



COMBINING BIG DATA WITH SMALL DATA FOR THE BEST RESULTS OF OFFICIAL STATISTICS



1

Inbound Tourism

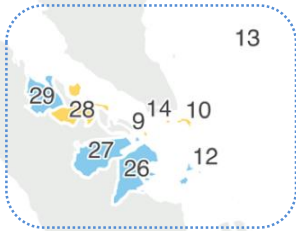
- ▶ **Lack of Qualitative Data (such as purpose of visits, accommodation type).**
- ▶ **Expenditure.**
- ▶ **Mobile phone usage (mobile phone usage behaviour).**

Small data (survey data) is required to obtain data that can not be provided by mobile positioning data

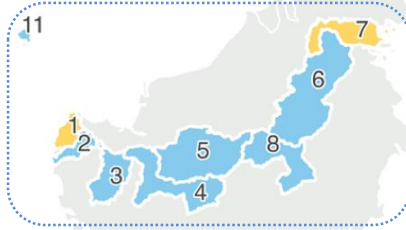
RESEARCH AREA

- No immigration
- Immigration

Riau islands (SG border)



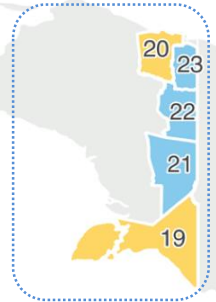
Borneo (MY)



Sintang&Talaud (PH)



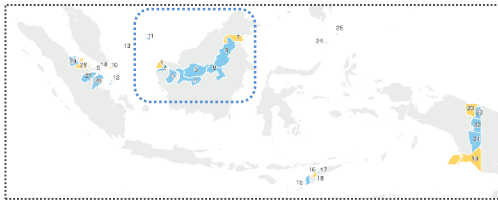
Papua (PNG)



East Nusa Tenggara (TL)



Sambas 1 | Bengkayang 2 | Sanggau 3 | Sintang 4 | Kapuas Hulu 5 | Malinau 6 | Nunukan 7 | Mahakam Hulu 8 | Karimun 9 | Bintan 10 | Natuna 11 | Lingga 12 | Kepulauan Anambas 13 | Kota Batam 14 | Kupang 15 | Timor Tengah Utara 16 | Belu 17 | Malaka 18 | Mereauke 19 | Jayapura 20 | Boven Digoel 21 | Pegunungan Bintang 22 | Keerom 23 | Kepulauan Sangihe 24 | Kepulauan Talaud 25 | Indragiri Hilir 26 | Pelalawan 27 | Bengkalis 28 | Rokan Hilir 29 |



Immigration entry points



Roamer trip start area

high

low

Kalimantan - Borneo

Malaysia

Indonesia

100 km



Cross Border Survey to obtain:

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



Survey was conducted in 25 Kabupaten cover 76 gates, July & October 2017, samples= 36.000

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 | <input type="checkbox"/> |
| Bisnis manager/Eksekutif | -2 | Pelajar/Mahasiswa | -7 | |
| Pegawai Pemerintah | -3 | Pensiunan | -8 | |
| Militer | -4 | Lainnya, sebutkan | -9 | |
| Karyawan Swasta | -5 | (.....) | | |

Occupation

How many phones : Jumlah HP yang anda gunakan saat ini buah

b. Jumlah Sim Card yang anda gunakan dan aktif saat ini

How many SIM cards

sebutkan nama providernya:

- Sim card 1 : Sim card 3 :
Sim card 2 : Sim card 4 :

5. a. Maksud utama mengunjungi Indonesia:

- | | | | |
|-------------------------------|----|------------------------|--------------------------|
| Bekerja mendapat gaji/sekolah | -1 | →STOP | <input type="checkbox"/> |
| 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 |
| | | (.....) | |

Purpose of visit

b. Rencana lama tinggal di Indonesia hari

Length of stay

6. Frekuensi mengunjungi Indonesia dalam satu bulan terakhir:

- | | | | |
|-----------------|----|----------------|----|
| Setiap hari | -1 | Sebulan sekali | -3 |
| Seminggu sekali | -2 | Tidak tentu | -4 |

Frequency of visit

7. Negara tempat tinggal

Country of residence

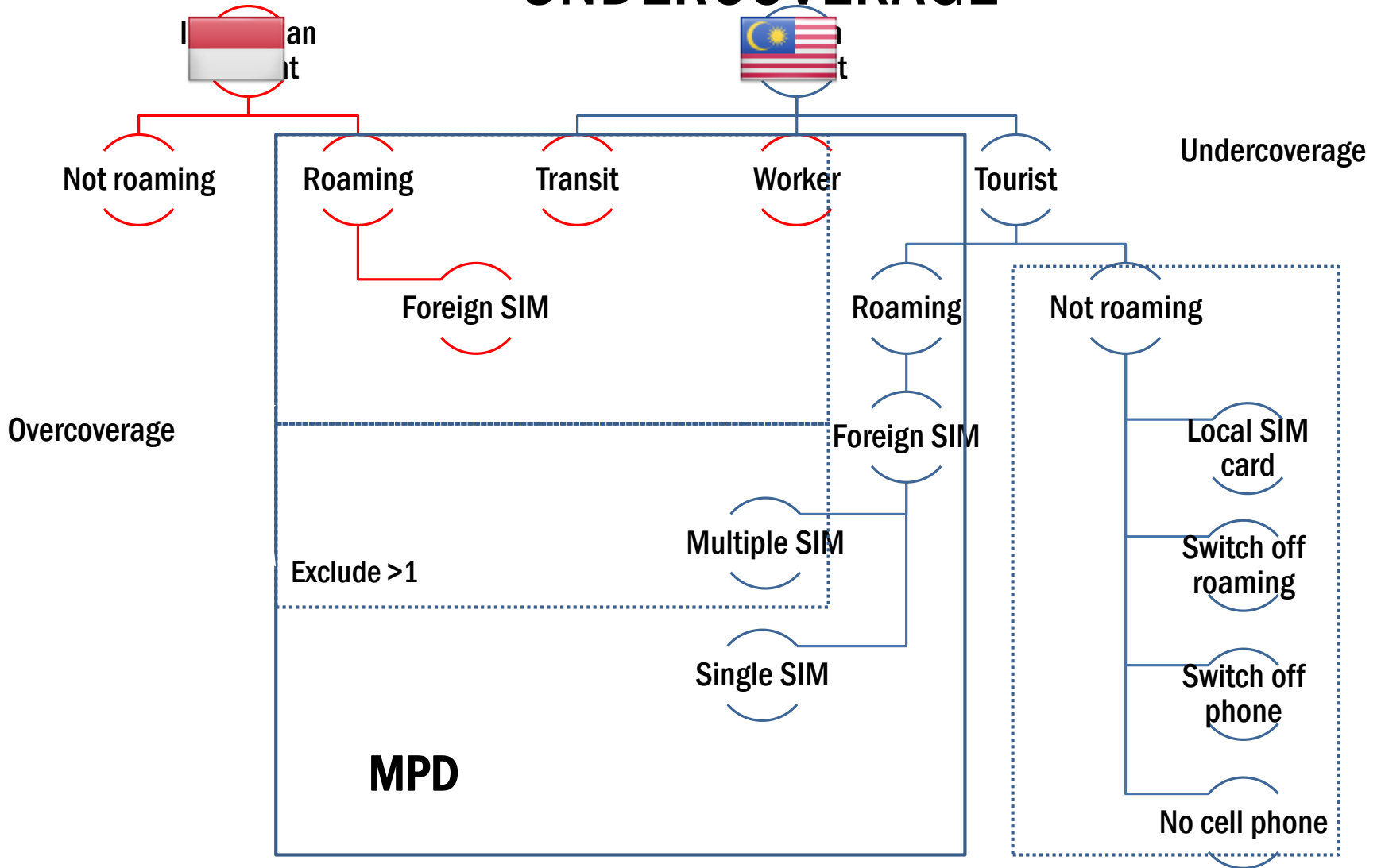
8. Kewarganegaraan

Nationality

9. Berapa uang yang akan dibelanjakan di Indonesia?

Expenditure

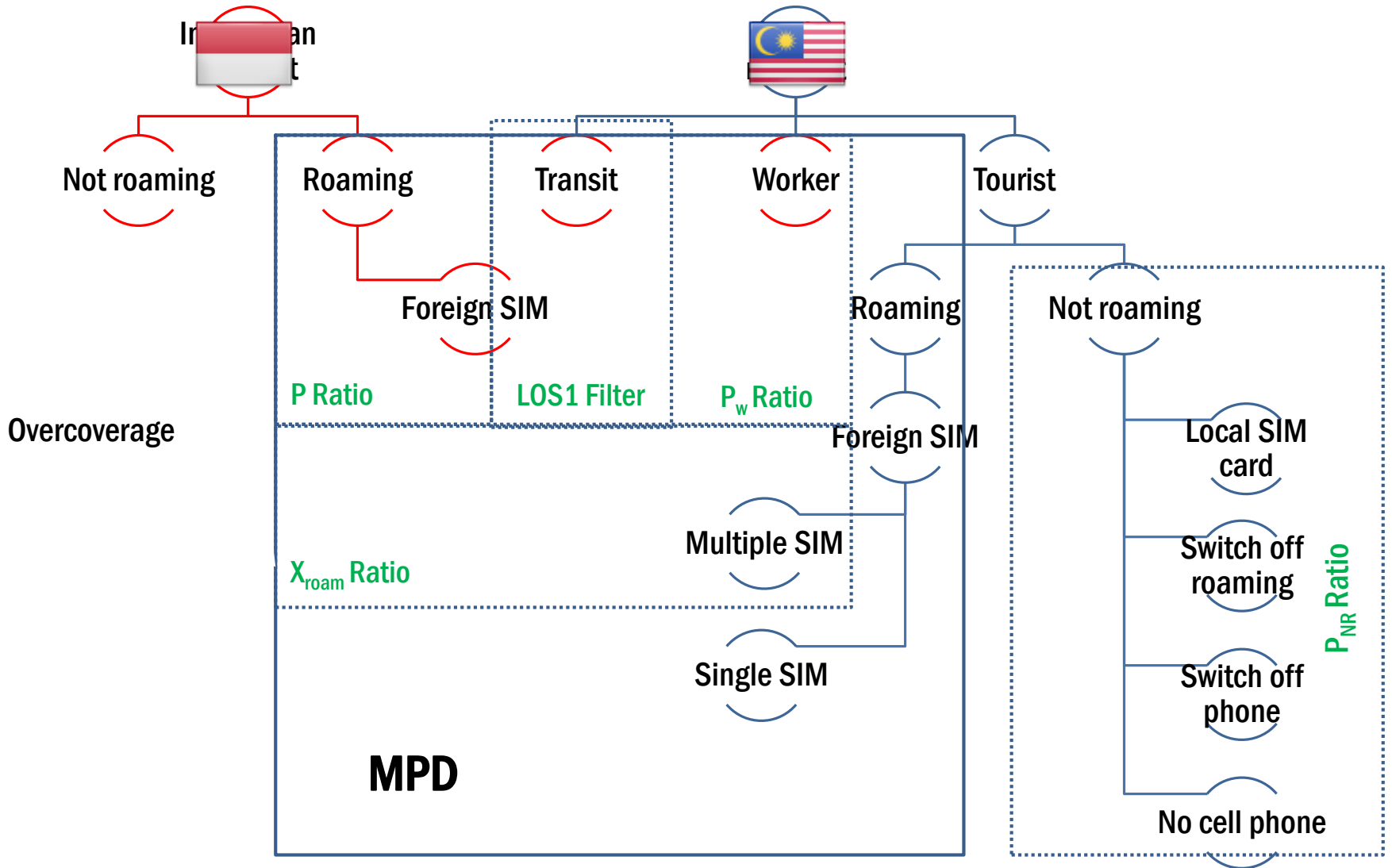
UNDERCOVERAGE



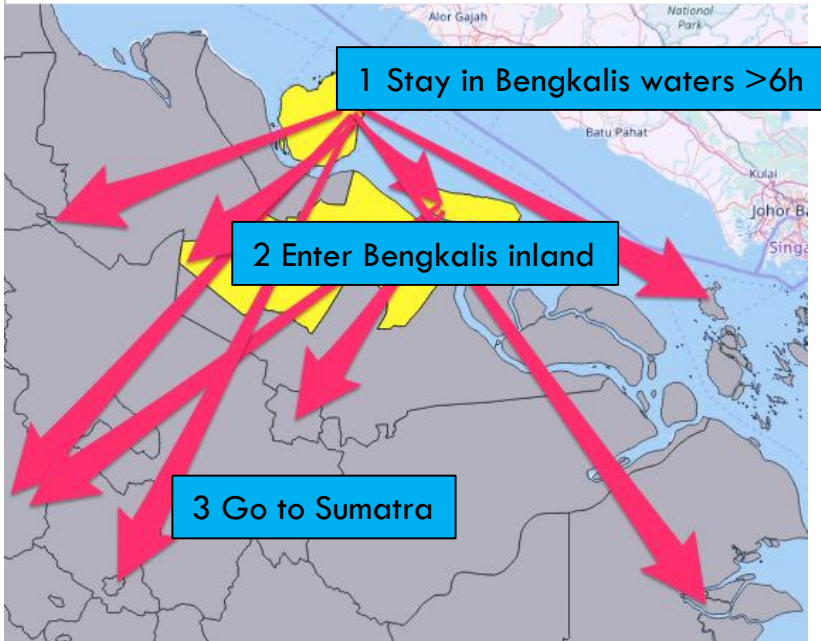
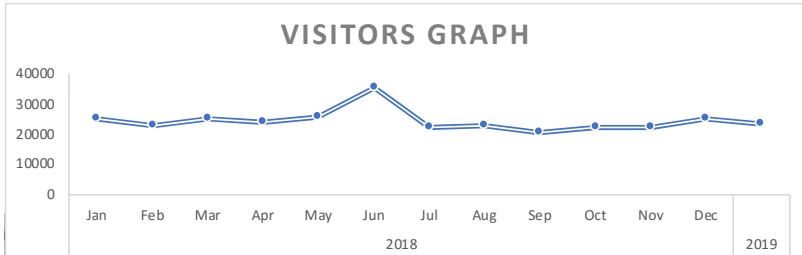
FILTERING MPD AT BORDER GATES

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

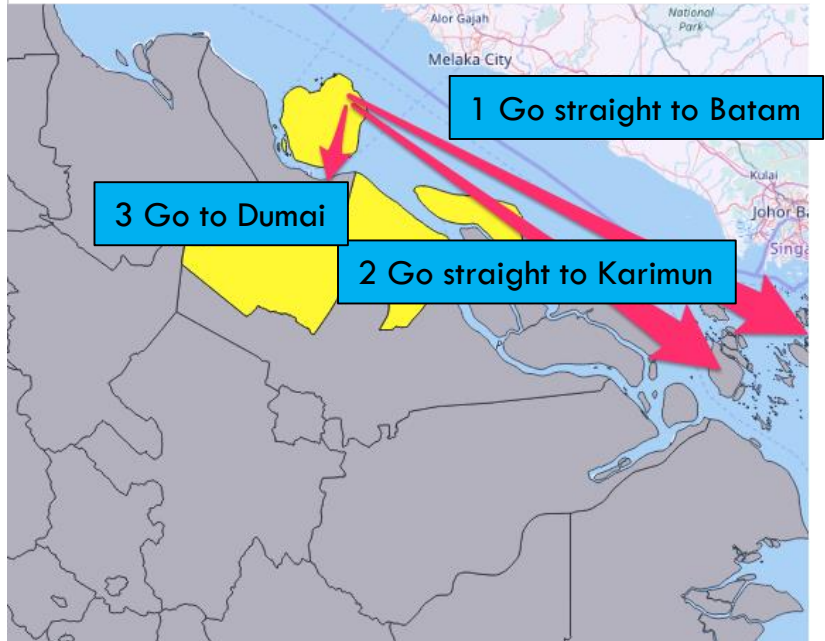
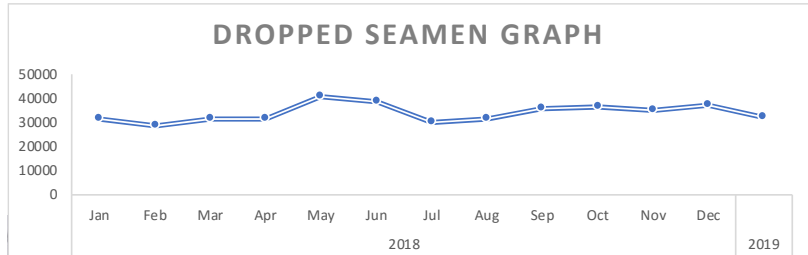
- ▶ **AT** : Additional Tourists based on MPD
- ▶ **MPD** : Number of sim card foreigner detected by MNO
- ▶ **X_{roam}** : Ratio sim card per mobile phone
- ▶ **P_{nr}** : Ratio of foreigner Non-roaming (using local sim card or no mobile phone)
- ▶ **MS** : Market share
- ▶ **WCI** : Inbound Tourism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



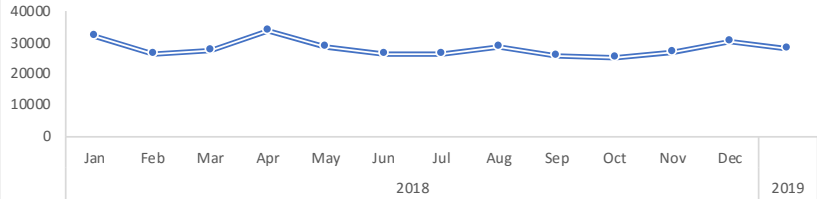
Bengkalis remain



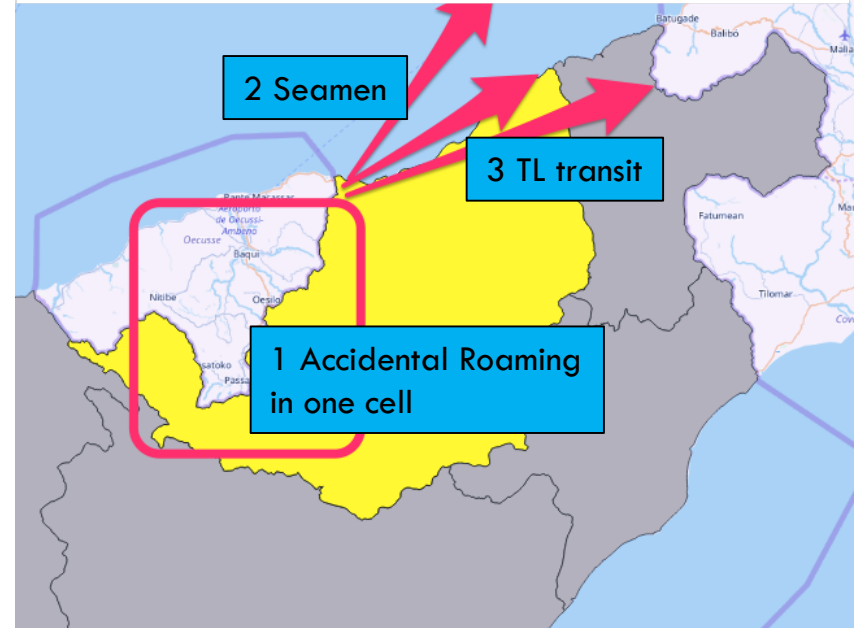
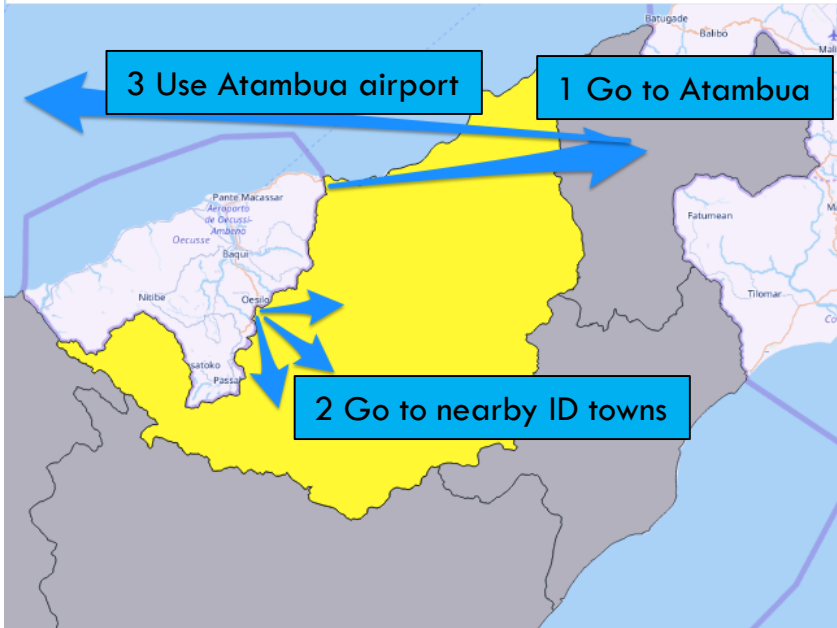
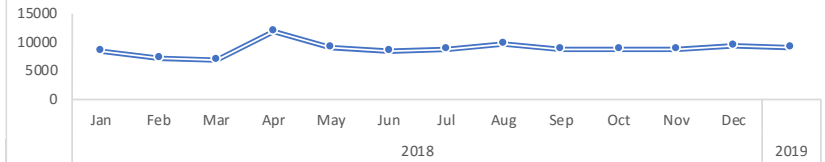
Bengkalis



VISITORS GRAPH

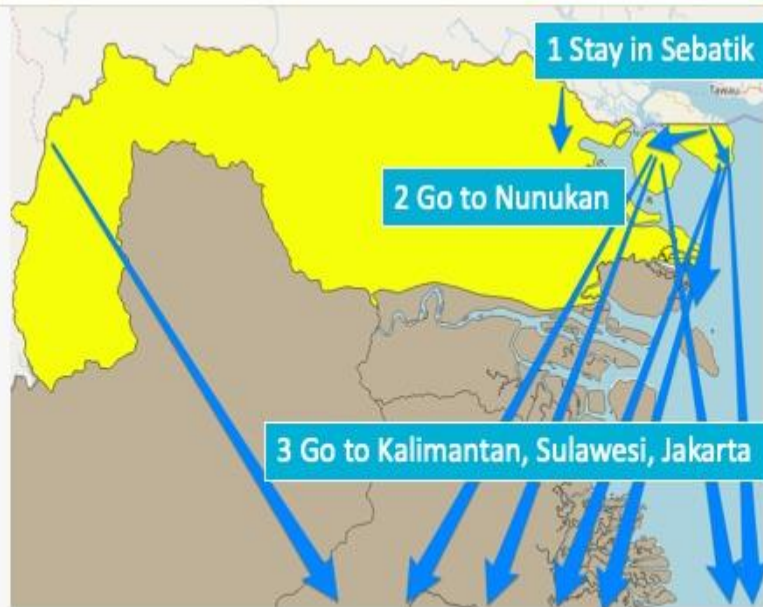


DROPPED SEAMEN AND ACCIDENTAL ROAMING GRAPH



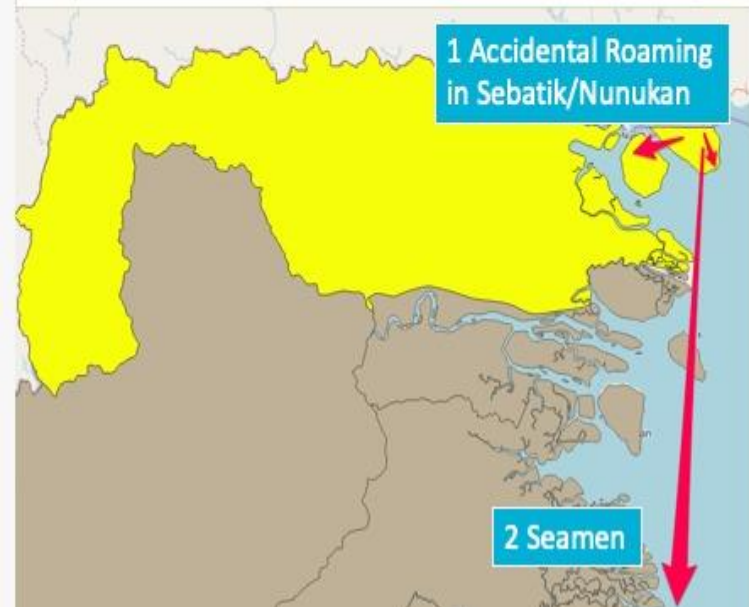
Nunukan remain

VISITORS GRAPH



Nunukan dropped

DROPPED SEAMEN AND ACCIDENTAL ROAMINGGRAPH



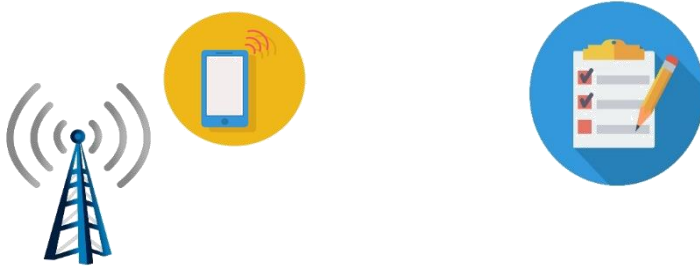
Lesson Learnt

MPD is useful, it gives more accurate and coverage compare to cross border survey. However, there also limitation of MPD.

Survey is also useful to obtain ground truth and qualitative and quantitative data that can not be obtain from MPD

So, there is no data source that is superior to other data source. All of data source could complete each other

1 Combining mobile positioning data (big data) and survey (small data) provide the best result of official statistics



2 Formula for additional tourism at the border

$$AT = \left(\frac{MPD}{Xroam} \times \frac{1}{1 - Pnr} \times \frac{1}{MS} \right) - WCI$$

3 Combining mobile positioning data (big data) and administrative data (immigration data) also provide the best result of official statistics



2

Domestic Tourism and Commuting

Household Survey (Conventional)

- Distribution sample
 - 30.000 census blocks,
 - 50.000 travellers
- Listing, chose eligible sample, estimate population
- face to face interview

Using MPD & digital survey

- Distribution sample
 - All census block (more than 800.000)
 - +/- 140 million subscribers
- All domestic tourism subscribe to MNO, estimate for the non subscribers
- Ground check

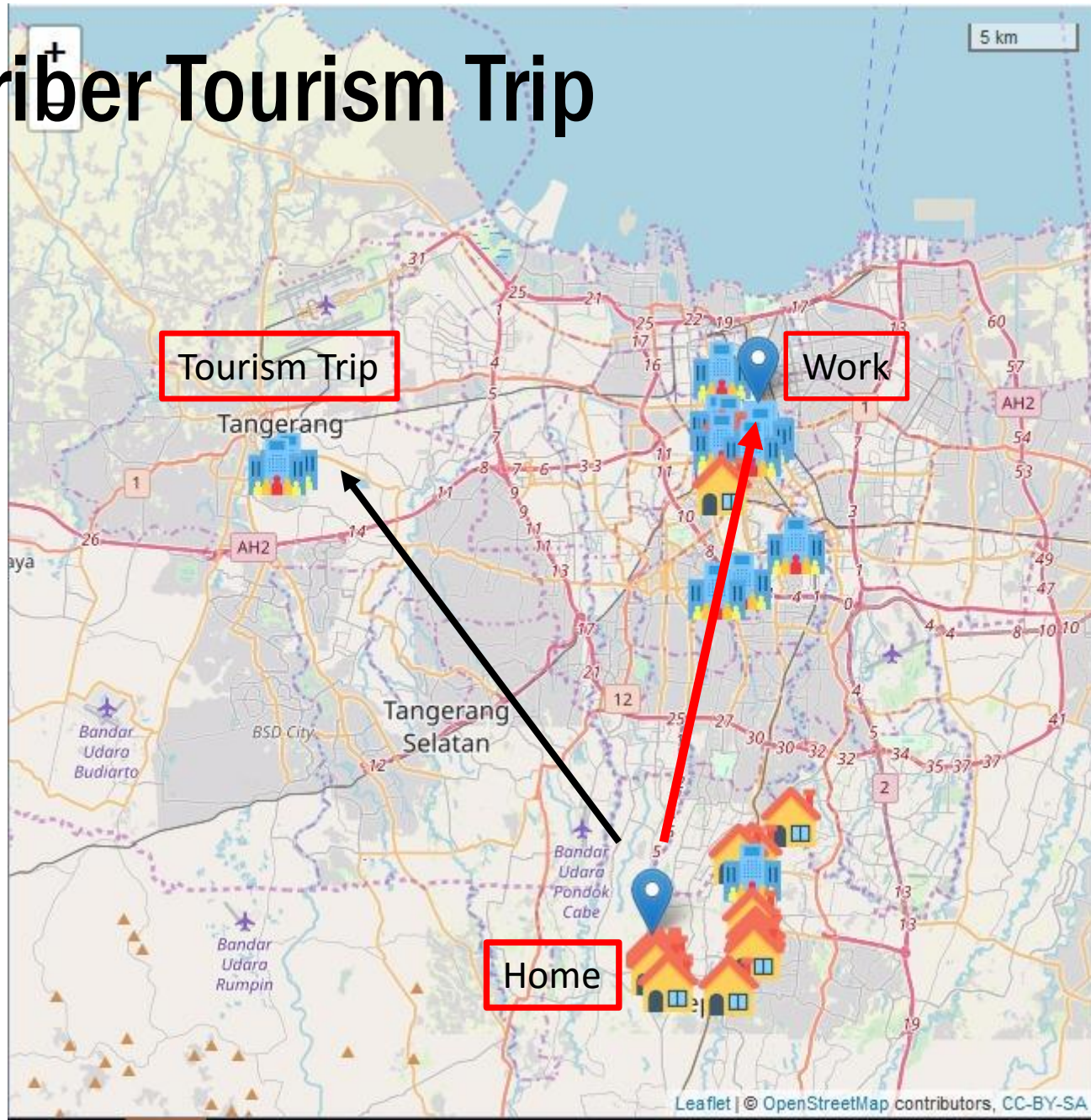
Household Survey

- Minimum :
 - 8.000 x 4 = 32.000 man survey
 - Recruitment
 - Training
 - Questionnaire & manual
 - Office supplies
- Quarterly, **memory lapse**
- **Sampling problem**
- **Resistant** from respondent
- **Remote area** problem, difficult to be reached

MPD & Digital Survey

- **No** enumerators are **needed**, reduce work burden
- Monthly (**timeliness**), even daily data
- Fact, real data (**accuracy**)

One subscriber Tourism Trip



ONE SUBSCRIBER TOURISM TRIP

POPULATION

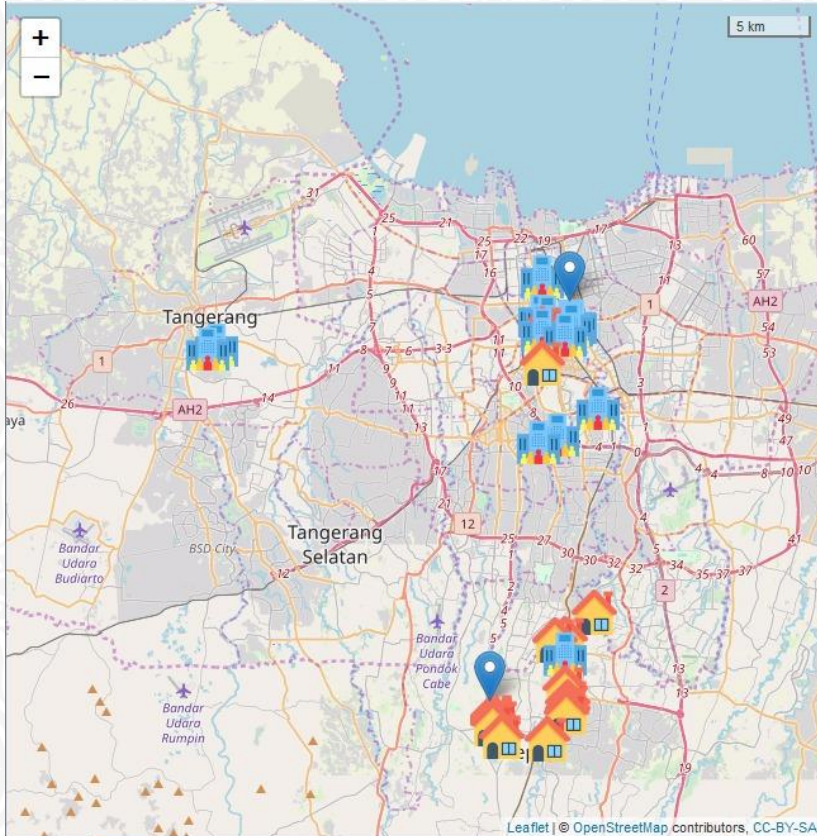
FOR EACH SUBSCRIBER:

1. REMOVE USUAL ENVIRONMENT;
2. APPLY TOURISM ALGORITHM;
3. MAKE A LIST OF NUMBER THAT DO TOURIST TRIPS;
4. THIS LIST IS A SAMPLING FRAME FOR THE DIGITAL SURVEY

SAMPLE

FOR SUBSCRIBER WHO TRAVEL

1. SEND SMS;
2. ASK THEIR PROFILE;
3. ASK WHETHER THEY VISITED CERTAIN AREA;
4. ASK FOR PURPOSE OF TRIPS, TRANSPORTATION, ACCOMMODATION, EXPENDITURE



Survei Wisatawan Nusantara 2018 - BPS1

Bapak / Ibu Yth,

Dalam rangka meningkatkan pelayanan bagi para wisatawan di Indonesia, Badan Pusat Statistik (BPS) mengadakan survei nasional kepada para wisatawan domestik dan Anda terpilih menjadi responden kami. Mohon kesediaannya untuk mengisi dengan lengkap pertanyaan-pertanyaan di bawah ini.

Anda diharapkan untuk mengisi survei dengan durasi 2-4 menit hingga selesai. Sebagai apresiasi atas kesediaan mengisi kuesioner kami sediakan saldo TCASH sebesar Rp. 5000 **khusus kepada pelanggan Telkomsel yang menerima sms undangan survei resmi BPS.** Dengan mengikuti survei ini, Anda memberikan persetujuan kepada BPS dan pihak ketiga yang bekerjasama untuk menyimpan dan menganalisa jawaban Anda atas pertanyaan Survei. Kerahasiaan jawaban Anda dilindungi Undang-undang no. 16 tahun 1997 tentang Statistik.

- Ya, saya setuju
- Saya tidak setuju

Selanjutnya

0%



Survei Wisatawan Nusantara 2018 - BPS14

Data diri

Gender

Pria

Wanita

14%

Survei Wisatawan Nusantara 2018 - BPS14

Berapa biaya yang Anda keluarkan untuk perjalanan tersebut?

Mohon untuk mengisi perkiraan pengeluaran Anda pada kotak isian di bawah ini:

Akomodasi (a)

Makanan / minuman (b)

Angkutan (c)

Cinderamata (d)

91%

SCENARIO A (AT THE VERY BEGINNING)

BPS TEAM WENT TO MNO AND DID SANDBOXING THERE

MEMBER OF THE TEAM: DATA SCIENTIST, METHODOLOGY STAFF, TOURISM STATISTIC STAFF

SCENARIO B (LATER ON)

BPS TEAM CONNECT TO MNO SERVER THROUGH VPN

WE NEED TO REQUEST FOR AN ACCESS AND RENEW THE ACCESS EVERY 4 (FOUR) HOURS.

SCENARIO C (WHAT WE WISH FOR)

MNO HAND THE DATA OVER TO BPS TEAM



THANK YOU