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Assessing the Environmental Footprint of ICTs and AI in Africa

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Introduction

- **Objective of the Presentation**
  - To discuss methodologies for assessing the environmental footprint of ICTs and AI in Africa

- **Overview of ICT's Role in Africa**
  - **Importance of ICT for economic growth and development**

  ICT as a driver of economic diversification and job creation

  - **Growing reliance on digital infrastructure and AI**

  Increasing dependence on technology for service delivery and innovation

- **The Digital Infrastructure Boom**

  - **Data Centers**

  Market value projected to grow from USD 3.49B (2024) to USD 6.81B (2030)

  - **Networks**

  Anticipated 87% Continental Smartphone Adoption by 2030; quadrupling of data demand

  - **Concentration**

  41% of capacity currently located in South Africa, Kenya and Nigeria

Understanding Environmental Footprint

- **Definition of Environmental Footprint**

  Environmental footprint measures the impact of:
  - Energy consumption;
  - Greenhouse gas emissions (GHG); and
  - Water usage

  on the Planet's ecosystems and resources.

- **Why Measurement Matters**

  - Supports evidence-based policy-making
  - Informs investment decisions for sustainable development

- **Energy and Carbon Footprint**
    - **Demand**
      Data Center power capacity is expected to reach 2 GW by 2030 (9% CAGR)
    - **Reliability**
      ‘Five nines’ requirement leads to diesel backup dependency in fragile grids
    - **Net Zero Focus**
      Hyperscalers prioritizing renewable energy and Power Purchase Agreements (PPAs)
- **The AI Environmental Impact**
    - **Intensity**
      AI queries consume up to 10 times energy than traditional searches
    - **Resource Demand**
      Accelerated servers for AI drive high heat loads and Water Usage Efficiency (WUE) pressure
    - **Dual Nature**
      AI as a consumer of resources versus AI as a tool for climate adaptation and energy optimization.

Current Challenges in Measurement

- **Data Availability and Reporting Hurdles**

  The Data Dilemma
  - Reliance on legacy systems
  - Lack of standardized data collection methods across countries.

  Capacity Issues
  - Limited resources and expertise for accurate measurement.

  Reporting Hurdles
  - Reporting Gaps - Inconsistent reporting practices resulting in fragmentation among Ministries Agencies and Departments (MDAs) and Operators.
  - Granular Grid Emission Factors (GEFs) and Scope 3 Guidance

  Informality
  - 95% of E-Waste is managed illegally
  - There is need for Extended Producer Responsibility (EPR) and formal data collection

- Water and Cooling Challenges

Consumption

  - Large Data Centers use between 300K to 5M gallons of water daily

MEA Market

  - Water consumption is expected to reach 535 billion liters by 2031

Efficiency

  - Liquid cooling and closed-loop systems as essential sustainability constraints

Assessment Methodologies (ITU-T L.1400 standards)

- Standardized Metrics
    - Introduction to standardized metrics for energy use, GHG emissions, and resource consumption.
- Examples of Methodologies
    - **L.1410**: Life Cycle Assessment (LCA) of goods, networks, and services.
    - **L.1420**: Environmental assessment for organizations/operators.
    - **L.1450**: National-level ICT Sector footprint and Carbon Footprinting (CO_2) trajectories.

  The purpose of these standardized methodologies is to harmonize reporting in order to increase credibility and facilitate comparison
- Importance of Local Context
    - It is important to tailor methodologies to fit the African context.

Case Studies and Best Practices

- Successful Examples from Africa
    - Highlight case studies where assessment methodologies have been effectively implemented.
- Lessons Learned
    - Importance of collaboration between Governments, Industry and Academia.

Policy Development and Target Setting

- **Linking Measurement to Policy**
    - How improved measurement supports policy development.
- **Setting Targets**
    - Importance of setting realistic targets based on data.
- **Tracking Progress**
    - Mechanisms for monitoring progress toward sustainable digital infrastructure.

Policy Recommendations and Path Forward

- **Measurement**
    - Mandate standardized environmental reporting for all major operators.
- **Circular Economy**
    - Implement national roadmaps for e-waste and critical mineral recovery.
- **Regional Strategy**
    - Leverage AfCFTA and Smart Africa for cross-border data and sustainability standards.

Conclusion and Call to Action

- **Summary of Key Points**
    - The necessity of standardized metrics, challenges faced, and the importance of local context
    - Sustainable digital infrastructure is the foundation of long-term economic resilience
- **Call to Action**
    - Encourage collaboration among stakeholders to improve measurement practices.

- **Moderated Discussion**

Further discussion on this critical topic:

1. Why is it crucial for countries to assess the environmental footprint of their digital infrastructure, and how can this data support national digital transformation, climate policy, and sustainable development planning? Additionally, how can Governments ensure that digital infrastructure planning is aligned with climate and sustainability objectives?

Answer:

a) Indeed, from a policy and strategic planning perspective, it is important for countries to understand the environmental footprint of their digital infrastructure for the following reasons:

- Understanding the environmental footprint enables policymakers to **make informed data-driven decisions** regarding ICT investments and infrastructure development;
- Countries are able to **align with national and international sustainability commitments**, such as the **Paris Agreement**, promoting responsible resource use and emissions reduction;
- Countries are able to **optimize resource allocation and management**, thereby ensuring efficient use of energy and materials in ICT networks;
- Also, **raising public awareness** about the environmental impact of digital infrastructure encourages public support for sustainable practices and policies;
- Further, knowledge of the environmental footprint **aids in the development of regulatory frameworks and standards** that promote greener technologies and practices within the ICT sector.

b) This data can support national digital transformation, climate policy, and sustainable development planning in the following ways:

- ICT environmental footprint data can **guide national digital transformation** by identifying energy-efficient technologies and practices, ensuring that digital infrastructure supports economic growth while minimizing environmental impact.

- In **climate policy**, this data helps assess the carbon emissions associated with ICT, enabling Governments to set informed targets and implement strategies to reduce greenhouse gas emissions from the ICT sector.

- For **sustainable development planning**, understanding the environmental impact of ICT aids in integrating sustainability into digital initiatives, promoting responsible resource use, and supporting resilience in communities by ensuring that digital advancements align with ecological and social goals.

c) Governments can align **digital infrastructure planning** with **climate** and **sustainability objectives** by:

- Integrating environmental impact assessments into the planning process. This includes setting clear sustainability criteria for infrastructure projects, promoting energy-efficient technologies, and encouraging the use of renewable energy sources.
- Establishing policies that prioritize green procurement and lifecycle assessments can ensure that digital infrastructure minimizes its carbon footprint.
- Additionally, encouraging collaboration between ICT, energy, and environmental agencies will help create comprehensive frameworks that support sustainable development.
- Further, engaging stakeholders, including communities and industry experts, in the planning process can also enhance transparency and accountability, ensuring that infrastructure projects contribute positively to climate goals.

2. What institutional coordination is needed between ICT Ministries, Environmental Authorities, Energy Institutions, Statistics Agencies and Regulators **to improve measurement**?

Answer:

Effective institutional coordination among ICT Ministries, Environmental Authorities, Energy Institutions, Statistics Agencies, and Regulators **is essential** for **improving measurement of the ICT environmental footprint**.

- This collaboration should involve establishing a unified framework for data collection and reporting that aligns with national environmental goals.
- Regular communication and joint initiatives can facilitate the sharing of best practices and methodologies for accurate measurement.
- Additionally, creating cross-sectoral working groups can enhance understanding of each institution's priorities and challenges, leading to more comprehensive and standardized metrics.
- Training programs can also be developed to build capacity in data analysis and interpretation.
- Ultimately, fostering a culture of collaboration will ensure that ICT policies are informed by reliable environmental data, promoting sustainable digital transformation.

END