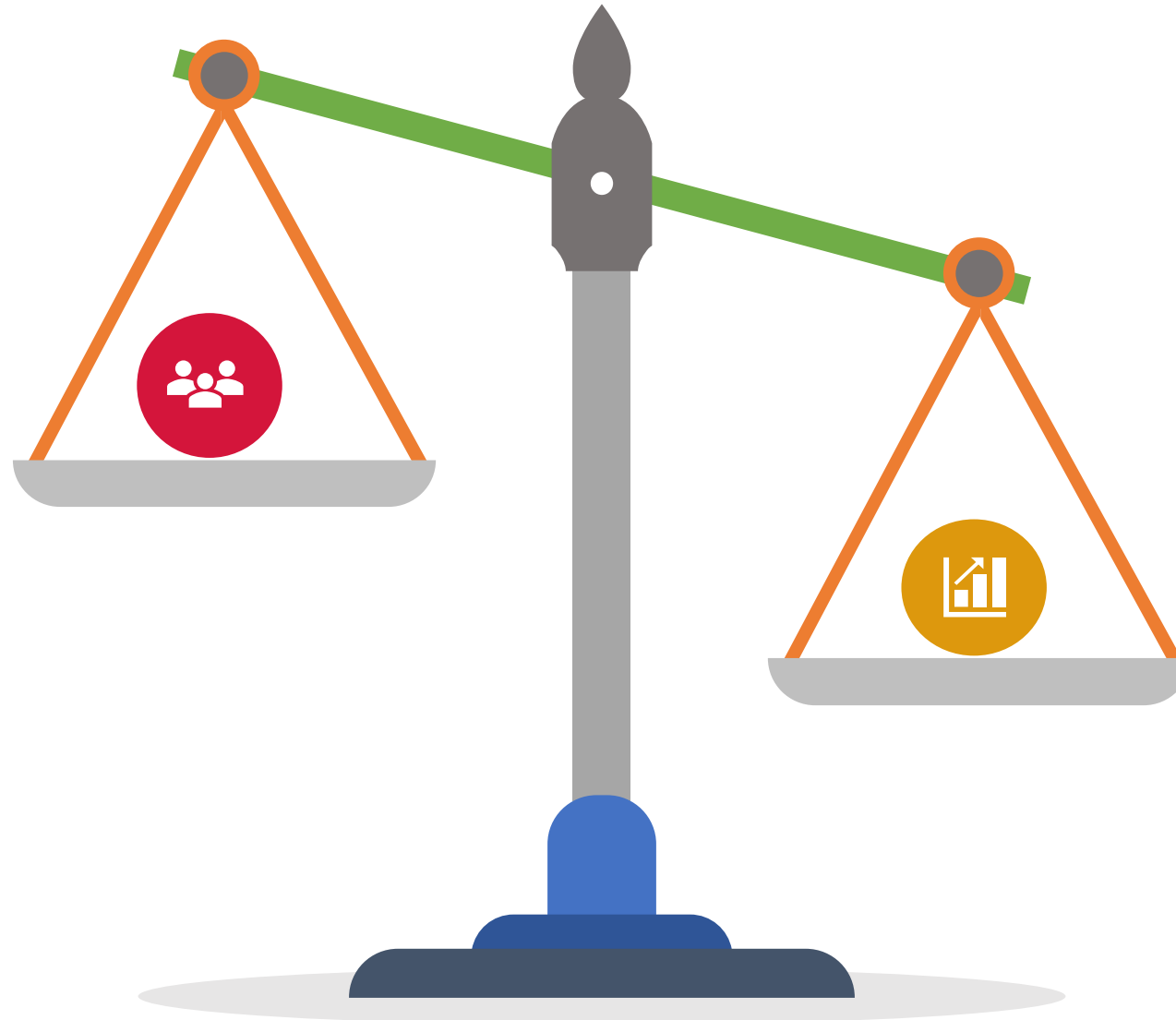
## Digital Infrastructure Ecosystem

### Policy Bottleneck

Digital Infrastructure  
Access Policies

=

**Digital Inclusion & CNI**  
guaranteeing long term  
**Socio-economic Benefits**



Digital Infrastructure  
Access Policies  
=  
**Immediate Term  
Revenue Generation  
Opportunity**



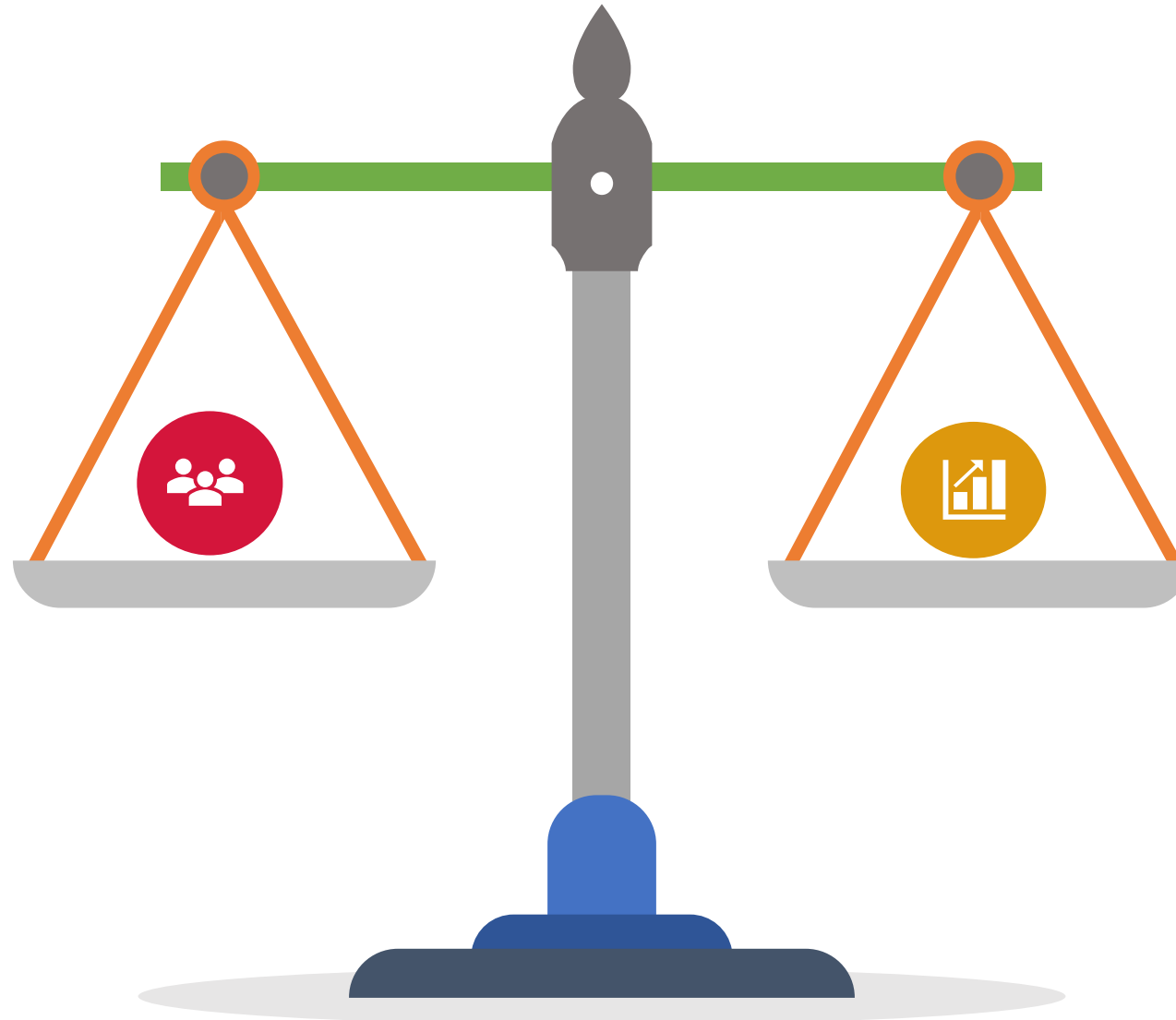


# Digital Infrastructure Ecosystem

## Policy Bottleneck

Digital Infrastructure  
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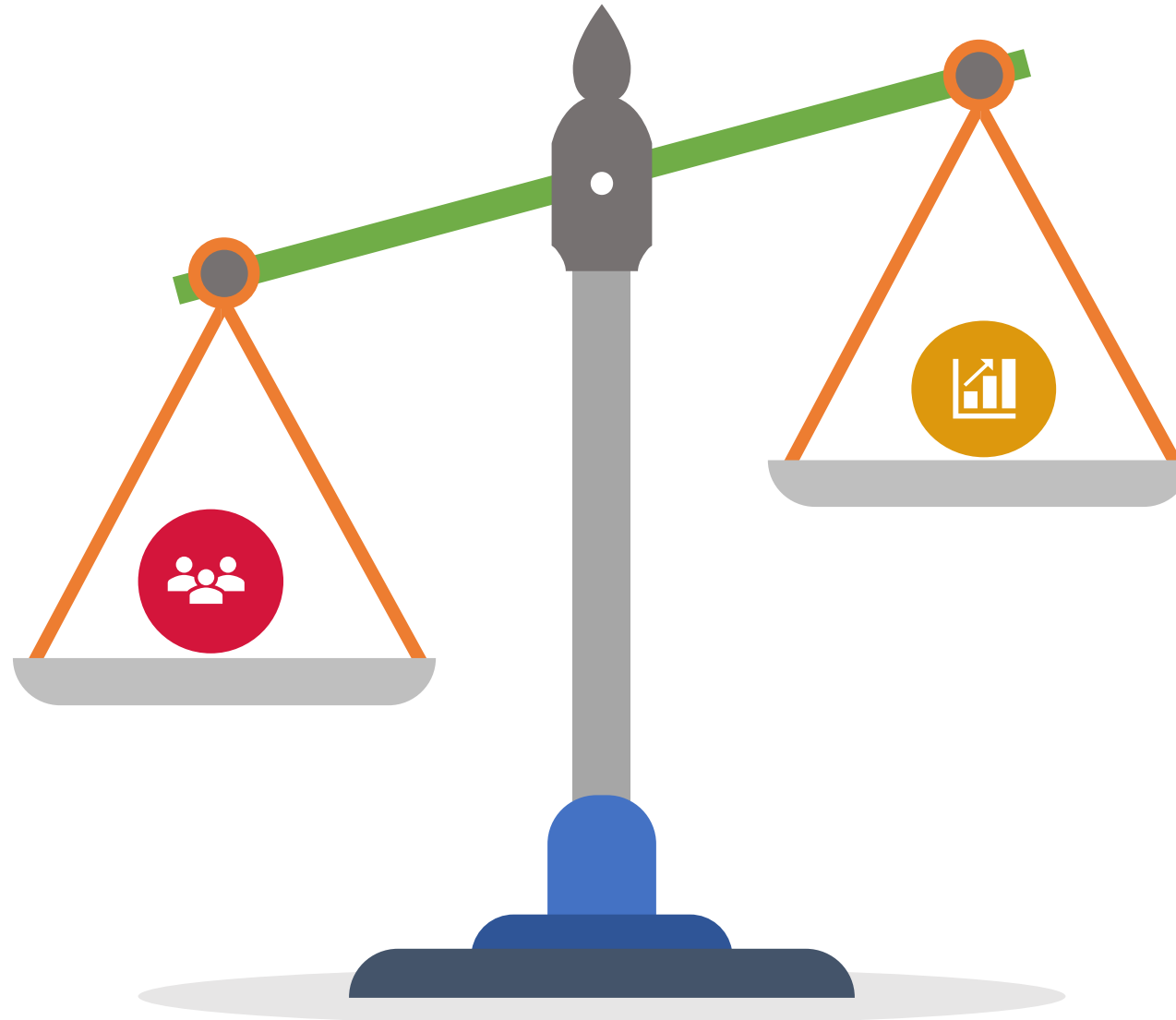
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# Digital Infrastructure Ecosystem

## Policy Bottleneck

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Digital Infrastructure  
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**Immediate Term  
Revenue Generation  
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# Digital Infrastructure Ecosystem

1

Digital Broadband Infrastructure is  
**Private Play.**

Taxpayers' money should not be used to pay for something that the private market can provide; therefore government investment and/or **Lowering Barriers** is wasteful and unnecessary.

2

Digital Broadband infrastructure is  
**Public Utility**

like roads, social infrastructure and other shared utilities; therefore, taxpayer investment into broadband infrastructure and/or **Lowering Barriers** is just as justified as it is in other public services.





## Digital Infrastructure Ecosystem



Large scale social problems require **“unbundling of the problem”** and creation of **“shared digital infrastructure”** on top of which **“innovative solutions”** can be **“built and assembled”** to meet diverse contextual needs.



## Digital Infrastructure Ecosystem



Strategies are mostly focused on Expanding **Access**. However, the true value of Digital Infra is

- Derived from **Applications and Content**, and
- Realized through **User Adoption**.
- All 3 essential components are Enhanced by **shared, common Infrastructure Buildout**



## Digital Infrastructure Ecosystem

# Broadband Infrastructure Build-Out

- ❖ Shared International & National Fiber Backbone
- ❖ Adoption of Newer Wireless Broadband Technologies
- ❖ Facility Sharing (Ducts, Fibre, Towers, DCs, Collocation etc)
- ❖ Cloud and Digital Content Platforms
- ❖ Off-Power Grid Clean Energy Solutions
- ❖ Competition in the Marketplace

**User Adoption:**  
Government, Business and Citizens

**Broadband  
Infrastructure Build Out**

**Applications  
and Content**

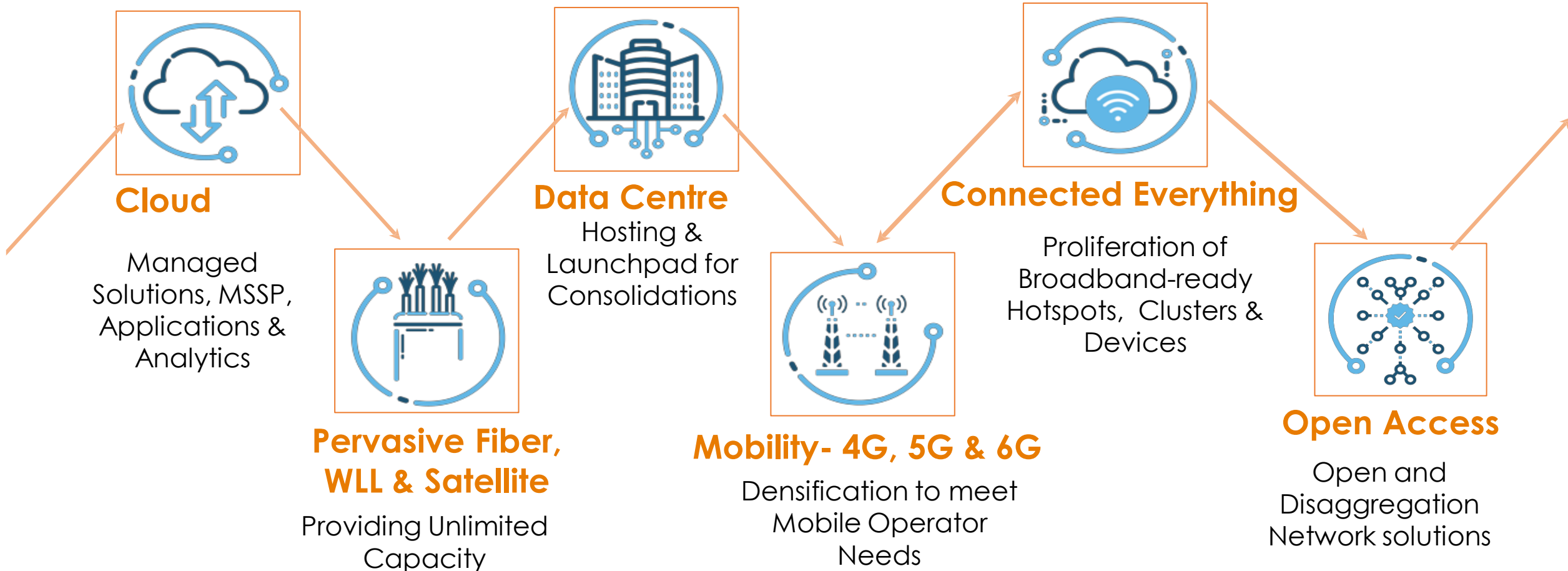
**Facilitating Environment:**  
Strategy, Policy, Legal & Regulatory



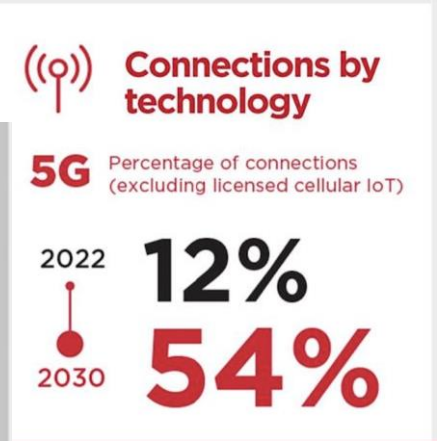
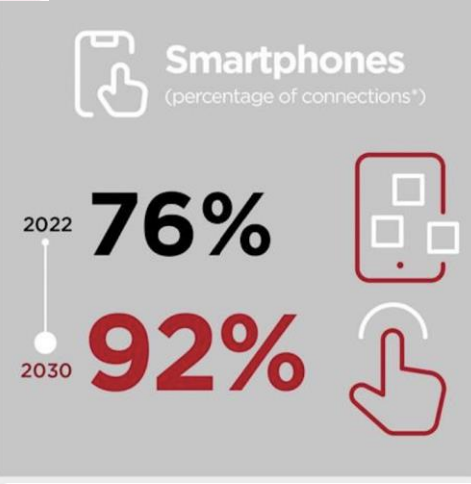
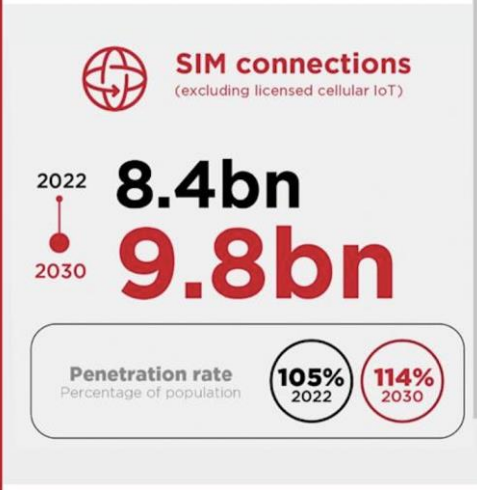
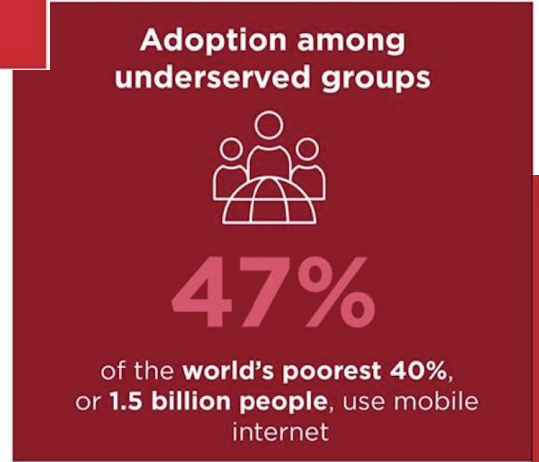
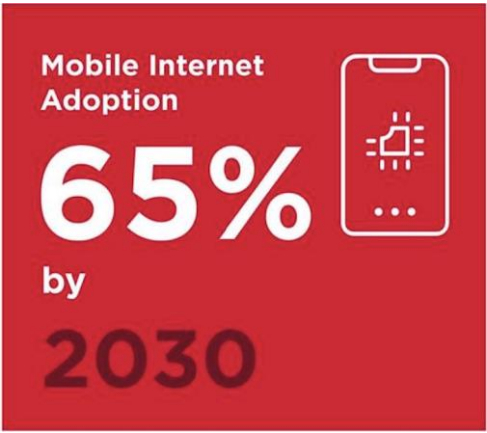
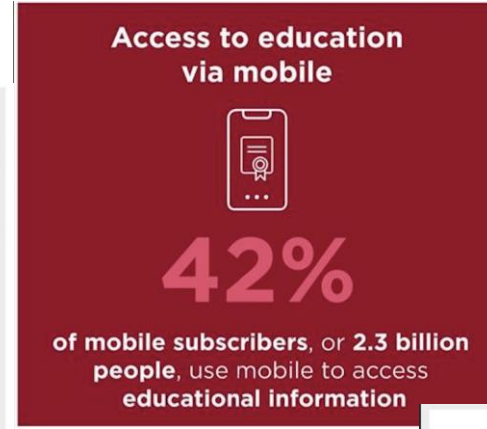
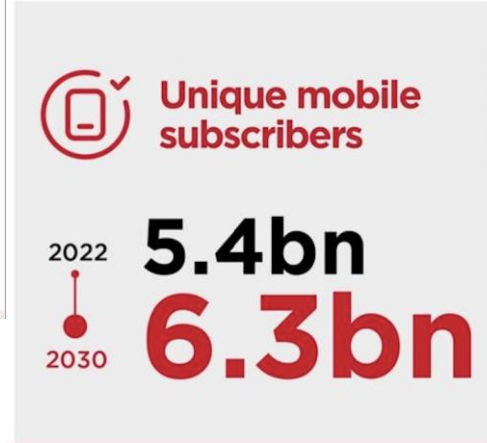
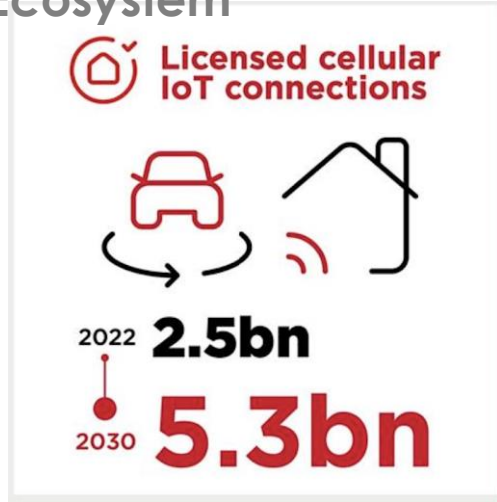
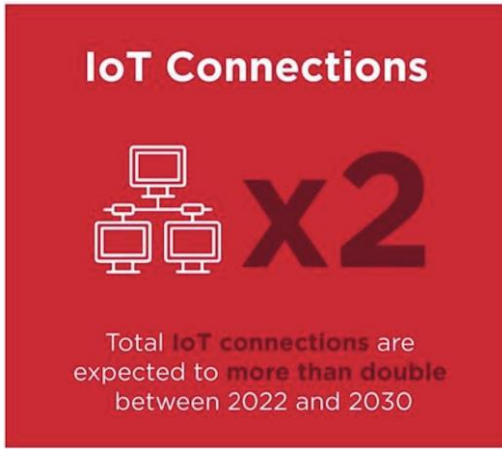


# Digital Infrastructure Ecosystem

The future of telecoms infrastructure is Hyper-Connections & Digital Interactions

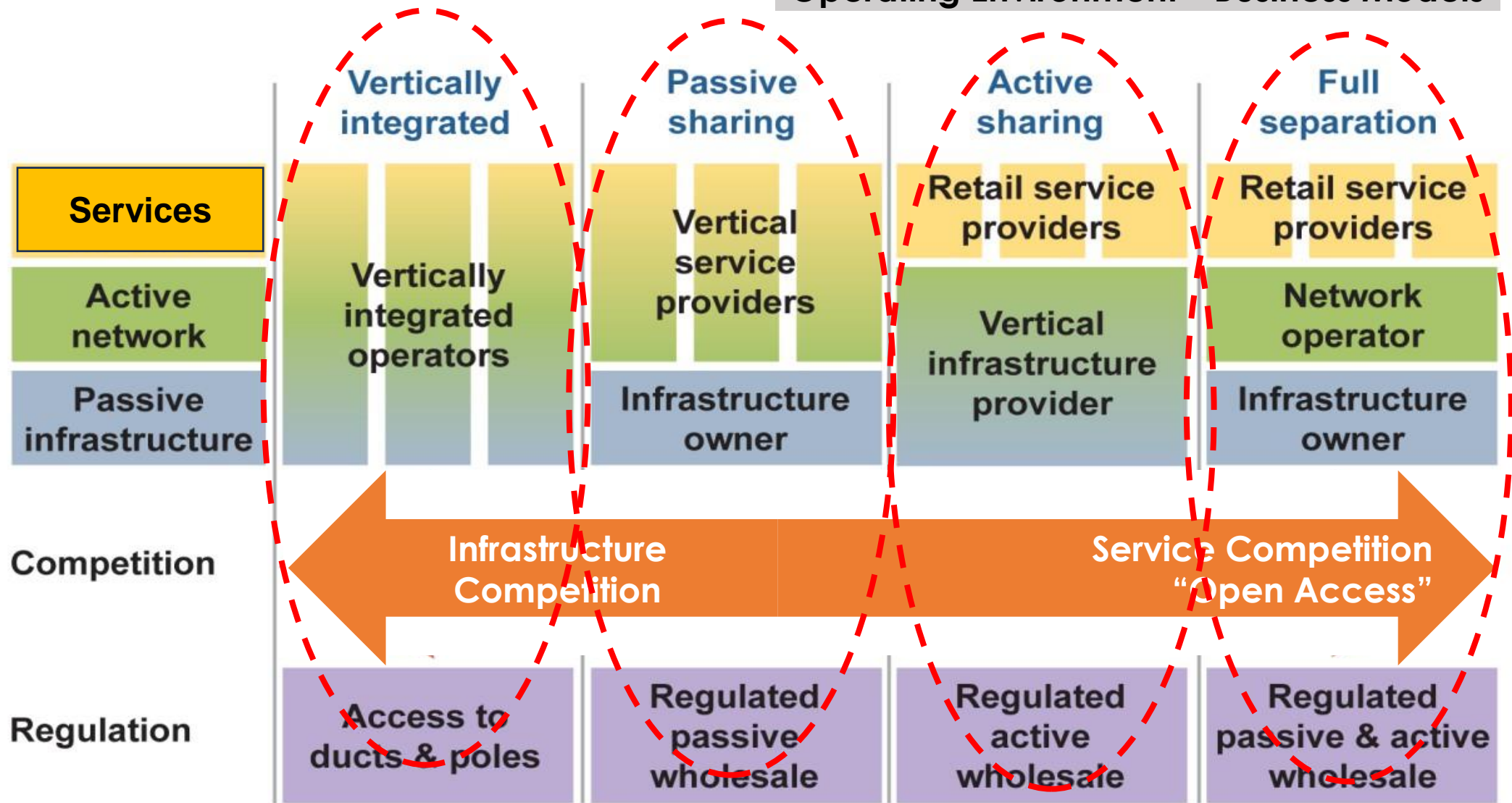


# Digital Infrastructure Ecosystem



# Digital Infrastructure Ecosystem

## Operating Environment – Business Models





## Digital Infrastructure Ecosystem

## Open Access & Consolidation – The Growth Future

Common, Redundant, Distributed  
Passive/Active Shared Services  
Infrastructure Platform.

Cost Reduction on CAPEX & OPEX  
**Apps, Cloud, Digital & CDN**



**Mobile & Enterprise Solutions**



**Access - FWA/LM Solutions**



# Digital Infrastructure Ecosystem

## **Telecom Operators**

Front end MNOs, MVNOs and Providers of connectivity, services and retail market solutions. Transitioning to Digital Service Organisations

## **Netcos**

Infrastructure Providers, Satellite Providers, TowerCos, FibreCos, Data Centres, Small Cells, Private Networks etc (**IaaS**)

## **Equipment & User Devices Manufacturers**

Hardware Providers from network equipment (switches, radio units etc) to the end devices ( smartphones etc)



## **Hyperscalers**

Companies, typically platform and cloud providers, with infrastructure designed for horizontal scalability.

## **Systems Integrators**

Companies specialized in the process of integrating the physical and virtual elements that compose the network.

## **Software Vendors**

Companies responsible for developing the software systems, vRAN and the virtualization platforms -



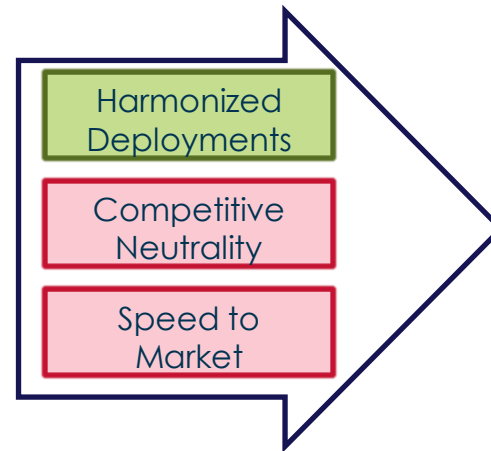


# Digital Infrastructure Ecosystem

## Open Access Delivery - Ecosystem Benefits

### Market players

- 1 Metro Fibre Operators
- 2 Mobile Network Operators
- 3 Wireless ISPs & Operators
- 4 Long-distance operators
- 5 Hyperscalers, DCs and CDNs



### Key services Impact & Enhancements

- Metro enterprise services
- Metro wholesale services
- Long-distance services
- Metro Retail Services
- Managed Services
- Cloud CDN & Content Play
- **Cost Savings**
- **Speed to Market**





# (WTES LASG\_UDIP)

## Unified Duct Infrastructure Project



# WTES Lagos State Unified Duct Infrastructure Project

## Overview

The **WTES LASG\_UDIP** project is an initiative of **Lagos State** in collaboration with **WTES** to entrench the **Dig-Once policy** and unify fibre infrastructure build and projects in Lagos State.

The Government of Lagos State, understanding the critical need for high-speed connectivity, initiated the PPP with WTES to design, Build, Operate and maintain fibre ducts covering the span of Lagos State; delivering the fibre solutions for a Connected Lagos.

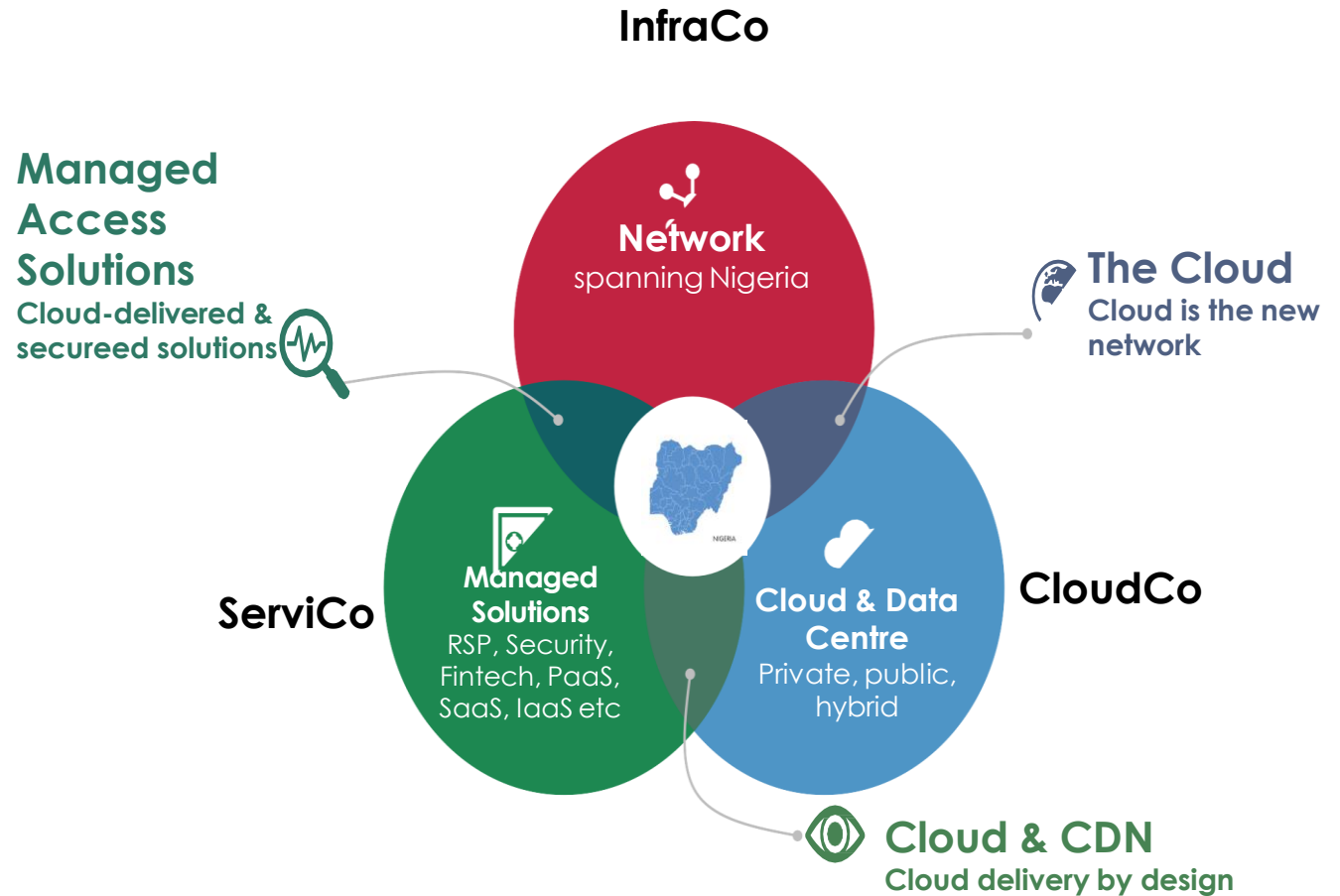
To date, the initiative has successfully built 6-way metro and 3-way last mile access/tower/enterprise connection ducts as common infrastructure for Mobile Operators, ISPs and multiple Access Seekers.

Phase	Status
Phase 1	3,000 km Live and RFS
Phase 2	3,000 km Commencing



# WTES Lagos State UDIP Project – Strategic Intent

- The overall strategic focus is to entrench a Build-Once Policy and consolidate the connectivity requirements of all Operators, ISPs and Enterprise through an **Open-Access** vehicle.
  - Harmonize fibre and duct Infrastructure permitting and leasing to minimize service disruptions and vandalization; and to guarantee service options for all Access Seekers.
  - Build the strategic offload and gateway infrastructure for International Landing Stations, Data Centers, Hyperscalers, Content Delivery Networks, Cloud Providers, Enterprises and Home Users to ensure service availability from Lagos inland into Nigeria.
- **Lagos: Nigeria's Hyperscale Gateway**
  - The infrastructure is the overall strategic platform for consolidated services, hosting, managed solutions and offload of OTT services for existing and planned networks across Nigeria.

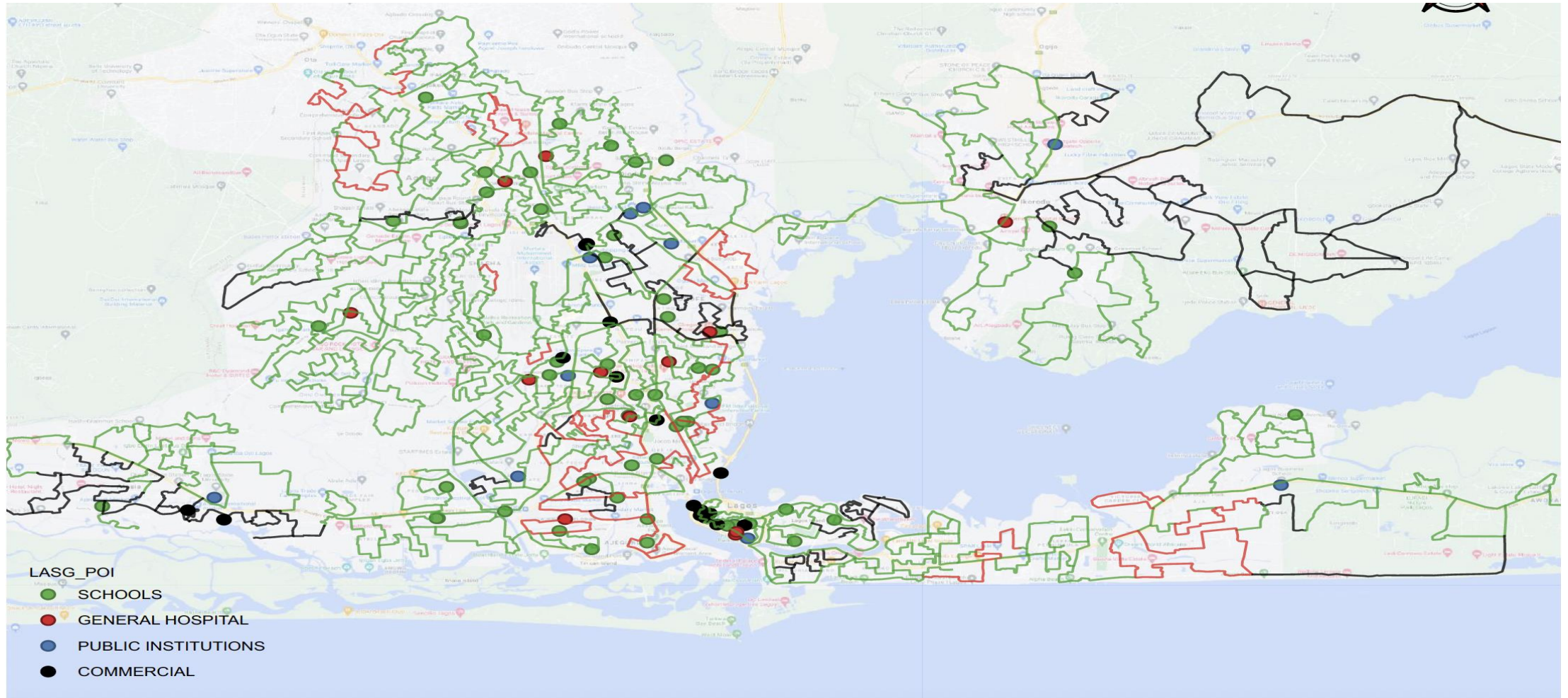








# WTES Lagos State - Fibre & Duct Infrastructure



**Fig 1.** The **WTES LASG\_UDIP** Phase-1 has built 3,000 km of fibre duct across the Lagos metro connecting all telecom Operator and Service Provider infrastructure on open access, neutral basis; providing the high speed Interconnection and backhaul path for Mobile and fixed Operators to optimize existing fixed & 4G services and to drive the launch of 5G services.





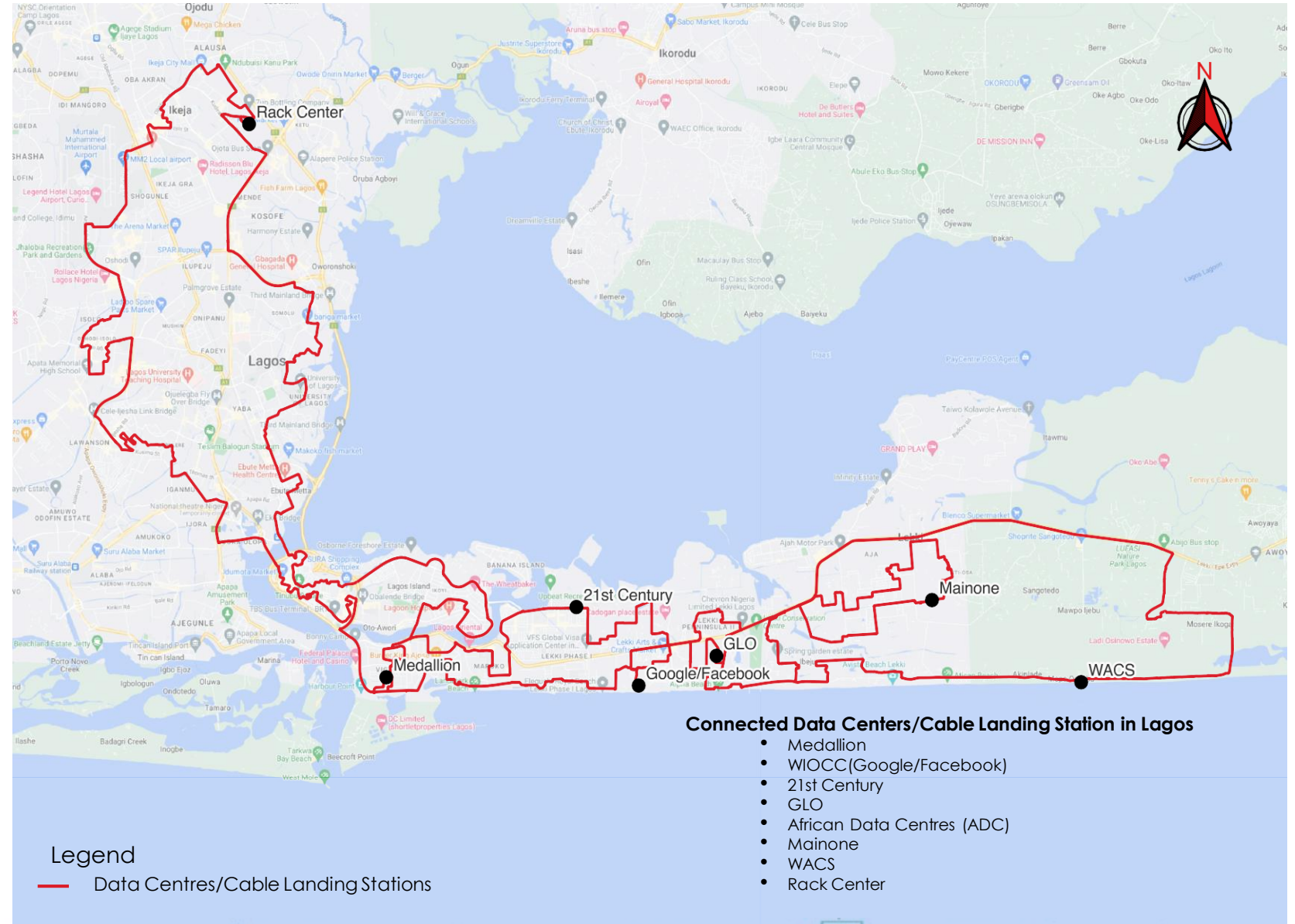
# International Landing Stations (ILS) and Data Centers Connectivity

**Lagos** is host and gateway to all of Nigeria's 6 active International Cable landings.

**WTES LASG\_UDIP** plays a critical role in offload of the huge bandwidth landings in Nigeria by **ACE, WACS, SAT-3, MainOne, Glo1, Google (Equiano) and Facebook (2Africa)**.

Lagos is also home to all of Nigeria's top tier Data Centers and main Telecom Operator Switches (**ADC, Medallion, Rack Center, CEWA, MainOne MDX, Google OADC, 21st Century** etc).

The **WTES LASG\_UDIP** network actively connects all Landing Stations (ILS) and Data Centres (DC) to Operator and ISP nodes/hubs in a redundant Ring/Mesh architecture, thus offloading services and capacities into greater Lagos and all of Nigeria.

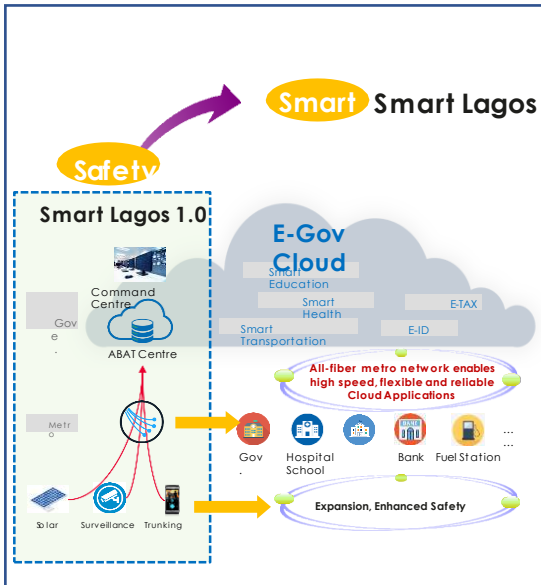
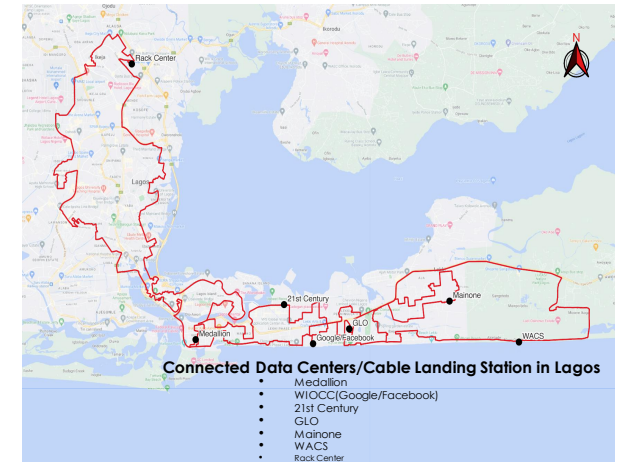


The **WTES LASG\_UDIP** provides the high speed Interconnection and backhaul for Mobile and fixed Operators, connecting Base Stations for reliable telecom services across Lagos State. Operators are leveraging this to optimize existing 4G and launch 5G services.



**Massive traffic growth and high telecoms services demand**

Lagos is home to all of Nigeria's six (6) International Submarine Landing Stations (ILS) and 90% of Data Centers. The **WTES LASG\_UDIP** provides the high speed Interconnection of all Data Centers and Cable Landing Stations – Providing the offload of Internet traffic, Storage, Collocation and Managed Services for Nigeria's digital ecosystem.



The **WTES LASG\_UDIP** powers the Lagos Smart City project, an initiative powering high speed Internet connectivity into all communities within the state, public schools, institutions of higher learning, health centres, and all government offices and parastatals. The digital infrastructure is also drives enhance security and safety powering security cameras in public places, roads to achieve efficient traffic management; and e-government solutions



**Interconnected Services - Broadband Everywhere**

The completed first phase 3,000 km of telecom fibre duct spans all of the Lagos metro area, covering all LCDAs. The infrastructure is on IRU lease to ISPs and others providing FTtx broadband services bridging the Digital Divide, connecting Carriers, Enterprises and Home Users and enriching the Connectivity ecosystem, truly making Lagos Nigeria's Hyperscale Digital Gateway.



## Learnings & Takeaways

**Open-Access Policy Initiator (FG, State, City or Access Agency) must understand the wider Digital Broadband Infrastructure goals and the socio-economic gains it offers:**

- Recognize the importance of digital connectivity in delivering economic, environmental and social benefit to citizens, businesses, and all other city stakeholders.
- Optimise underground asset space planning and implementation, including working with utility companies, and other bodies working to build new or improve the state of existing sub-surface public infrastructure.

**Define build metrics and an enforceable Implementation Framework in line with other social development Policies, Strategy & Initiatives:**

- The Government should contribute and make available other conduits within its portfolio into the Dig Once Policy vehicle for consolidated permitting.
- Officials leading digital connectivity efforts should have cross-agency/organisation mandates





## Learnings & Takeaways

### Engage the Broadband/Telecom Ecosystem – Value Creation & Trust

- Develop an 'ecosystem of trust', with connectivity providers considering them as partners and collaborators in improving the lives and livelihoods of citizens in line with **Commercial Sensitivities**.
- **Non-Extractive** Approach to Lease Fees and Service engagements.
- Balancing the longer-term lease rates & space assignments between the BIG providers with ensuring space for more targeted and smaller-scale providers.

### Initiate Governance Processes for Accountability and Compliance

- Suitable governance 'steering groups or similar models - with representatives from the Owner (Govt, Agencies, ROW Owner etc), Implementing Company & other Stakeholders – for proper SOPs.
- Once instituted, there must be strict adherence and non-interference with the operational model to create market confidence and support the overall goals of the policy.
- Support mix & match pricing models to cater for various needs in the Ecosystem.





# What people said...



- ✓ **Messaging Apps** – I can communicate loved ones anywhere
- ✓ **Cloud storage e.g. Dropbox, virtual drive** - I can access precious photos securely.
- ✓ **Map tools** – I can find my way around even if I'm somewhere totally new
- ✓ **Digital ID** – I am legitimate even if I lose ID paperwork
- ✓ **Money transfer apps/Mobile money** – I can support loved ones more easily
- ✓ **Satellite internet service** – it allows communities to be inclusively connected.
- ✓ **Diabetes blood monitoring tool** – it's literally saving my life
- ✓ **E-learning tools** – I can progress in my career more easily



- **Social media**
  - ✓ Great for addressing loneliness
  - ✓ I find old friends
  - ✓ I learn about current news quickly
  - ✓ I find my communities all over the world
- BUT...
  - × Addictive
  - × Toxic narratives – some incite violence
- **ChatGPT**
  - ✓ Makes some of my job so much easier
- BUT...
  - × Threat to my job
  - × Easier to cheat on assignments



## **Automated customer service chat bot.**

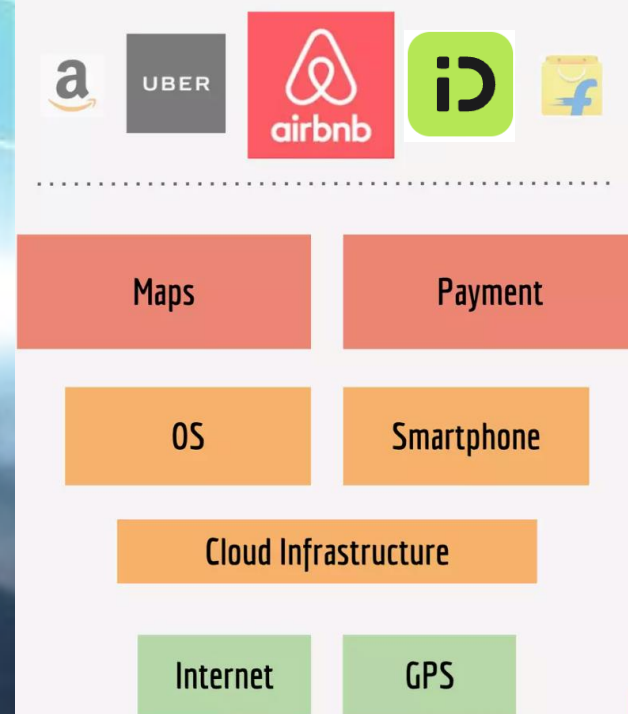
- × Not helpful – so infuriating
- × Clearly designed to save money at the cost of customers experience and jobs
- × Risky when used in place of medical emergency staff

## **Poorly regulated AI application**

- × I feel like I'm being manipulated and I worry about where my data goes
- × It can propagate biases that exist in historical data



Disruptive Solutions are  
created, managed and  
sustained on Peering,  
Collaboration & Open-Access,  
Shared Infrastructure.







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