

Coverage challenges to overcome with MPD

Presentation at International Meeting on Measuring Human Mobility

28 March 2019



Undercoverage Issues

CDR
subscribers
of one
MNO

vs

official
visitor
estimates
(from
MPD)

by country

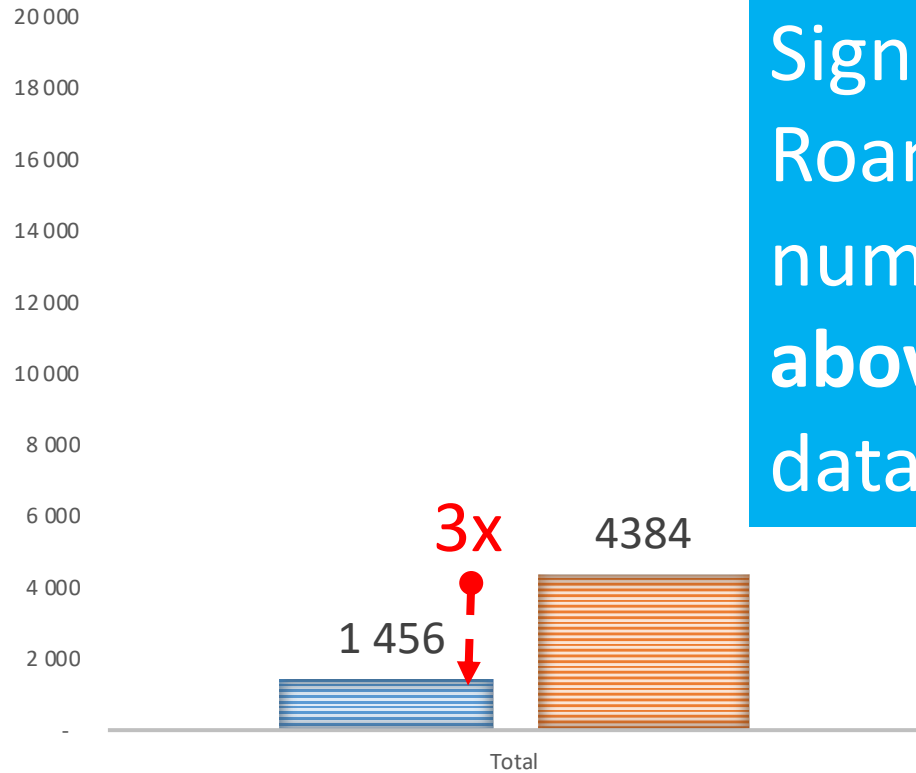
Estonia
2018H1

Country	Visitors	MNO subscriber	Single MNO %
Europe 1			23.0%
Europe 2			17.9%
Europe 3			13.2%
Europe 4			7.8%
Europe 5			15.1%
United States			3.4%
Europe 6			38.5%
Europe 7			23.1%
Asia 1			0.4%
Europe 8			28.1%
Europe 9			9.1%
Europe 10			15.2%
Europe 11			33.9%
Europe 12			33.0%
Europe 13			23.7%
Europe 14			19.2%
Asia 2			0.4%
Europe 15			19.0%

CDR:
Roaming subscriber
numbers are well
below the visitor
estimation

BINTAN, JULY 1

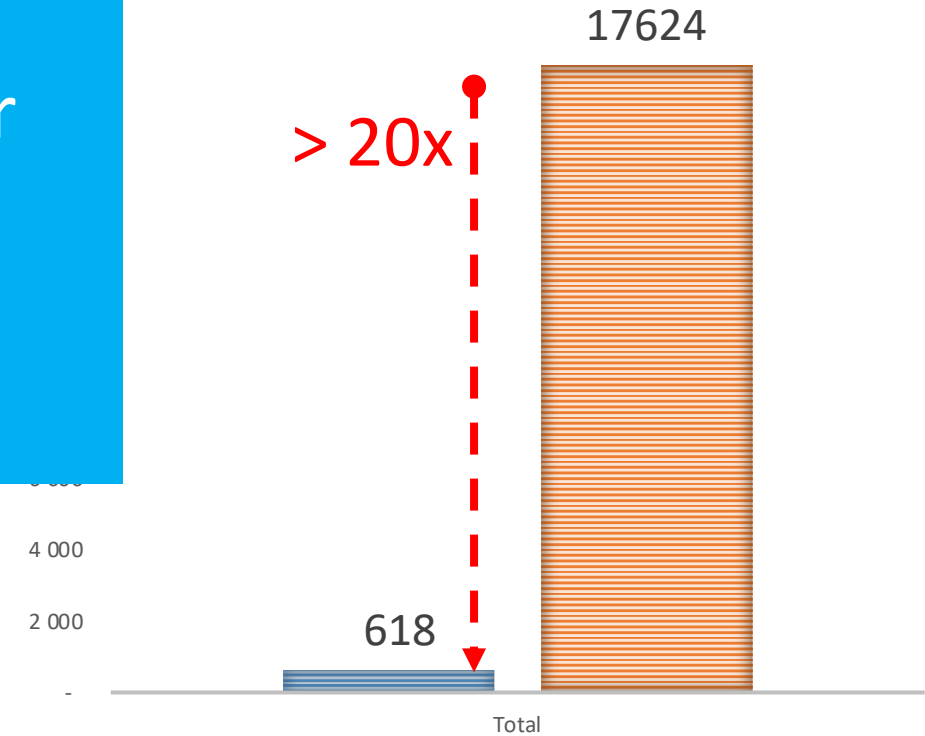
IMMIGR MPD



Signaling:
Roaming subscriber
numbers are well
above immigration
data

BINTAN, JULY 23

IMMIGR MPD



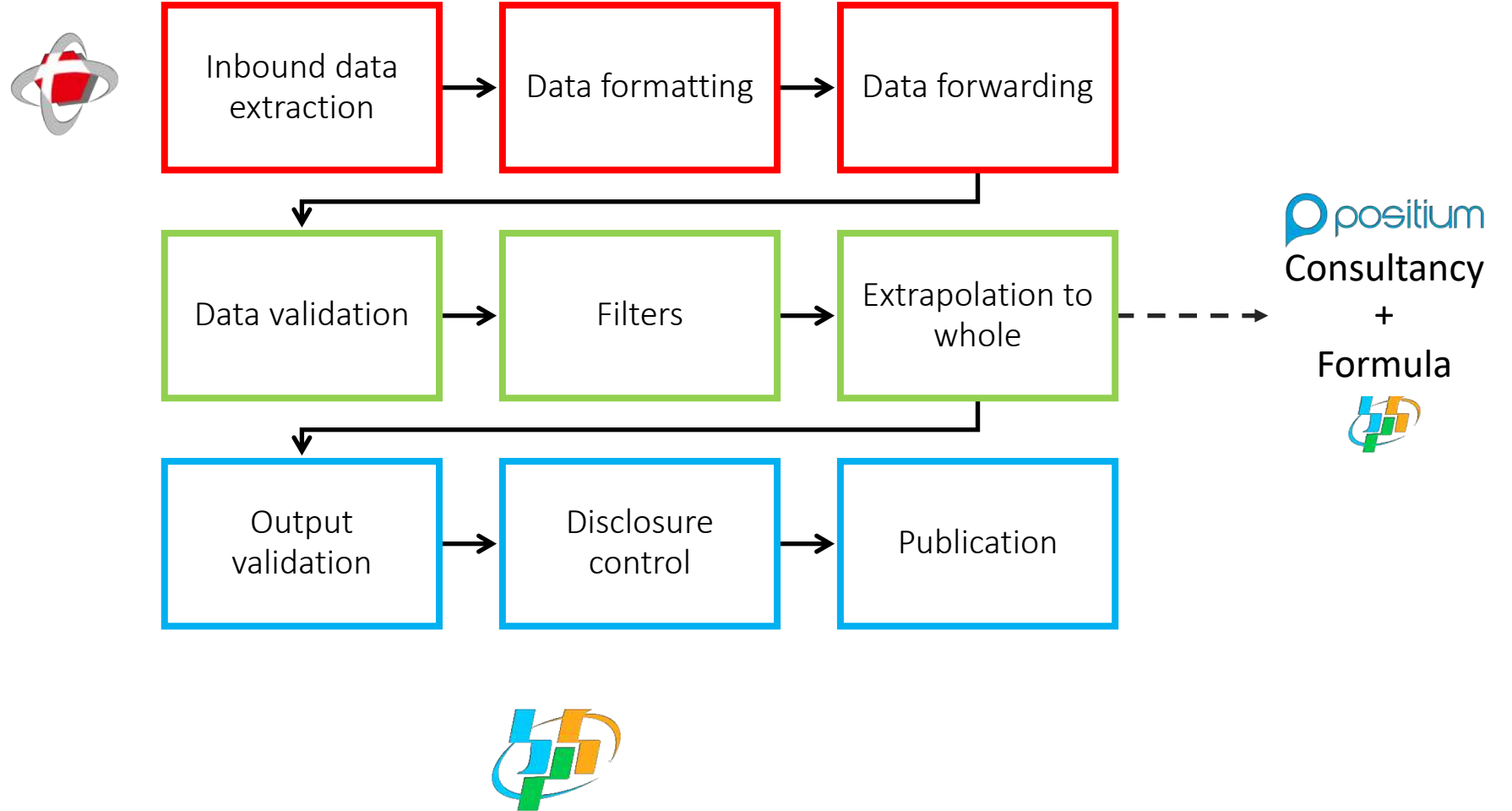
Method

Positium's Data Model Principle no 1

Data = Reality

Data must reflect reality as closely as possible

Processing 2018



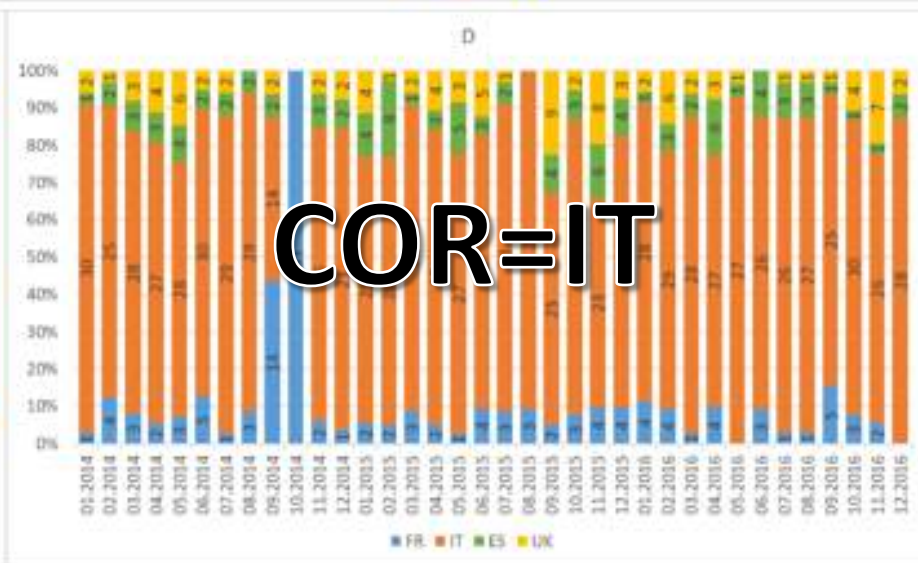
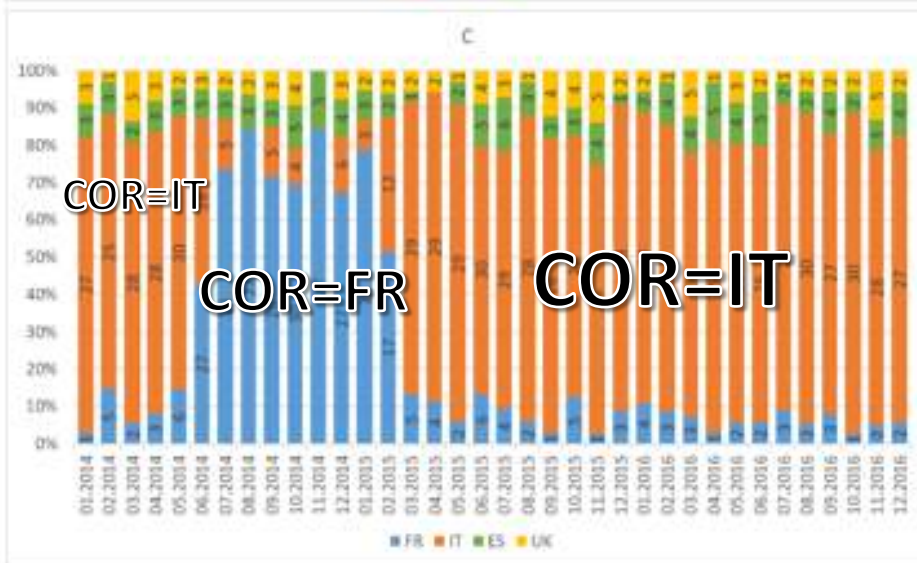
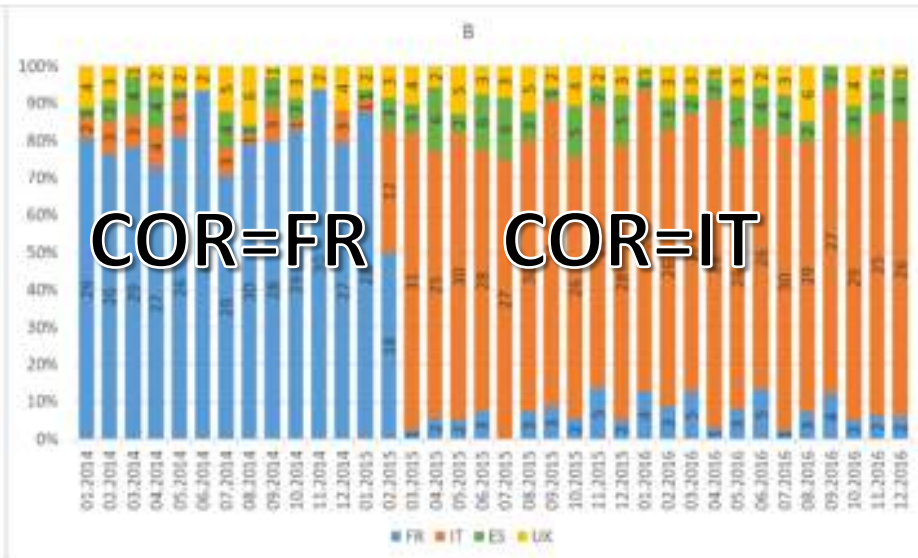
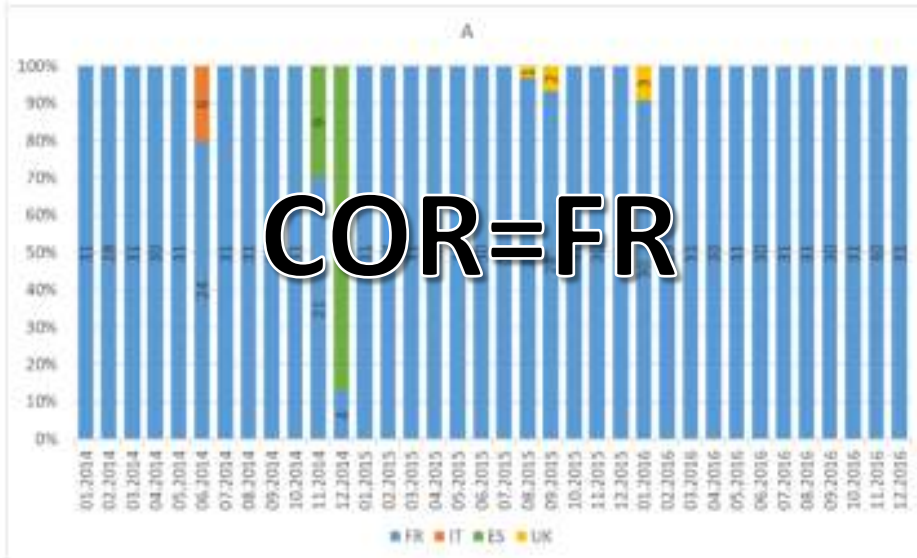
Processing 2019



Each process is designed carefully to bring data closer to the definition of tourism



Country of Residence

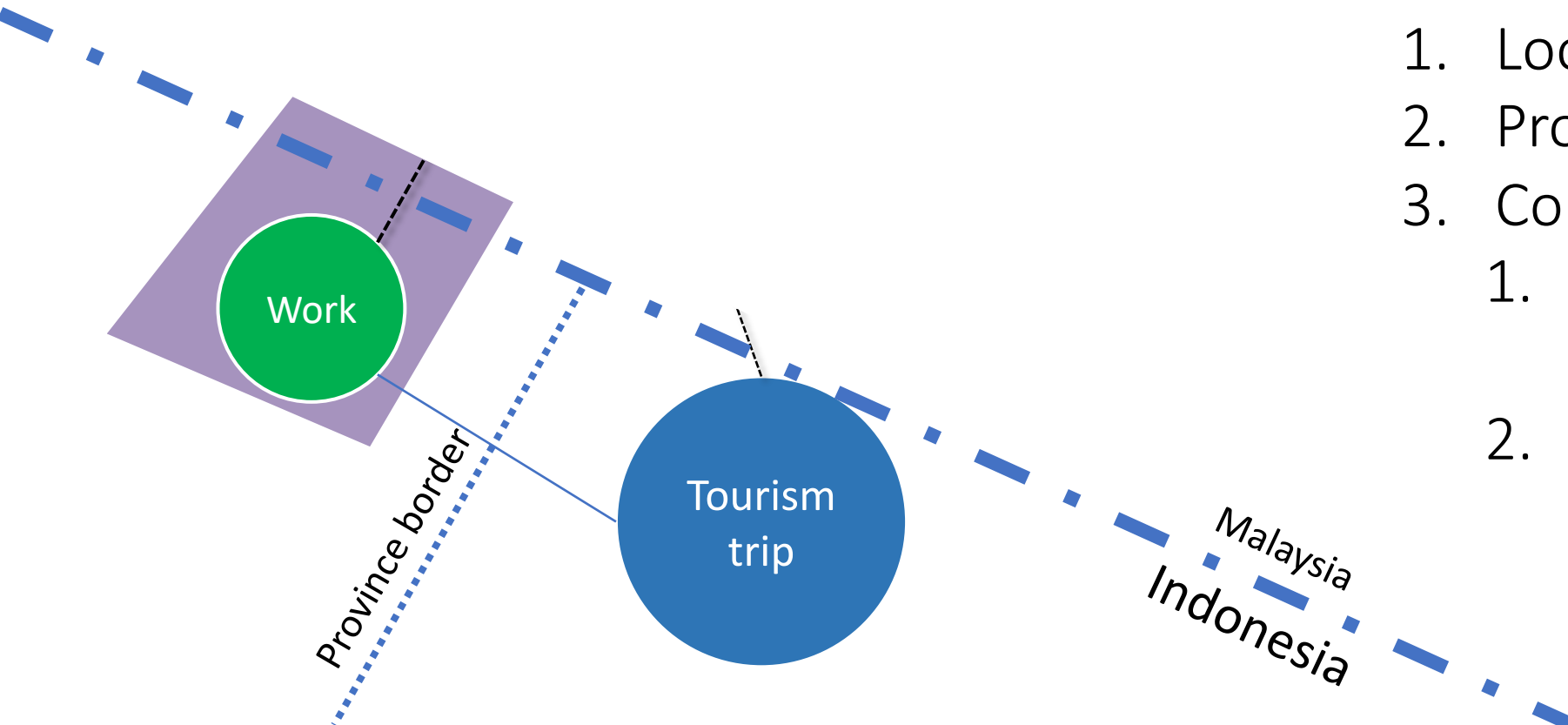


12 month sliding window
>50% of time in ID

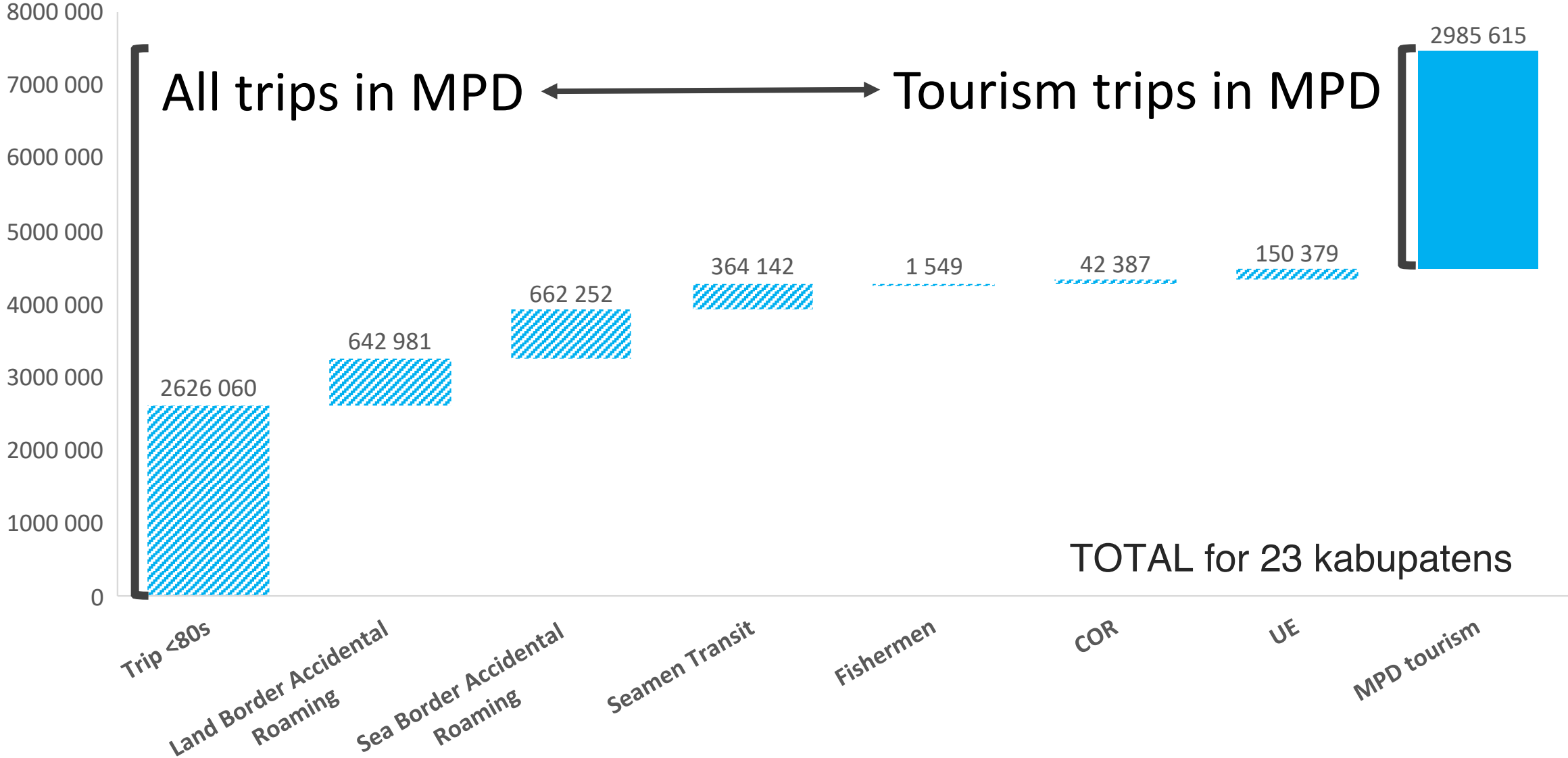
Usual Environment

Usual environment

- Less strict than COR
 - Not based on trip duration
 - Based on weekly regularity
1. Look back 12 months
 2. Province level
 3. Comes weekly
 1. Present in more than 75% of the weeks
 2. Minimum number of trips 52



Cascading of MPD data across error classes, one year



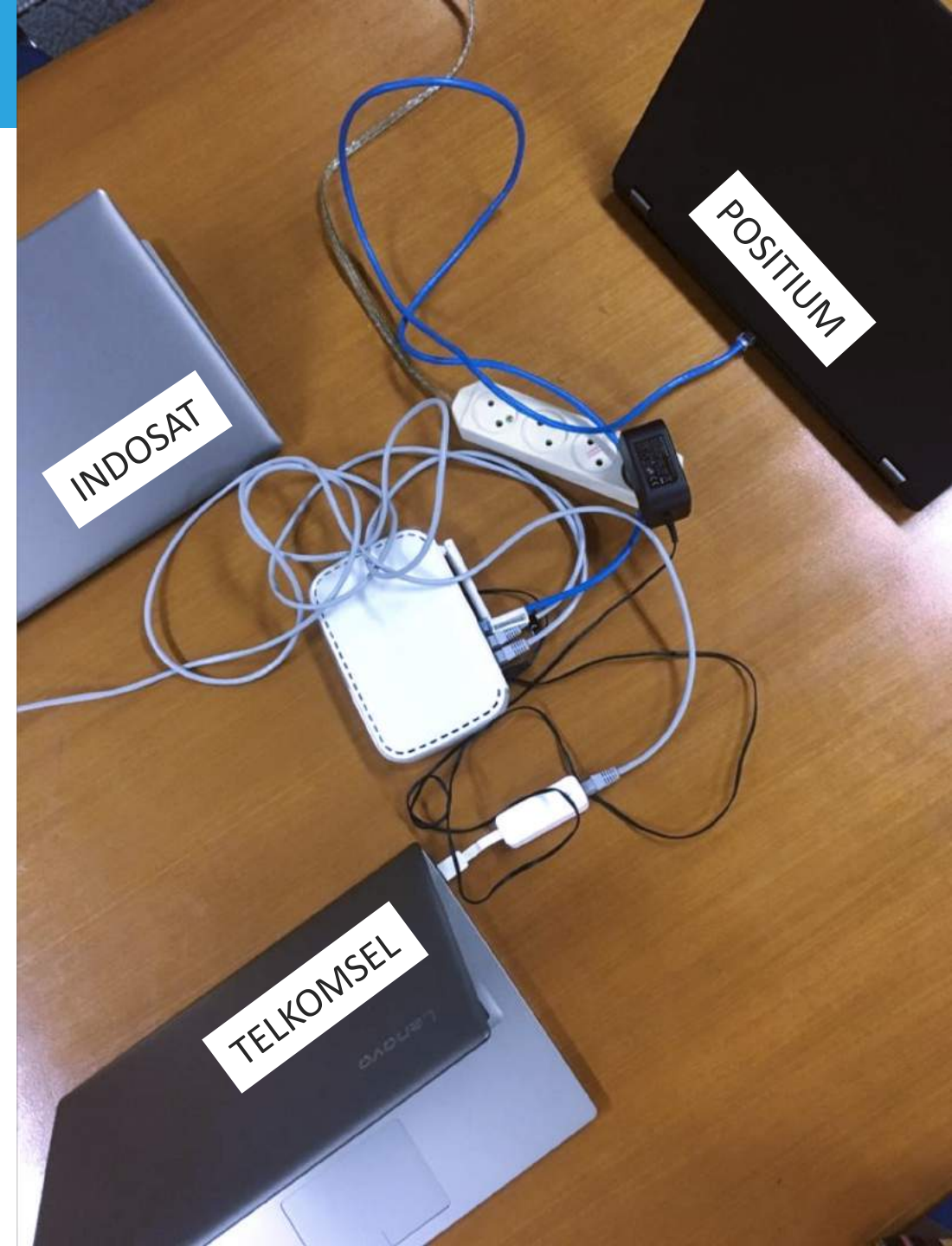
TOTAL for 23 kabupatens

Calibration

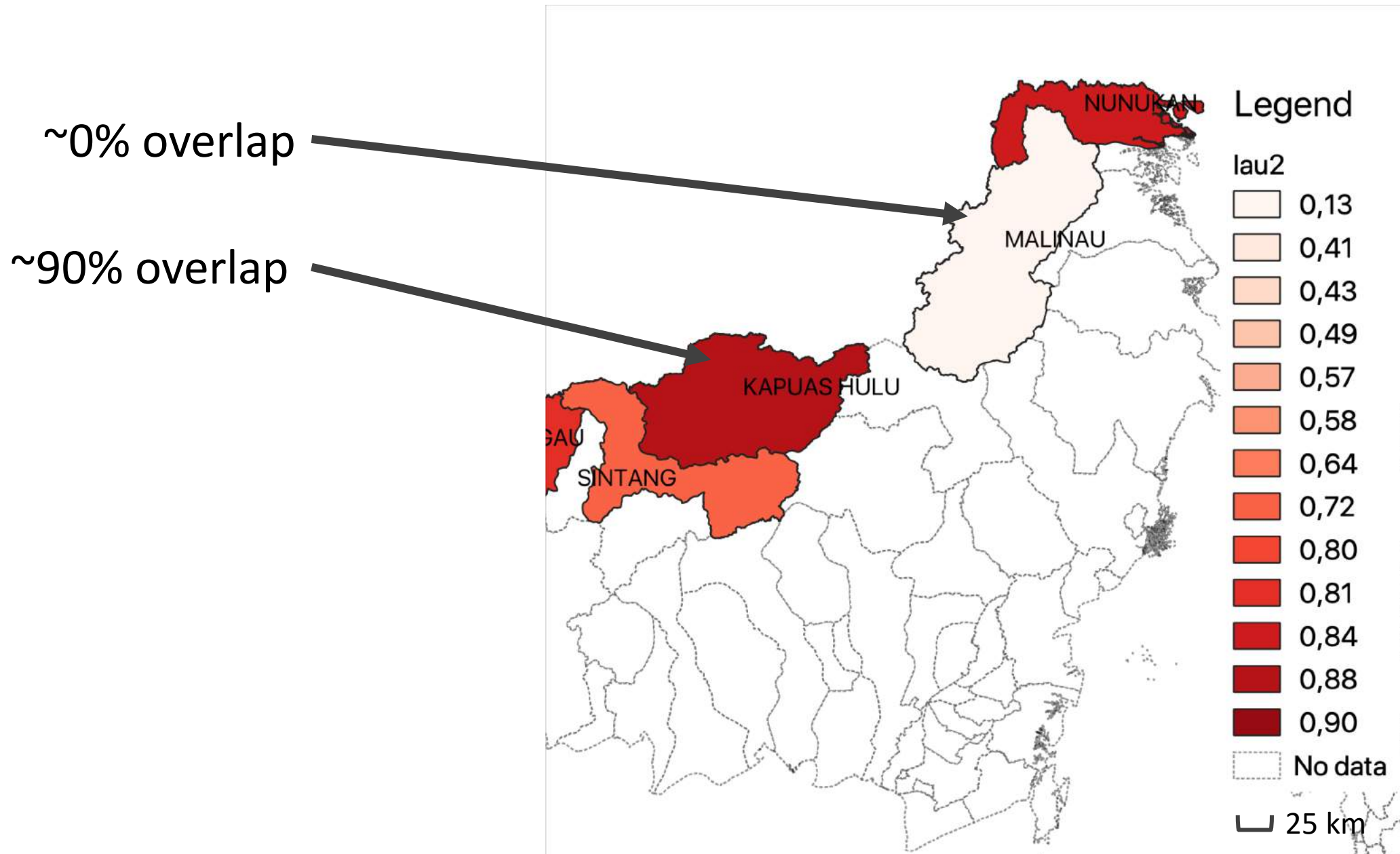
Cross-Roaming Check

- Individual subscriber data combined from two operators
- Check what is the cross-roaming ratio
- State-of-the-art encryption software&hardware – secure multi-party computation

Market share ratio based on **actual roaming market share**



Share of Cross-Roaming Subscribers



Calibration Formula

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

Multiple
SIM
cards

Non-
roamers

Market
share

Methodology challenges to overcome

*Not to be taken lightly!
Official statistics development
requires clear deliberation*

Large questions:

- How to bring the detail of official definitions (even COR and UE) down to data level?
- How do we measure the quality of the data when we aim to produce new indicators (no immediate ground truth)?

Specific questions:

- Methods of overcoming all the cases of overcoverage (non-tourism)
- Overcoming the cross-roaming overlap (through secure multi-party computation)
- Overcoming SIM card change (through IMEI?)
- Etc...

Terima Kasih!