Data & Digital for Climate Action

Thursday Oct 19th (9:30 – 10:30 am)
Data and Digital for Climate Action

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Lead, Korea Digital Development Program (KoDi)
Agenda

Data and Digital for Climate Action

1. The Big Picture
2. World Bank Green-Digital Investments
3. Shared Data Platform for Early Warning: The case of the Maldives
4. A Way Forward
Data and Digital for Climate Action

1 The Big Picture
Green Digital Development

A World Bank Commitment
1.5 - 4% of global GHG emissions is estimated for the digital sector (and growing)

64% of NDCs mention using technology for adaptation and/or mitigation*

~3 billion people remain offline and the vast majority are concentrated in developing countries

Countries are lagging behind on climate commitments

How do we bridge the digital divide in a sustainable way and leverage digital technologies effectively for climate action?

*an NDC, or Nationally Determined Contribution, is a climate action plan to cut emissions and adapt to climate impacts
Digital contributes to 1.5-4% of global GHG emissions

### Digital Sector Carbon Footprint Breakdown

<table>
<thead>
<tr>
<th>Consumer devices: 24-40%</th>
<th>Connectivity networks: 16-40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartphones</td>
<td>Mobile network operation</td>
</tr>
<tr>
<td>Computers</td>
<td>Fixed network operation</td>
</tr>
<tr>
<td>Others</td>
<td>Depl/Dec (*)</td>
</tr>
</tbody>
</table>

**Data centers: 20-48%**
ICT sector’s contribution to the global GHG emissions

- ICT sector is estimated to emit 740 Mt-CO$_2$ eq annually and responsible for 1.4-3.6% of the global GHG emissions in 2020.
- By 2040, the ICT carbon footprint could account for as much as 14% of the total worldwide carbon footprint (Belkhir and Elmegri (2018)).
- ITU stresses that in order to follow the 1.5°C trajectory, GHG emission from the ICT sector should be halved and limited to less than 400 Mt-CO2 equivalent in 2030.

Source: Belkhir and Elmegri (2018)
Source: ITU (2020)
# The Green Digital Nexus

## Greening Digital

<table>
<thead>
<tr>
<th>Climate Action</th>
<th>Greening the Digital Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation</td>
<td>Greening the digital sector by climate proofing digital infrastructure and services</td>
</tr>
<tr>
<td>Mitigation</td>
<td>Greening the digital sector through energy efficiency measures and use of renewable energy</td>
</tr>
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</table>

## Greening with Digital

<table>
<thead>
<tr>
<th>Greening with Digital Technologies</th>
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<tbody>
<tr>
<td>Leveraging digital technologies to enhance resilience of economies, populations, and sectors</td>
</tr>
<tr>
<td>Leveraging digital technologies to decarbonize other sectors such as energy, transport, and cities</td>
</tr>
</tbody>
</table>
So ... Why is Now the Time to Act?

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2 World Bank Green-Digital Investments
Exponential Growth in World Bank Digital Investments

Digital investments are expected to grow dramatically over the next 3 years.
Mainstreaming Green in World Bank Digital Investments

Examples of recent digital investments with green digital components (funding size is for the full project, incl. the green digital components)

**CARIBBEAN (4 COUNTRIES): $94mn**
*Greening Digital & Greening with Digital:*
climate resilient digital infrastructure and digital delivery of services to ensure continuity, and growing the digital economy

**SIERRA LEONE: $50mn**
*Greening Digital:*
data-driven early warning systems & *Greening Digital:*
e-waste management policy

**CAMEROON: $100MN**
*Greening Digital:*
e-waste recycling strategy, solar power promotion and compliance with Green ICT standards for digital networks

**MONGOLIA: $41mn (WB, GoM)**
*Greening with Digital:*
Disaster recovery data centers, e-Mongolia portal

**MARSHALL ISLANDS: $37.5mn**
*Greening Digital:*
energy efficient digital infrastructure

**MOZAMBIQUE: $200mn**
*Greening Digital:*
renewable energy powered digital infrastructure & mobile payments for home solar systems

**ARGENTINA: $200mn**
*Greening Digital & Greening with Digital:*
climatic resilient telecom/data infrastructure, energy efficient data infrastructure

**MALDIVES: $10mn**
*Greening with Digital:*
shared data platform and innovative data collection, including climate relevant data, to monitor/manage marine ecosystems
## Digital Investments in other Key Sectors too

<table>
<thead>
<tr>
<th>Sector</th>
<th>Challenge</th>
<th>Opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture</strong></td>
<td>Agriculture, forestry, and land use change produce almost 25% of global GHG emissions.</td>
<td>Digital technologies can potentially reduce GHG emissions by 1-4% from agriculture sector by 2030.</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>Transport accounts for 20% of the world’s greenhouse gas emissions.</td>
<td>Optimizing traffic flow; contributing to the establishment of digitally-enabled modern logistic systems that improve freight management; and transitioning to electric vehicles.</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>It is estimated that energy accounts for more than two-thirds of total GHG emissions globally.</td>
<td>Enhancing energy efficiency, and by enabling demand-side flexibility and mobile money enables new business models for delivering affordable home solar systems.</td>
</tr>
<tr>
<td><strong>Urban</strong></td>
<td>Cities consume 2/3 of the energy used worldwide and account for about 70% of carbon emissions.</td>
<td>Digital technologies can help reduce total energy demand in the building sector by about 10% through operational efficiency compared to IEA’s reference scenario, from 2017-2040.</td>
</tr>
</tbody>
</table>
Climate Change Amplifies the Risks

The impacts of climate change, causing floods; droughts; frosts; and heatwaves, affect the world's population.

Data and Digital transformation will help in implementing urgent action to combat climate change.

<table>
<thead>
<tr>
<th>FLOODING</th>
<th>SEA LEVEL RISE</th>
<th>WIND, STORM</th>
<th>TSUNAMI</th>
<th>WATER SCARCITY &amp; HIGH TEMPERATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT equipment at risk of outage due to flooding of premises</td>
<td>Poses long-term risk to submarine cable landing stations, and terrestrial networks accessing them.</td>
<td>High wind with debris damages wireless communication antennas and related passive infrastructure (poles, towers, building fixtures)</td>
<td>Severely damages submarine cable landing stations</td>
<td>Impacts operation of data centers (cooling systems)</td>
</tr>
<tr>
<td>Flooding–caused power outages</td>
<td>Flooding risk for data centers and ICT equipment in coastal areas.</td>
<td>Top-soil erosion damages underground infrastructure</td>
<td>Damages and puts high risks for terrestrial infrastructure of all kinds</td>
<td>Medium level impact on the operation of servers and network equipment that requires cooling.</td>
</tr>
<tr>
<td>Water with debris, causing surface damage, risking cabling and ground level backup power</td>
<td></td>
<td>Risk for data centers in coastal areas.</td>
<td>Risk for data centers in coastal areas.</td>
<td>Shorter lifecycle of devices</td>
</tr>
</tbody>
</table>
# Hazards Impacting Digital Connectivity Infrastructure

<table>
<thead>
<tr>
<th>Infrastructure/Climate event</th>
<th>Inland/Coastal Floods</th>
<th>Earthquake</th>
<th>Tsunami</th>
<th>Sea level rise</th>
<th>High Temp</th>
<th>Water Scarcity</th>
<th>High Winds/Storm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submarine Cable (undersea)</td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="High" /></td>
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<td>Submarine Cable (near shore)</td>
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<td><img src="image" alt="Medium" /></td>
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<tr>
<td>Submarine Cable Landing Station</td>
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<tr>
<td>Terrestrial Cables (underground)</td>
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<td><img src="image" alt="Medium" /></td>
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<tr>
<td>Terrestrial Cables (overland/aerial)</td>
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<tr>
<td>Network Nodes (switches, cabinets, points of presence etc.)</td>
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<td><img src="image" alt="Medium" /></td>
<td><img src="image" alt="High" /></td>
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<tr>
<td>Antennas/ mobile BTS</td>
<td><img src="image" alt="Low" /></td>
<td><img src="image" alt="Medium" /></td>
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*Source: Adapted from GSA (2014), UK DRO (2018), Fu et al. (2016), and Dept. of Homeland Security (2017)*
3

Shared Data Platform for Early Warning:
*The case of the Maldives*
About the Maldives

• About 550,000 people live across 185 islands
• The country covers approx. 90,000 square kilometers, but only 298 square kilometers is dry land
• Of which, more than 80% lies less than one meter above sea level
Why are coral reefs important?

Among the most biologically diverse and valuable ecosystems on Earth

Approx. 25% of all marine life, including over 4,000 species of fish, are dependent on them

An estimated 1 billion people worldwide benefit from their ecosystems

Source: https://www.epa.gov/coral-reefs/basic-information-about-coral-reefs
Coral Reefs are critical to The Maldives

Tourism  Fisheries  Sustainability
Digital Maldives Project

Three components:

1. Improved digital connectivity & competitiveness
2. Digital identification for improved in-person & online service delivery
3. Digital technologies & data platform for climate resilience

- 3a. Climate data platform: To provide a means for government entities, people, and businesses to find and engage with climate-relevant data
- 3b. Pilot featuring state-of-the-art digital technologies and tools to collect and analyze data related to climate-critical ecosystems
How can a Shared Data Platform Help?

- **Complex & Fragile**
  - Water temps, salinity, acidity, runoff, physical damage, etc.

- **Hidden**
  - Not visible

*It is difficult to protect Coral Reefs*

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**Data**
- Collection
- Processing
- Visualization

**Inform Decision Making**
- National
- Local

**Global Engagement**
- Crowdsourcing
- AI/ML
Foundations for development of
Shared Data Platform for Climate Action

• Data
  • Collection / Continuous
  • Aggregation
  • Processing
  • Visualization
• Decision making
  • Relevant and easy to use
• Global engagement
  • Crowdsourc / Build for many
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4 In Conclusion ... A Way Forward
More needs to be done...

Compared to other sectors, the relationship between digital and climate change is less clearly understood and further work is needed – research, policy and regulation good practices and investments.
The Way Forward

- Digital is part of the climate change solution – and the challenge
  - Climate change and digital are global policy priorities but often addressed in silos. Bridging the twin transition of green and digital is necessary
  - Reducing emissions from the digital sector requires national action. Digital sector is the largest renewable energy consumer

- Digital technologies can help countries adapt to climate change but require investments in Connectivity, Data, and digital skills for developing the appropriate solutions
  - Digital infrastructure needs to be treated as critical infrastructure with the necessary climate proofing
  - Leveraging data for climate reporting, decision making, citizen engagement is critical for climate action and requires investments in digital public goods, interoperability and safeguards
  - Climate financing largely ignores the digital sector, which needs to change if digital is to be a catalyst for climate action
Priority Actions

▪ Continue upstream support while growing our downstream work
  o Upstream
    o Project design, diagnostics, Analysis and Assessment, etc.
  o Downstream
    o Technical design

▪ Mainstream “greening digital” while expanding “greening with digital”
  o Greening digital
    o Resilience and GHG emission; green data centers; etc.
  o Greening with digital
    • Shared data platform; digital technologies for climate use cases; etc.

▪ Increase awareness for the nexus of digital and climate change
  o Promote knowledge sharing and raise awareness both externally and internally
THANK YOU

Contact
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