Metropolitan Areas in Indonesia

Share of Metropolitan Areas in Java to Indonesia's GDP, 2018

Jabodetabek	**24.56%**
Gerbangkertosusila	**6.69%**
Cekungan Bandung	**3.20%**
Kedungsepur	**2.13%**
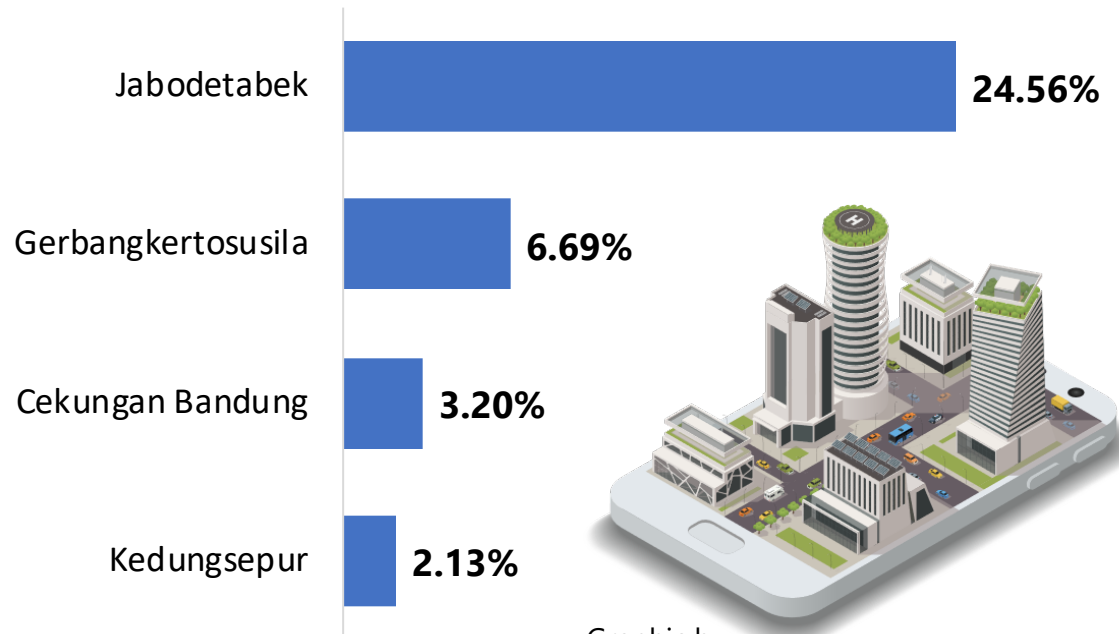
Source:
Indonesia GDRP 2018
(BPS, 2019)

Graphic by
Freepik/Macrovector

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Stimulate economic growth

Increased competitive advantages

Proper metropolitan area delineation will drive budgeting and development of metropolitan area conducted appropriately

DECADE OF ACTION

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2020 Asia-Pacific Statistics Week
Leaving no one and nowhere behind

Delineation of Metropolitan Areas in Indonesia

Considered Aspects in Determining Metropolitan Area Delineation

Socio-economic and cultural linkages between the core area and the surrounding hinterlands

Urban development (land cover change)

High commuter movements between the urban core and the surrounding hinterlands

Distance and travel time based on commuter movement

Ecological balance and water resources

Source: Ministry of Public Works of Indonesia Regulation No. 15/2012

Delineation of Metropolitan Areas in Indonesia

Commuting statistics have been produced using a conventional survey conducted by BPS, **but limited** to:

Only 5 metropolitan areas

Regency/municipality level of estimation

Conducted every 1-2 years consecutively

Delineation of Metropolitan Areas in Indonesia

There are metropolitan areas whose
delineations haven't been determined

delineation has been determined	delineation hasn't been determined
Mebidangro (Medan)	Patungraya Agung (Palembang)
Jabodetabekjur (Jakarta)	Gerbangkertosusila (Surabaya)
Cekungan Bandung (Bandung)	Banjarbakula (Banjarmasin)
Kedungsepur (Semarang)	Bimindo (Manado)
Sarbagita (Denpasar)	
Mamminasata (Makassar)	

Source: presented by Deputy for Regional Development,
Ministry of National Development Planning (2019)

New Source of Data:
Mobile Positioning Data (MPD)

BPS was exploring another data sources
to produce official statistics, one of them is MPD

MPD is large-scale location data of MNO subscribers

MPD can be used to produce commuting
statistics in **a shorter time lag** and **lower
level of administration area**
(compared to conventional survey)

Graphic by
Freepik/Vectorpocket

How MPD can be used to produce commuting statistics?

Data Structure of MPD

| Hashed MSISDN	Kecamatan	Regency/ Municipality	Province	Start Date	End Date
0AC*******	PANCORAN	KOTA JAKARTA SELATAN	DKI JAKARTA	12/1/2018 9:37	12/1/2018 14:28
0AC*******	SETIA BUDI	KOTA JAKARTA SELATAN	DKI JAKARTA	12/1/2018 15:09	12/1/2018 16:29
0AC*******	TANAH ABANG	KOTA JAKARTA PUSAT	DKI JAKARTA	12/1/2018 18:08	12/1/2018 23:59

Who

Where

When

How MPD can be used to produce commuting statistics?

Usual Environment
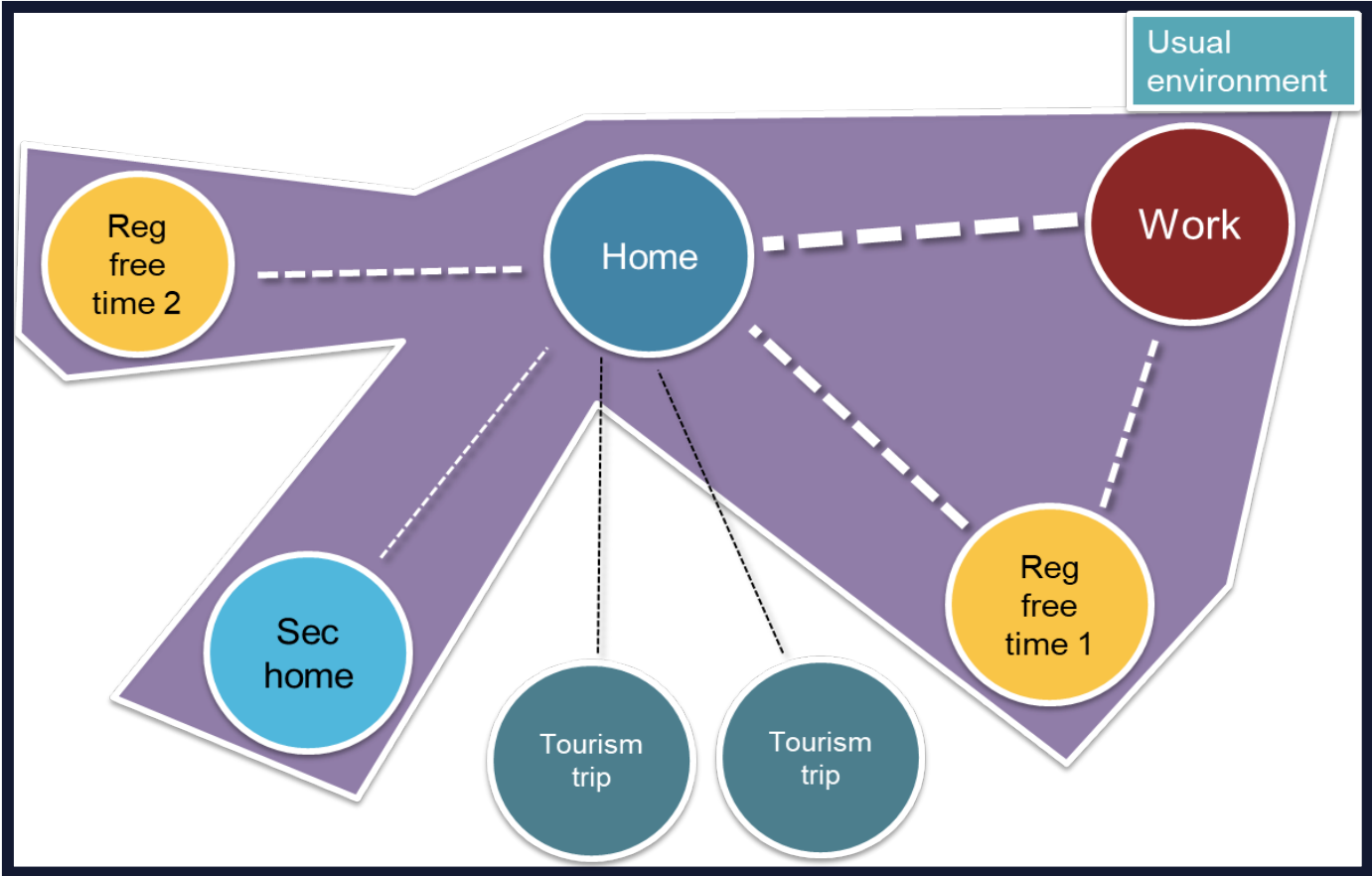
Source: presented by Erki Saluveer in BPS (2018)

How commuting statistics can be used for metropolitan area delineation?

Functional Urban Area (FUA)
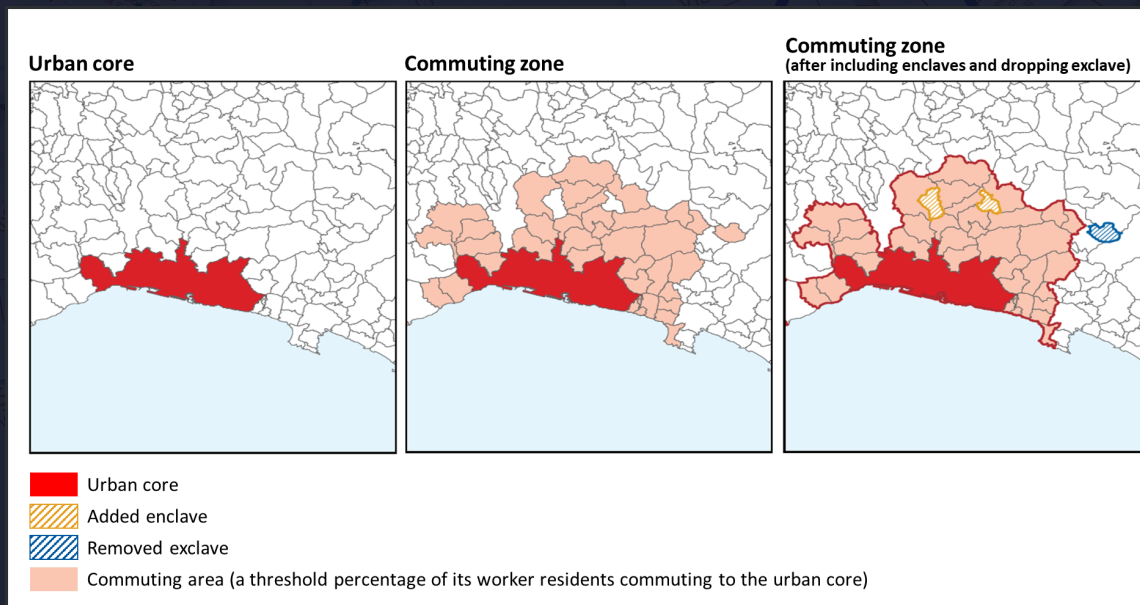
1. Identify all surrounding hinterlands with a **certain threshold** of its worker residents commute to the urban core
2. Contiguous surrounding hinterlands are included (**enclave**), and non-contiguous surrounding hinterlands are dropped (**exclave**)

Source: Eurostat (2017) Methodological Manual on City Statistics
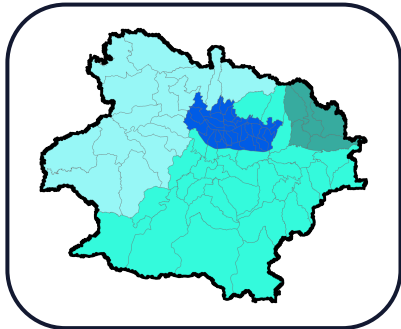DOI: 10.2785/708009

Case Study: Delineating 'Cekungan Bandung' Metropolitan Area
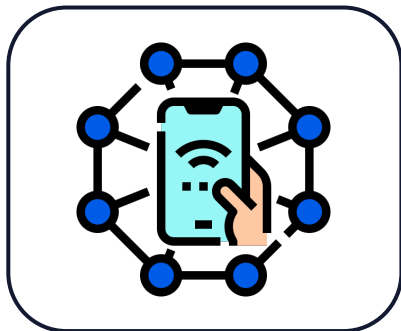
Scope of Study

Location: **Cekungan Bandung**
- Based on Presidential Reg. No.45/2018
- Located in West Java
- Consist of 33 kecamatans (sub-district) as the urban core, and 52 kecamatans as the surrounding hinterlands

Data Source: **Telkomsel**
- One of the largest MNOs in Indonesia
- November 2019
- 50,907 subscribers

Case Study: Delineating 'Cekungan Bandung' Metropolitan Area

Threshold FUA

Literature Review

15% of worker residents
(Eurostat, 2017)

25% of worker residents
(US OMB, 2010)

5% of worker and student residents
(Kurahashi, 2012)

Evidence-based

69.19% commuters
were commuting for work purposes
(Commuting Survey, 2017)

8.91% workers
were commuting to its urban core
(Labor Force Survey, 2018)

5% of MNO subscribers
were commuting to the urban core

Case Study: Delineating 'Cekungan Bandung' Metropolitan Area

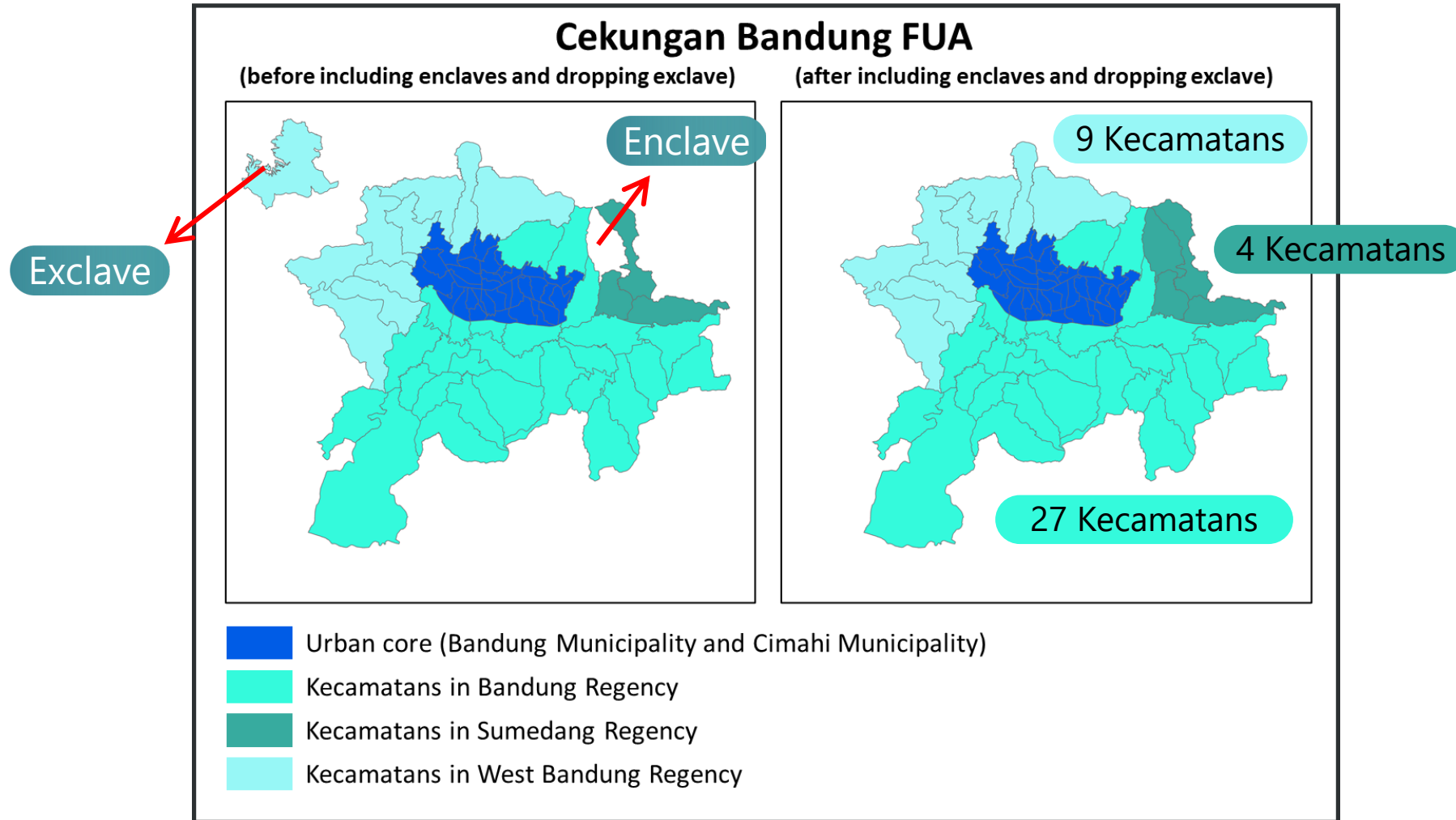## Validation Method

MEILI
MSA
(Metropolitan Statistic Area)

Records intertemporal location

Uses GPS feature to determine the location of the mobile phone

Has annotation feature to verify trips

907 volunteers, subset of Telkomsel's subscribers

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Result: Delineation Based on FUA

Cekungan Bandung FUA

(before including enclaves and dropping exclave)   (after including enclaves and dropping exclave)

Exclave

Enclave

Enclave

9 Kecamatans

4 Kecamatans

27 Kecamatans

Urban core (Bandung Municipality and Cimahi Municipality)

Kecamatans in Bandung Regency

Kecamatans in Sumedang Regency

Kecamatans in West Bandung Regency

Result: Comparation of Delineation
(FUA vs Presidential Reg. No.45/2018)

Cekungan Bandung FUA
(after including enclaves and dropping exclave)

Cekungan Bandung Metropolitan Area
(based on Indonesia Presidential Reg. 45/2018)

1 kecamatans

7 kecamatans

4 kecamatans

Urban core (Bandung Municipality and Cimahi Municipality)

Kecamatans in Bandung Regency

Kecamatans in Sumedang Regency

Kecamatans in West Bandung Regency
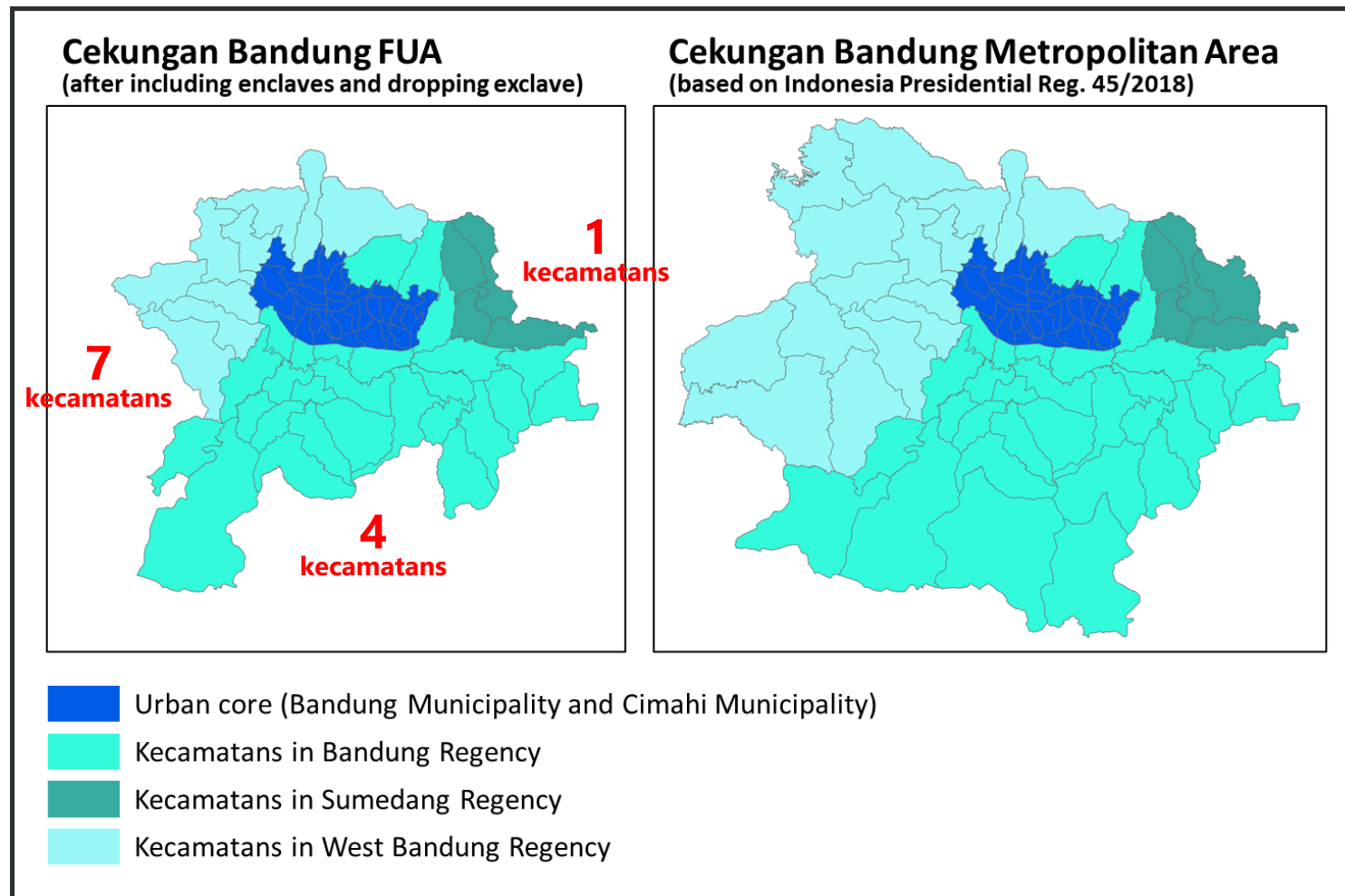
Discussion: Delineation Result
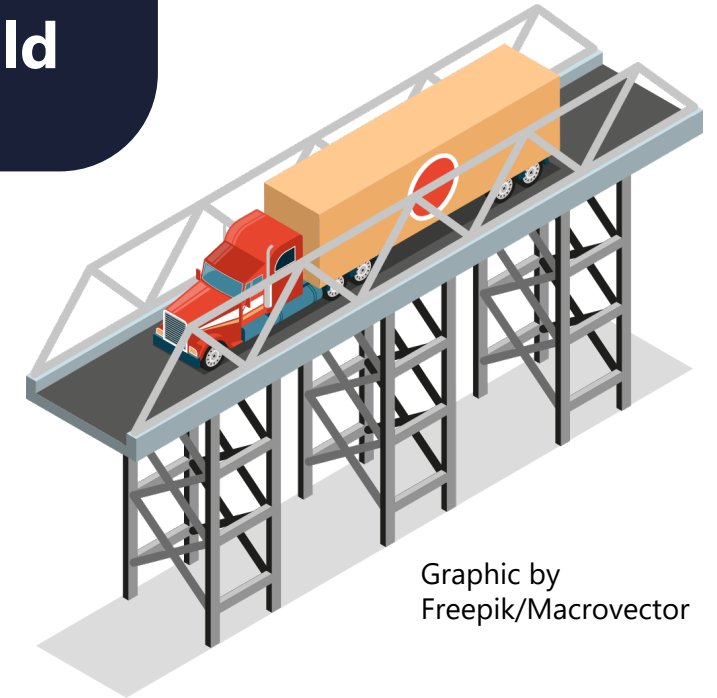
12 kecamatans **not included in Metropolitan Area based on MPD result with 5% threshold**

Indicate that the **degree of integration is lower than 5%**

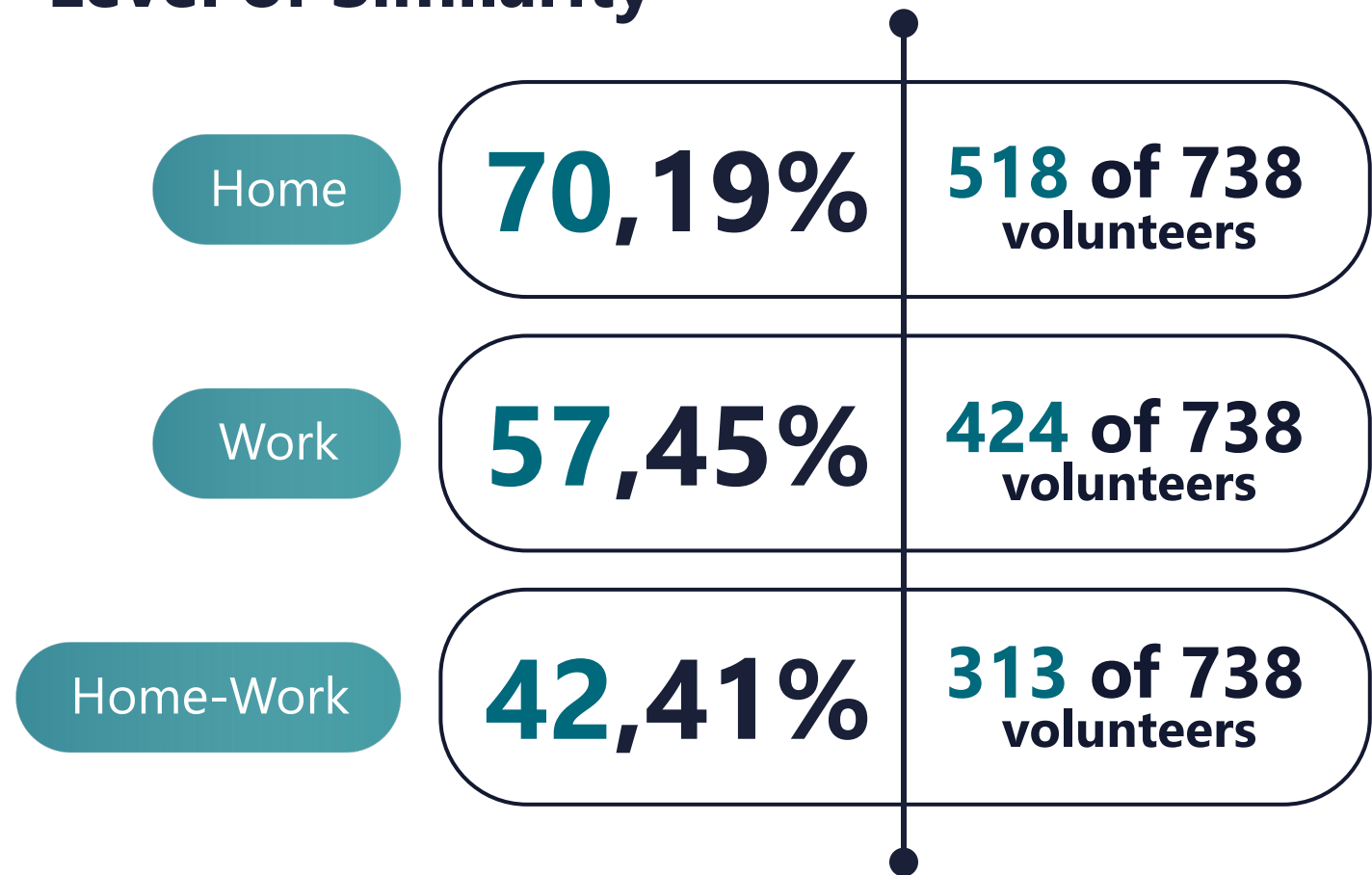**Important to identify the best threshold** to delineate metropolitan areas

Graphic by
Freepik/Macrovector

Result:
MPD Validation

Level of Similarity

Home	**70,19%**	**518** of **738** volunteers
Work	**57,45%**	**424** of **738** volunteers
Home-Work	**42,41%**	**313** of **738** volunteers

Discussion: MPD Validation

home location identification has a **higher accuracy** than work location identification

There were significant number of volunteers who **frequently mobile during work**

The algorithm needs to be improved

Graphic by
Freepik/Vectorpocket

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Summary:
The Use of MPD to Delineate Metropolitan Area

Opportunities

MPD can be used to delineate metropolitan area more detail and comparable across area

Relevance   **Comparability**

With MPD, we can produce commuting statistics in shorter time lag

Timeliness

Graphic by Freepik/Macrovector

Summary:
The Use of MPD to Delineate Metropolitan Area

Need Improvement

The more detailed the administrative area, the lower the accuracy

Accuracy

Relies on the cooperation agreement (contract) process with MNO

Accessibility

Graphic by Freepik/Macrovector

Data has a better idea

Virtual Event 15-18 June 2020

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THANK YOU!

Panca D. Prabawa | Hamim T. Soblia | Yudi F. Amin
Winida Albertha | Edi Setiawan

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"The world is now awash in data. It can be used to solving many problems that humankind faces. The goal is to turn data into information, and information into policy."