STATISTICS INDONESIA

The Use of Mobile Phone Data for Official Tourism Statistics

With Examples from Countries

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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

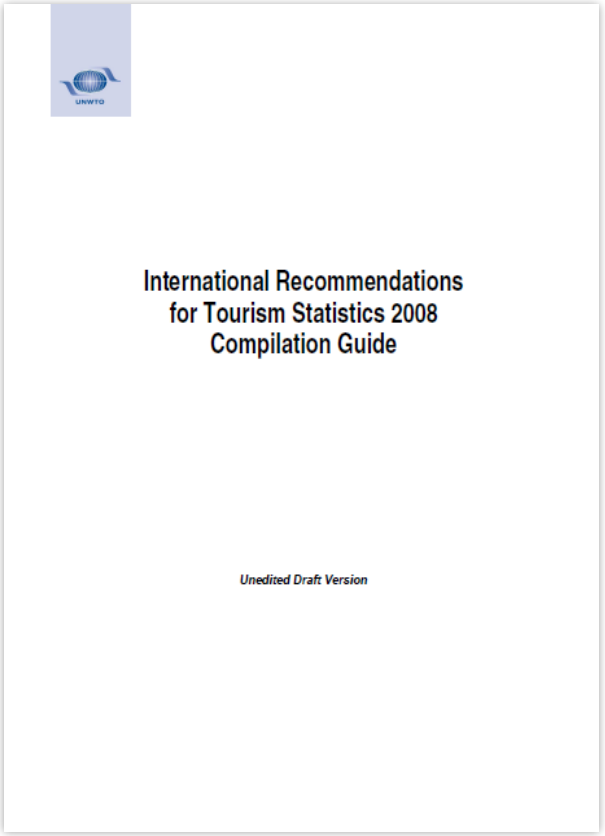
Countries that use MPD for Official Tourism

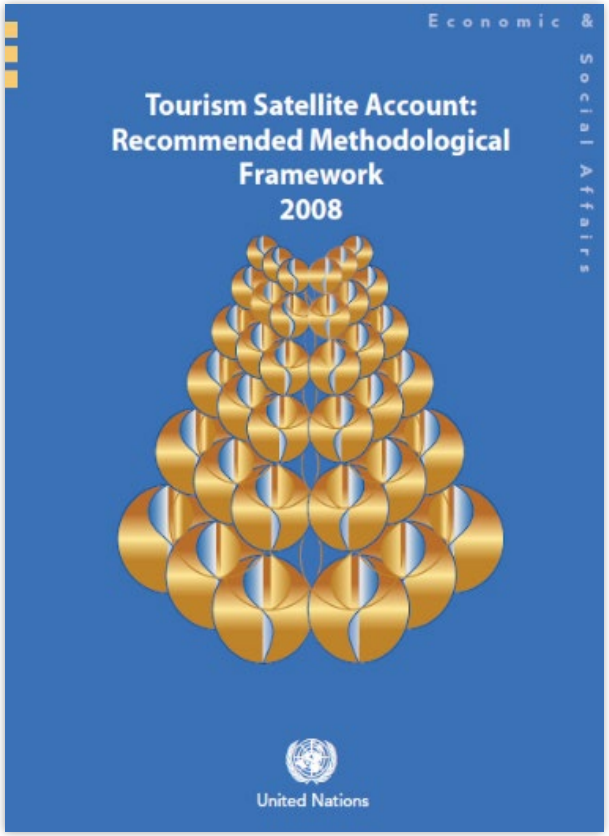
- ✓ Estonia (Bank of Estonia, since 2008)
- ✓ Indonesia (Statistics Indonesia, since 2016)
- ✓ Italy (bank of Italy)

Research

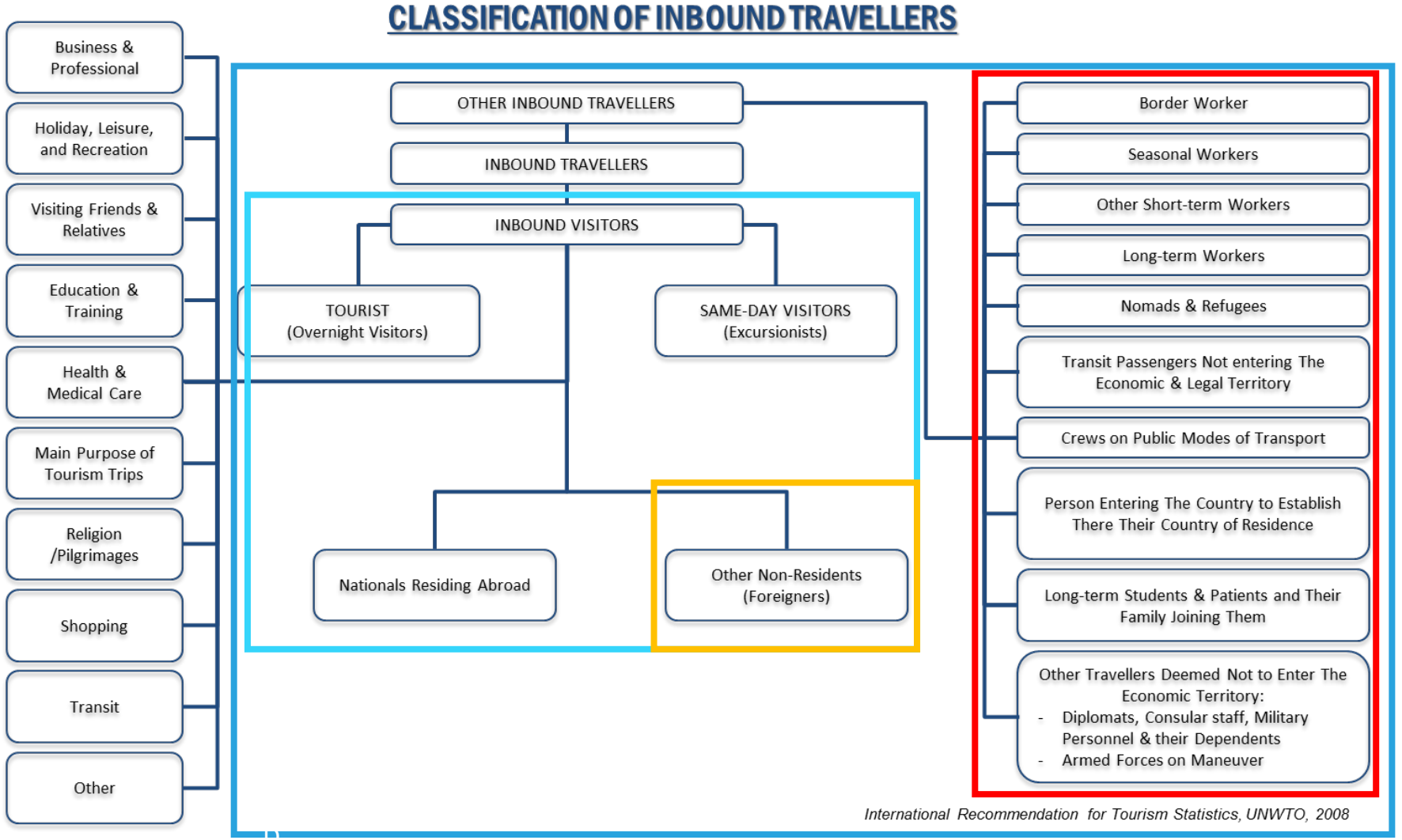
- ✓ Oman

Tourism Statistics Manuals

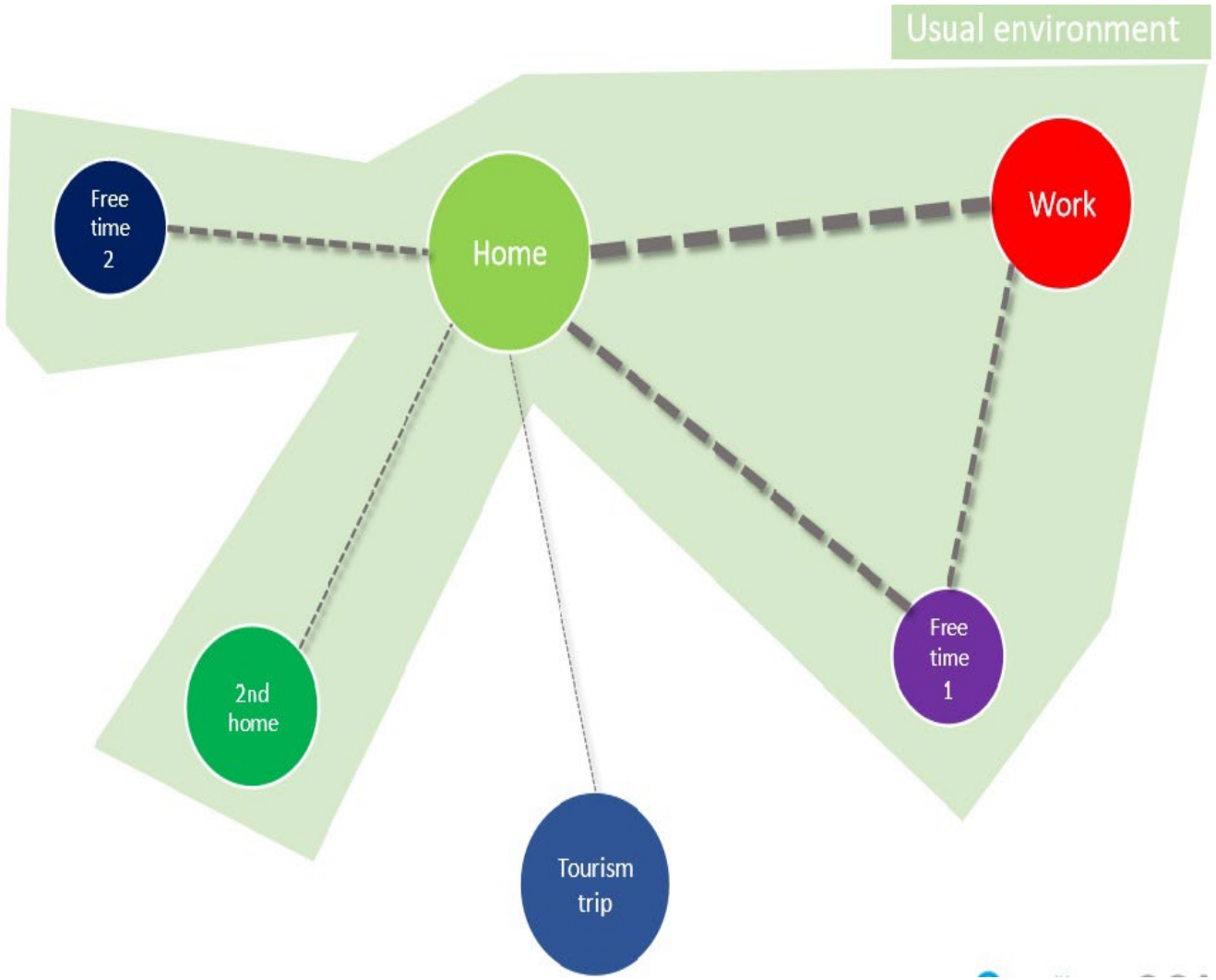




How do we implement the tourism concept to mobile phone data



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)

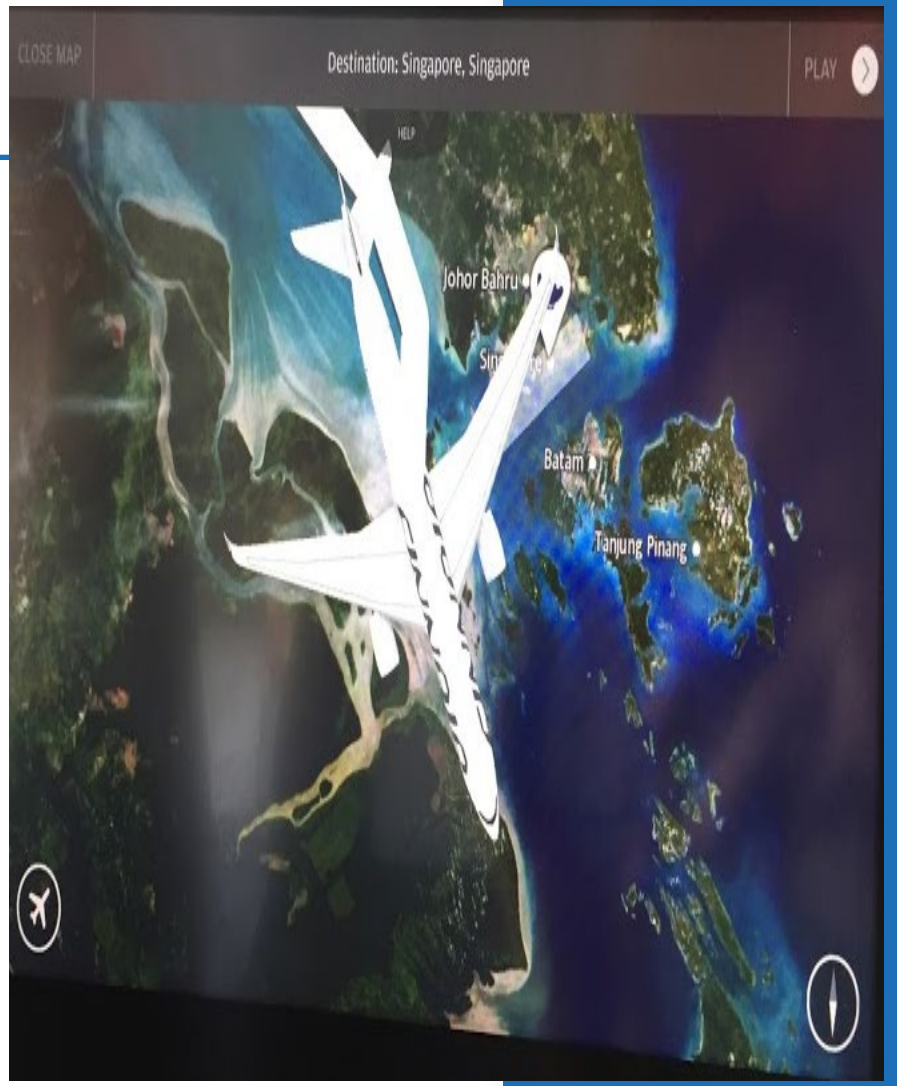
Call Detail Record (CDR)

- ✓ 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

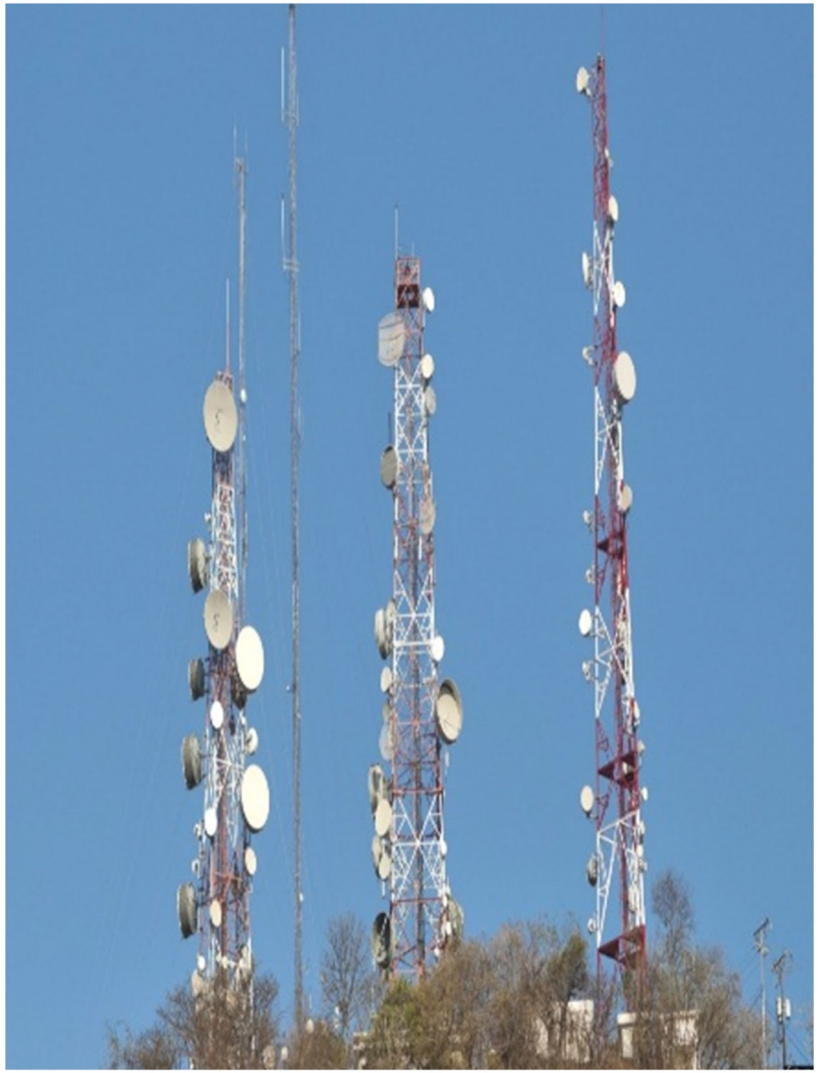


Methodology is important

- ✓ 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

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

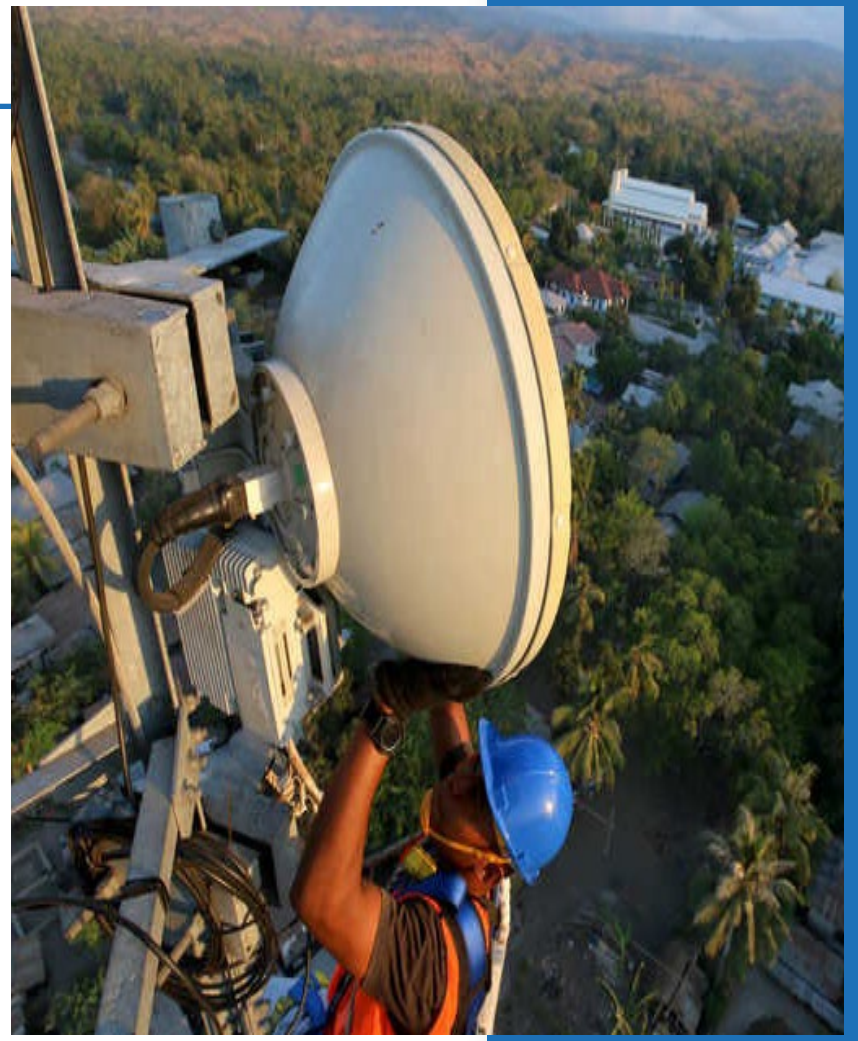
```
lbs.limit(5).toPandas()
```

	datetime	hashed_msisdn	source	latitude	longitude	id_prov	id_kab	id_kec	node	calling_date
0	2020-01-27 01:15:32	-6280891885648479061	LBA	-6.24991	106.60868	36	03	051	3G	2020-01-26
1	2020-01-26 19:15:23	-6280891885648479061	LBA	-6.24991	106.60868	36	03	051	3G	2020-01-26
2	2020-01-26 16:15:19	-6280891885648479061	LBA	-6.24991	106.60868	36	03	051	3G	2020-01-26
3	2020-01-26 03:49:04	8422727271182682645	UPCC	-6.48370	107.68290	32	13	120	4G	2020-01-26
4	2020-01-27 06:53:55	8422727271182682645	LBA	-6.48378	107.68292	32	13	120	3G	2020-01-26

- ✓ 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)



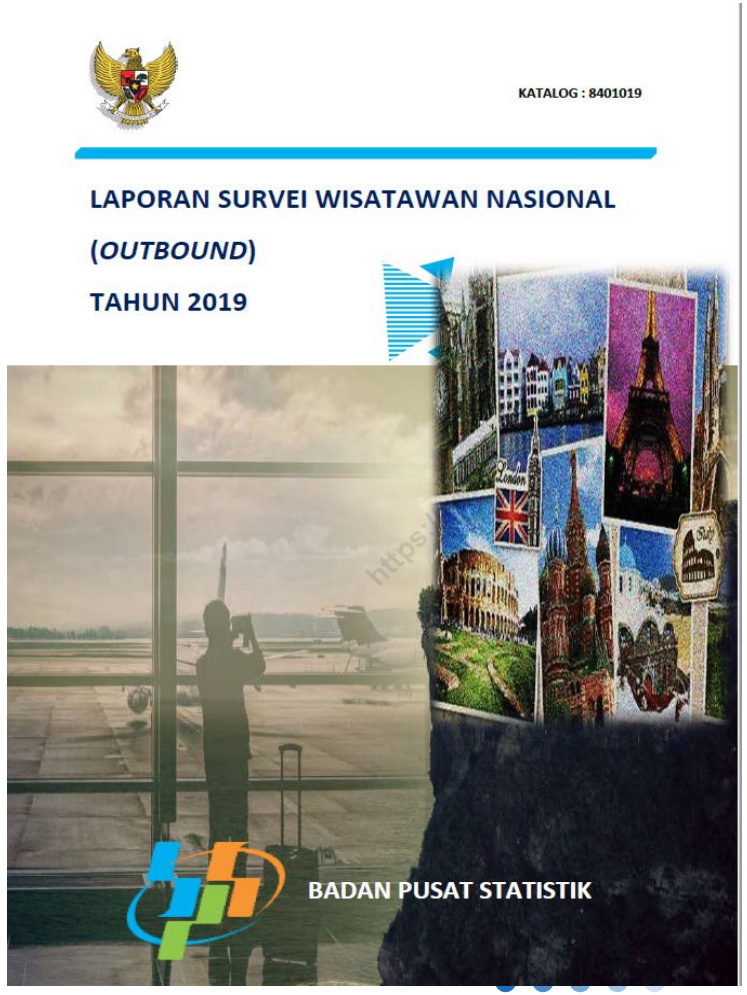
Press Release of Tourism Statistics (Indonesia)

Press Release

https://www.bps.go.id/pressrelease.html

Publications of Tourism Official Statistics

Publications



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)

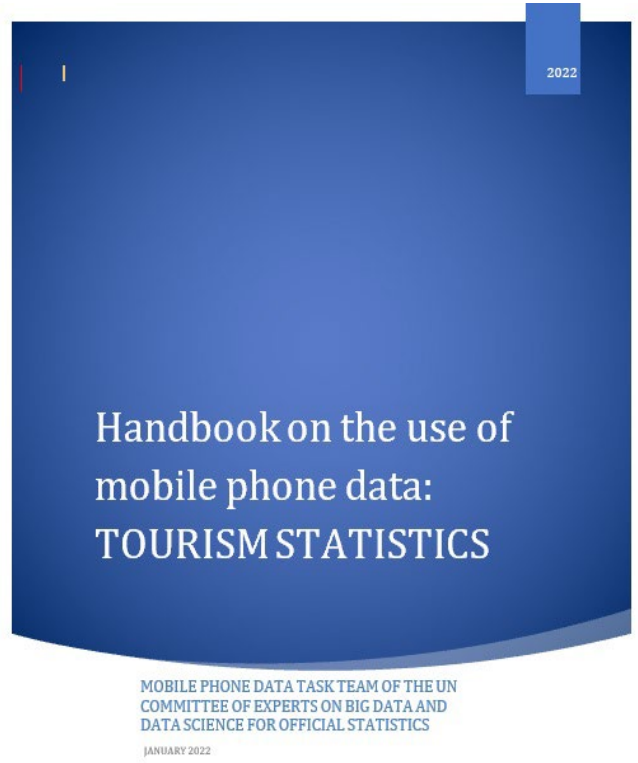
UN-CEBD MPD Task Team

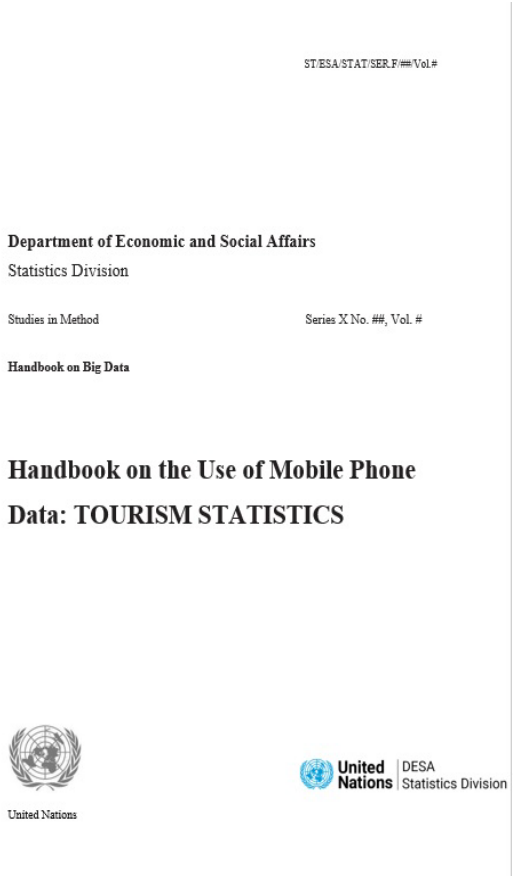
- ✓ Gather experiences of MPD Task Team members
- ✓ Develop Second Handbook for various use cases
- ✓ Create e-learning and course materials

***ITU**	Eurostat
CBS, Stat Netherlands	Positium
Geostat, Stat Georgia	UNSD
Istat, Statistics Italy	Flowminder
Saudi Arabia Statistics	
DOSM, Malaysia	
PSA, Philippines	
BPS, Stat Indonesia	* Task Team lead

UN MPD Handbook for Official Tourism Statistics

Draft Handbook





THANK YOU