Emerging technology for connectivity

Accelerating digital transformation in LDCs, LLDCs and SIDS

Learning in a post COVID world: How can emerging technologies help achieve universal access to quality education?

9 July at 14:00 CEST:

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Learning in a post-COVID world: How can emerging technologies help achieve universal access to quality education?

Friday, 9 July 2021 14:00-15:00 (CEST)

Connect2Recover

Building back better with broadband

Sameer Sharma
Senior Advisor
International Telecommunication Union

Connect2Recover

Building back better with broadband

COVID-19 has caused unprecedented disruption in countries around the world and has highlighted the urgency for universal digital connectivity.

- **Education: 2.2 billion children and young people unconnected** and as COVID-19 has spread across the globe, most countries announced temporary closure of schools, **impacting 91% students worldwide** – around **1.6 billion** children and young people.

- **Jobs:** Unprecedented global employment **losses in 2020 of 114 million jobs,** higher for women (5 %) than for men, and for young workers (8.7%).

- **Healthcare:** Confirmed COVID-19 cases worldwide surpassed **165 million, with over 3.4 million deaths**. Focus on continued availability of health services during movement restrictions , other social and public health measures to contain the spread of COVID-19.

- **Fixed Broadband**: The econometric models published in the 2020 study made by ITU has proven that **fixed broadband had a higher economic impact for developed countries** (countries with GDP per capita higher than USD 22000 and countries with GDP per capita between USD 12000 and USD 22000).

- **Mobile Broadband:** The 2020 study has proven that in **countries with low fixed broadband penetration mobile broadband technology has taken over in becoming the pre-eminent technology driving economic growth.**
- n (countries that have a low GDP per capita),

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Education ***Healthcare*** ***Jobs***

Objective

To reinforce and strengthen the **digital infrastructure and digital ecosystems** of beneficiary countries as they adjust in the wake of COVID-19

Key Outputs

Country internet resilience assessment including identifying the gaps and bottlenecks in the effective use of digital networks and technologies

National ICT strategy, policy, and regulatory recommendations to support recovery efforts and the “new normal”

Projects to implement specific solutions in line with Connect2Recover recommendations

Regions

Africa
Arab States
Americas
Asia-Pacific
CIS
Europe

* *Priority to **LDC, LLDC, SIDS** countries*

Founding Partners

مركز الملك سلمان للإغاثة والأعمال الإنسانية
KING SALMAN HUMANITARIAN AID & RELIEF CENTRE

MIC Japan
Ministry of Internal Affairs and Communications

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Connect2Recover 5 Phase Approach

- **Global Methodology:** A methodology to assess gaps and **bottlenecks at a country level** for the utilization of networks and digital technologies **and identify policies to respond to and mitigate the consequences of COVID-19** pandemic and preparedness for any future disasters.

- **Country Landscape Assessments:** Conduct country-level **Digital and Internet resilience assessment**

- **National ICT Strategies:** Based on the Internet Resilience assessments, develop and implement comprehensive **ICT strategies to ensure that digital infrastructure and ecosystems adequately support recovery efforts** as well as the 'new normal', in line with global best practices

- **Pilot Activities:** Partner with other programs and organizations to implement pilot activities that **test specific technological solutions** in line with national country strategies and policies, with a particular **focus on education, health, and job creation**. These pilots can also be used to inform policy making.

- **Deep-Dive Studies:** Undertake deep-dive studies in specific areas of digital policy as prioritized by the countries selected (*e.g.*, in areas such as **e-education, e-health and job creation**).

Methodology for Identifying Connectivity Gaps and Strengthening Resilience in the New Normal

Key Phase One Findings – Data, Resiliency and Policy

- The **quality of available broadband data is incomplete** overall and is worst in the places where it's needed the most.
- The ITU is in a unique position to convene various stakeholders to develop **new data collection methodologies and visualizations, such as coverage maps**.
- The pandemic has taught us that a **country's broadband network cannot be viewed as resilient** if significant portions of its **population cannot access the internet at home**.
- To be better prepared for the new normal and for future disasters, governments and regulators should consider refreshing and **renewing their national broadband plans.**
- Governments and regulators can use the national broadband planning process to **collect trustworthy sources of data to carry out gap analyses, increase network redundancy and resiliency, help close digital divides**, and be prepared to move quickly should future natural and manmade disasters occur.

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Phase Two Country Landscape Assessments

We will work with participating Member States to assess their . . .

- Data Collection Practices
- Resilience of . . .
  - Country
  - Network Operators
  - Critical Infrastructure
  - Market
- National Digital Strategy

We will focus on three keys to post COVID-19 recovery . . .

- Education*
- Jobs
- Healthcare

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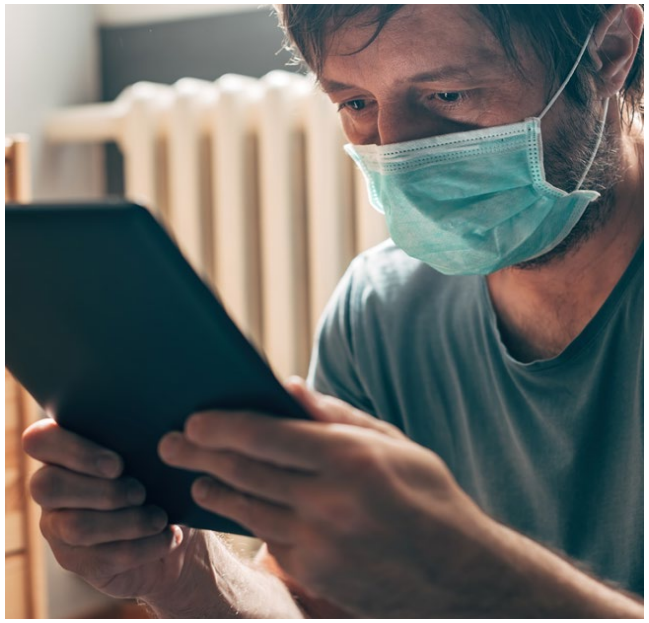
Response under Connect2Recover



A. Country-Level Implementation:

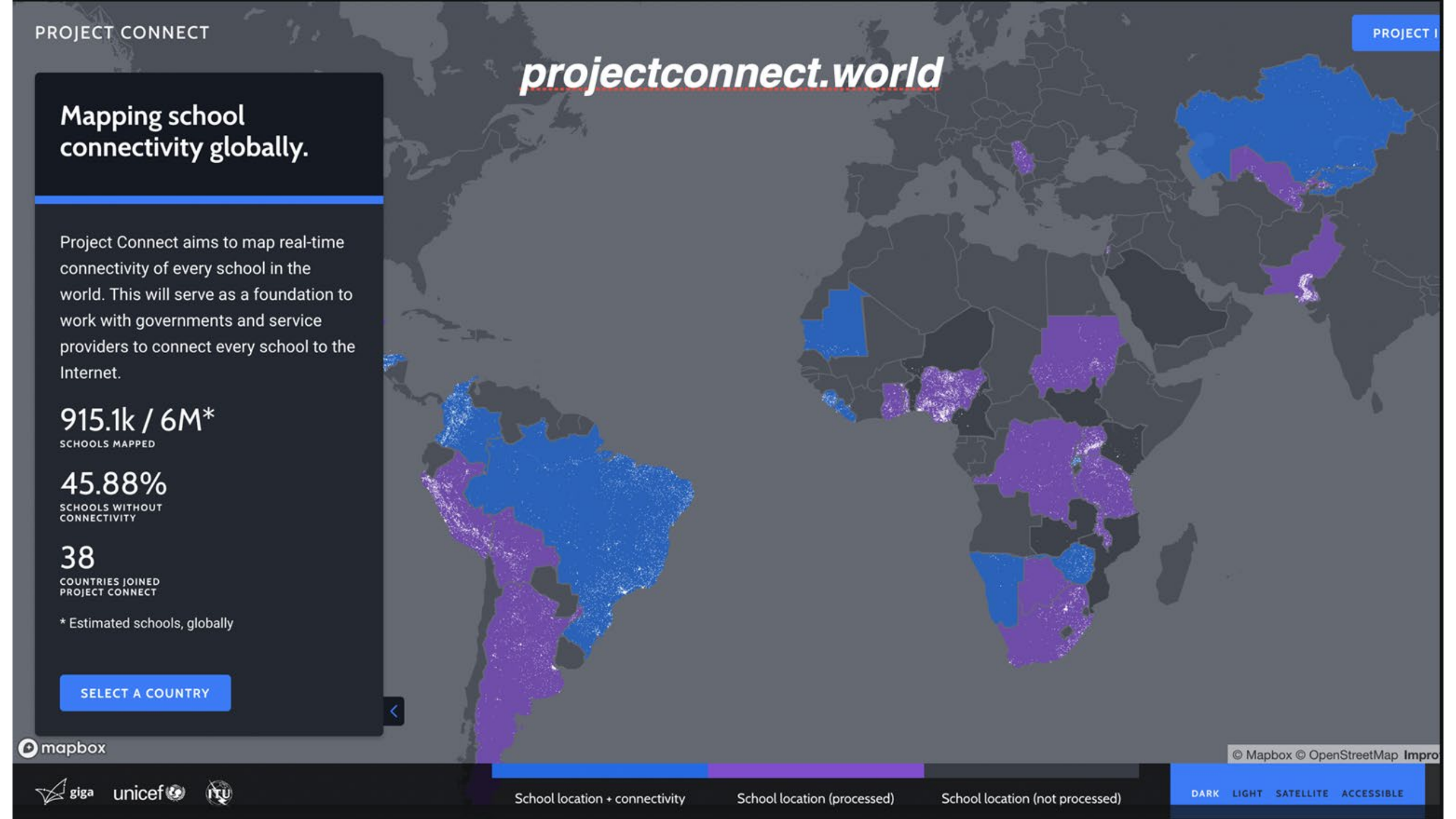
- Connect2Recover is supporting Giga Initiative in providing funds **to connect 10 schools in Rwanda.**
- Project **"TECH in the Community"**: Provide ICT Connectivity to disadvantaged communities in **Haiti** to introduce **digital literacy, access and skills in ICTs.**
- **Armenia and Kazakhstan** have now joined the Connect2Recover initiative as beneficiary countries
- Assessment for **OECS countries in Americas region**
- **Broadband transmission map** in Arab region
- Discussions underway with regions for suitable countries with focus in Africa.

B. Emerging Technologies

- Promoting deployment of innovative technologies / solution including Satellite, IMT, OFC, community wifi / radio, MW for access and backhaul while use of AI/ML etc. for sustained learning for enhancing digital skills

Technologies to map schools and their connectivity

Shilpa Arora | Data Scientist, Giga | 9 Jul 2021


PROJECT CONNECT
projectconnect.world
PROJECT I
Mapping school connectivity globally.
Project Connect aims to map real-time connectivity of every school in the world. This will serve as a foundation to work with governments and service providers to connect every school to the Internet.
915.1k / 6M*
SCHOOLS MAPPED
45.88%
SCHOOLS WITHOUT CONNECTIVITY
38
COUNTRIES JOINED PROJECT CONNECT
* Estimated schools, globally
SELECT A COUNTRY
mapbox
© Mapbox © OpenStreetMap Impro
giga
unicef
ITU
School location + connectivity
School location (processed)
School location (not processed)
DARK
LIGHT
SATELLITE
ACCESSIBLE

School Detection using Deep Learning

Training data Process

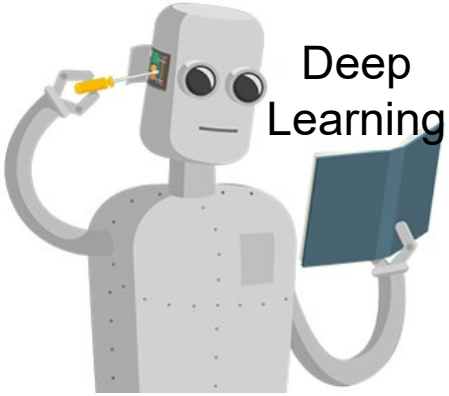
Satellite image

Labels

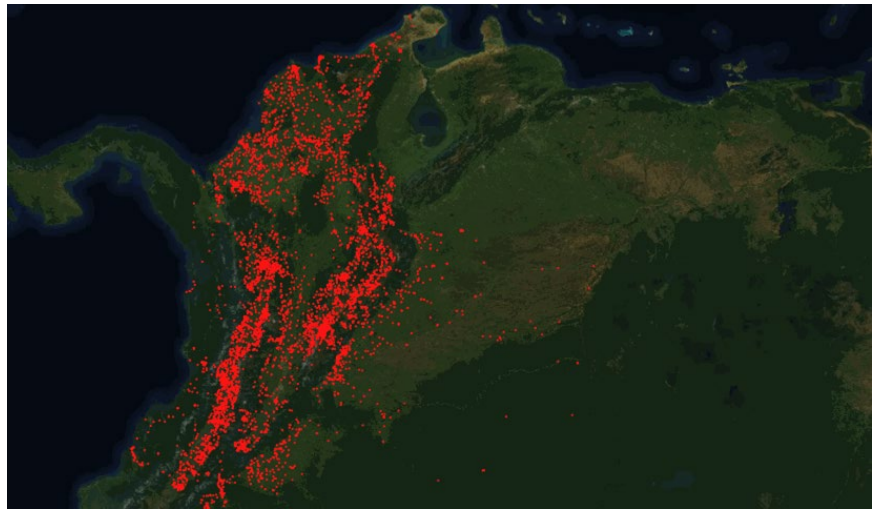
school

not school

Satellite imagery

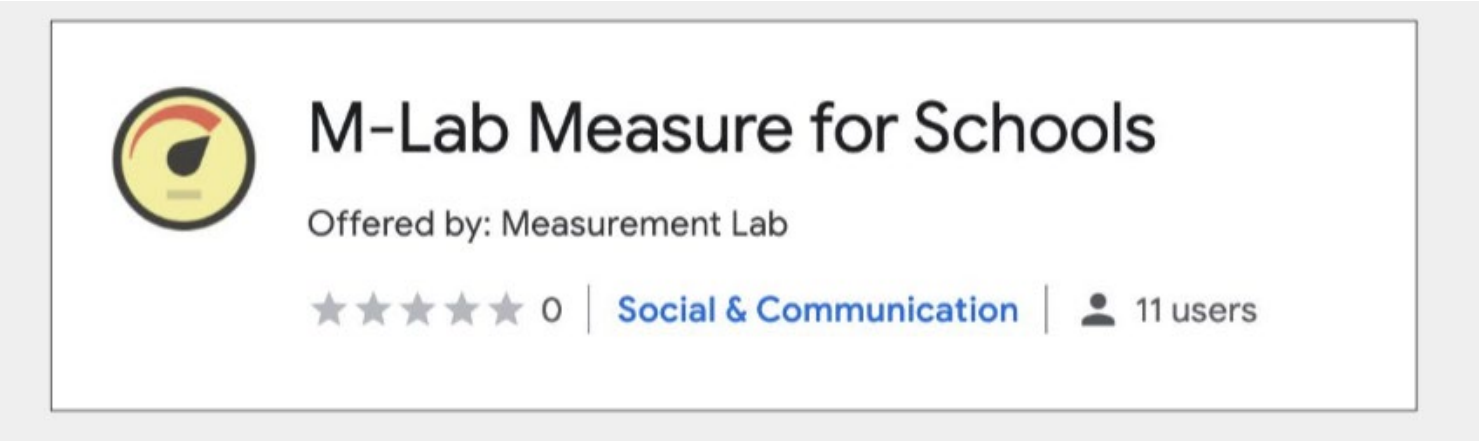


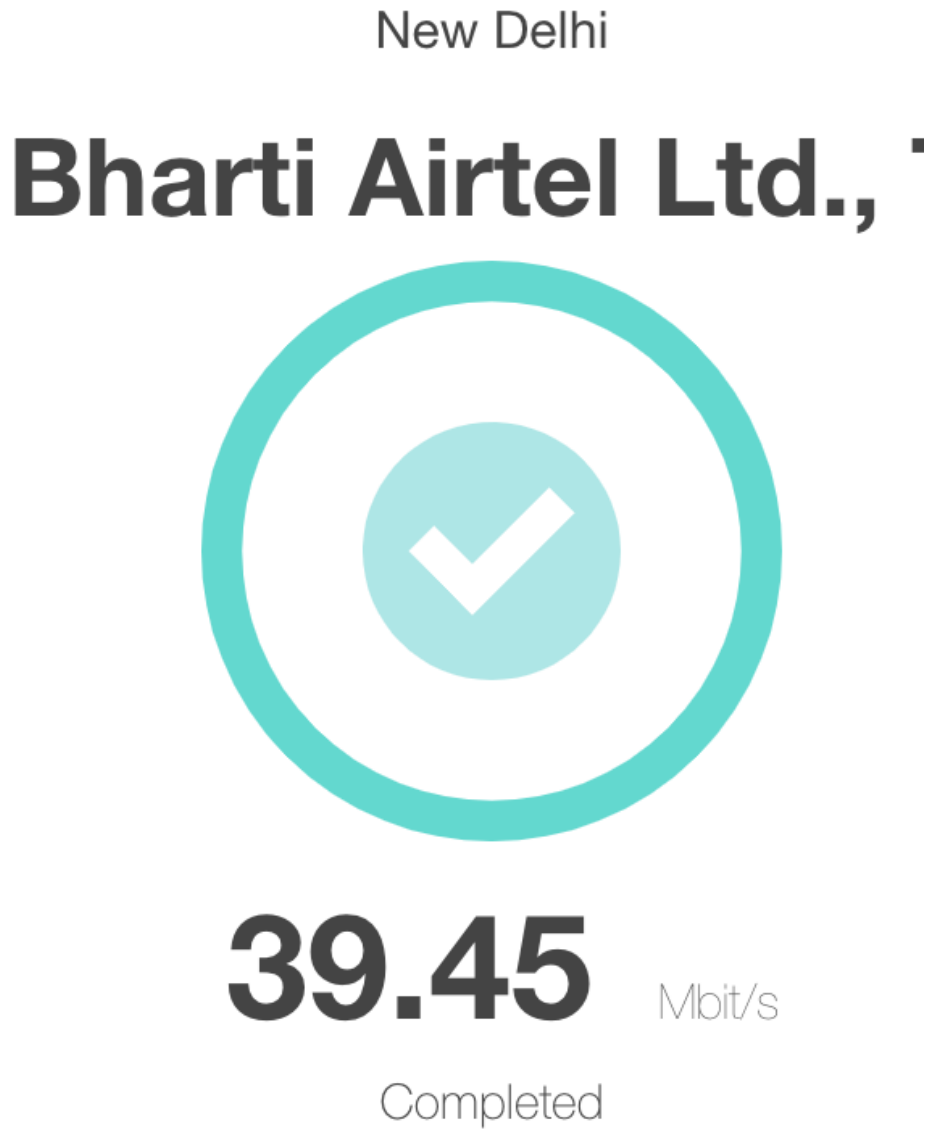
Prediction Process



School map for Colombia with 89% accuracy

Real-time connectivity data collection app

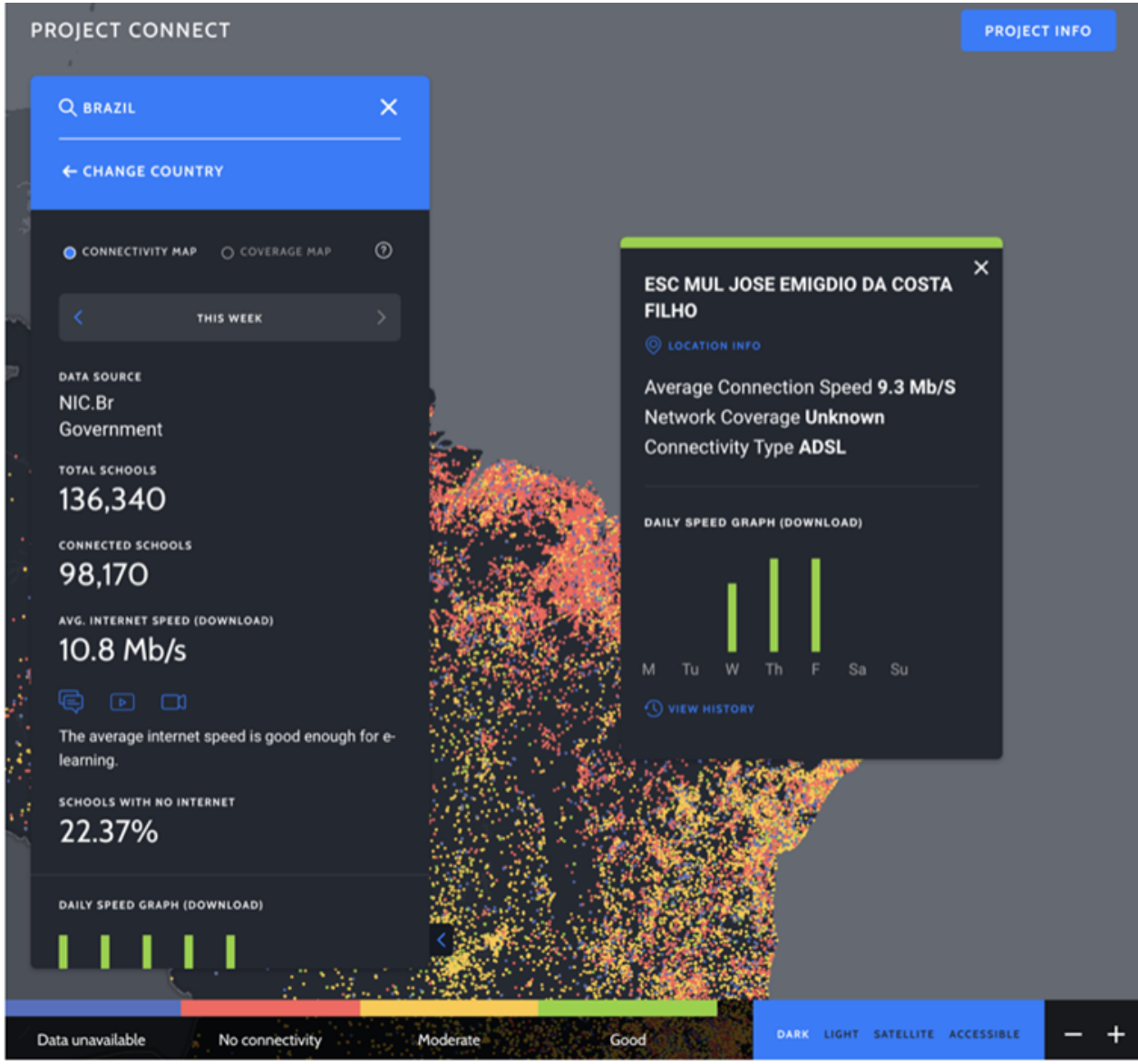




A PROTOTYPE COUNTRY

In Brazil, school internet speeds are reported every 4 hours, holding providers accountable and measuring impact

- Giga has developed a browser extension for connected schools to measure speed in real-time
- This data can be linked to procurement roll-out and operating expenses – “no internet, no service fee”

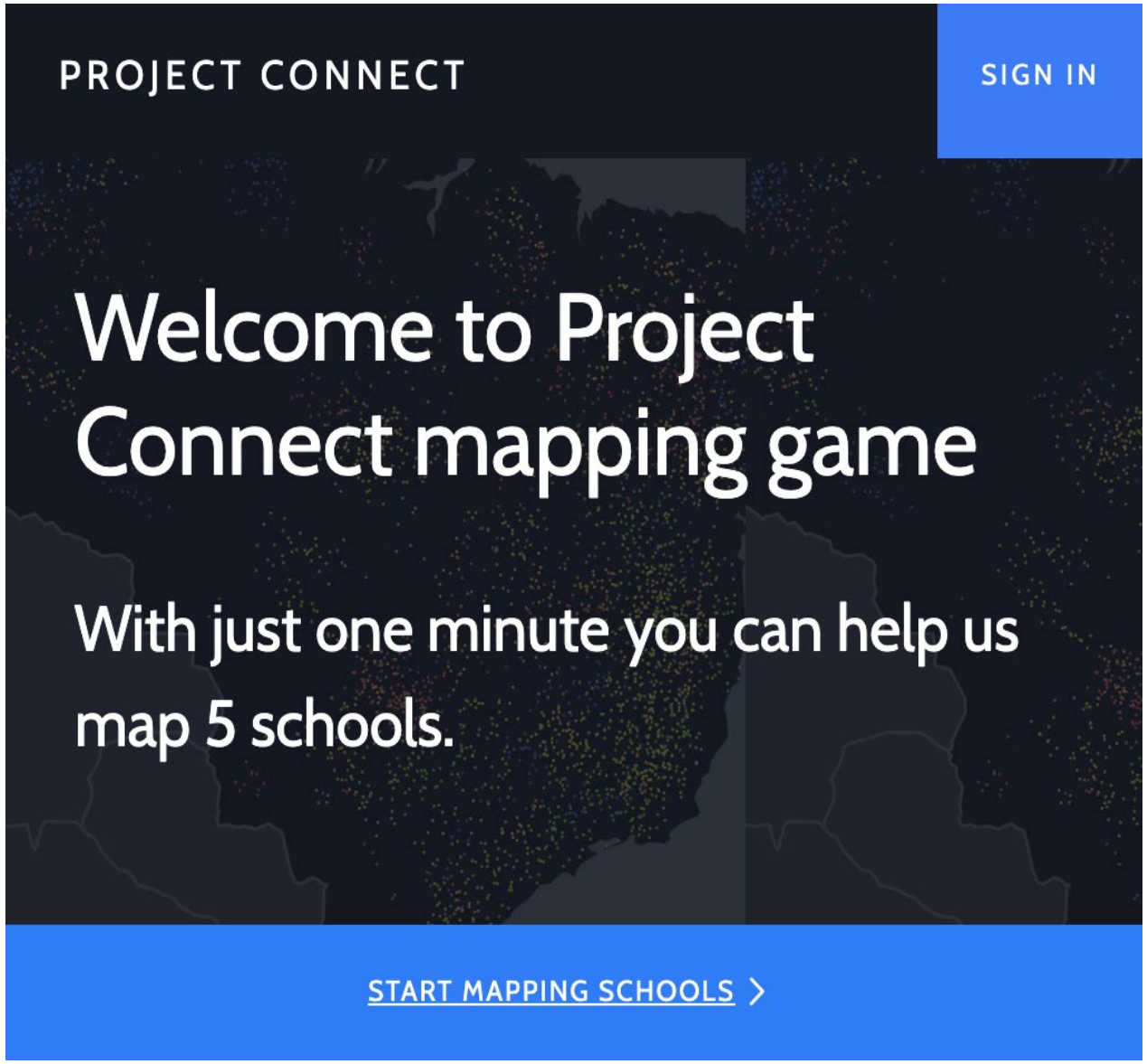


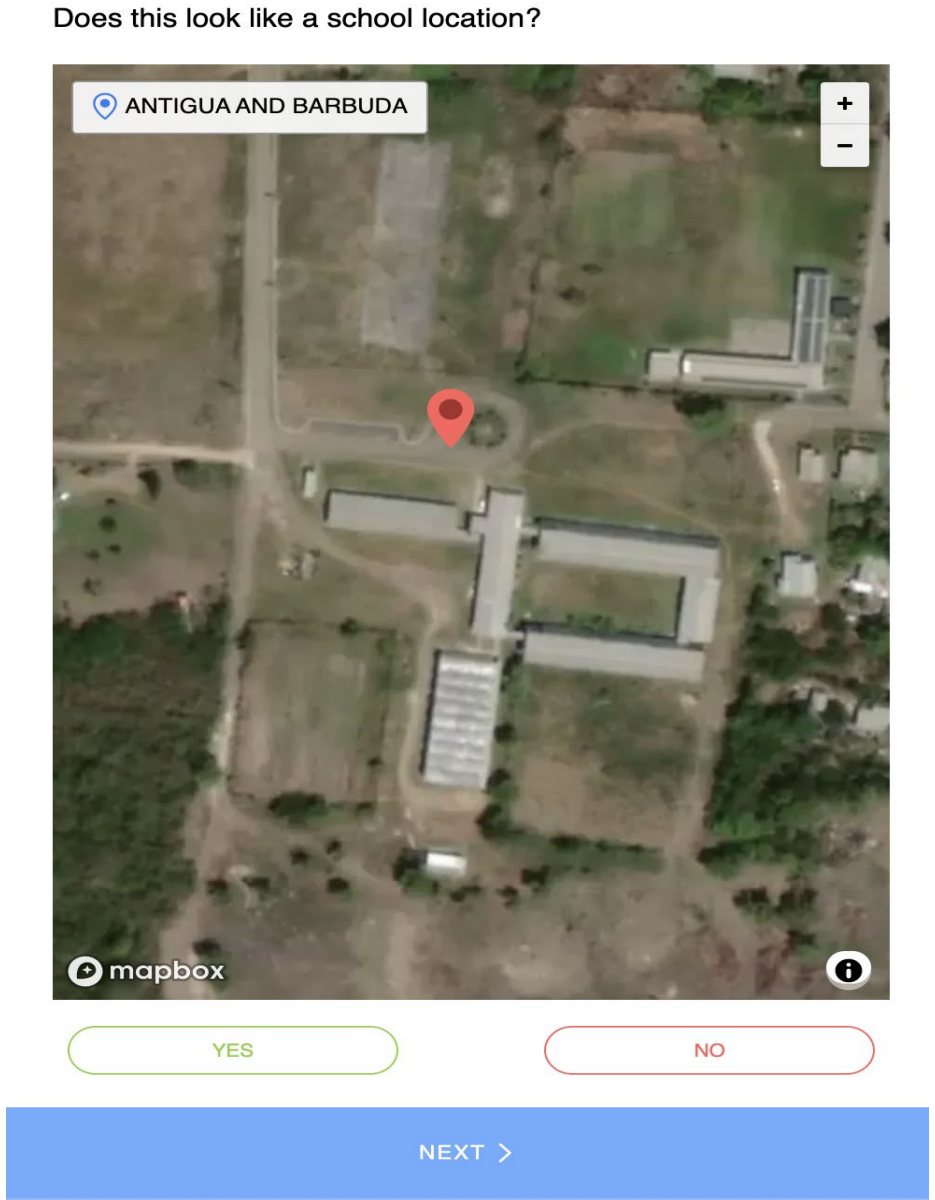
Real-time school mapping in Brazil, live on Project Connect

www.projectconnect.world

giga

Mapping Game: Validating schools through crowdsourcing





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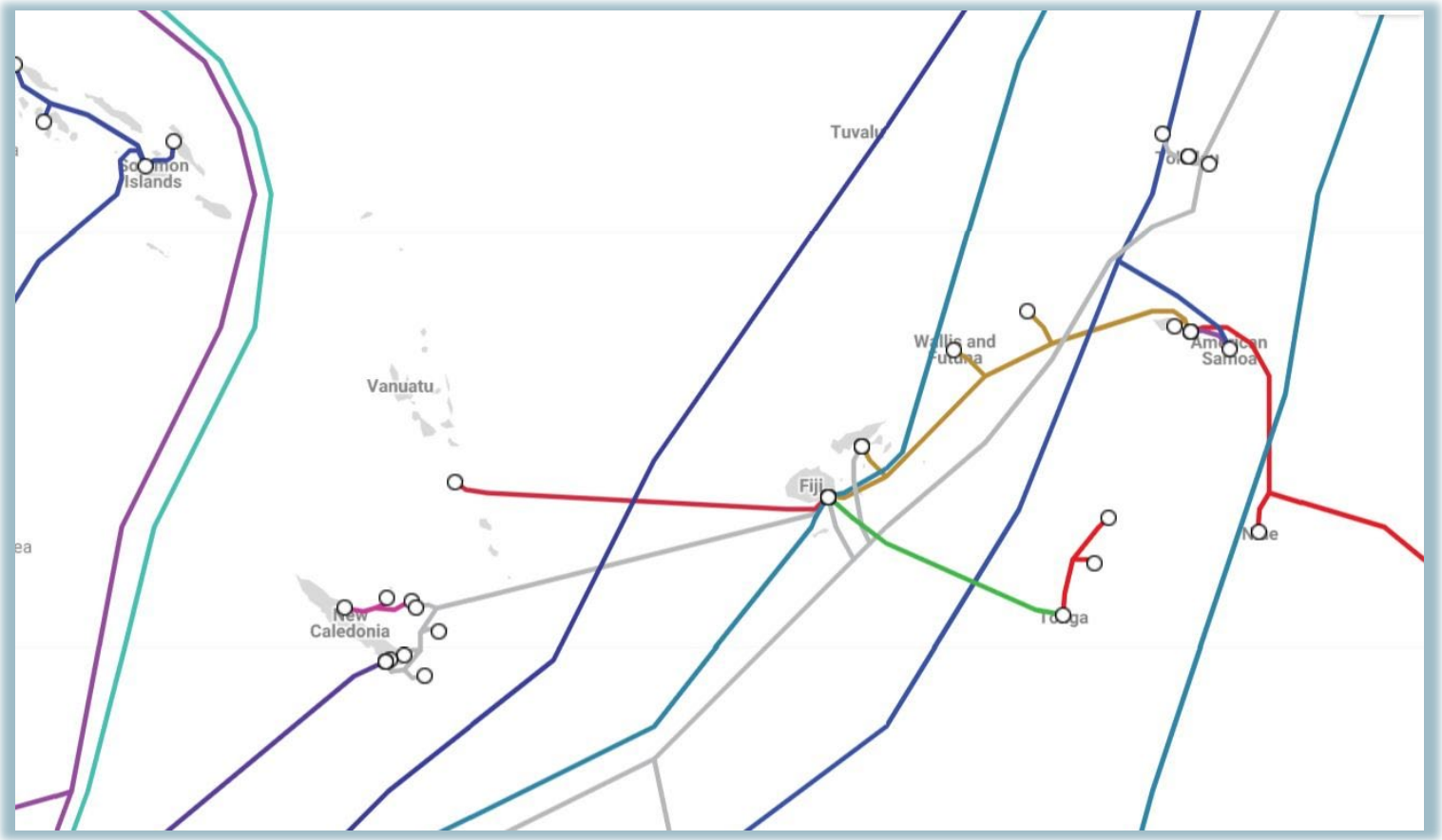


EMERGING MOBILE TECHNOLOGIES TO FACILITATE DIGITAL TRANSFORMATION IN PACIFIC ISLANDS

Shivnesh Prasad,
Digital Development Specialist
The World Bank

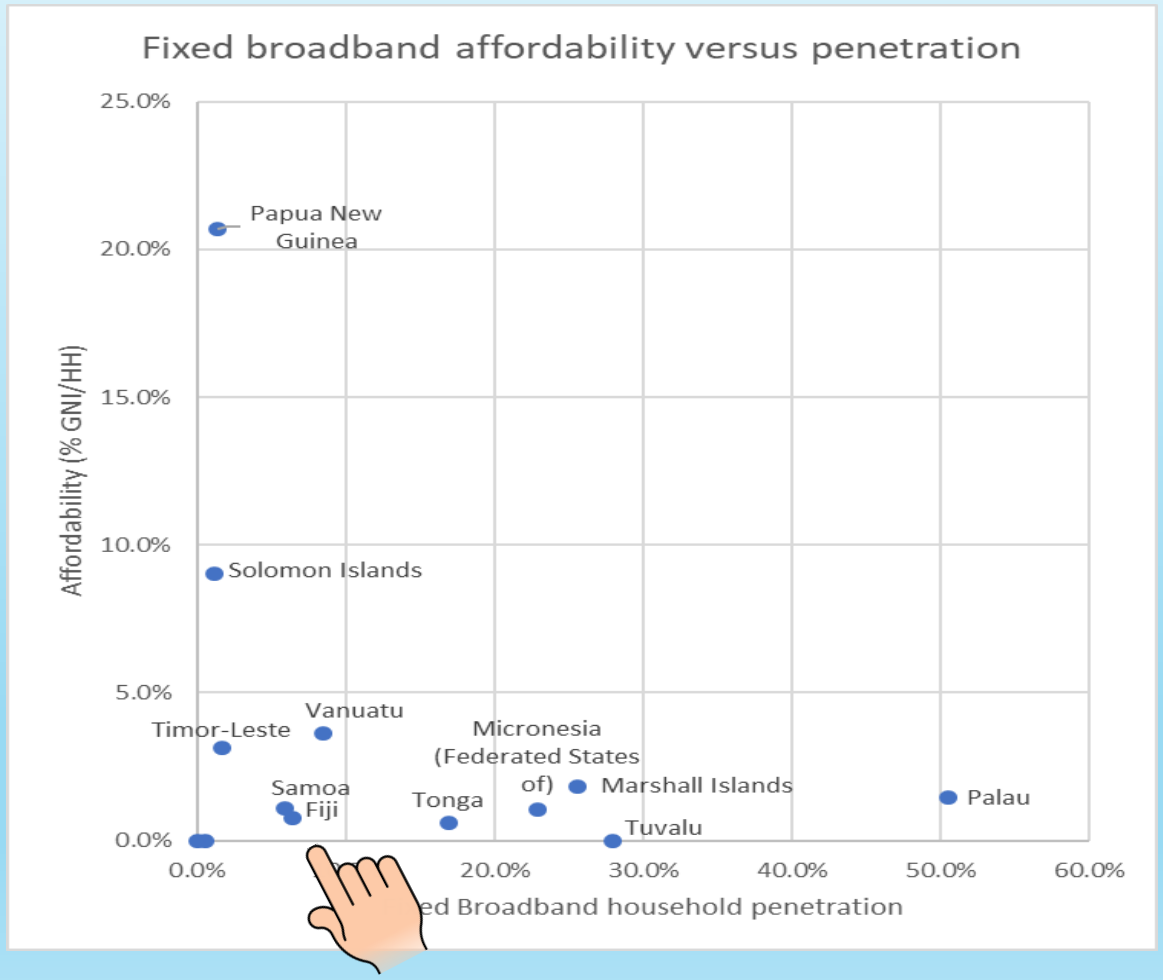
AFFORDABLE AND RELIABLE CONNECTIVITY AS A PRE-REQUISITE FOR THE DIGITAL TRANSFORMATION

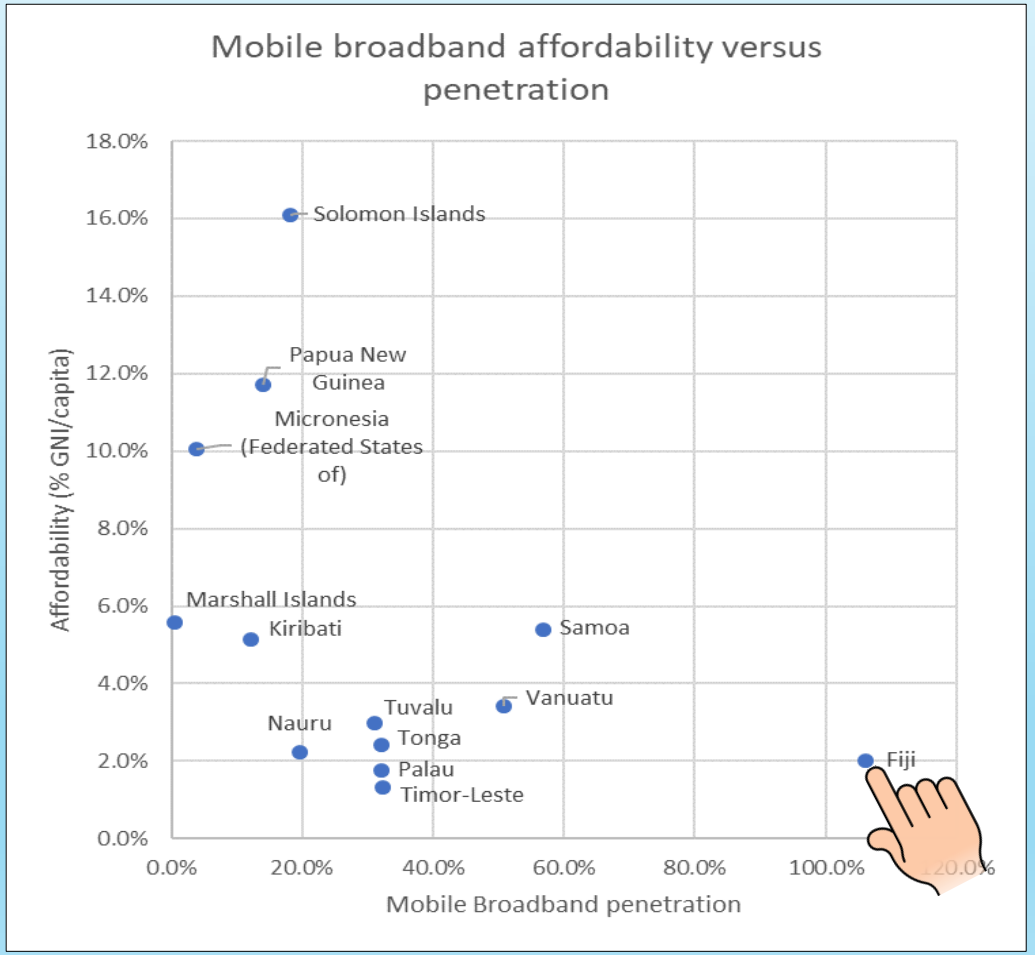
- Accelerating to digital economy and society, and associated service delivery platforms, requires more **affordable and reliable connectivity**

- Key Drivers of Growth
  - Government to adopt digitalization agenda to increase demand, improve access and affordability
  - User Appetite and preference

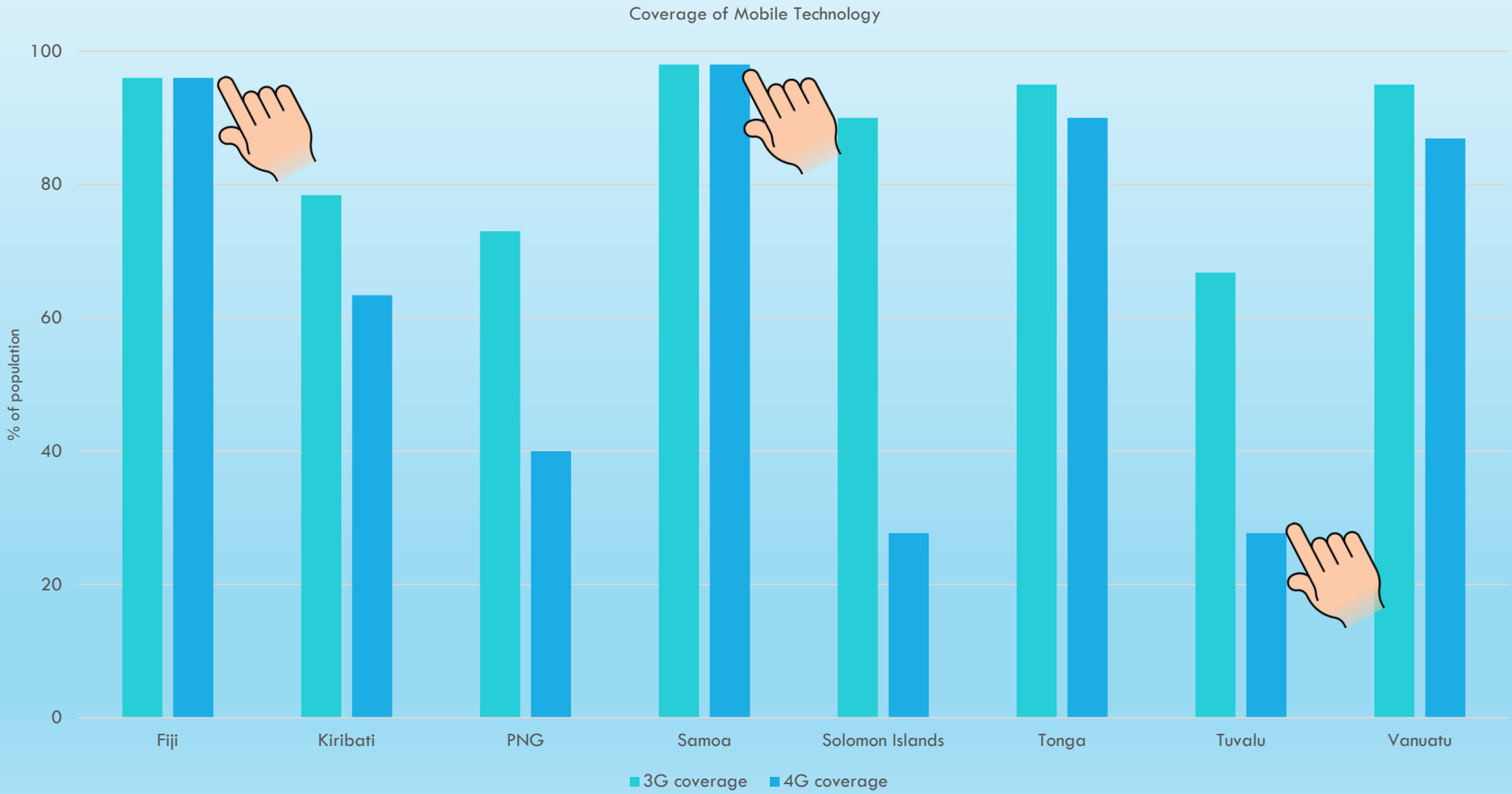
- Challenges to consider
  - International bandwidth capacity and costs
  - Small markets
  - Satellite connectivity
  - Cybersecurity
  - Sustainability

HIGH INTERNET COSTS LEAD TO LOW PENETRATION. DESPITE CONSIDERABLE IMPROVEMENTS IN INTERNET CONNECTIVITY, INTERNET IN THE REGION IS NOT AFFORDABLE IN ALL COUNTRIES. CLEARLY MOBILE BROADBAND OFFERS THE MOST AFFORDABLE SOLUTIONS FOR MAJORITY OF THE COUNTRIES IN THE REGION.



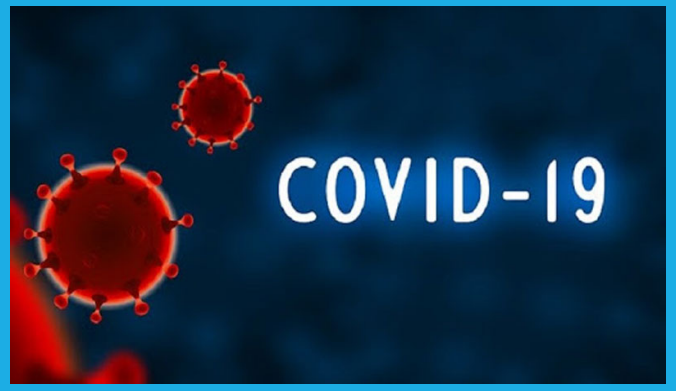


DESPITE THE CHALLENGING NATURAL ENVIRONMENT, MOBILE INTERNET IS AVAILABLE IN MOST PICS. 4G/LTE COVERAGE HAS BEEN ESTABLISHED AS THE DOMINANT MOBILE IN TECHNOLOGY IN FIJI, AND HAS NOW STARTED TO MAKE INROADS IN SEVERAL MARKETS SUCH AS VANUATU, SAMOA, AND TONGA.



Source: GSMA, 2020

DIGITAL INNOVATIONS INCREASINGLY BEING ADOPTED IN THE PACIFIC



USE OF DIGITAL TECHNOLOGIES IN RESPONSE TO THE PANDEMIC

- Vaccination registration and administration
- Online dashboard of active cases and locations of hotspots
- Government assistance- social transfer payments, distribution of ration
- Business continuity- application of passes, increasing online presence

Growing in usage

- Financial Services- Mobile Money Wallet, Internet Banking and Remittances
- eGovernment applications
- eCommerce and use of Online marketplace, including using social media for exchange of goods and services

The future for the region

- Reducing international connectivity gap either through use of submarine cables and/or satellites
- Universal access- Connecting the unconnected to increase market size and demand
- Growing use of cloud technologies, eGovernment and the digital economy
- Use of shared services to increase efficiency and reduce costs

VINAKA

THANK YOU

INTELSAT

Connecting the Unconnected: Satellite Enabled Rural Connectivity

Albie Bester

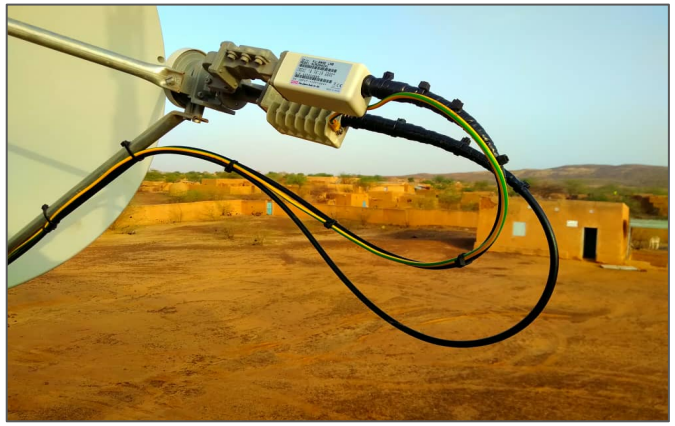
9 July 2021

Intelsat Community Connectivity Projects

- Ku-Band based turn-key solution
- Wi-Fi, 2G, 3G, LTE, pLTE
- Rapid deployment (1 – 3 days)
- Scalable to 1000's of sites
- Funding support for trials

Rwanda Schools

Niger – Smart Villages



UNHCR – Ghana

Coca-Cola EKOCENTER

Internet for All – South Africa

INTELSAT

Thank you

Albie Bester

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Country operating models for school connectivity

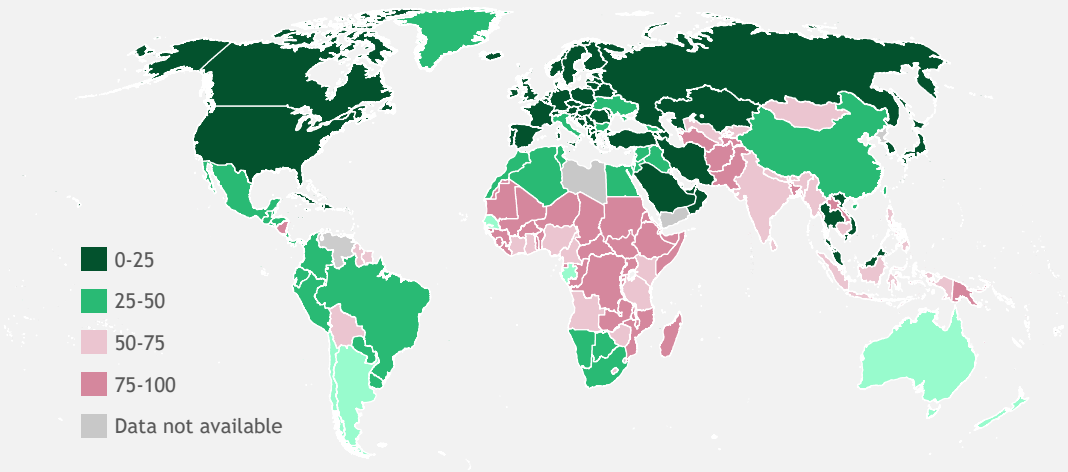
ITU Webinars - Emerging technology for connectivity

giga | unicef for every child | ITU

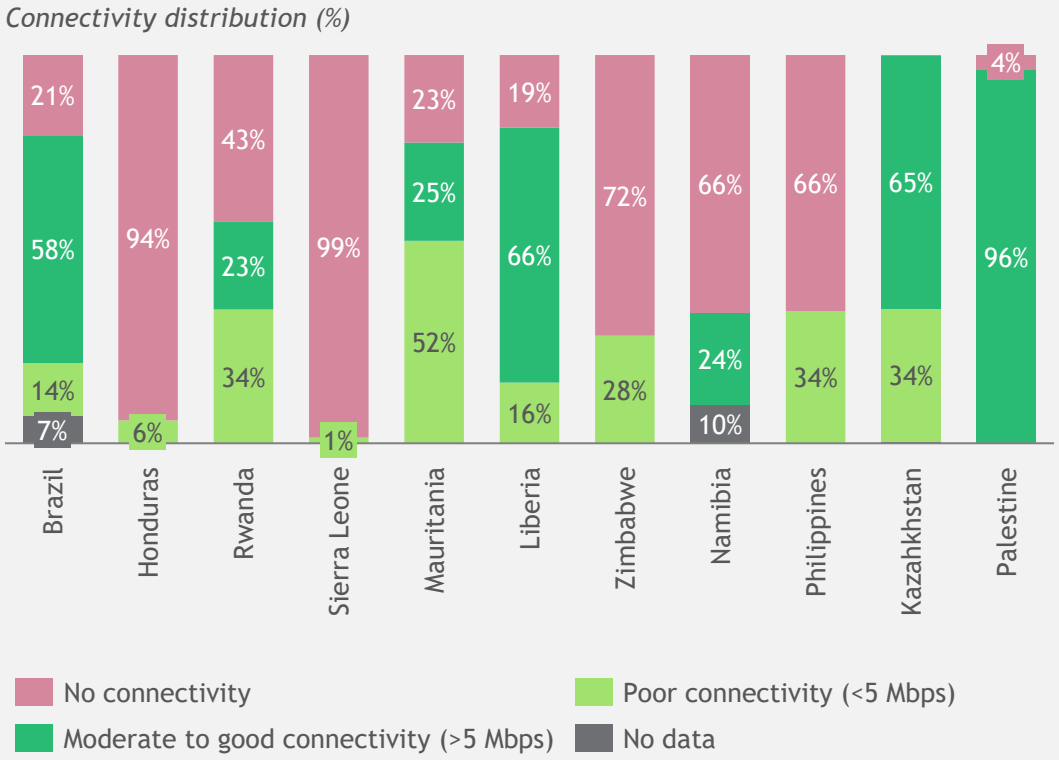
FRIDAY, JULY 9

The challenge | Large part of world not connected to Internet, which is also reflected in school connectivity

Large percentage of population with no access to the internet globally…



…which is reflected in school connectivity and needs to be tackled in a sustainable matter



Source: ITU data, Giga school mapping, BCG analysis

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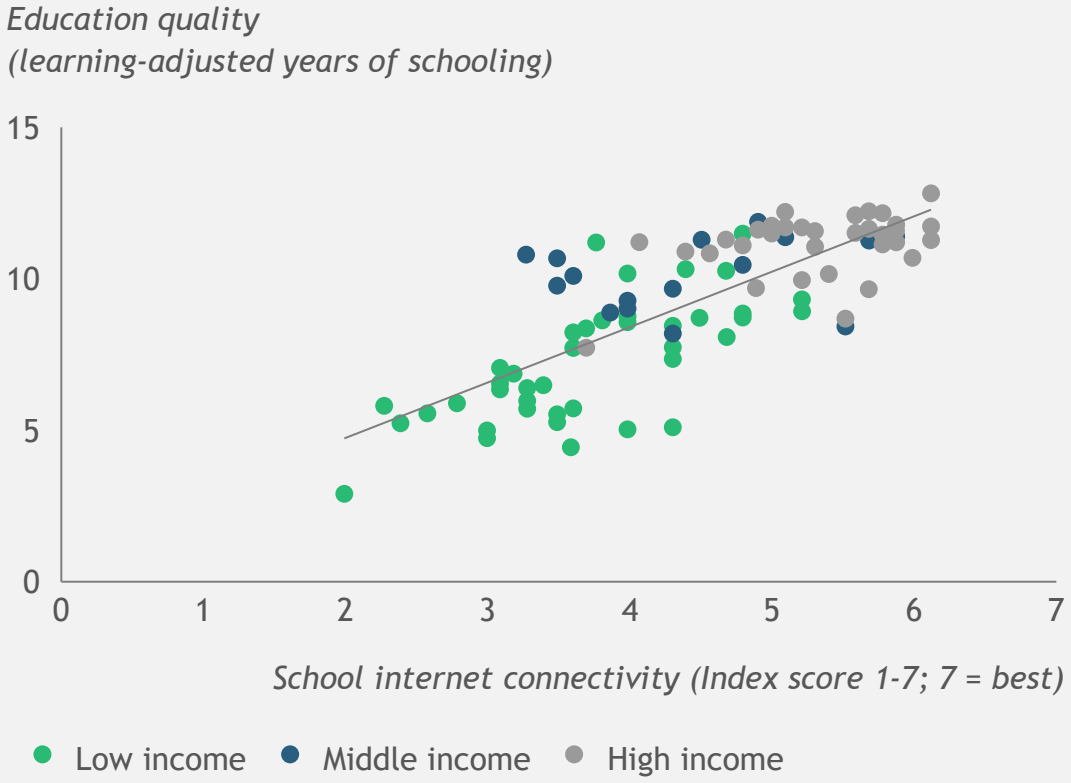
The challenge | School connectivity & education quality correlated, and linked to improved country economics

The relationship between school internet connectivity and education quality is clear…



…and has been proven to lead to an increase in developing country's GDP

- **Individual level:** individuals can **find and keep employment** and earn more over their lifetime
- Country-level: More skilled & productive labor force is created. Leads to an **increase in GDP**, increased consumer spending, increased number of jobs, and increased economic development
  - Schools can enable benefits not only for the students, but also for the wider community – **school serves as hub for connectivity**
- Increasing education therefore allows for **closing the gap** between developing and developed countries
- This positive reinforcing cycle only works if students receive good quality education uninterruptedly. In order to achieve this, **sustainable business models to connect schools are required**

Source: World economic forum global competitiveness index, World bank human capital index, BCG analysis

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Sustainable business model influenced by technology, operational set-up, funding structure, and financials

Deep-dives on following slides

Technology

- Desired internet speed
- Infrastructure options & considerations

Financials

- Key determinants of costs
- OpEx
- CapEx

Funding structure

- Funding model
- Sustainable funding sources
- Government input
- Evolved funding

Operational set-up

- Setup to execute, build, operate, maintain
- Role MNO & gov't
- Mgmt. options

Source: BCG expertise

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Technology | Minimum target set to reach meaningful connectivity, which has implications on the technology that can be used

Giga has set a minimum target for meaningful connectivity…

2024 target

Level of detail

20 Mbps per school

20 Mbps per school
1 Mbps per 20 students
Monthly minimum of 100 GB

20 Mbps per school
1 Mbps per 20 students
Monthly minimum of 100 GB
Download speed of 20 Mbps
Upload speed of 5 Mbps

In short:

- Giga's view on meaningful connectivity is to deliver a minimum of 10 Mbps per school, but Giga will advise on a target for 20 Mbps per school where reasonable

Nuanced:

- For larger schools, 1Mbps / 20 students is the target. This means ~15 Mbps for an average sized school of ~300 students
- The monthly minimum on data is 100 GB. Giga will advise on a target of 200 GB per month

In detail:

- Giga's minimum download speed for meaningful connection is 10 Mbps with an upload speed of 2.5 Mbps. As a target, Giga will advise for double the minimum download and upload speed

…which translates into certain technology options

Technology	Suitability
2G	✗
3G	✗
4G	✓
WISP	✓
Fiber	✓
Satellite	✓

Source: Methodology of Education Superhighway: Equivalent organization to Giga in the USA, industry expert interviews, Giga team, BCG experience re. technology capabilities. Notes: Satelite may be challenged for video-enabled due to cost for traffic. WISP will only work for Hybrid-ready for smaller schools/communities with up to ~300 students.

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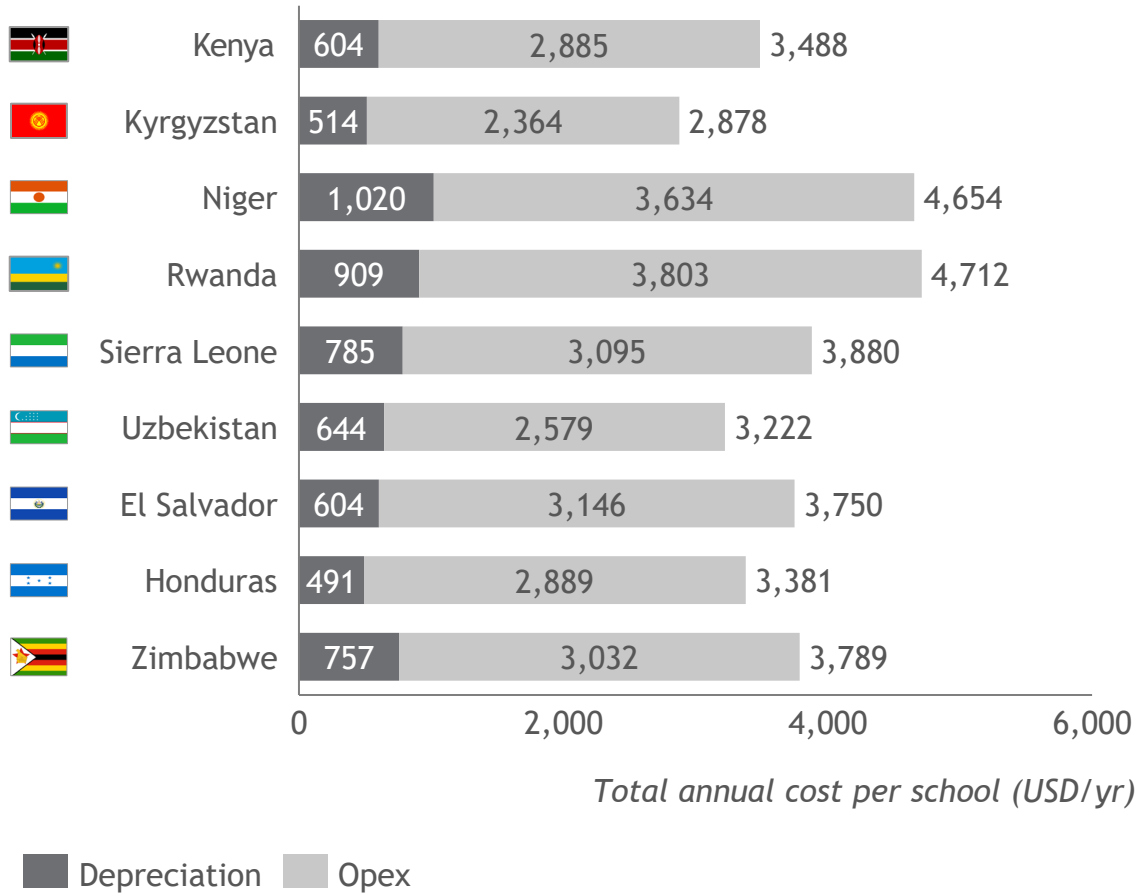
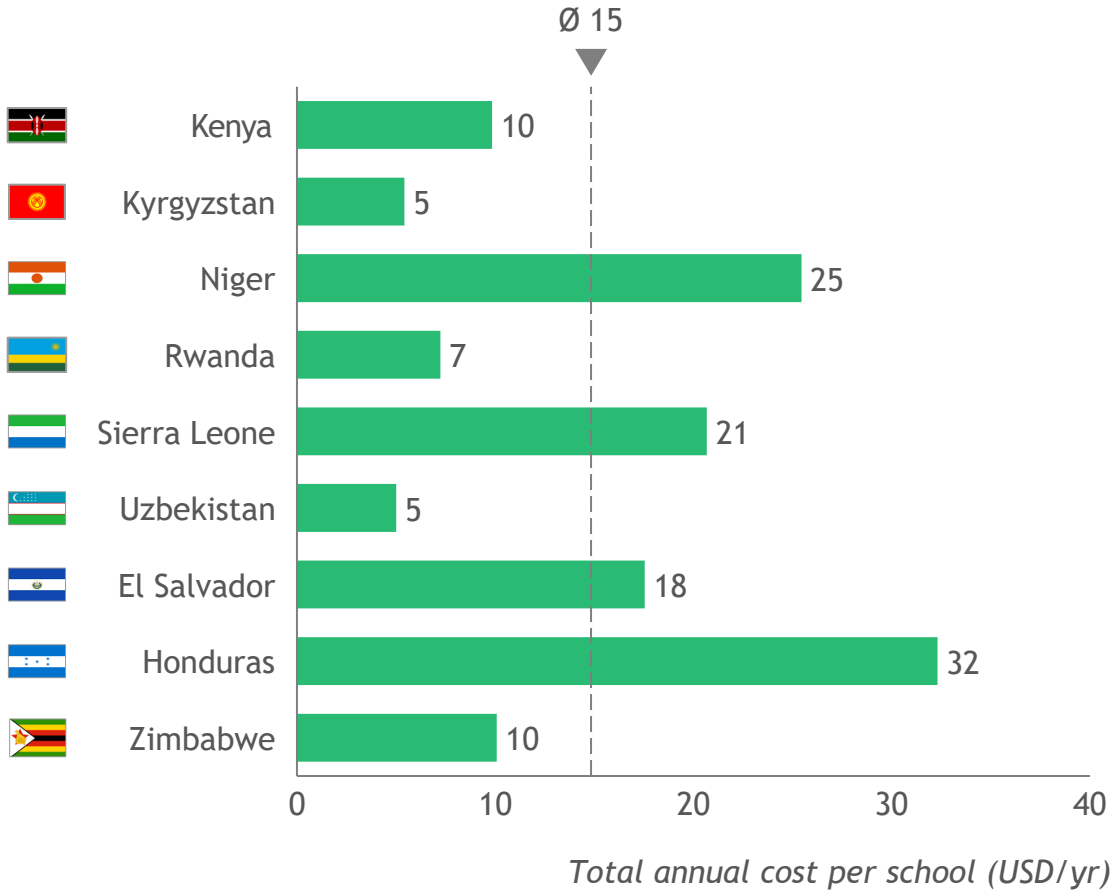
Financials | Required revenues would need to be between 5 and 30 USD per year per student





Source: ACTUAL model; Note: depreciation assumed 4 year for equipment and 20 years for fiber; modelling in process of further refinement

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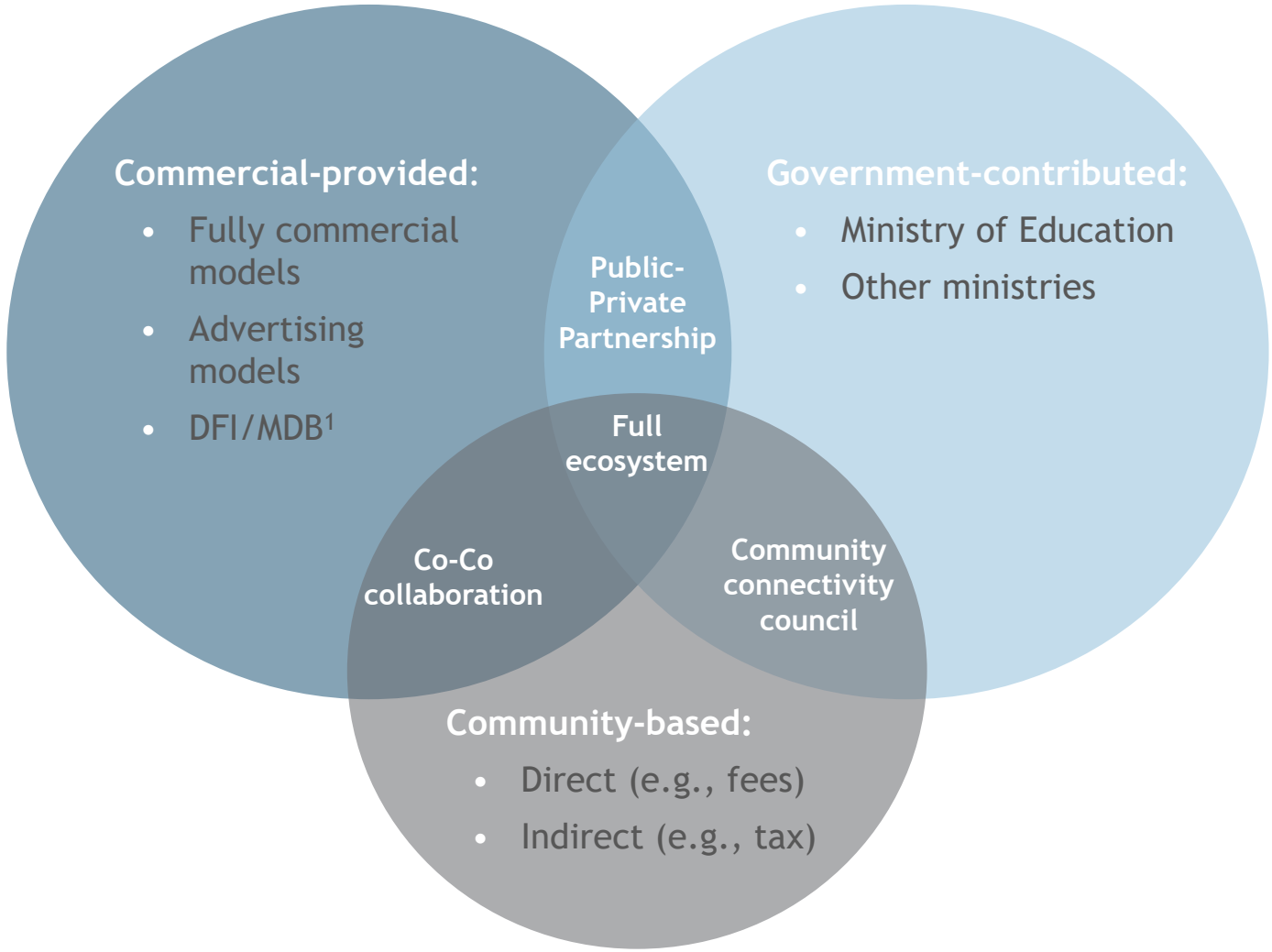
Funding | Seven country archetypes arise based on funding opportunities

3 primary archetypes and
4 secondary archetypes



1. Development finance institution (DFI) and Multilateral development bank (MDB), e.g., World Bank, African Development Bank, etc.

Source: Expert interviews, BCG analysis

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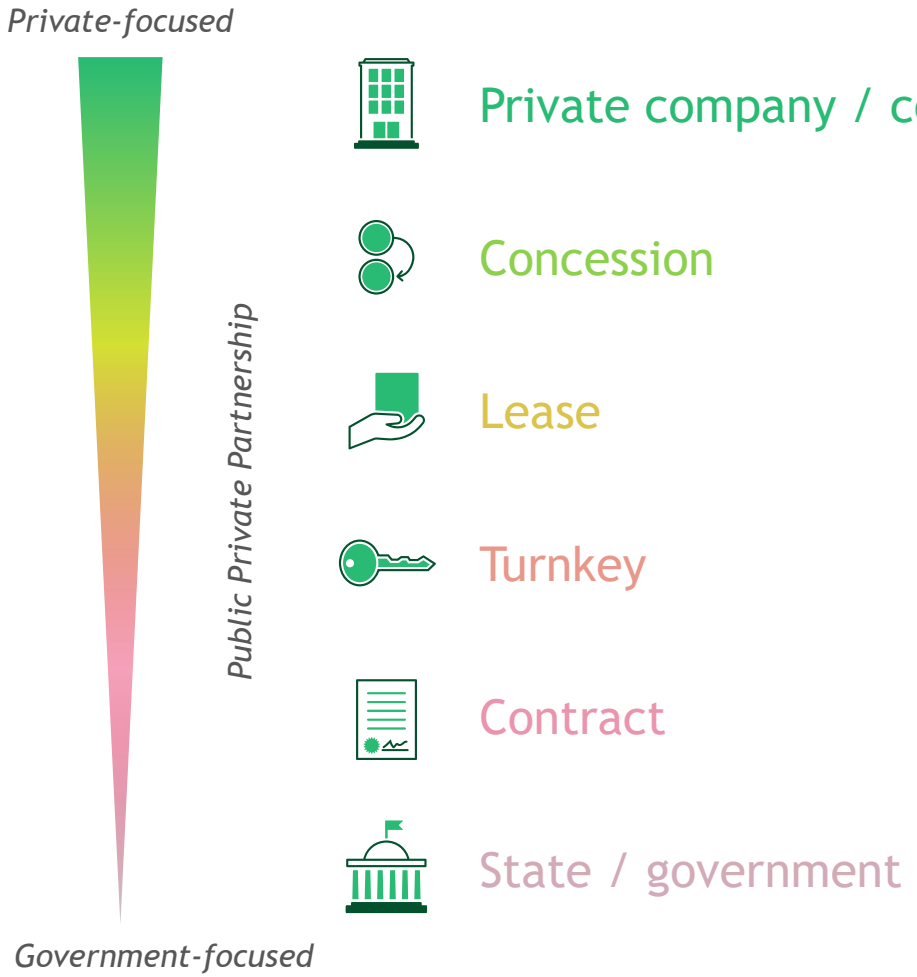
Operational set-up | Different archetypes lead to different ideal operating set-ups, with private sector involvement increasing financial performance



- Management that's mostly private-focused has proven in practice to be **most efficient with faster times to roll-out and healthier financial statements**
- Contrarily, government/state-owned management options have proven to be **difficult in practice, with operational, financial, and commercial risks carried by the government**
  - There are several examples of state-owned management solutions that have turned out to be difficult to implement in practice, e.g. Gambia ECOWAN, Senegal ADIE, Lithuanian RAIN, and Oman Broadband Company

Source: World Bank, Investopedia, UNESCAP, expert interviews, BCG analysis

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