THE USE OF MOBILE POSITIONING DATA FOR OFFICIAL STATISTICS: INDONESIA’S EXPERIENCE
The Use of Mobile Positioning Data for Inbound Tourism
BPS rely on the Immigration Record and Border Survey for Inbound & Outbound Tourism Data

Visits from neighbouring countries only 7% of tourism

Under Coverage:

→ Not All Border Gates have 24/7 Immigration service
→ Not All Borders have border gates
→ Border Survey is too expensive and can not be done in all unattended gates (Cross Border Survey 2016 can only be done in 16 kabupatens)
In line with UN Recommendation “A World that Count”

Big Data
- Can be compiled automatically
- Real Time
- Less Manual Labour

Data Revolution For Sustainable Development

The integration of these new data with traditional data to produce high-quality information that is more detailed, timely, and relevant for many purposes and users, especially to foster and monitor sustainable development.

MPD as one of the Most Promising ICT Data Sources

To measure the mobility of people, including mobility of tourists. The digital footprint left by the users is very sensitive, but also highly valuable, as it provides new possibilities to measure and monitor the spatio-temporal activities of the population.
BPS implemented MPD since October 2016

The MPD used is signalling data

Data provided by MNO → aggregate table (data quality?, QAF?)

Oct-Des 2016: MPD was applied to 19 districts, since January 2017 became 25 districts.

Filtering and Calibrations is improved 3 times

Methodology is improved once
Mobile Positioning Data

- Signaling – all signals of mobile phones captured by the BTS (mobile antenna), even with no call/text
- CDR – records of active use of mobile phones

Statistical and Non Statistical Noises

- Fast fliers
- Seamen
- Accidental roamers
- Other transit
Overcoverage in MPD and should be excluded with algorithm.
FILTERING MPD AT BORDER GATES

\[ AT = \left( \frac{MPD}{X_{roam}} \times \frac{1}{1 - P_{nr}} \times \frac{1}{MS} \right) - WCI \]

- **AT**: Additional Tourists based on MPD
- **MPD**: Number of sim card foreigner detected by MNO
- **X_{roam}**: Ratio sim card per mobile phone
- **P_{nr}**: Ratio of foreigner Non-roaming (using local sim card or no mobile phone)
- **MS**: Market share
- **WCI**: Inbound Tourism recorded by Immigration
Cross Border Survey to obtain:

- Mobile phone Usage During Crossing Border
- Purpose of Travel
- Expenditure
- Main Occupation

Survey was conducted in 25 Kabupaten cover 76 gates, July & October 2017, samples= 36,000
Indonesia currently already has Methodology and QAF handbook for the use MPD in Cross Border Inbound Tourism
The Use of Mobile Positioning Data for Domestic Tourism
BPS-Statistics Indonesia never published domestic tourism data at Regency/City level due to sample sufficiency, expensive and huge work burden, while the data became more important and demanding by policy maker and business.

Pilot in 2018 and 2019, compared household (conventional) survey for domestic tourism with Mobile Positioning Data and digital survey.

Digital survey is conducted to overcome limitation of MPD such as no expenditure data, no motivation. Digital survey was conducted using selected sample indicated by Mobile Positioning Data

BPS expects to substitute surveys with timely and more accurate digital data collection in the future (hopefully)
DOMESTIC TOURISM WITH MOBILE POSITIONING DATA (MPD) AND DIGITAL SURVEY (PILOT)

<table>
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<th>Coverage</th>
<th>190 million subscribers, all Indonesia</th>
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<td>Output</td>
<td>O-D Matrix of 514 kabupaten/city</td>
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<tr>
<td>Expenditure data</td>
<td>Digital survey 50,000 travellers</td>
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<td>Estimation</td>
<td>Other MNO subscribers &amp; non cellular user from conventional household survey</td>
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O-D MODEL

Source: Saluveer, E
# Mobile Phone Footprint for BPS Volunteer No 4

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MOBILE PHONE FOOTPRINT FOR BPS VOLUNTEER NO 4

Using latitude longitude data, we can measure distances of origin and destination.

Using date and time, we can measure duration of the movements.

Using local administrative units (LAU), we can know the movements between regions.
Indonesia currently already has draft of Methodology Handbook for the use MPD in Domestic Tourism
The Use of Mobile Positioning Data for Commuting
Previously commuter data is obtained from survey (every two years at several cities)

BPS-Statistics Indonesia plan to get commuter data more frequent, cover all kabupatens, obtain data up to kecamatan level and near real time.

Commuters and circular travellers were the by product of domestic tourism MPD.

MPD can gave data at small area even until venue (e.g GBK, JSC, Nusa Dua).
Commuter Estimation Comparison using Survey vs MPD

Commuter Survey vs MPD
Commuter Estimation Comparison using Survey vs MPD
The Use of Mobile Positioning Data for Event Analysis (Asian Games 2018 and AM WB-IMF)
- The immigration data only gave inbound to Jakarta, Palembang and Denpasar
- MPD can gave data until venue (e.g. GBK, JSC, Nusa Dua)
- The data then used for economic impact analysis (using Computable General Equilibrium/CGE model) and other analysis (destination analysis)
Asian Games attracted a lot of visitors, as evidenced by good ticket sales, but not many foreign tourists.

78 thousand is low compared to expected number of foreign visitors.

However, Asian countries posted good trends overall, with some exceptions.
Other destinations visited
25 Aug – 8 Sept
THANK YOU