STATISTICS INDONESIA

The Use of Mobile Positioning Data to Capture Tourism Data in Indonesia

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Tourism Policy Planning

Business

Marketing

GDP

TSA

SITS

BOP

SDGS

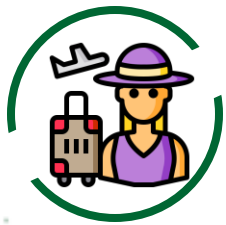→ **Supply & Demand of Tourism Data** → **Household Survey Administration Data Other Sources?**

Domestic Tourism
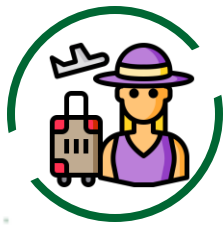
- ✓ How Many Domestic Traveller?
- ✓ How long they stay ?
- ✓ How Much Their Expenditure ? For what
- ✓ Where they come from, where they go
- ✓ Mode of Transport ?

REMOTE AREA:
NEED SPECIAL EFORTS

BADAN PUSAT STATISTIK

HOME | DATA SERVICE ▾ | METADATA ▾ | MEDIA ▾ | STATISTICAL PRODUCT ▾ | Search information.. | EN ▾ | 🏠 Choose Another Census

Tagline | Mencatat Ir

Location
INDONESIA | Change Location

Jumlah dan Distribusi Penduduk

Jumlah penduduk Indonesia pada tahun 2020 adalah sebanyak 270.203.917 jiwa.

Persebaran penduduk menurut jenis kelamin adalah 136.66X.X9 untuk penduduk laki-laki dan 133.542.018 untuk penduduk perempua

270 Million Population

Telkomsel
by Telkom Indonesia
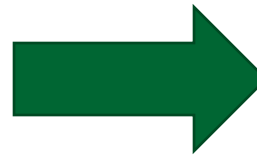
MOBILE

Menyediakan layanan *legacy* seluler termasuk *voice* dan SMS, *mobile broadband*, dan layanan *mobile digital* yang mencakup IoT, *big data*, layanan keuangan, VOD, musik, permainan, dan iklan digital.

PELANGGAN SELULER
169,5 juta

Pelanggan Pascabayar
6,5 juta

Pelanggan Prabayar
163,0 juta

PELANGGAN MOBILE BROADBAND
115,9 juta

+

indosat

Selular	Unit	2020
Pelanggan Prabayar	juta pelanggan million customer	58.7
Pelanggan Pascabayar	juta pelanggan million customer	1.6
Total Pelanggan	juta pelanggan million customer	60.3
ARPU Prabayar	Rp ribu | thousand	30.5
ARPU Pascabayar	Rp ribu | thousand	83.2
ARPU Gabungan	Rp ribu | thousand	31.9

+

XL axiata

144.000 menara BTS per akhir 2020

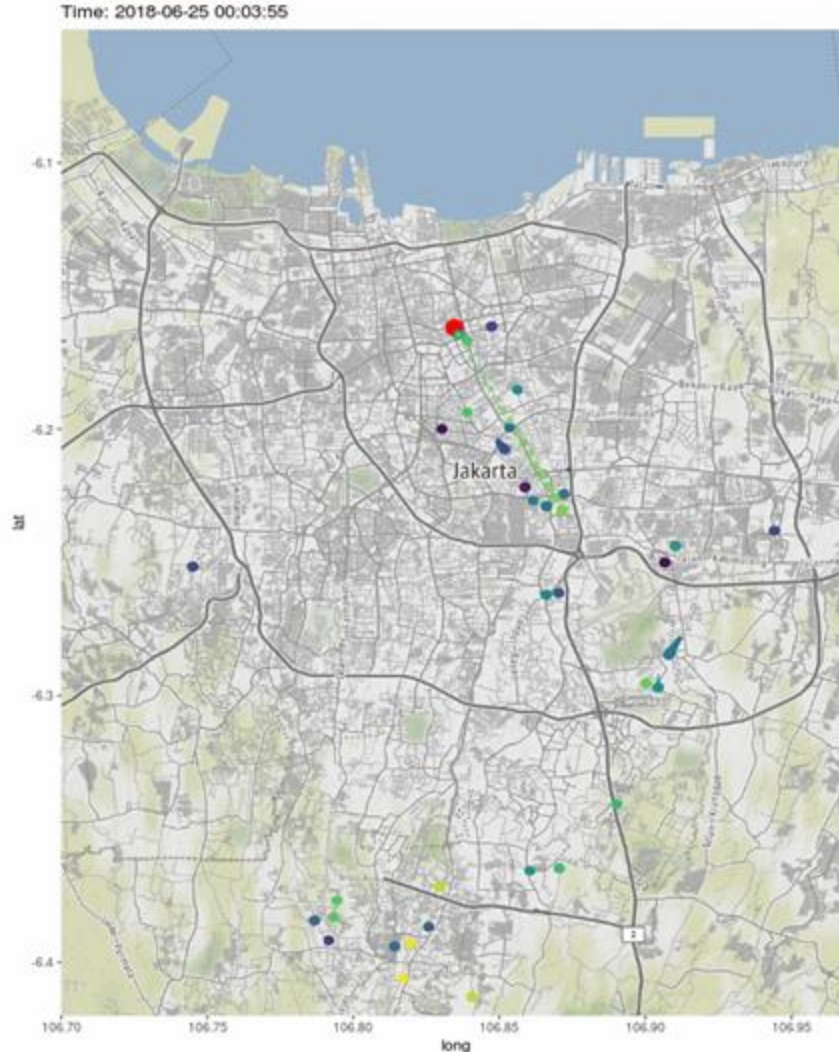pertumbuhan pangsa pasar menjadi 19,6%, pelanggan menjadi 57,9 juta orang, dan penetrasi smartphone ke 89%.

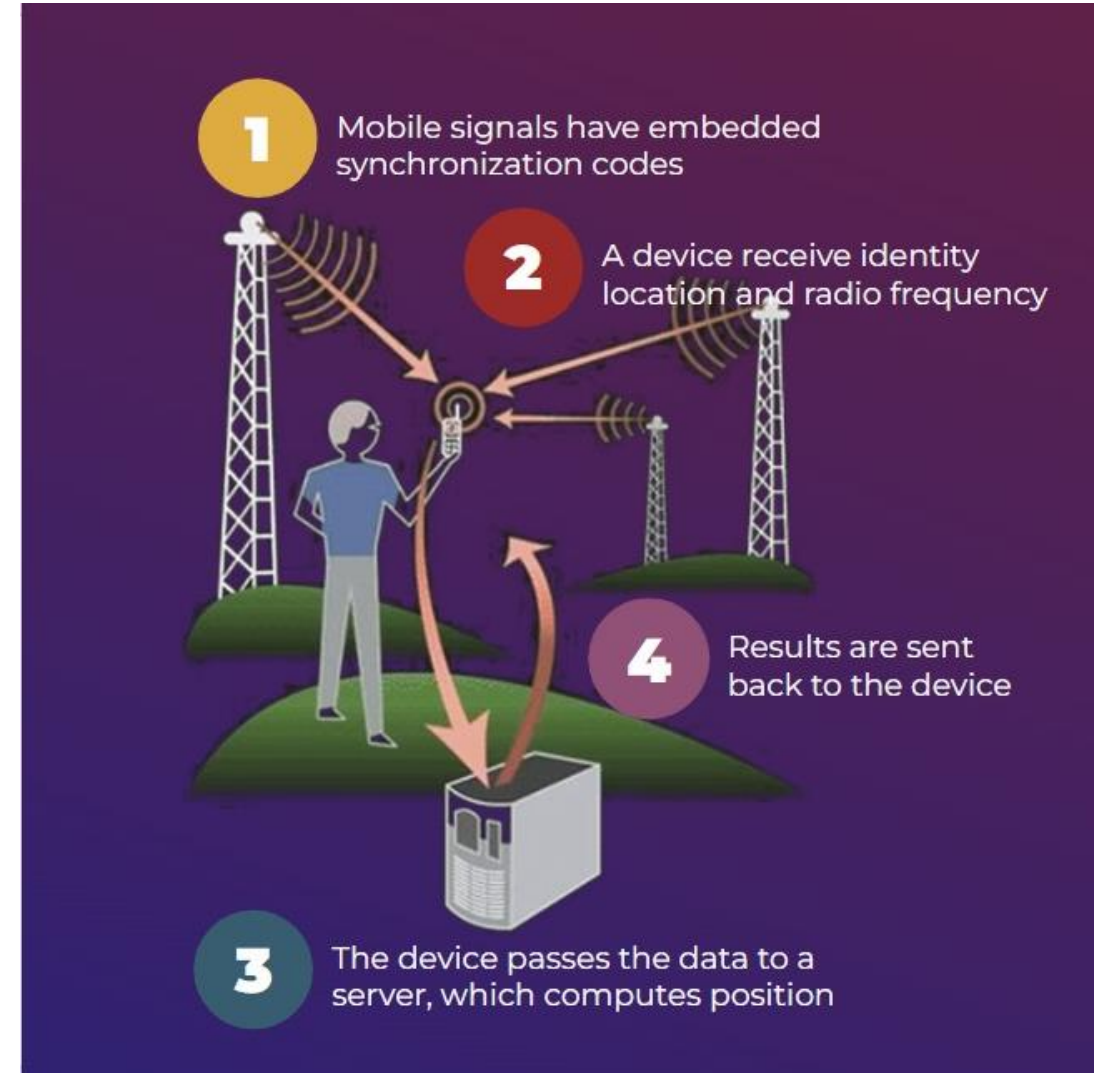**=**

285,8 Million Mobile Phone Subscriber

1,4 TB DATA per YEAR
60 Million records per year

Examples of subscriber mobilities

Time: 2018-06-25 00:03:55

1 Mobile signals have embedded synchronization codes

2 A device receive identity location and radio frequency

3 The device passes the data to a server, which computes position

4 Results are sent back to the device

Mobile Phone Log Dataset Example

DOMESTIC MPD DATA

msisdn char	datetime timestamp	source char	bts_lat char	bts_lon char	prov char	kab char	kec char	desa char	node char	trx_date date
6281 ...	2018-02-08 13:33:03	LBA_ALL	-4.54691	120.35833	SULAWESI SELATAN	BONE	TANETTE	CELLU	3G	2018-02-08
6281 ...	2018-02-08 13:51:39	CHG_POST	-4.54051	120.30777	SULAWESI SELATAN	BONE	TANETTE	MACANANG	3G	2018-02-08
6281 ...	2018-02-08 14:00:39	CHG_POST	-4.53591	120.30377	SULAWESI SELATAN	BONE	TANETTE	MACANANG	3G	2018-02-08

ROAMING DATA

| date	time	mcc_destination	mnc_destination	hashed imsi/msisdn
21/09/2018	23:59:21	420	01	439114f7a28d2f4eef896c38e7f70321
21/09/2018	23:59:22	208	09	7f859e31d44a1012275306aa01925de1
21/09/2018	23:59:22	302	610	d865eab7ccf0ff0727adb75db2960e6a
21/09/2018	23:59:22	310	30	cee4f08b61a6f60012e2437b77dced75
21/09/2018	23:59:22	404	90	d2b39a57ec308360e11de37d0a29df9c
21/09/2018	23:59:22	404	98	7d0dd387c0f879b4342fe85f65f98838
21/09/2018	23:59:22	418	40	7b7375a5080fb9b9304b19c2cc66a846
21/09/2018	23:59:23	310	30	52b62dcb44bb8b75c36dd9adc3e08416

ID
Hashed MSISDN

Datetime
Transaction timestamp

Source
Type of data stored (CDR, signalling)

Lat & Lon
BTS coordinates
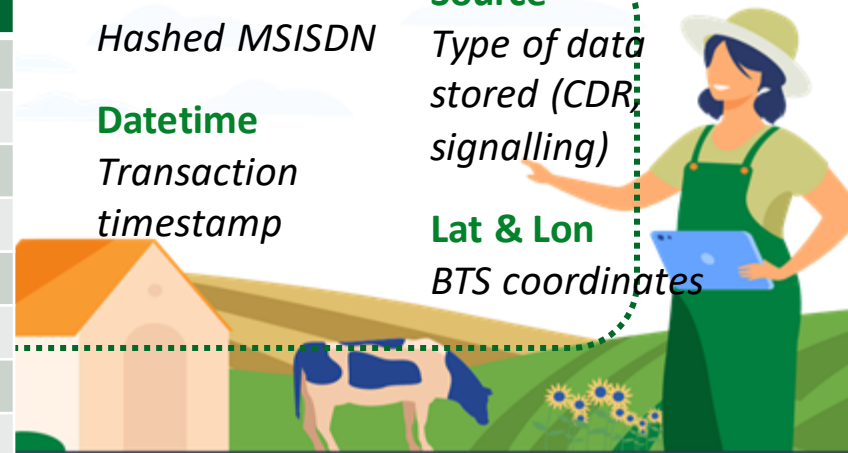
TYPE OF MPD DATA SOURCES

Passive Mobile Positioning

Location information generated from LBS (Location Based Services) data by MNO (Mobile Network Operator), which contains: CHG, LBA, and UPCC

3 **UPCC (Unified Policy and Charging Controller)**

It provides policy, service, subscription, quota, and bearer resource management functions, as well as admission control for internet data usage.
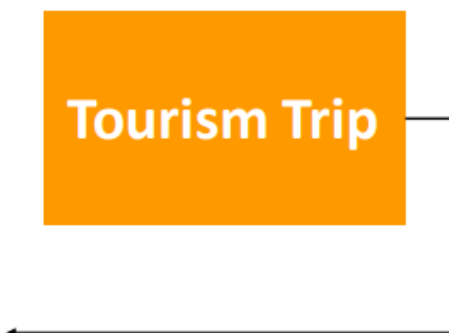
2 **LBA (Location Based Advertising)**

The technology is used to pinpoint consumers location and provide location-specific advertisement on their mobile devices.

1 **CHG (Charging Data)**

Billing domain log which stores successful charging transaction record such calls, messaging, etc.
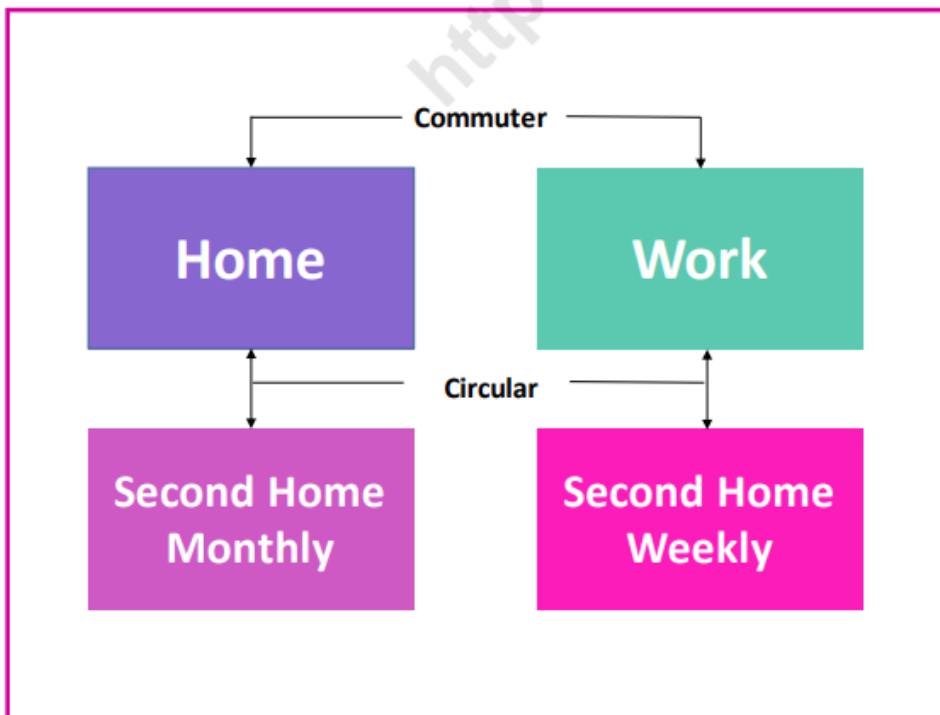
ITRS 2008

B.4.   The usual environment of an individual

2.21.   The **usual environment** of an individual, a key concept in tourism, is defined as the geographical area (though not necessarily a contiguous one) within which an individual conducts his/her regular life routines.

2.22.   It is a characteristic attached exclusively to an individual that complements the concept of country of residence used in the national accounts and the balance of payments (see box 2.2) and that of place of usual residence used in household statistics (see box 2.3).

2.23.   The purpose of introducing the concept of usual environment is to exclude from visitors those travellers commuting regularly between their place of usual residence and place of work or study, or frequently visiting places within their current life routine, for instance homes of friends or relatives, shopping centres, religious, healthcare or any other facilities that might be at a substantial distance away or in a different administrative area but are regularly and frequently visited.

2.24.   Based on the prevalent habits of movements, **it is recommended** that each country define the precise meaning of what is termed regular and frequent in the context of its tourism statistics.

2.25.   The usual environment of an individual includes the place of usual residence of the household to which he/she belongs, his/her own place of work or study and any other place that he/she visits regularly and frequently, even when this place is located far away from his/her place of usual residence (see box 2.3) or in another locality, except for vacation homes the treatment of which is developed below.

MPD AND DIGITAL SURVEY

MPD

Within a certain radius, BTS catches mobile signal as log data for every transaction

Log data stored in MNO's database

Processing log data: filtering, counting, dan validating by algorithm
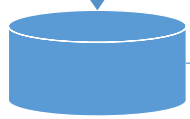
Produce datasets:
1. Domestic tourism
2. Commuter
3. Circular
4. Others

Domestic tourism profiling by MPD contains variables:
1. MSISDN
2. Number of trips
3. Home
4. Destination
5. Length of stay

Digital Survey

MNO prepares list of subscribers' mobile number based on MPD profiling. It is used as digital survey sample frame

1. BPS build digital survey platform connected to BPS's server
2. BPS create direct link to digital survey webpage
3. BPS create digital survey sampling mechanism

1. MNO conducts sampling based on walkthrough from BPS
2. MNO create digital survey masked link survei to be injected in SMS
3. MNO sends SMS Contains digital survey link to targeted mobile number
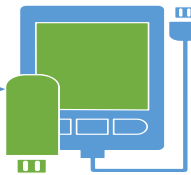
1. Respondent receive digital survey SMS
2. Respondent fill questionaire of digital survey
3. Validated digital survey response data are sent to BPS's server
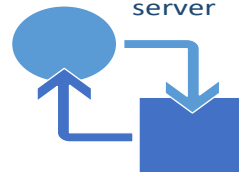
1. MNO download list of submitted respondent and match the mobile phone respondent with sampel frame then create white-list
2. MNO send reward to submitted respondent
3. MNO submit report to BPS

1. BPS process digital survey response data
2. BPS shows list of submitted respondent into dashboard. MNO can donwload some variables especially mobile number, result status, and type of reward

Domestic tourism variables are collected by digital survey:
1. Demographic
2. Trip motivation
3. Accommodation
4. Transportation mode
5. Type of tourism activity
6. Type of tourism packages
7. Expenditure values
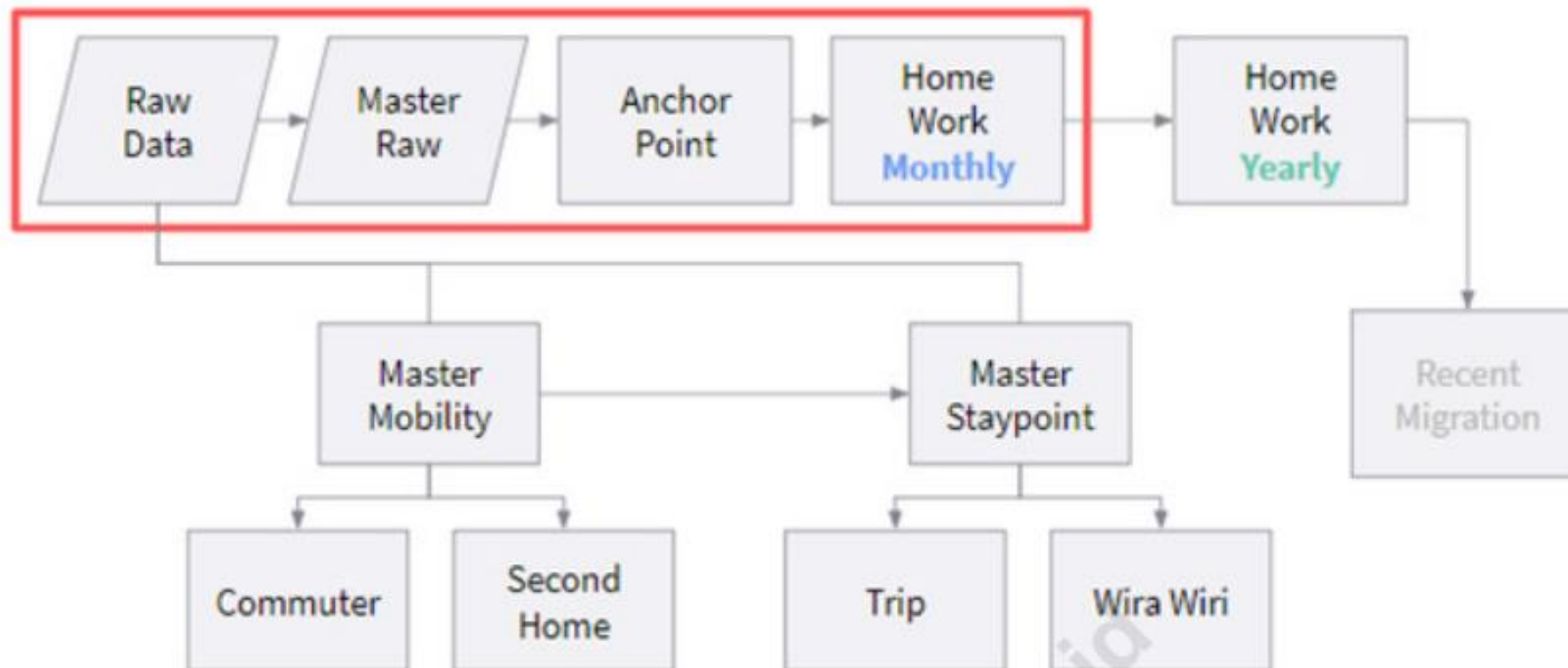
- ONLY USE ONE MNO, NEED TO ESTIMATE:
 - OTHER MNO USER
  - NON USER MOBILE PHONE

GET PATERN OF TRIP WITHHABIT OF USING MOBILE PHONE IN SOSIO-ECONOMIC HOUSEHOLD SURVAI

BLOK VIII. KETERANGAN TEKNOLOGI INFORMASI DAN KOMUNIKASI

No. Urut ART	DALAM 3 BULAN TERAKHIR, APAKAH (nama) MENGGUNAKAN TELEPON SELULER (HP)/NIRKABEL UNTUK KEPERLUAN KOMUNIKASI? 1. Ya 5. Tidak	DALAM 3 BULAN TERAKHIR, APAKAH (nama) MEMILIKI/ MENGUASAI TELEPON SELULER (HP)/ NIRKABEL? 1. Ya 5. Tidak	TELKOMSEL?	INDOSAT?	XL AXIATA?	LAINNYA?	DALAM 3 BULAN TERAKHIR, APA SAJA JENIS KOMPUTER YANG DIGUNAKAN (nama)? (Pilihan jawaban harus dibacakan) A. PC/DESKTOP B. LAPTOP/NOTE BOOK C. TABLET X. TIDAK MENGGUNAKAN KOMPUTER	DALAM 3 BULAN TERAKHIR, APAKAH (nama) PERNAH MENGGUNAKAN INTERNET (TERMASUK FACEBOOK, TWITTER, YOUTUBE, INSTAGRAM, WHATSAPP, DLL.)? 1. Ya 5. Tidak→812	DALAM 3 BULAN TERAKHIR, MEDIA APA SAJA YANG DIGUNAKAN (nama) UNTUK MENGGUNAKAN INTERNET? (Pilihan jawaban harus dibacakan) A. PC/DESKTOP B. LAPTOP/NOTE BOOK C. TABLET D. HP/PONSEL E. LAINNYA	DALAM 3 BULAN TERAKHIR, DI MANA SAJA (nama) MENGGUNAKAN INTERNET? (Pilihan jawaban harus dibacakan) A. RUMAH SENDIRI B. BUKAN RUMAH SENDIRI C. TEMPAT BEKERJA/KANTOR D. GEDUNG SEKOLAH/KAMPUS E. TEMPAT UMUM F. DALAM KONDISI BERGERAK	DALAM 3 BULAN TERAKHIR, UNTUK APA SAJA (nama) MENGGUNAKAN INTERNET? (Pilihan jawaban harus dibacakan) A. MENDAPAT INFORMASI/BERITA B. MENDAPAT INFORMASI MENGENAI BARANG/JASA C. MENGIRIM/MENERIMA E-MAIL D. MEDIA SOSIAL/JEJARING SOSIAL E. PEMBELIAN BARANG/JASA F. PENJUALAN BARANG/JASA G. FASILITAS FINANSIAL (E-BANKING) H. PEMBELAJARAN ONLINE I. WORK FROM HOME (WFH)/BEKERJA ONLINE DARI RUMAH J. HIBURAN K. PEMBUATAN KONTEN DIGITAL L. LAINNYA	Untuk ART Umur 5 Tahun ke Atas APAKAH (nama) PERNAH BELAJAR TIK, MISALNYA BELAJAR KOMPUTER, DLL.? 1. Ya 5. Tidak	No. Urut ART	SEJAK 1 JANUARI–31 DESEMBER 2021, APAKAH (nama) PERNAH BEPERGIAN KELUAR DARI LINGKUNGAN KESEHARIAN, BUKAN BEPERGIAN RUTIN, MINIMAL 3 JAM DI TEMPAT TUJUAN, TIDAK UNTUK SEKOLAH ATAU BEKERJA? 1. Ya 5. Tidak→905
401	801	802	803	804	805	806	807	808	809	810	811	812	401	901
1	☐	☐	☐	☐	☐	☐	A B C **X**	☐	A B C D E	A B C D E F	A B C D E F G H I J K L	☐	1	☐
2	☐	☐	☐	☐	☐	☐	A B C **X**	☐	A B C D E	A B C D E F	A B C D E F G H I J K L	☐	2	☐
3	☐	☐	☐	☐	☐	☐	A B C **X**	☐	A B C D E	A B C D E F	A B C D E F G H I J K L	☐	3	☐
4	☐	☐	☐	☐	☐	☐	A B C **X**	☐	A B C D E	A B C D E F	A B C D E F G H I J K L	☐	4	☐
5	☐	☐	☐	☐	☐	☐	A B C **X**	☐	A B C D E	A B C D E F	A B C D E F G H I J K L	☐	5	☐
6	☐	☐	☐	☐	☐	☐	A B C **X**	☐	A B C D E	A B C D E F	A B C D E F G H I J K L	☐	6	☐
7							A B C **X**		A B C D E	A B C D E F			7	☐
8													8	☐

TOURIST ARE NOT COMMUTER

Comparison the Result of Conventional Survey and MPD in Jabodetabek (May 2019)
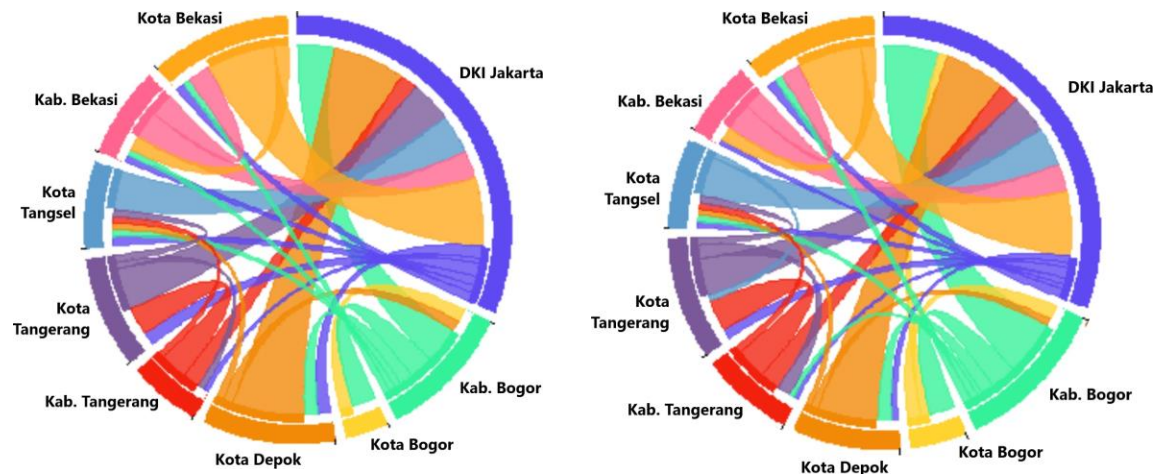
*Source: **Conventional Survey 2019***

*Source: **MPD 2019***

Delineation of Metropolitan Area (MA) In South Sumatera and South Kalimantan (2021)
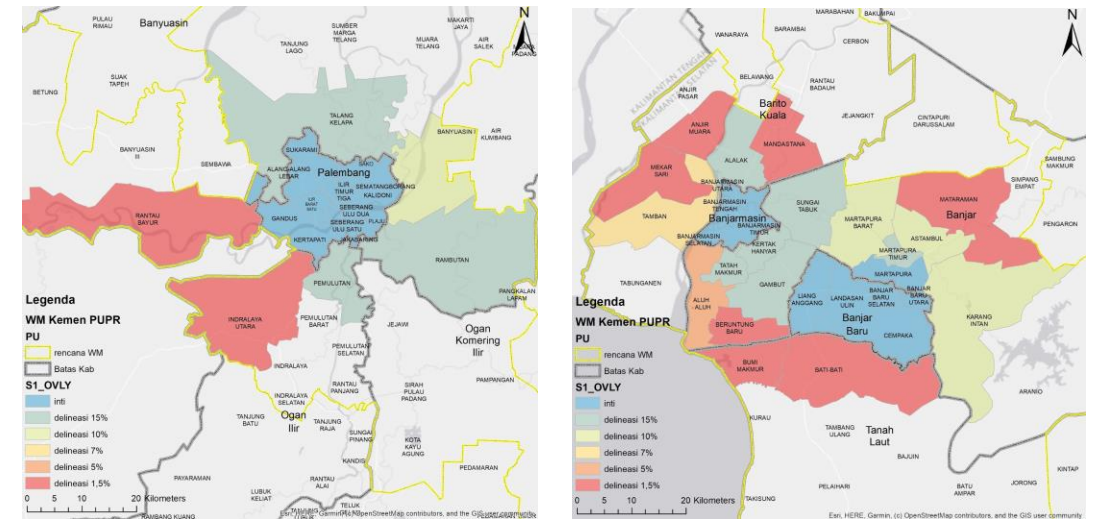
*Source: **MPD MSA 2021***

Commuting data results from conventional survey and MPD have the same pattern

In 2021 MPD has been applicate to determine the MA delineation through the coverage of urban commuting in South Sumatera and South Kalimantan

Inbound Tourism

ADMISTRATION RECORD WAS UNDER COVERAGE

Recorded At:
- **37 Airport**
- **126 Seaport**
- **55 Cross Border Gates**

Immigration Record
Passport Data:
- **Nationality**
- **Length of Stay**
- **Sex**
- **Age**

NOT ALL GATE HAVE 24/7 IMMIGRATION SERVICE

➡ Under Coverage Inbound & Outbound Data (7%)

⬅ BORDER SURVEY is TOO EXPENSIVE
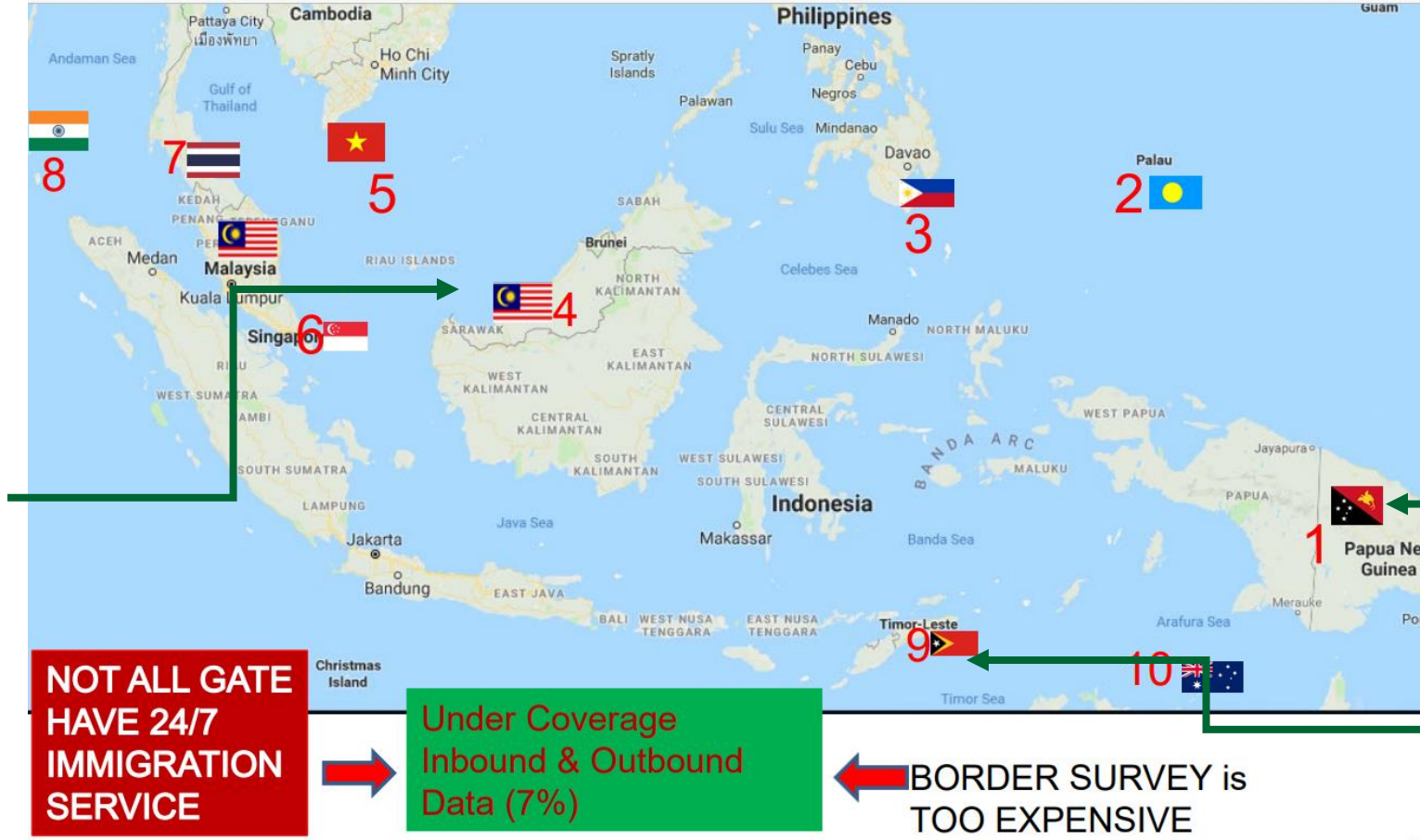
✓ BPS rely on the Immigration Record and Border Survey for Inbound & Outbound Tourism Data

✓ Visits from naighbour countries only 7% of tourism

CALIBRATION

MPD is not 100 % Inbound Data:
1. It comes from one MNO
2. Not all border crosser Using Mobile Phone (non-roamer)
3. Not all Mobile Phone User are Tourism
4. Some Using more than one Sim Card

BORDER AREA SURVEY FORM 2017

VMPD-17

PENDATAAN WISMAN BERBASIS *MOBILE POSITIONING DATA*
DI WILAYAH PERBATASAN INDONESIA 2017
KEMENTERIAN PARIWISATA DAN BADAN PUSAT STATISTIK

Lingkari atau isilah jawaban yang sesuai

Nama Pos Lintas Batas:

No. Kuesioner :

1. Nama : ....
   Umur : .... tahun
   Jenis Kelamin : ....

2. Pekerjaan utama:
   Profesional   -1   Ibu Rumahtangga   -6
   Bisnis manager/Eksekutif -2 Pelajar/Mahasiswa -7
   Pegawai Pemerintah   -3   Pensiunan   -8
   Militer   -4   Lainnya, sebutkan -9
   KaryawanSwasta   -5   (................................)

3. a. Jumlah HP yang anda gunakan saat ini ...... buah
   b. Jumlah Sim Card yang anda gunakan dan aktif saat ini ..... buah
   Sebutkan nama providernya:
   Sim card 1 : ....   Sim card 3 : ....
   Sim card 2 : ....   Sim card 4 : ....

4. Apa yang anda lakukan ketika di Indonesia?
   Menggunakan SIM Card asal (roaming)   -1
   Mengganti dengan Sim Card Lokal   -2
   Mematikan Mode Roaming   -3
   Mematikan HP   -4

5. a. Maksud utama mengunjungi Indonesia:
   Bekerja mendapat gaji/sekolah -1 →STOP
   Berlibur/rekreasi   -2   Keagamaan/ziarah   -7
   Bisnis/usaha   -3   Kesehatan & kecantikan -8
   Dinas   -4   Pendidikan/Pelatihan   -9
   Mengunjungi teman/keluarga -5 Misi OR/budaya   -10
   MICE/rapat   -6   Lainnya, sebutkan: -11
                                  (................................)
   b. Rencana lama tinggal di Indonesia .... hari

6. Frekuensi mengunjungi Indonesia dalam satu bulan terakhir:
   Setiap hari   -1   Sebulan sekali   -3
   Seminggu sekali -2   Tidak tentu   -4

7. Negara tempat tinggal ....

8. Kewarganegaraan ....

9. Berapa uang yang akan dibelanjakan di Indonesia?
   Mata uang : ....
   Nilai   : ....

10. Dalam perjalanan ini, dari pintu mana anda masuk ke Indonesia ....

$$ AT = \frac{MPD}{X_{roam}} * \frac{1}{1 - P_{NR}} * \frac{1}{MS} - WCI $$

Where:
- AT = Additional Tourism
- MPD= Number of SIM cards derected by MNO in the border area
- X_{roam} =Average number of cell phones actively used by tourist
- P_{NR} = Proportion of non-roamers
- MS = Market Share of roaming to the MNO
- WCI= Number of tourist entering trough Imigration Post

BADAN PUSAT STATISTIK
Statistic Indonesia

2016 & 2017

- BPS define concept & method of conversion MPD to Inbound Tourism Statistics
- MoT support budget to apply the method in border country MPD from the largest Mobile Network Operator

2018

wonderful indonesia

BADAN PUSAT STATISTIK
Statistic Indonesia

MPD
For Official Statistics

positium

- Fine Tune Inbound MPD to get better Tourism Statistics
- Produce Domestic Tourism Statistics using MPD
- Training
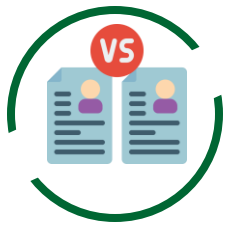- Write Handbook
- Develop QAF

4

Outbound Tourism

- IMMIGRATION RECORD AT INTERNASIONAL GATES
  - UNKNOWN DESTINATION CONTRY
  - LENGTH OF TRAVEL
  - SEX
  - AGE
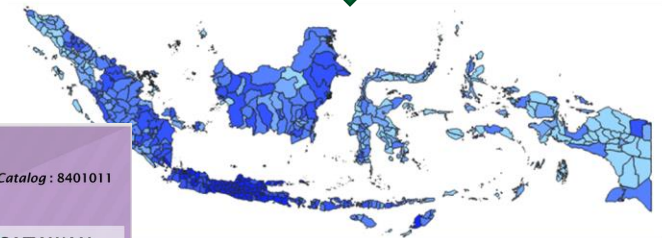
DIGITAL SURVEY :
- TO MEASURE EXPENDITURE WHILE OVERSEAS
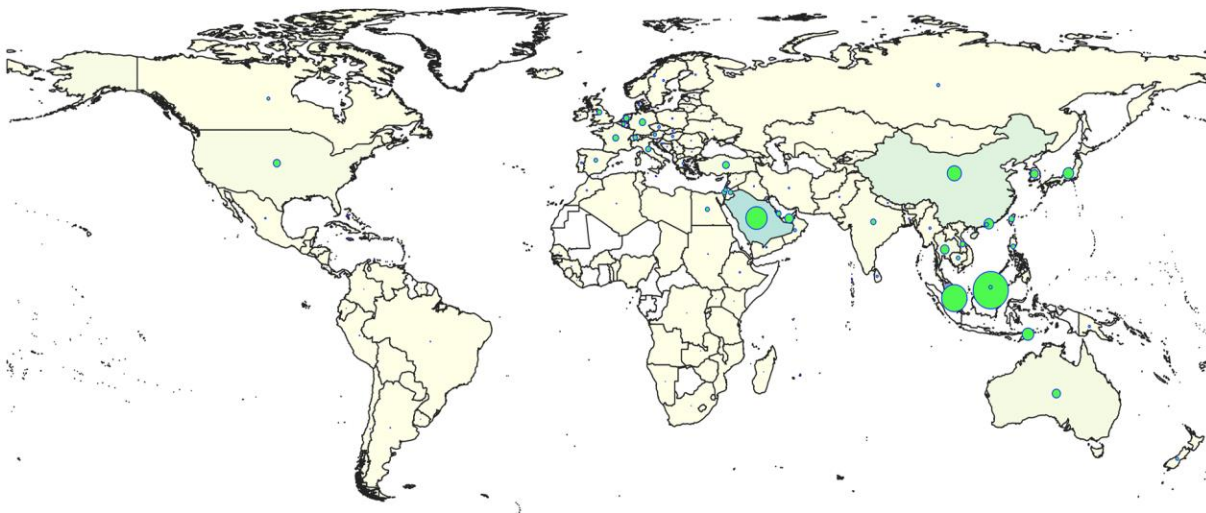
- MOBILE PHONE DATA RECORD OF DESTINATION COUNTRIES OF INDONESIAN TARVELLER :
  - 2019 : 174 DESTINATION CONTRIES
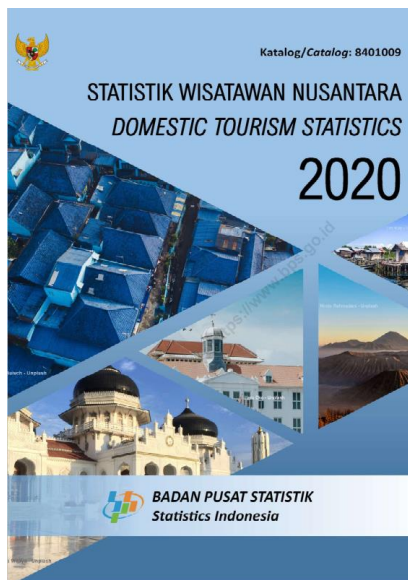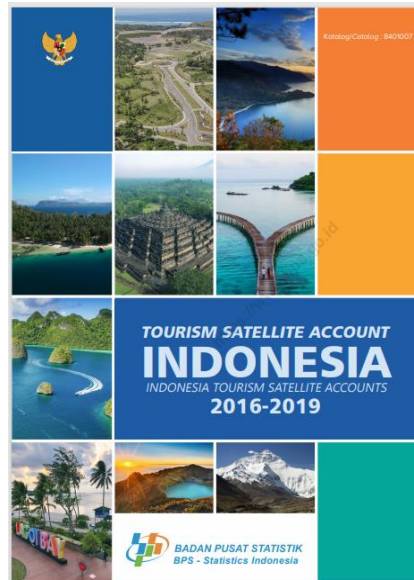 - 2020 : 173 DESTINATION CONTRIES
- LENGTH OF STAY

Domestic tourism by destination based on household survey

With MPD

CHALLENGES

01 DEPENDENCY

Highly depend on MNO as data owner. The confidentiality of data make it impossible to get raw data. We work at sand box that provided by MNO.

02 PROCUREMENT

Procurment is complicated since this type of srvice is very rare. .

03 OTHER MNO's

Currently only one out of five MNO that has good quality MPD data, the other need time to save their MPD wisely.

STATISTICS INDONESIA

Thank You
www.bps.go.id