Measuring SDGs with Mobile Phone Data

Siim Esko
Positium
siim.esko@positium.com
Utilising mobile big data and AI to benefit society: Insights from the Covid-19 response

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
## ITU Big Data Project

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

<table>
<thead>
<tr>
<th>Indonesia</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data provider: 1 largest mobile network operator (60% population coverage)</td>
<td>1 large mobile network operator (40% coverage)</td>
</tr>
<tr>
<td>Geographical scope: whole Indonesia</td>
<td>Rio de Janeiro Metropolitan region only</td>
</tr>
<tr>
<td>Temporal scope: 1 year</td>
<td>2 months</td>
</tr>
</tbody>
</table>

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
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
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 (%)
Measuring internet access in Brazil

The mean subscriber uses mobile data every day

2 months
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

Internet access using mobile phone (%)

Difference 0.02 percentage points
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

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

- 4x faster
- 200x sample size
- 12x countries breakdown
- 2.5x more cost-efficient
- 100% less burden on tourists
Thank you!

siim.esko@positium.com