BPS - Statistics Indonesia

MPD MOBILITAS

BIG DATA FOR SOCIAL AND DEMOGRAPHICS STATISTICS

Edi Setiawan

Head of Population and Labour Mobility Statistics Division
BPS-Statistics Indonesia

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Sumber Gambar:
https://assets.weforum.org/project/image/ofrXIgd3wA28wNpwNufi4dGvcJFnrsHujrSWSRXxAuw.png,
https://canva.com

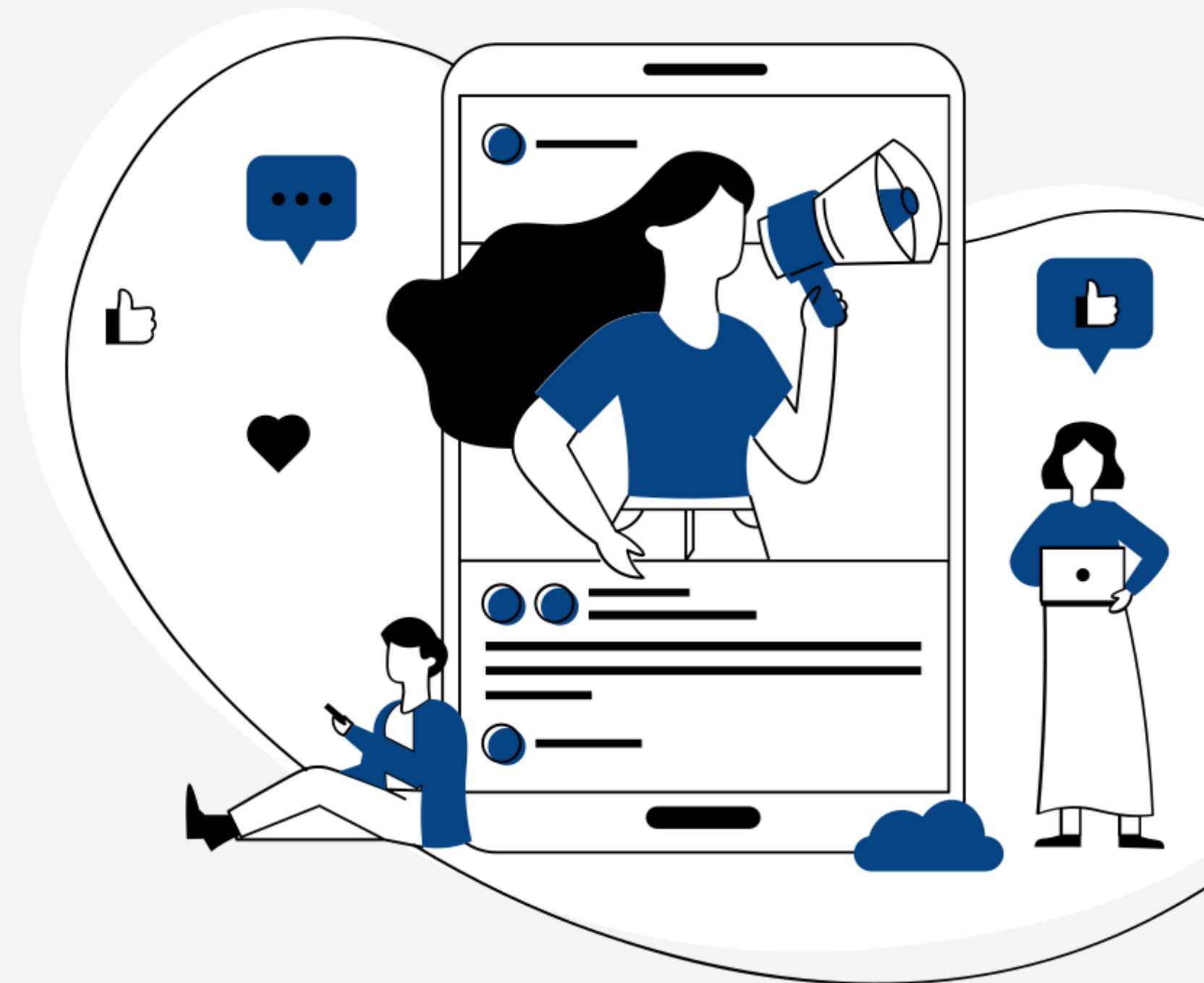# Data is Everywhere

Daily Activities

Digital Footprint

Big Data System

Mobile Positioning Data (MPD)

- large-scale dataset

- regarding the position/location of a subscriber of a cellular operator

- MPD processed and stored in the system in the mobile operator database

Central Jakarta

East Jakarta

Each movement patterns of phone user can be learned by MPD

Facts of
MPD in Indonesia

355 million active telephone numbers vs 268 million population (2019)

All numbers have to register based on Single Identification Number as in the personal ID Card

91% of the adult population using mobile phone device (any type) and 60% using smart phone (2019)

Mobile Network Operator (MNO)

TELKOMSEL

MPD Data Source

- **Call Detail Record (CDR):** mobile–call, mobile–sms
- **Location Based Service (LBS):** Internet Protocol Detail Record (IPDR), Location Area Update, Handover event, device turn on, and many more

MPD Data Structure

subscriber_ID	start_date	end_date	kecamatan_name	kabupaten_name	province_name
(1)	(2)	(3)	(4)	(5)	(6)
628111*****	12/1/2018 9:37	12/1/2018 14:28	PANCORAN	KOTA JAKARTA SELATAN	DKI JAKARTA
628111*****	12/1/2018 15:09	12/1/2018 16:29	SETIA BUDI	KOTA JAKARTA SELATAN	DKI JAKARTA
628111*****	12/1/2018 18:08	12/1/2018 23:59	TANAH ABANG	KOTA JAKARTA PUSAT	DKI JAKARTA
628111*****	12/2/2018 4:40	12/2/2018 4:59	CIBODAS	KOTA TANGERANG	BANTEN

WHO   *WHEN*   *WHERE*

Travel duration

modes of transportation

travel distance between regions
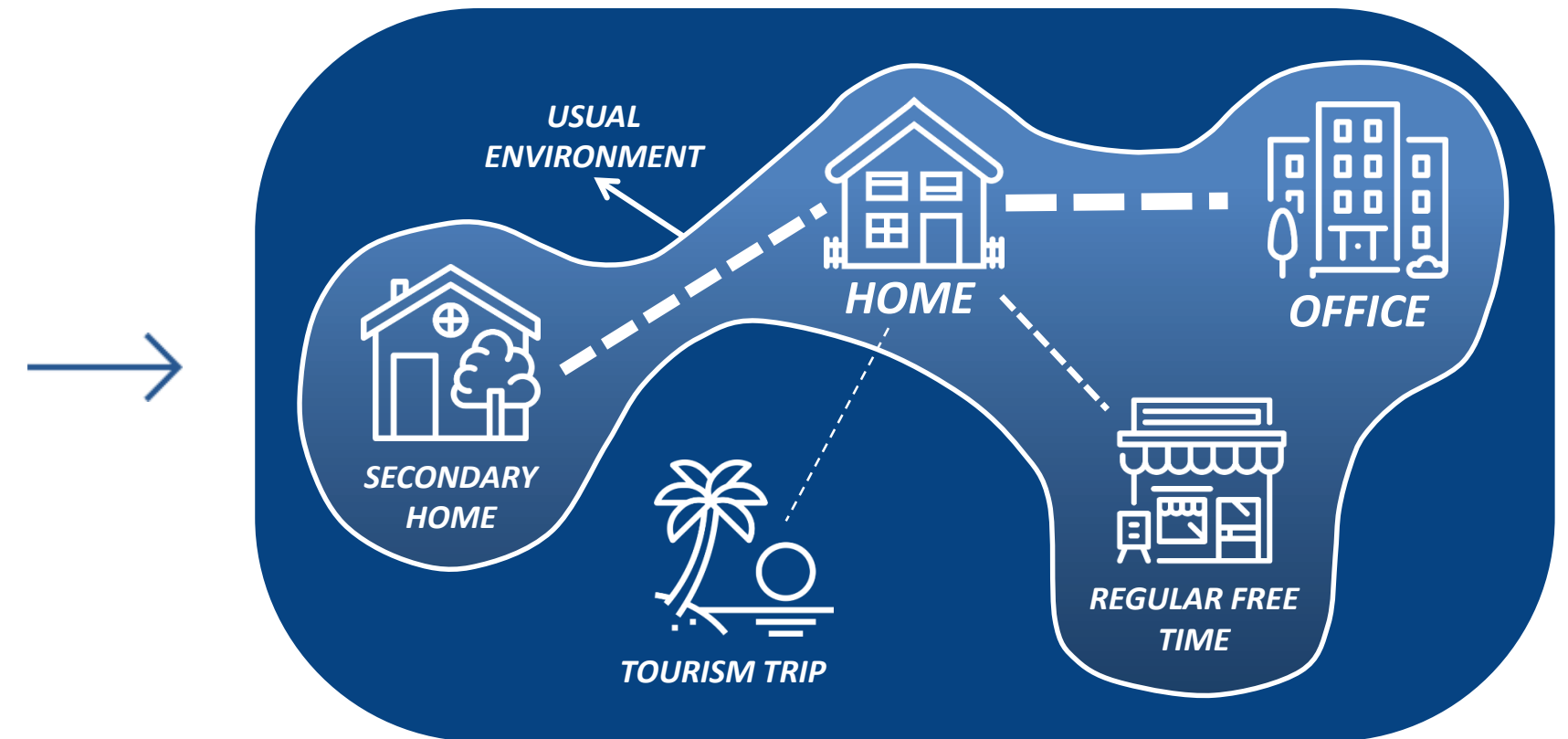
Mobile Positioning Data (MPD)

01

Usual Environment

- **Home**: phone number that is most exposed in a location at night (5.00 PM until 8.59 AM at next day)
- **Work**: phone number that is most exposed in a location from morning to evening (9.00 AM to 4.59 PM on weekdays)

others: secondary home, regular free time, tourism trip

02

Method: Sandboxing

- Access database by using a token from the MNO
- Limited access to sample data, not overall data.
- Limited only to the process of data exploration and algorithm development.
- MNO built a script to be implemented on the data.
- Running the script
- MNO will send the tabulation based on the request

03

Quality Assurance

- Validation for trip identification results
- Validation using volunteer data
- Validation result used to improve methodology

Benefit of Using MPD

INCREASE COVERAGE
Mobile phone data is used to increase the coverage data.

LESS BURDEN
Less work and respondent burden

COST EFFECTIVE
Less budget than traditional survey
(1 vs 8 million US$)

GRANULAR DATA
More granular data, such as municipality and sub-district

TIMELY
More timely and up to date data than traditional survey

MORE FREQUENT DATA
Annual data for monitoring

BPS' Initiatives with MPD For Official Statistics

BPS'
Initiatives
with MPD

Foreign Tourist at Cross Border Posts

Domestic Visitor

Event based analysis:
- Asian Games
- IMF-WB Annual Meeting

Commuting Statistics

Metropolitan Statistical Area

# Commuting Statistics

Commuter

person who trip from home and go to home on the same day regularly for work/school/course activities
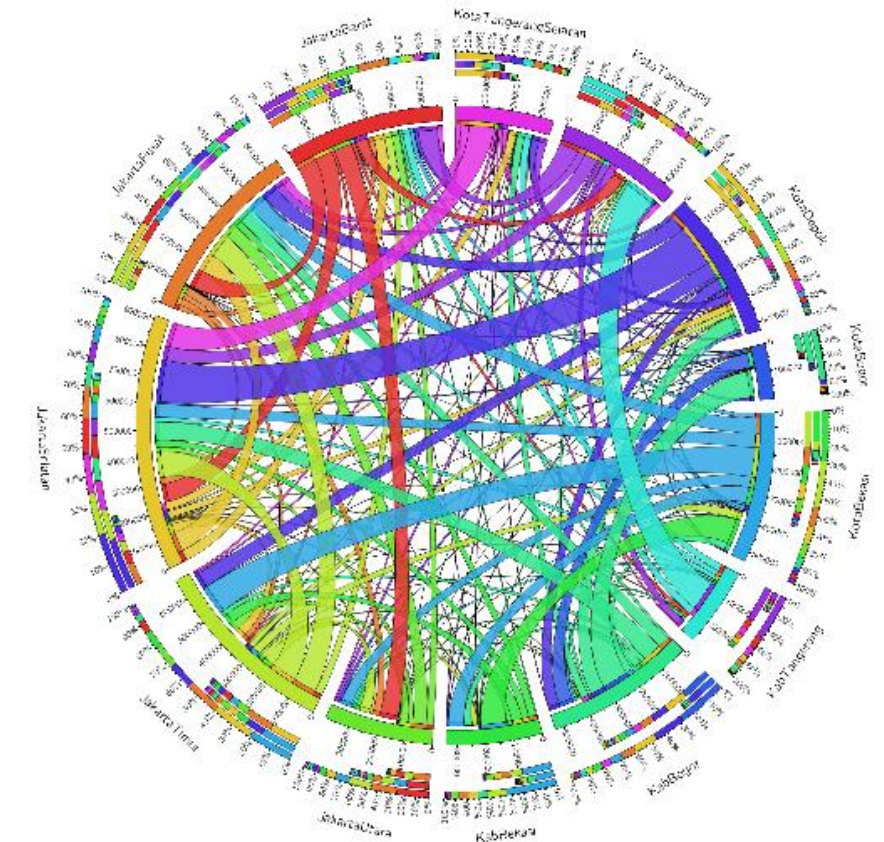
Traditional Survey

- 2014 (Jabodetabek);
- 2015 (Sarbagita and Mebidang);
- 2017 (Bandung Raya & Gerbangkertosusila);
- 2019 (Jabodetabek and Mebidang)

Comparison Of MPD And Traditional Survey

Comparison	MPD	Traditional Survey
Cost	cost effective	large costs, especially during field implementation
Time Interval	monthly	once every 4 years and only in different metropolitan areas
Estimate Level	district / city and subdistrict level	district / city level

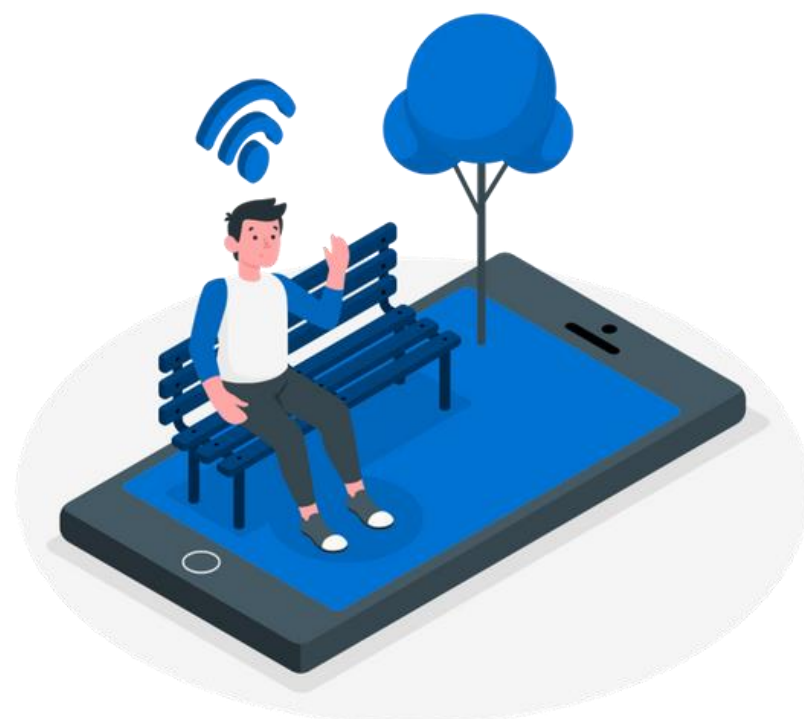MPD MOBILITAS
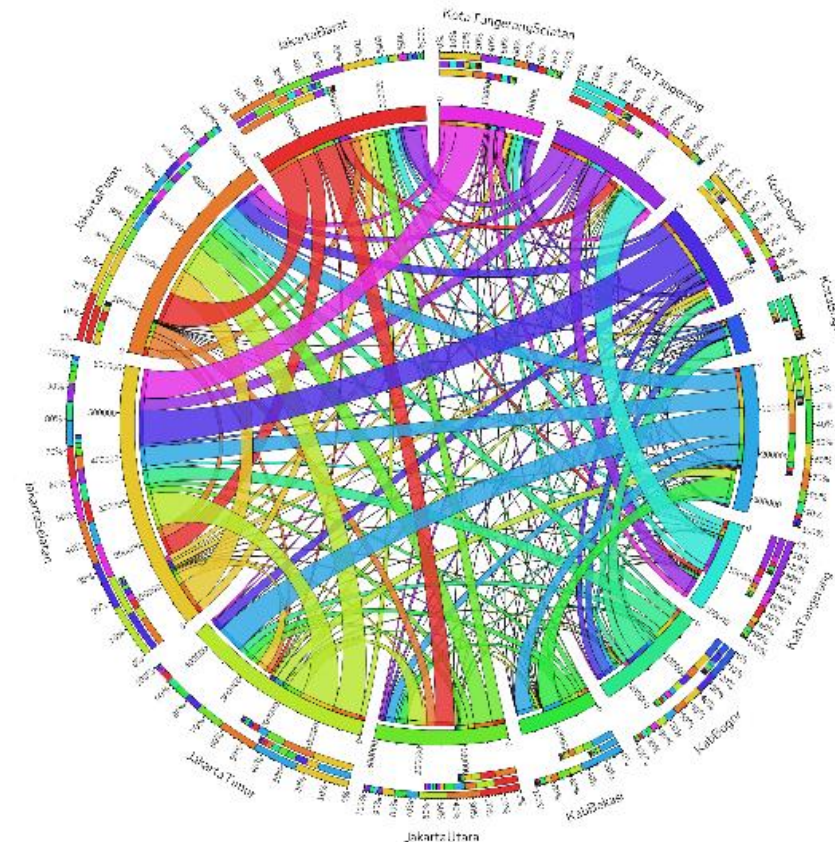
MPD (2019)

Commuter Survey (2019)

MPD vs Traditional Survey

on Jabodetabek Area

Metropolitan Statistical Area (MSA)

Alternative Delineation Method

In 2019, BPS conducts MSA as an alternative to the delineation method for Metropolitan Areas (MA) that has been used by the ministry of Agrarian Affairs and Spatial Planning.

The Use of MPD

using MPD in producing indicators of population/ commuter mobility between the **central city** and the **surrounding cities** at the **sub-district level** to determine MA.

Cekungan Bandung Area

consists of 5 districts/cities: Bandung City and Cimahi City are the central cities of the metropolitan area

The Use of MPD for MSA

01

Threshold

- **1,5 percent** commuters to the central city per population
- **5 percent** commuters to the central city per all commuters

02

Determination of MA

Districts that meet the Functional Urban Area (FUA) threshold and criteria will be included in the MA

03

Validation

Using a Travel Diary (**Meili_MSA Application**) for validation **(907 volunteers in 1 month)** to confirm mobility
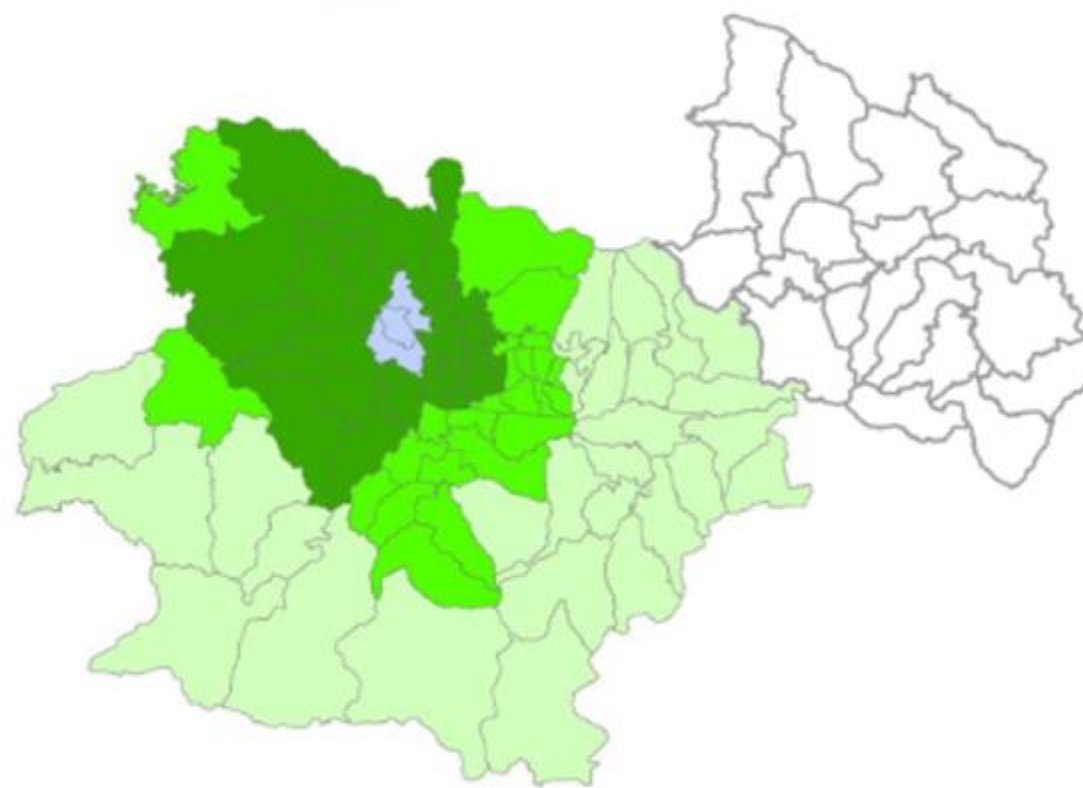
04

Scenarios

There are 3 scenarios:
1. **Bandung City** is the central city
2. **Cimahi City** is the central city
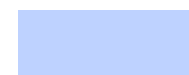3. **Bandung** City and Cimahi City are the central cities

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Scenario 1   Scenario 2   Scenario 3

Legend:
- Central City
- *Threshold* 5 percent
- + *Threshold* 1,5 percent
- Presidential Regulation No. 4 of 2018
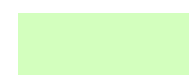
MPD for MA Delineation
on Cekungan Bandung

Internal Migration

Plans to estimate indicators of internal migration from **Mobile Positioning Data (MPD)**

Using usual environment: **Home**

Data:
- Location A: home of subscriber in the period of year X
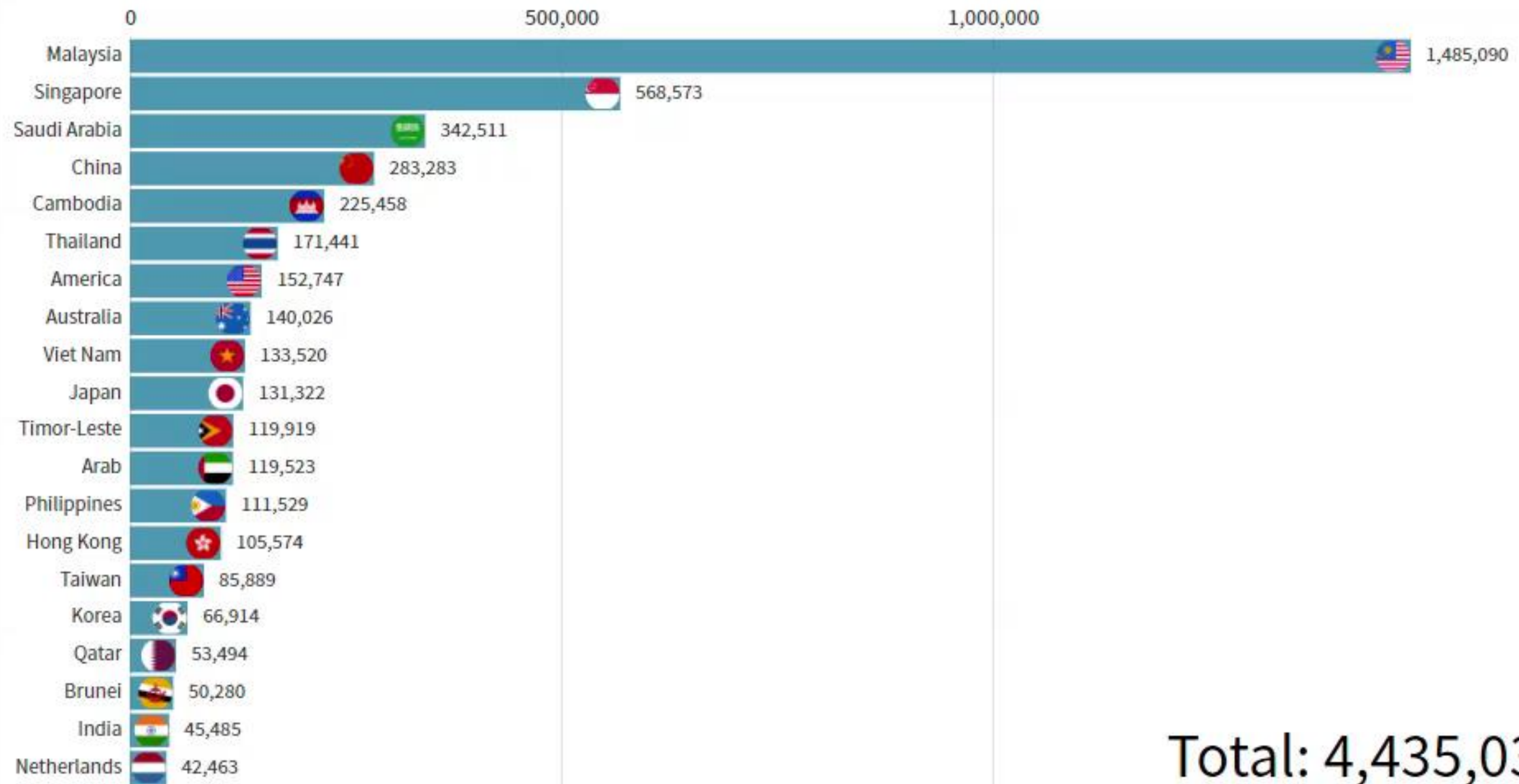- Location B: home of subscriber in the period of year X+1

Internal migrant is a person who has a different location between locations A and B

Transnationalism

Number of Stays of Transnational by Country Destination for the Main Destination in 2019

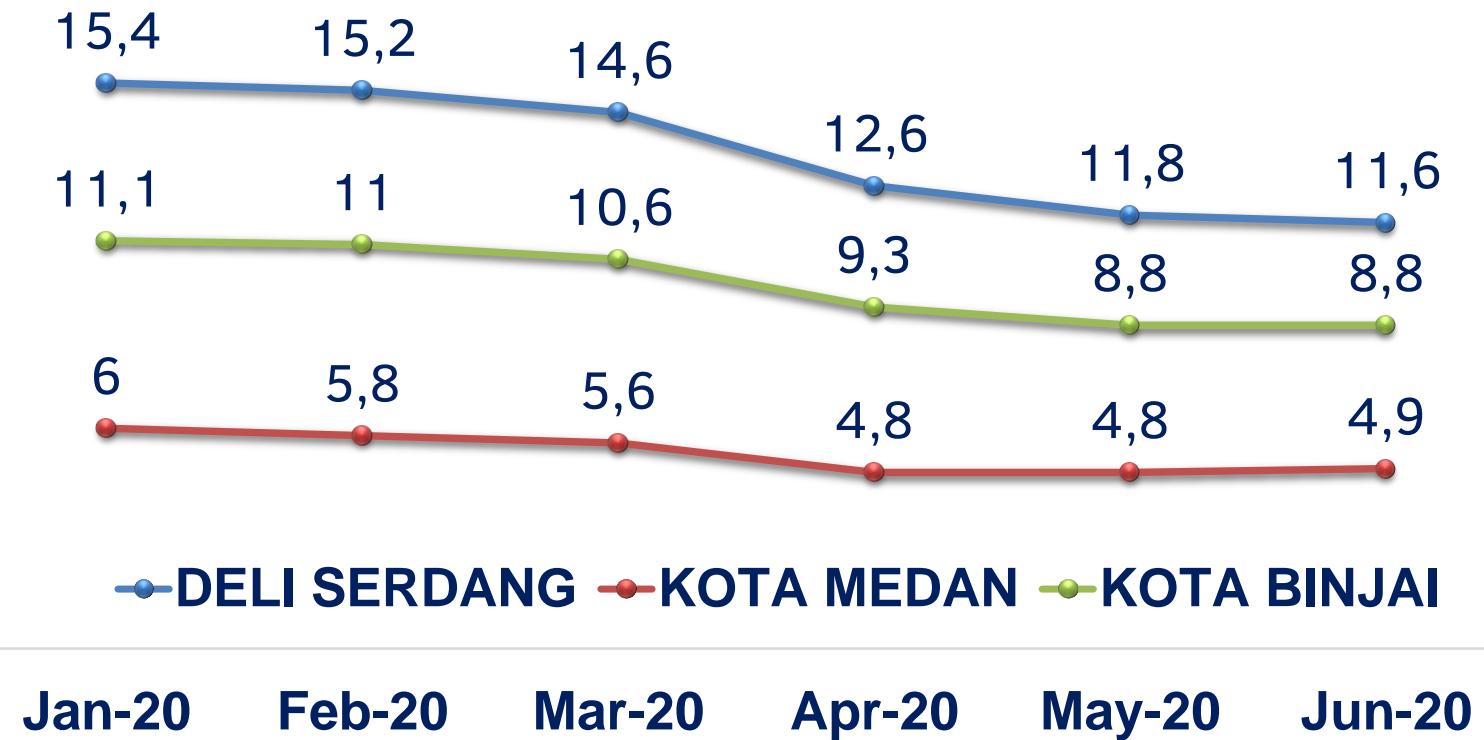|	0	500,000	1,000,000	
Malaysia				1,485,090
Singapore		568,573		
Saudi Arabia	342,511			
China	283,283			
Cambodia	225,458			
Thailand	171,441			
America	152,747			
Australia	140,026			
Viet Nam	133,520			
Japan	131,322			
Timor-Leste	119,919			
Arab	119,523			
Philippines	111,529			
Hong Kong	105,574			
Taiwan	85,889			
Korea	66,914			
Qatar	53,494			
Brunei	50,280			
India	45,485			
Netherlands	42,463			

Total: 4,435,036

Transnationalism refers to a situation where a person has close relations between several countries or is active in several countries. In economics and business, transnationalism is a fairly popular phenomenon. But in the context of migration, this term has become a growing trend in recent decades.

The Use of
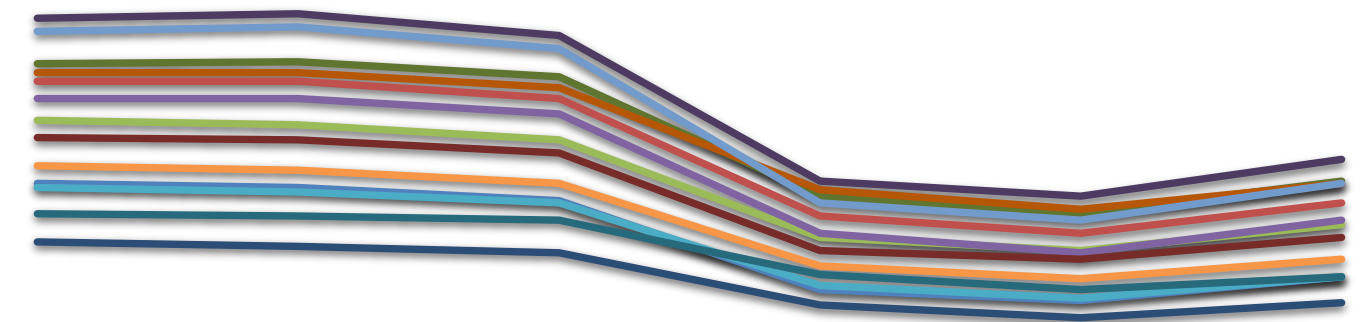# MPD for measuring the
Impact of Covid-19 Pandemic

Commuters Before and After the Covid-19 Pandemic

Percentage of Commuters in
MA - Mebidang

15,4 15,2 14,6 12,6 11,8 11,6

11,1 11 10,6 9,3 8,8 8,8

6 5,8 5,6 4,8 4,8 4,9

— DELI SERDANG — KOTA MEDAN — KOTA BINJAI

Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20

Percentage of Commuters in
MA - Jabodetabek

Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20

— KOTA JAKARTA SELATAN — KOTA JAKARTA TIMUR
— KOTA JAKARTA PUSAT — KOTA JAKARTA BARAT

Challenges

- ✓ **No rule or regulation.**

- ✓ **Administrative and legal process**

- ✓ **Continuity of Data sources.**

- ✓ **MNOs staffs/data scientist lack of understanding on Statistics**