

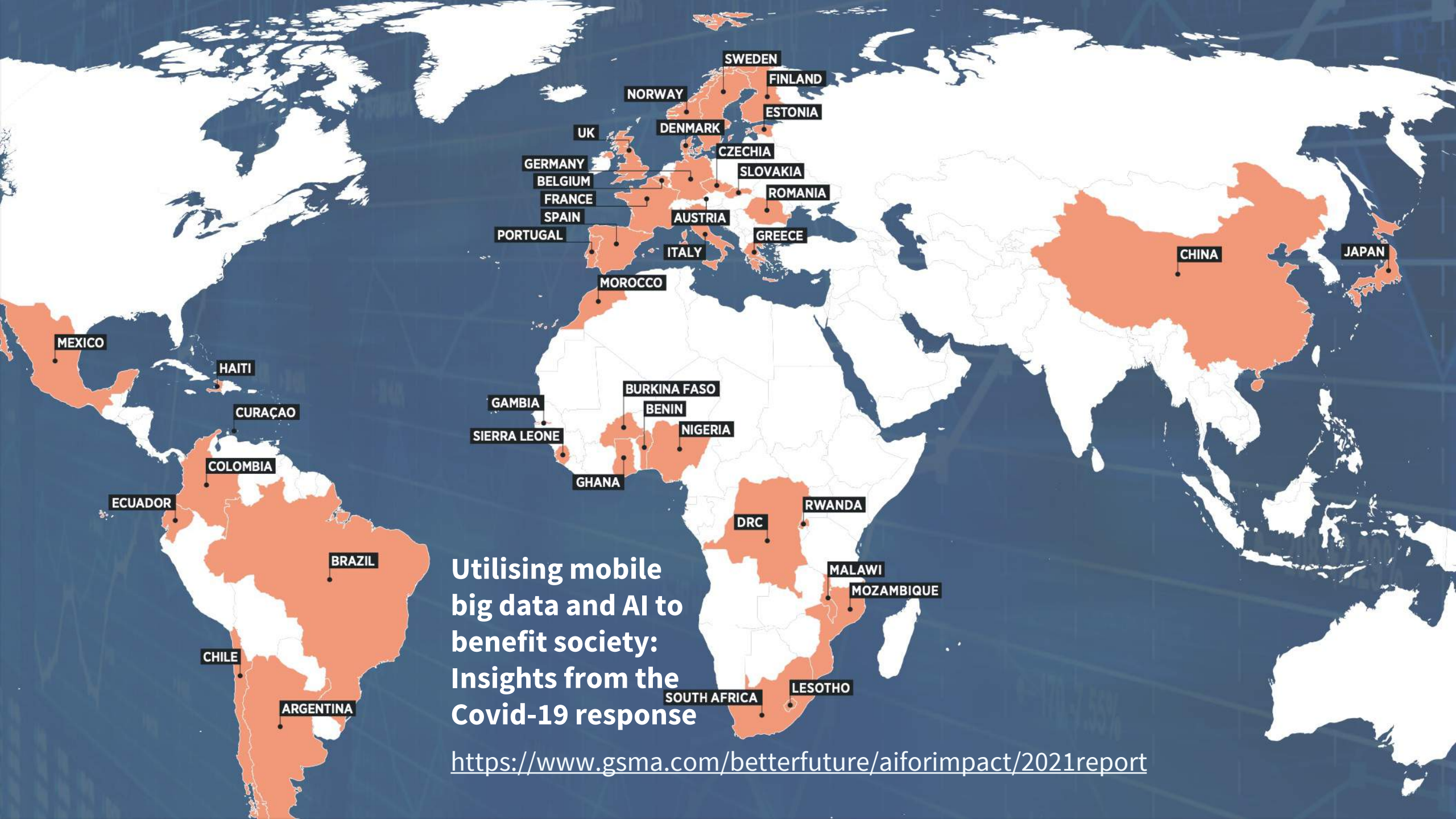
# Measuring SDGs with Mobile Phone Data

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**Utilising mobile  
big data and AI to  
benefit society:  
Insights from the  
Covid-19 response**

<https://www.gsma.com/betterfuture/aiforimpact/2021report>

# Why mobile phone data for SDGs?

## Why not?

MPD barriers

**Data gathered** by external parties, hard to access and control

**Large datasets**, requires resources

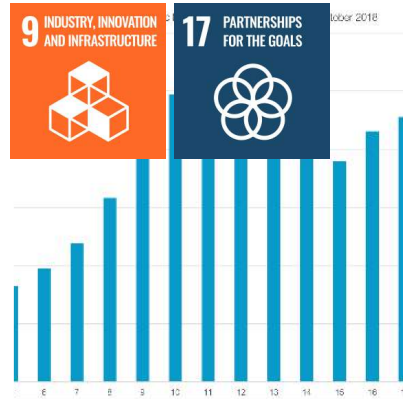
## Why yes!

MPD benefits

- ✓ Already gathered by external parties
- ✓ Large datasets with large sample coverage
- ✓ Timeliness
- ✓ Data quality
- ✓ Granularity

# Leave no-one behind: Mobile Phone Data (MPD) for SDGs

## Information society



## Population



## Tourism



## Migration



## Disaster Management



## Transportation



# ITU Big Data Project

	<b>Indonesia</b>	<b>Brazil</b>
Interested parties:	National Statistics Office (BPS) Ministry of National Development Planning (Bappenas)	National Statistics Office (IBGE) Centre of Excellence in ICT (CETIC)
Data provider:	1 largest mobile network operator (60% population coverage)	1 large mobile network operator (40% coverage)
Geographical scope:	whole Indonesia	Rio de Janeiro Metropolitan region only
Temporal scope:	1 year	2 months
Contractual scope:	Continuous	Pilot
SDG indicators	Mobile coverage (9.c.1) & internet access (17.8.1)	

## 2 Case Studies

	Indonesia	Brazil
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Can we:

1. Measure two SDG indicators with big data – coverage and internet use,
2. Compare to survey and administrative data in these countries, and
3. Conclude that the method that can be used in any country of the world?



## Input

- Gridded population (WorldPop)
- Cell location lat/long (mobile network operator or OpenCellID)
- Cleaned call and data detail records (CDR/DDR)

## Output

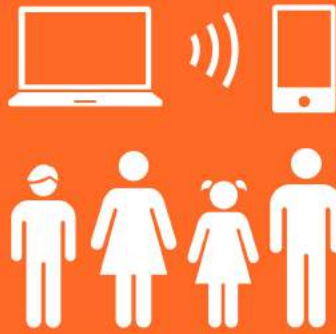
Sustainable Development Goal indicators:

1. SDG indicator 9.c.1 Proportion of **population covered by a mobile network**
2. SDG indicator 17.8.1 Proportion of **individuals using the Internet**



TARGET

9>C



UNIVERSAL ACCESS TO  
INFORMATION AND  
COMMUNICATIONS  
TECHNOLOGY

# Measuring cell coverage areas in Indonesia

IF

- Cell location data not available from MNO or Ministry
- Population data not precise enough

THEN

- Open and crowdsourced databases can be used:
  - OpenCellID for cell locations (good match with MNO and Ministry data)
  - WorldPop for population grid (good match with population projection)



# Before

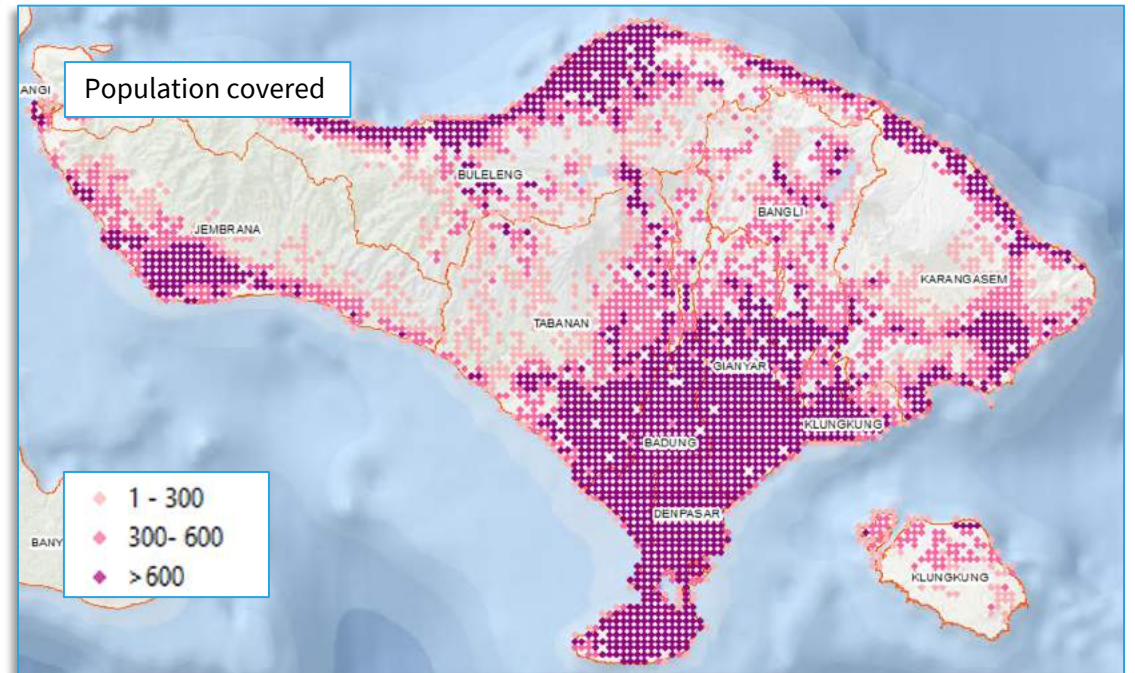
No SDG indicator published for less than national level

The available information is questionable and needed verifying.

- 100% coverage looks comforting, but is it true?

# After

SDG indicators now available up to grid level



Bali

# Lessons from Indonesia

MPD for ICT statistics is a stepping stone

SDG indicators for the local level

Data-sharing with mobile network operators



# Lessons from Brazil

## **Pilot with**

2 months of data

from 1 mobile operator

in 1 region (Rio de Janeiro)

Method for assessing reliability of  
the data

Pilot with existing infrastructure,  
then invest



# Population covered by a mobile network

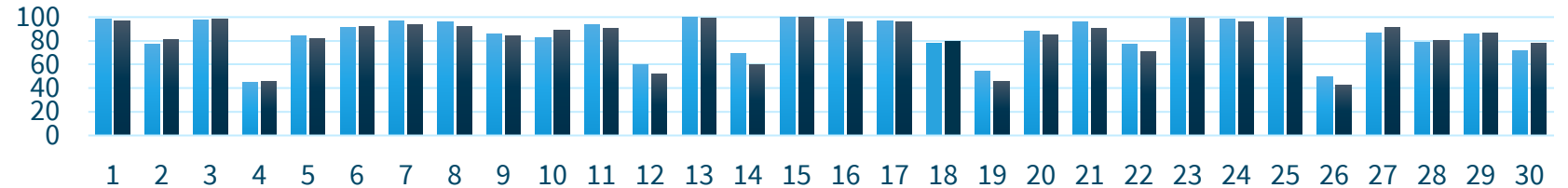
Comparison of results  
from

the case study and

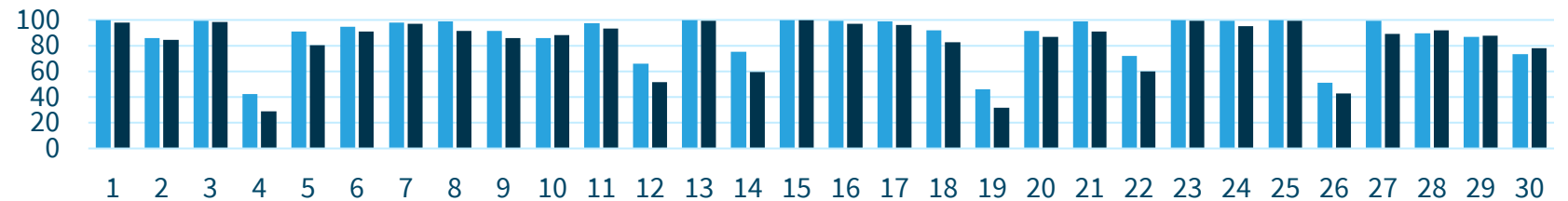
ANATEL (the  
telecommunication  
regulator)

X axis = municipality  
Y axis = population  
coverage (%)

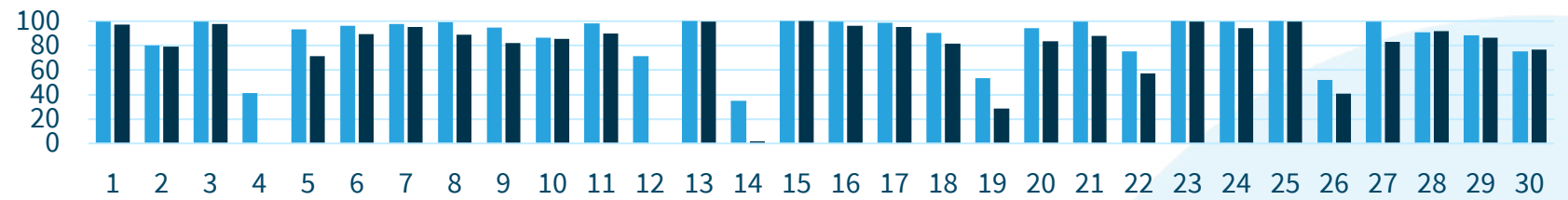
## 2G Technology



## 3G Technology

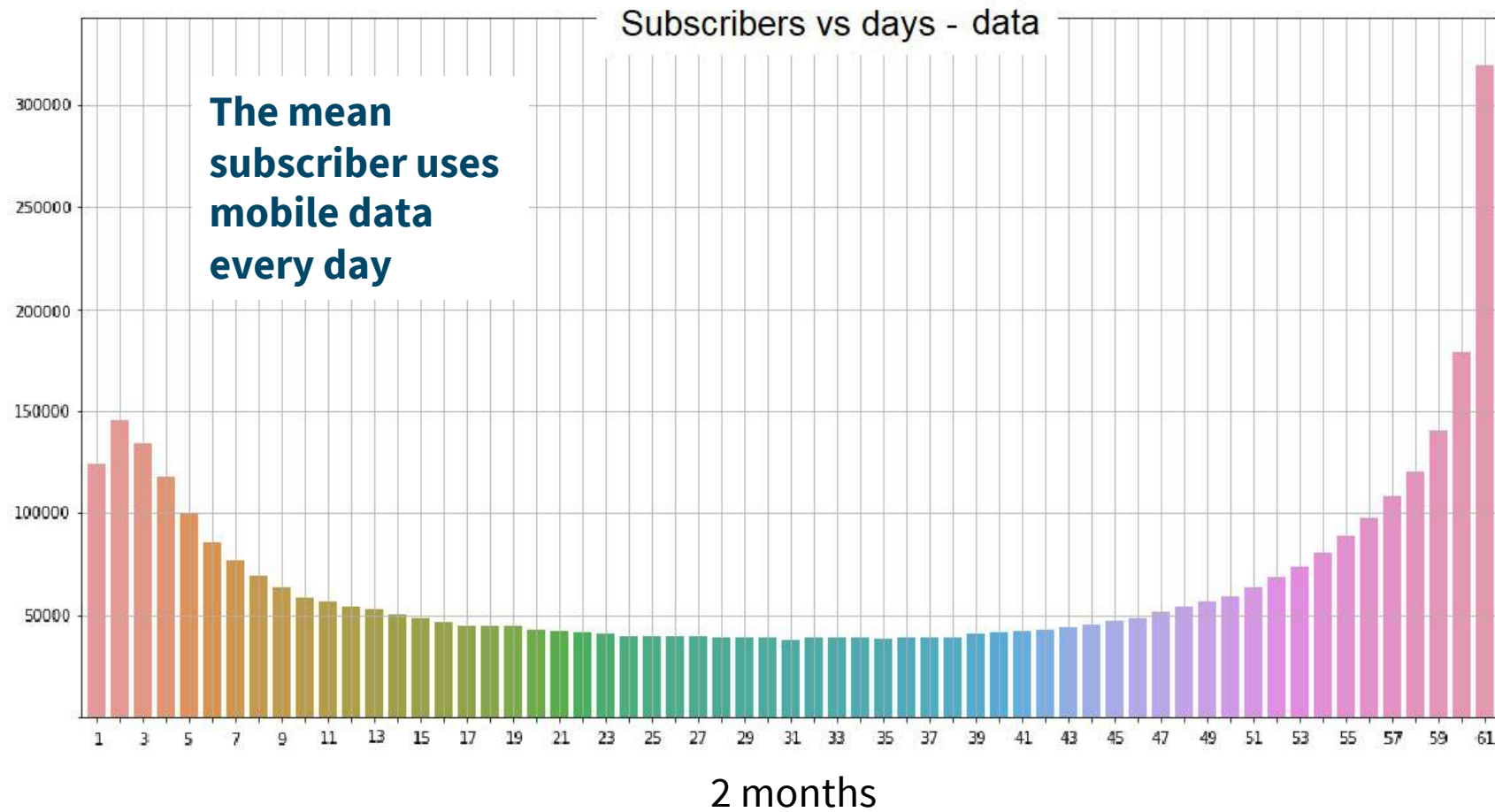


## 4G Technology

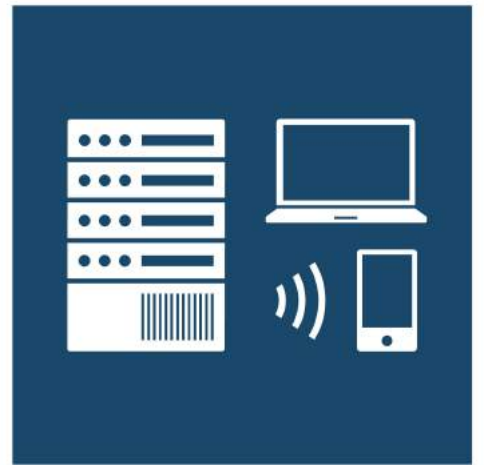


■ ANATEL ■ case study

# Measuring internet access in Brazil



**TARGET** 17.8

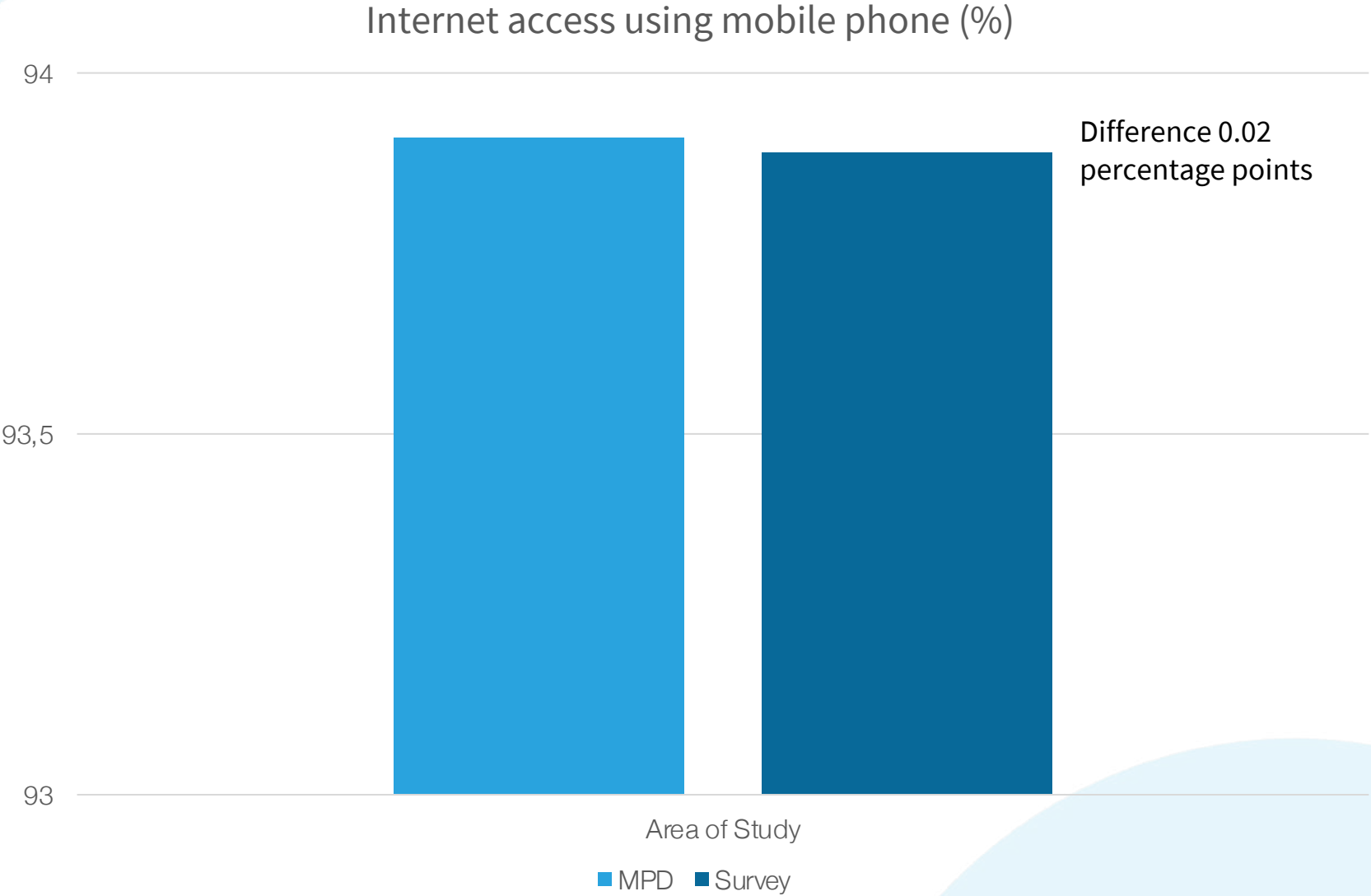


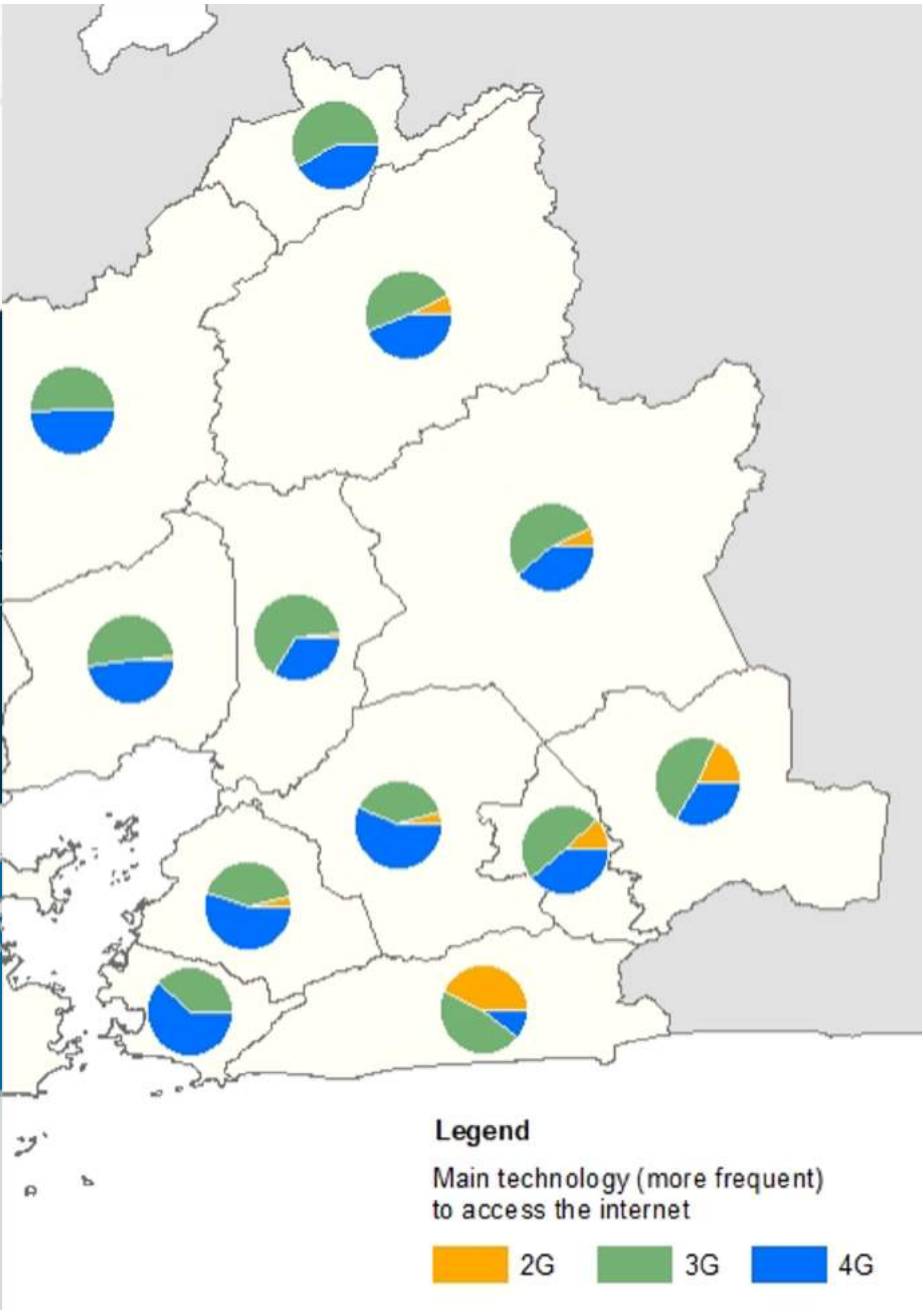
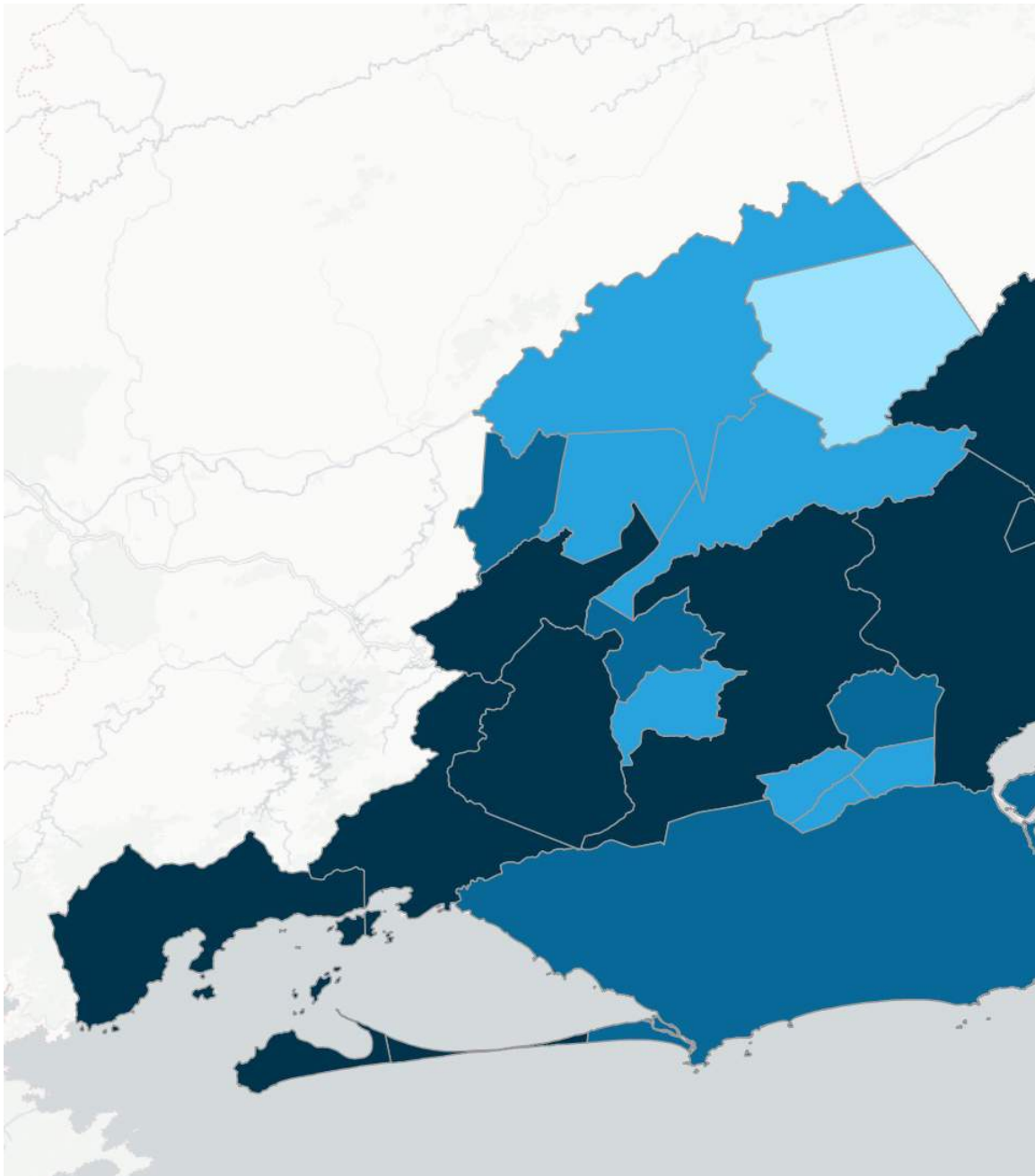
**STRENGTHEN THE SCIENCE, TECHNOLOGY AND INNOVATION CAPACITY FOR LEAST DEVELOPED COUNTRIES**

# Comparison of MPD & survey data from Rio de Janeiro, Brazil




## Sources:

- 1. Mobile positioning data (MPD) from 2018
- 2. PNAD Contínua Survey/IBGE Q4 2018





**Legend**  
Main technology (more frequent)  
to access the internet

	2G		3G		4G
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# Overall conclusion

MPD is **validated** and can be a source for measuring SDGs about mobile phone usage and access

Quality checks are important—  
at input, throughput and output stage

Produces **accurate small area measurements** to leave no-one behind





# How to start

There are countries that **produce official statistics** through mobile positioning data

- In Estonia, from 2009 until today
- In Indonesia, from 2017



CENTRAL BANK OF ESTONIA

<b>4x</b> faster	<b>200x</b> sample size	<b>12x</b> countries breakdown	<b>2.5x</b> more cost- efficient	<b>100%</b> less burden on tourists
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Set up the data pipeline

- 1. Attend ITU Academy course** on Big Data for Information Society Indicators
- 2. Gather stakeholders** – national statistics office, telecom regulator and data protection authority
- 3. Cooperate** with experts and data providers

**Follow best practices**



BADAN PUSAT STATISTIK



Instituto Brasileiro de Geografia e Estatística



# Thank you!

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