The Use of Mobile Phone Data for Official Tourism Statistics

With Examples from Countries

Sarpono Dimuljo

Dubai, 27 January 2022
The Use of Mobile Phone Data In Tourism Statistics

Complement for other data sources

- Complement for immigration data (administrative data)
- Inbound tourism, when there is no immigration checkpoint, destination analysis
- Outbound tourism, to obtain country of destination and length of stay in each country

Replacement for other data sources

- Domestic tourism, replacement of household survey
- Inbound tourism, replacement of shuttle trade (cross border) survey
- Event analysis, replacement of survey or ticket sales
Data and Indicators obtained from MPD

- Inbound Tourists (number of tourists, length of stay, place visited)
- Outbound Tourists (number of tourists, length of stay, country visited)
- Domestic Tourists (number of tourists, length of stay, place visited, O-D matrix)
- Event Analysis (number of visitors, venue/place visited)

Other Indicators

- SDG 8.9.1
- SDG 8.9.2
- SDG 12.b.1
Countries that use MPD for Official Tourism

- Estonia (Bank of Estonia, since 2008)
- Indonesia (Statistics Indonesia, since 2016)
- Italy (bank of Italy)

Research

- Oman
How do we implement the tourism concept to mobile phone data
Usual Environment

- Outside usual environment, tourist
- Home-work, commute
- Changing home, over a year, internal migration
What data is used

Signalling (probe)

- Capture more data (very big, especially for domestic tourism)
- Good for tourism statistics and commuting
- Add noises (statistical and non statistical)

Call Detail Record (CDR)

- Less data
- Possible under coverage, especially for inbound and outbound

Combination of both, signalling and CDR
Statistical and Non Statistical Noises

- Fast fliers
- Seamen
- Accidental Roamers
- Other transit

Methodology is important

- Filtering methods
- Select appropriate method that reflect reality
Data Access

- Statistical Law (e.g. Estonia)
- Telco Regulator (e.g. Georgia)
- MoU and Contract (e.g. Indonesia)
For Official Statistics

1. Quality Assurance
   - In line with UN-QAF, UNECE Big Data QAF, NSO’s QAF

2. Sound Methodology
   - Various methodologies
   - Choose that reflect reality

3. Privacy-Preserving Processing
   - Privacy protected
   - Aggregate data
Quality Assurance

- In-line with BPS QAF Handbook (for Census, Survey and Administrative data)
- In-line with UN QAF and Unece QAF for Big Data
- Quality check (Input, Throughput, Output)

Input Quality Checking (First gate)
- Data gaps
- Missing data
- Incorrect timestamps
- Duplicate record

Throughput Quality Checking (Second gate)
- Errors in data processing
- Overwrites

Output Quality Checking (Third gate)
- Anomalies checking
- Coherence with other data
- New phenomena can be explained
- Passed Calibration/Comparison with other data
Privacy Protected through Pseudonymization and k-Anonymity

The subscribers is masked with hash, when data scientists processed

The data produce is aggregate data (tables)
CHALLENGES

• Data access (if there is no direct rule or regulation).
• Administrative and legal process (administrative review, contract, negotiation, etc.)
• Once the MNO has committed, keeping that commitment
• MNO staff/data scientist lack understanding of Statistics
• Data processing volumes (e.g. for Indonesia up to 144 TB data/year)
Press Release of Tourism Statistics (Indonesia)

https://www.bps.go.id/pressrelease.html
Publications of Tourism Official Statistics

- **Publications**

**STATISTIK KUNJUNGAN WISATAWAN MANCANEGARA**
TAHUN 2019
INTERNATIONAL VISITOR ARRIVALS STATISTICS 2019

**STATISTIK WISATAWAN NUSANTARA**
DOMESTIC TOURISM STATISTICS
2020

**LAPORAN SURVEI WISATAWAN NASIONAL**
(OUTBOUND)
TAHUN 2019
MPD for SDGs

- Demand Side data for TSA
- SDG Goal 8 (Indicators 8.9.1 and 8.9.2)
- MPD give better coverage than household survey, better match with supply side in TSA Framework
- Linking TSA and SEEA to obtain SDG Goal 12 (Indicator 12.b.1)
UN-CEBD MPD Task Team

- Gather experiences of MPD Task Team members
- Develop Second Handbook for various use cases
- Create e-learning and course materials

*ITU
CBS, Stat Netherlands
Geostat, Stat Georgia
Istat, Statistics Italy
Saudi Arabia Statistics
DOSM, Malaysia
PSA, Philippines
BPS, Stat Indonesia

Eurostat
Positium
UNSD
Flowminder

* Task Team lead
THANK YOU