

Utilization of Big Data to Improve Mobility: Smart Planning Tool for Data-Driven Decision Making

LocationMind Inc.
Oriental Consultants Global Co., Ltd.

19 March 2025 18th ASEAN-Japan Experts Group Meeting on
Information Platform for Transport Statistics



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Introduction: Team Formation

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LocationMind (LM)

Location information
AI venture company



Oriental Consultants Global (OCG)

A global engineering consulting firm
for sustainable development

**Professional and Academic Insights of
AI and Big Data Analysis in Japan and Overseas**

**Professional Expertise and Knowledge in the
Transport and Mobility Field in ASEAN countries**

Introduction: LocationMind Inc.

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Company Profile

Company name LocationMind Inc.

Established February 2019

Employees 70 people

Funding Total amount: 4.9 billion yen (Series B)



CEO Naoki Kiritani



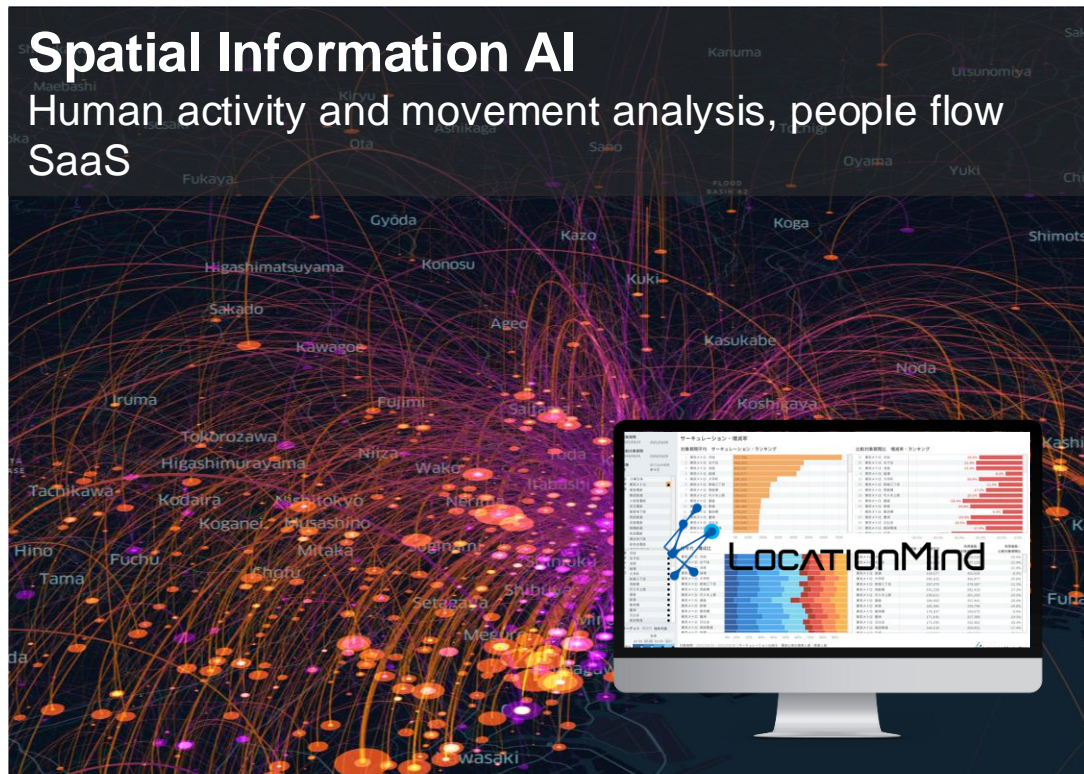
CTO Ryosuke Shibasaki

Main customers



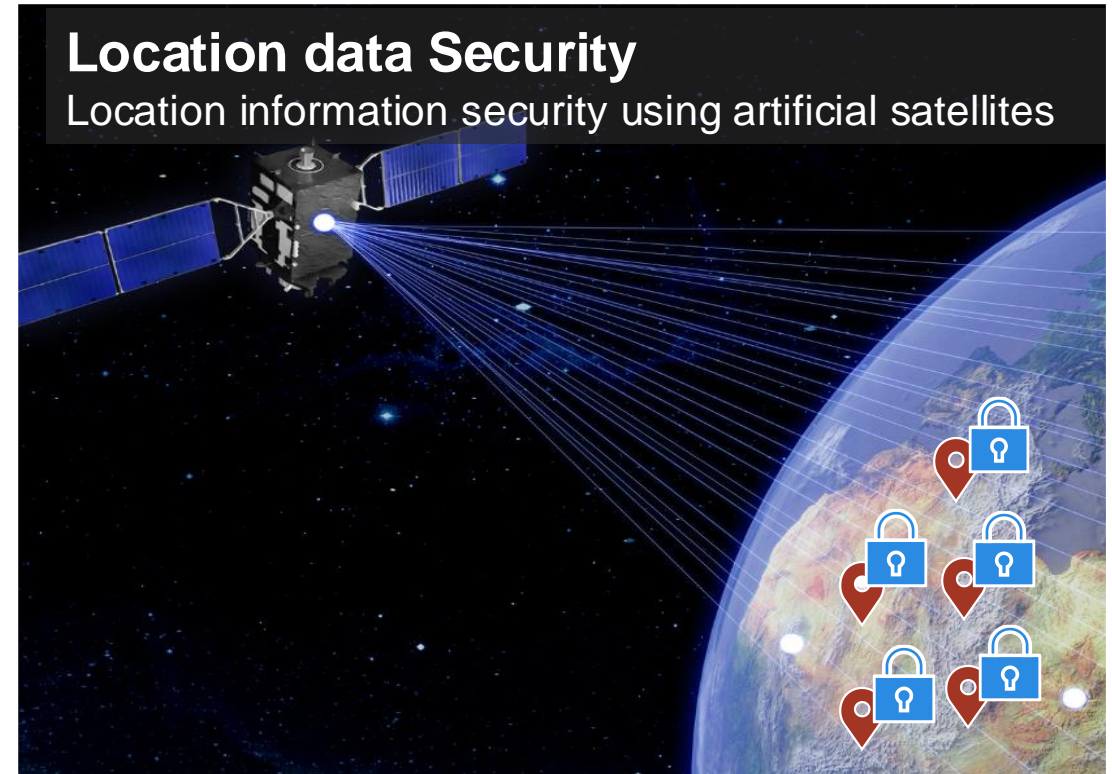
Spatial Information AI

Human activity and movement analysis, people flow
SaaS



Location data Security

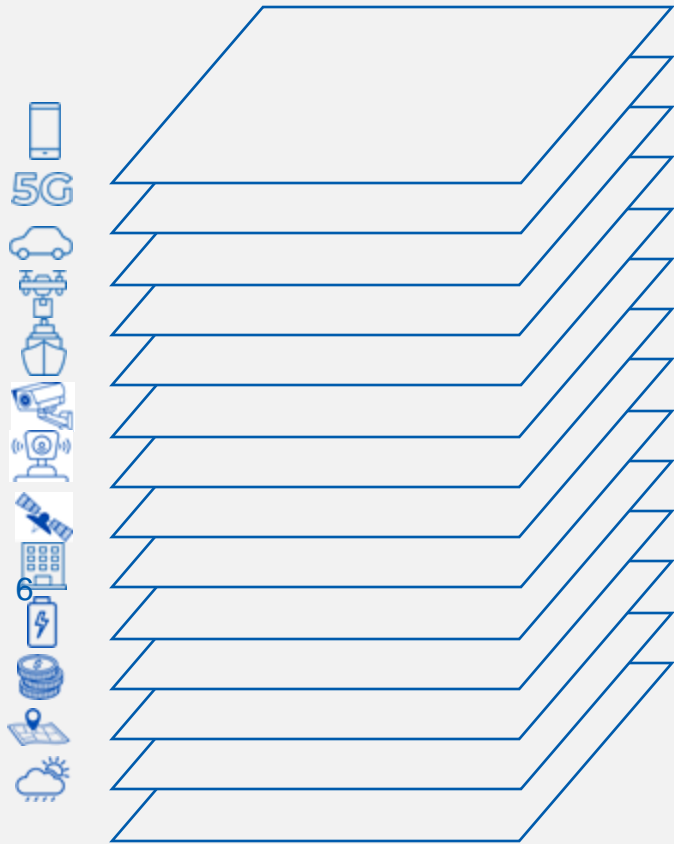
Location information security using artificial satellites



Combination of Foundation and Industry Models

We combine data sources and make AI models from scratch to maximize client satisfaction. These models are priced as a high-end model.

Data Source



Foundation Model

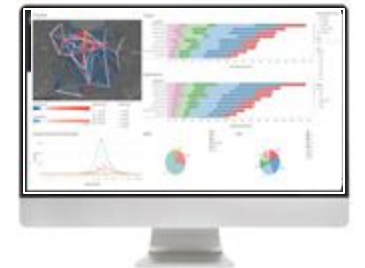


Industry Model



etc.

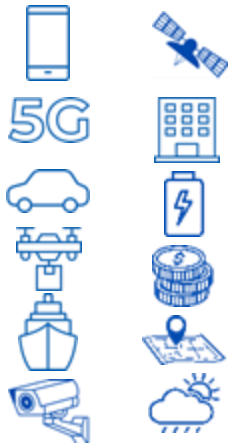
SaaS



Geospatial Generative AI

The large-scale SaaS Upgrade integrating Large Language AI Models.

Global Geospatial Data



Vast Industry Use Case



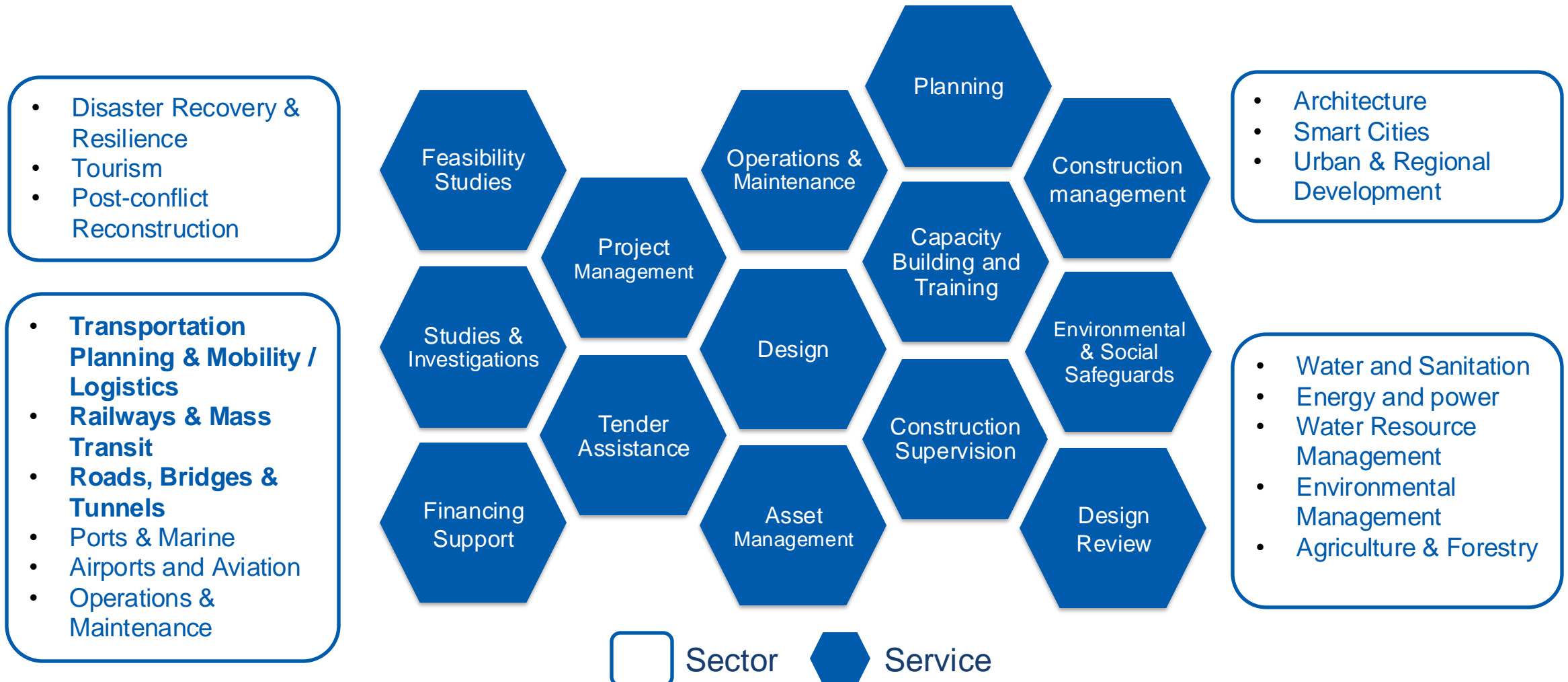
Aiming to turn the world “Geospatial Native”
Where location business intelligence is just a chat away

Introduction: Oriental Consultants Global (OCG)

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A global engineering consulting firm headquartered in Tokyo, Japan, established in 1957, renowned for its professional expertise and experience in sustainable development across the world



Introduction: Oriental Consultants Global (OCG)

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Long-term contributions to the sustainable development of transport infrastructure and the improvement of mobility across ASEAN countries

OCG's Global Network



Jakarta MRT Phase 1, Indonesia (Opened in 2019)



Transport Masterplan for Jakarta Metro. Area, Indonesia (2009-2013, 2017-2019, 2022-ongoing)



Autonomous Mobility PoC, Indonesia (implemented in 2022)



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Tangled Urban and Transport Issues in ASEAN Countries

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- ◆ Rapid population growth and rural-to-urban migration with megacity expansion
 - Over 10 million: 5 cities (Jakarta, Manila, HCMC, Hanoi, Bangkok)
 - Over 100 million: 29 cities
- ◆ Economic growth driven by economies of scale necessitates **robust urban and transport infrastructure support**

A key driver of high potential across ASEAN countries, yet also a root cause of urban and mobility challenges

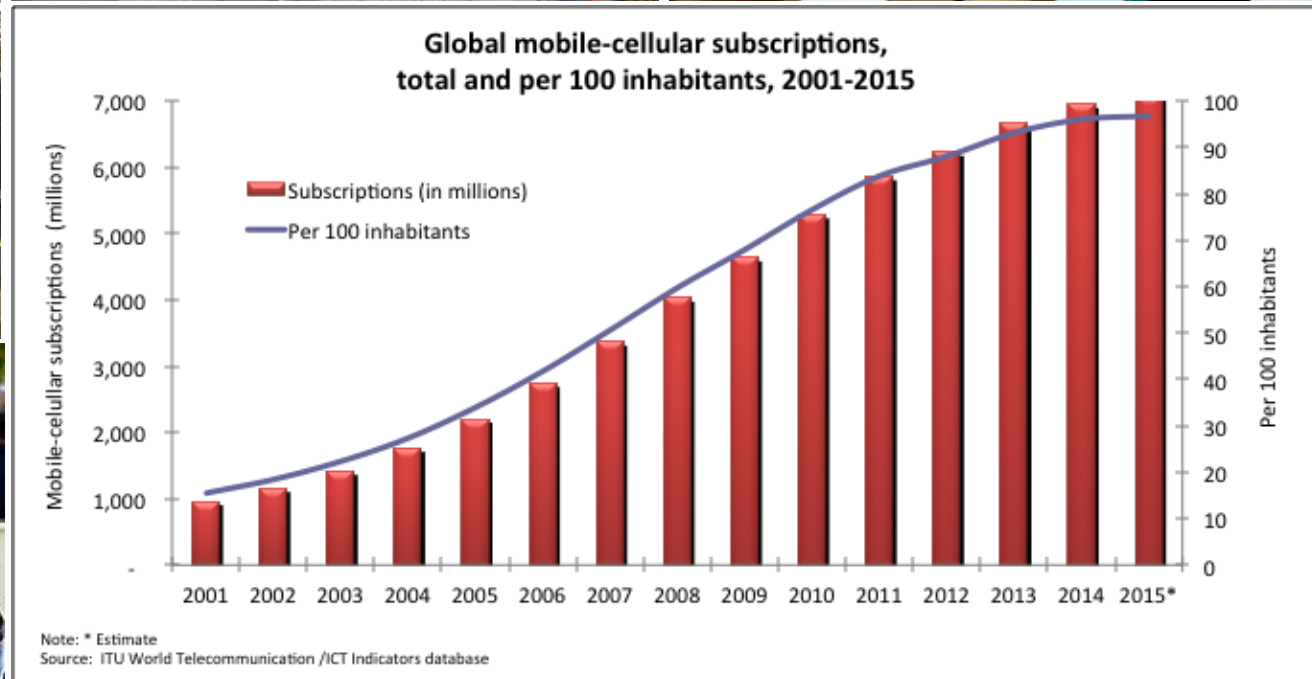


- ◆ Transport has cross-sectoral and cross-boundary impacts, presenting tangled challenges that cannot be solved by infrastructure solution alone
- ◆ Addressing such challenges requires stakeholders to **develop a shared understanding, collaborate effectively, and align on a common vision for sustainable development**

A tool that enables easy access, facilitates consensus building, and fosters collaboration and co-creation among stakeholders is essential

More than 7 billion mobile subscriptions

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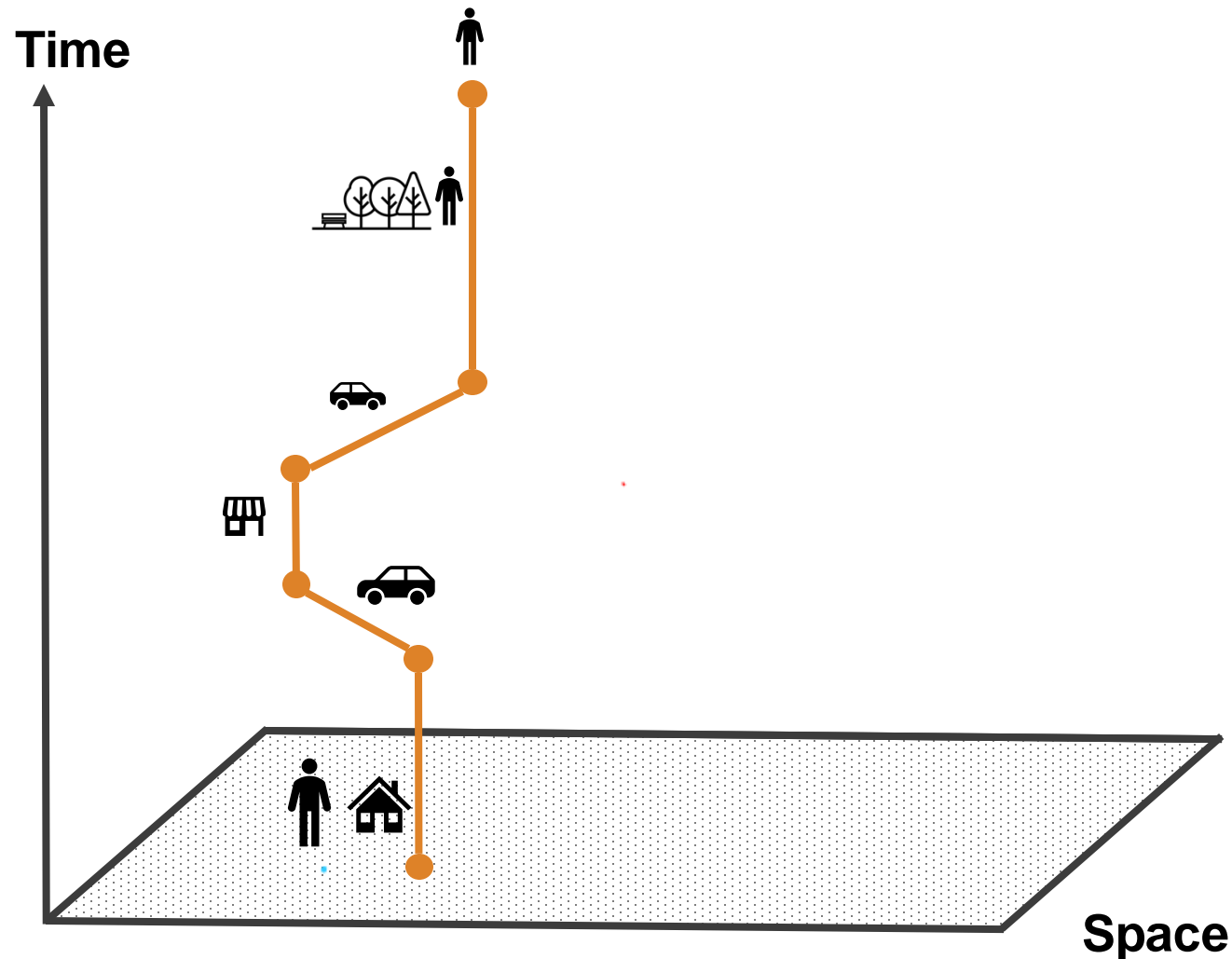


ITU Statistics: Global ICT developments

https://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2015/stat_page_all_charts_2015.xls

People's activities modeled in time and space

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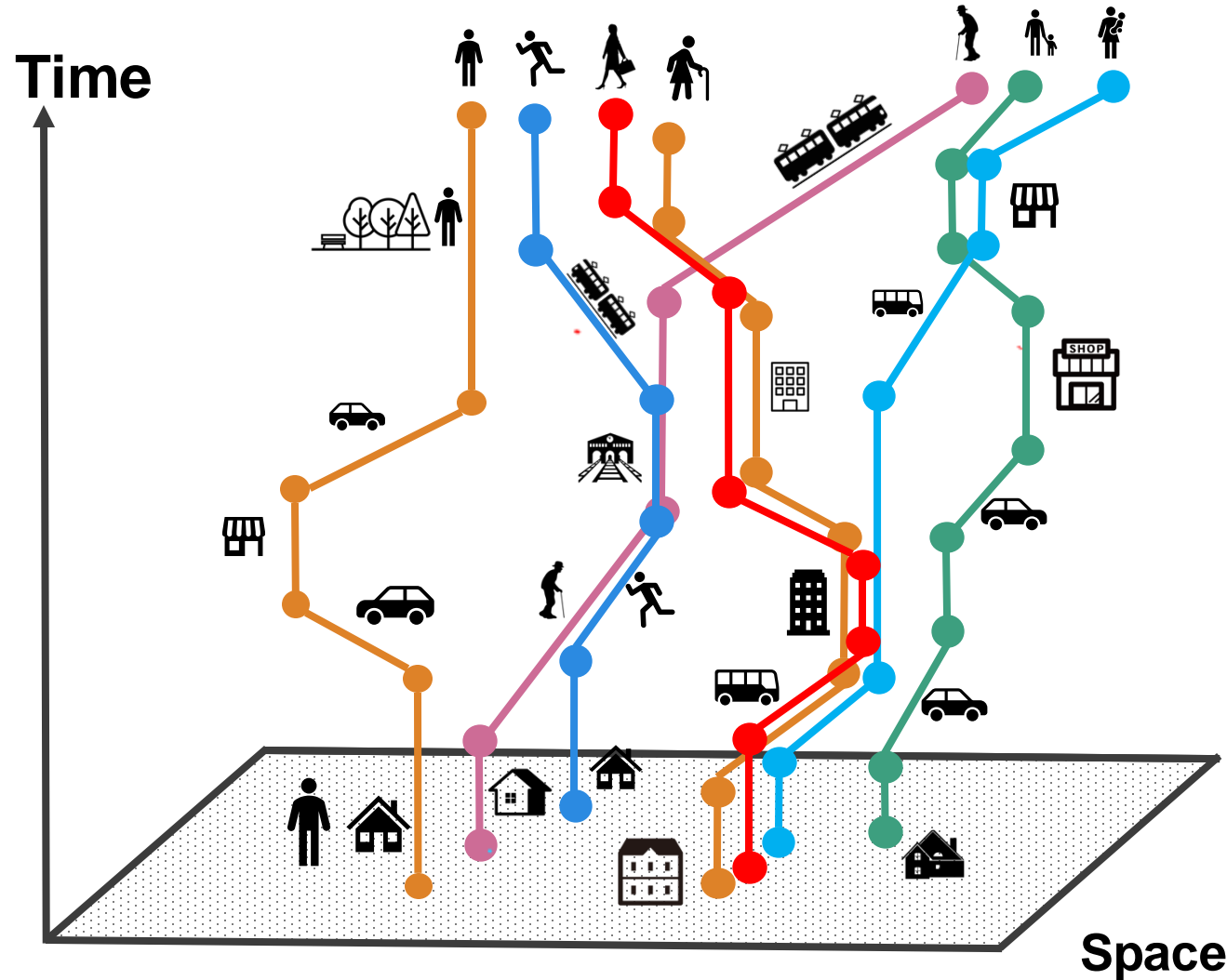
People work for a variety of reasons.

They set up shop in a specially designed area, spend time there and take care of each other.

They choose the means and routes of transport that suit their purpose.

Real world is collection of diverse people/activities/infrastructures

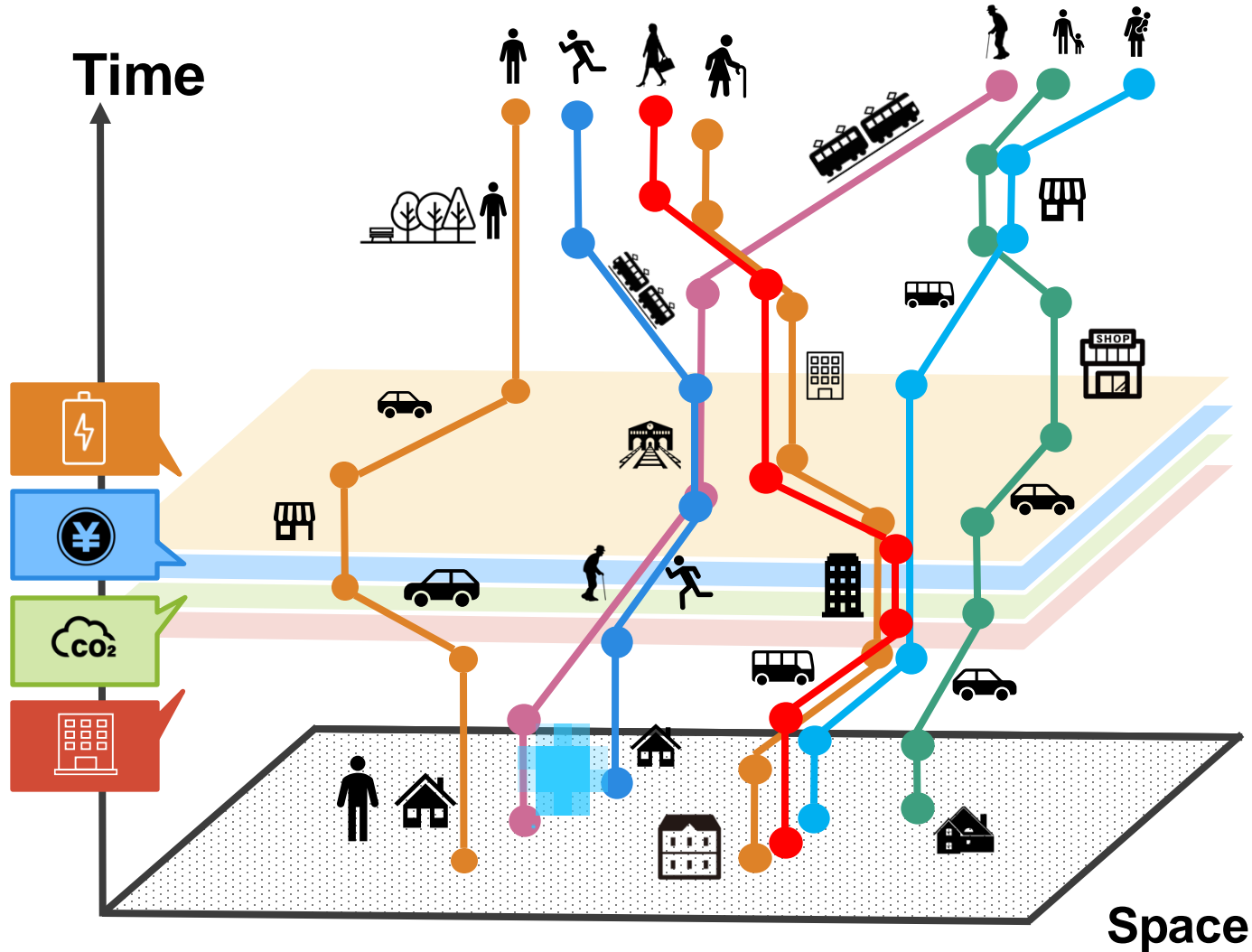
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The real world resembles a chaotic mass of people, guided by transport infrastructures and urban facilities, each with a good reason and a purpose.

Analyze data for specific problems

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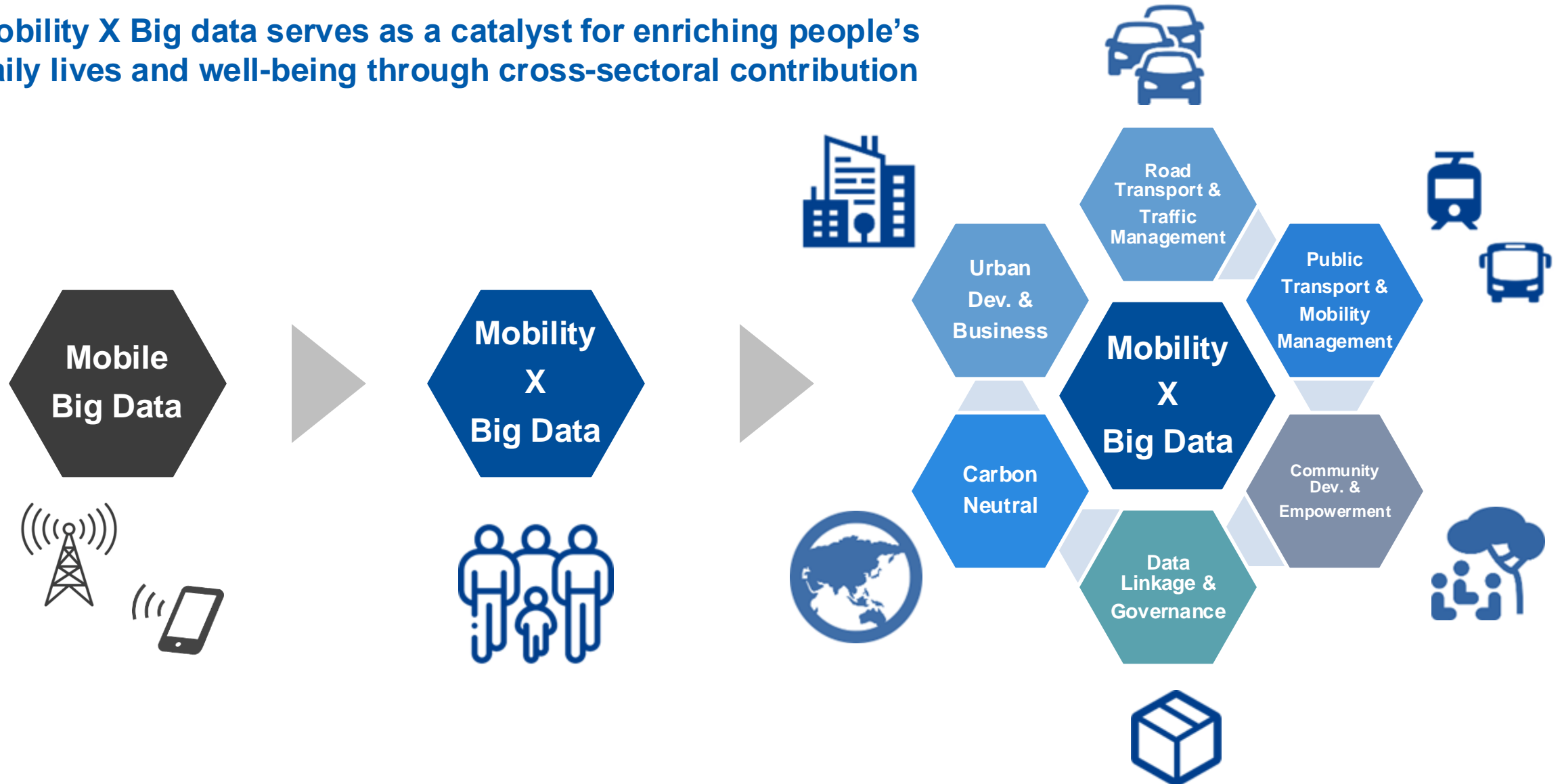


If we analyze people's activities using space-time, we can establish a link between money, energy, the environment, spatial values and so on.

Mobility X Big Data: Unlocking Potentialities for Mobility

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Mobility X Big data serves as a catalyst for enriching people's daily lives and well-being through cross-sectoral contribution

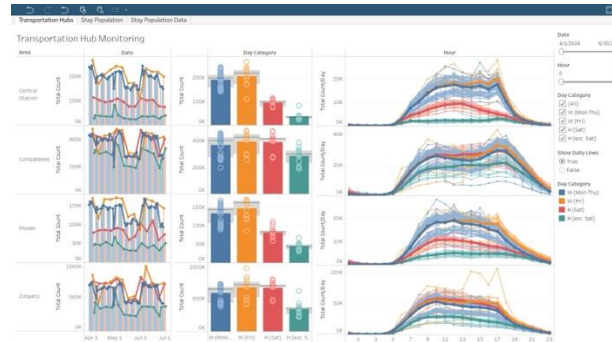
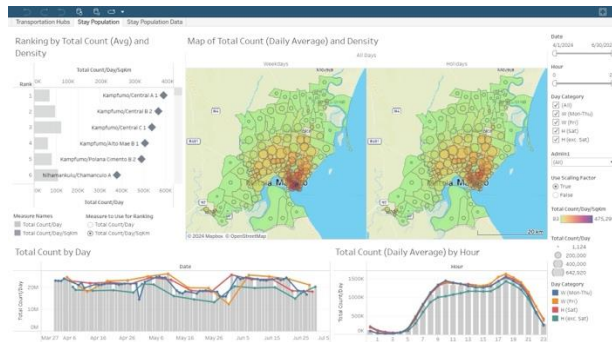


Visualization for Mobility Analysis and Monitoring in Mozambique

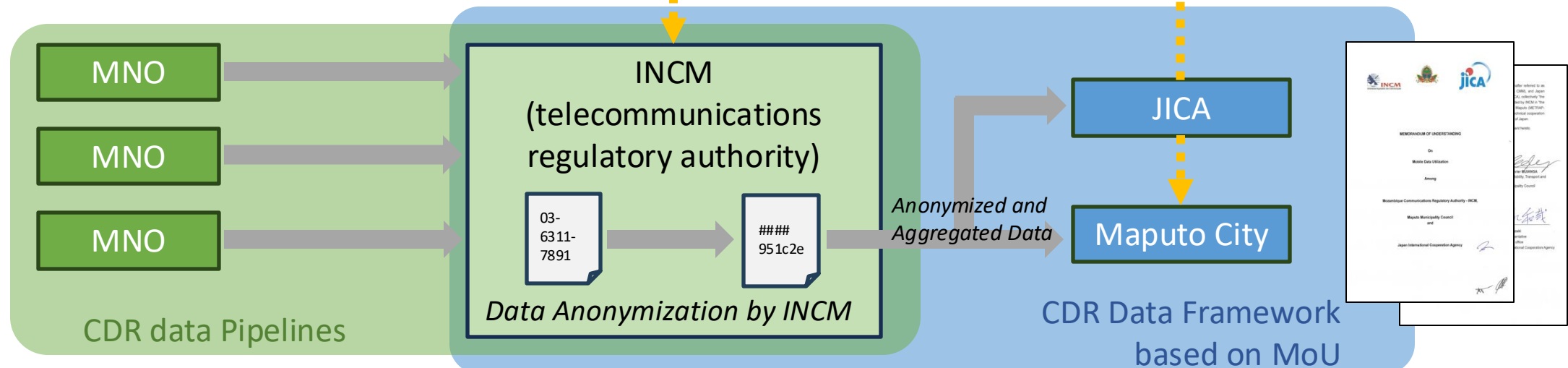
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Process Call Detail Records (CDR) data at telecommunications regulator for transport planning

- ◆ Establish data processing and visualization pipeline at telecommunications regulator's premise
- ◆ **Design and develop interactive online dashboard** to analyze city-wide mobility for transport planning

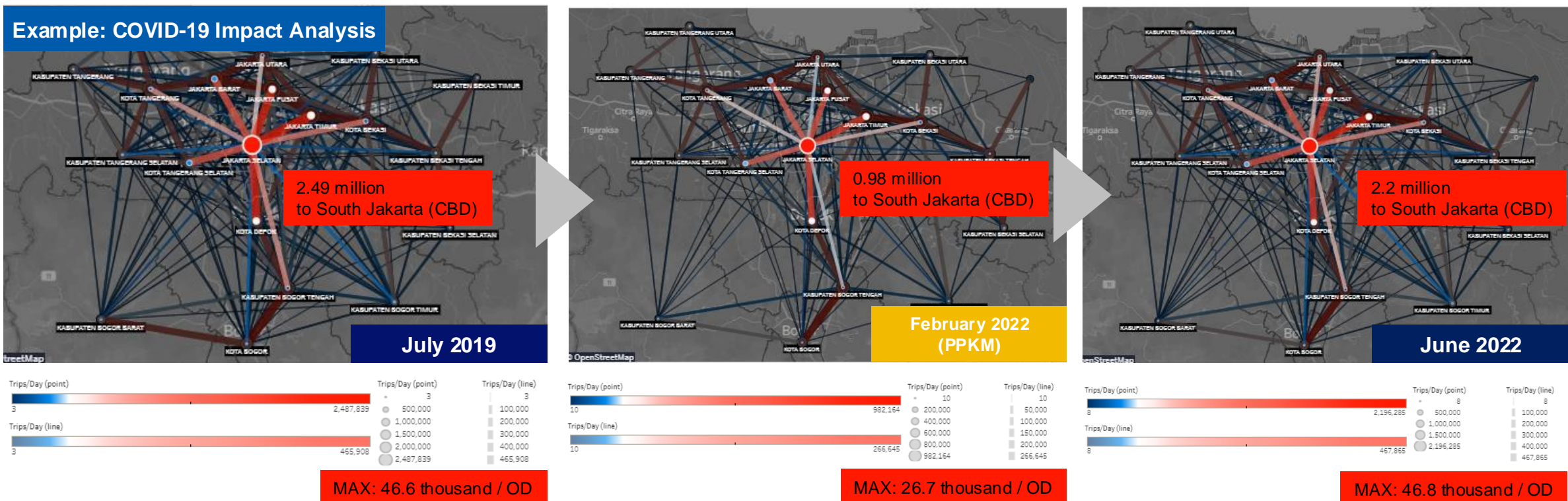


Technical Assistance



GPS Data-driven Visualization for Mobility and TOD Analysis in Jakarta Metropolitan Area

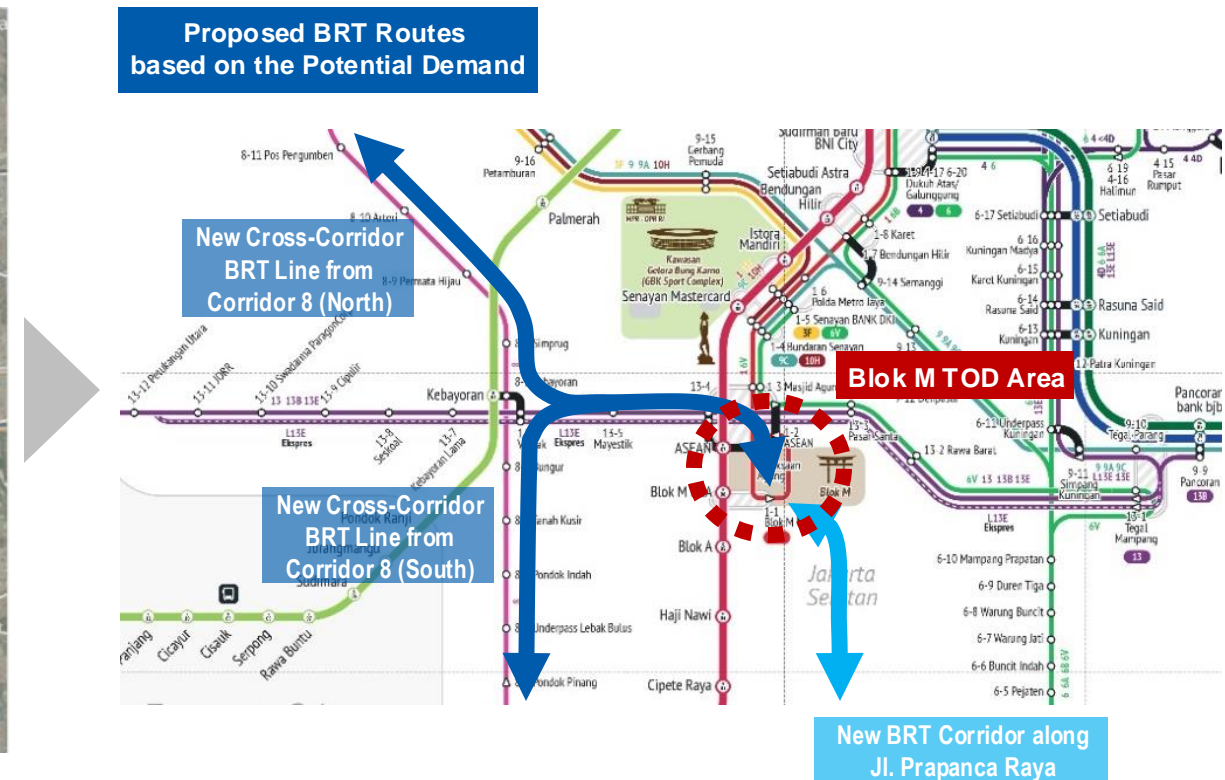
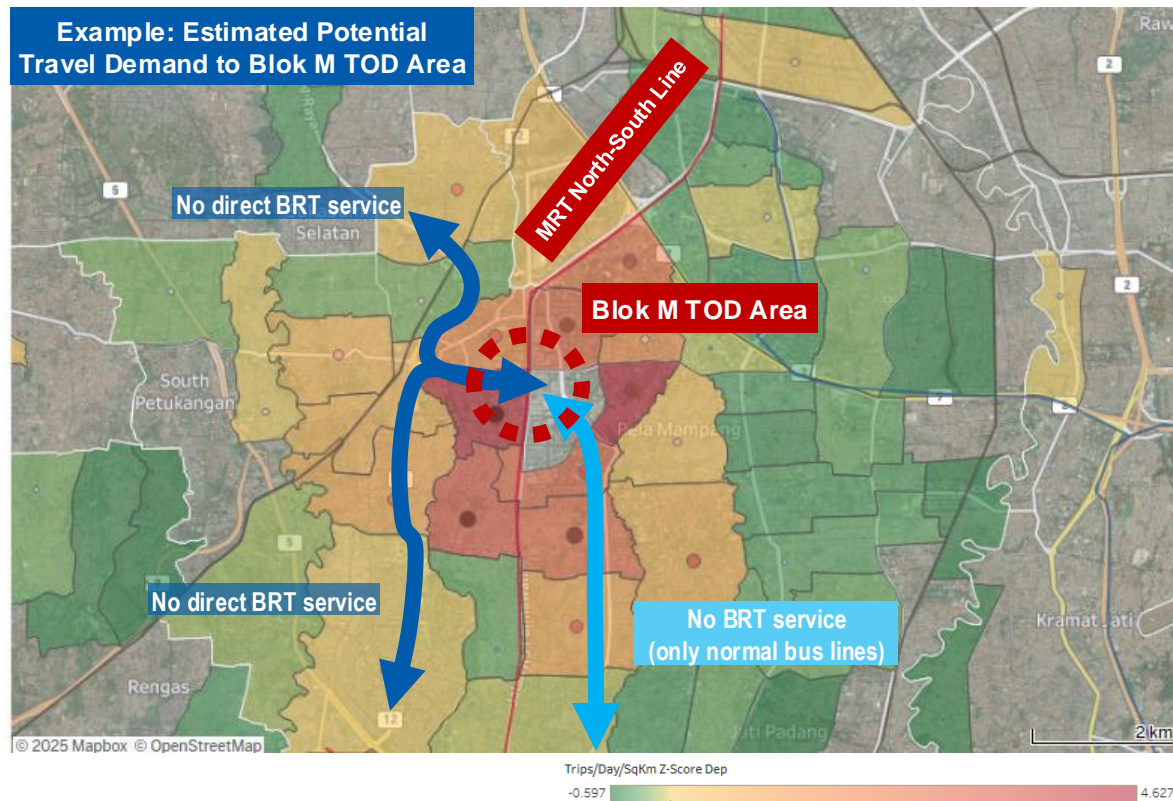
- ◆ Developed an online mobility analysis dashboard that interactively visualizes the estimation travel demand with the combination of GPS data and existing transport survey data in the Jakarta Metropolitan Area



Applied the result of this estimation not only to COVID Impact Analysis but also to the update of the travel demand forecast modelling and transport master planning

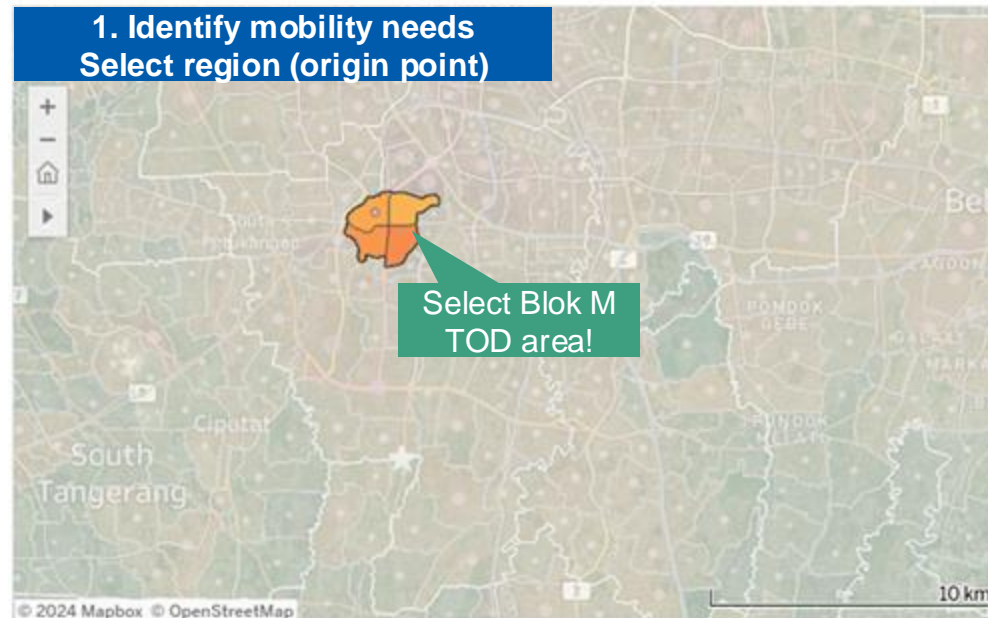
GPS Data-driven Visualization for Mobility and TOD Analysis in Jakarta Metropolitan Area

- ◆ Mobile big data can reveal latent or unmet travel demand that existing public transport services might not fully accommodate.

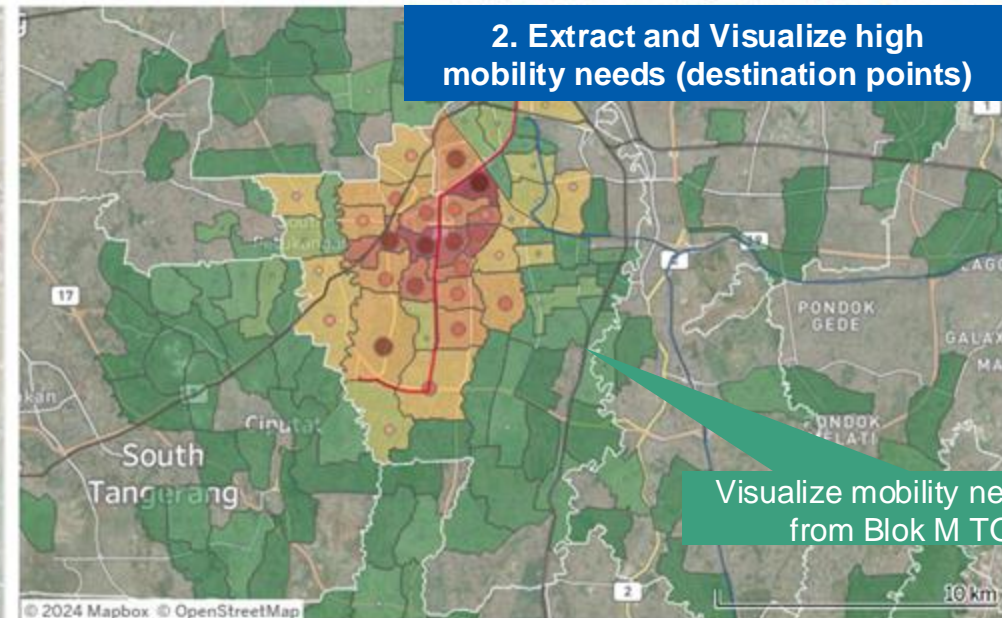


GPS Data-driven Visualization for Mobility and TOD Analysis in Jakarta Metropolitan Area

1. Identify mobility needs
Select region (origin point)



2. Extract and Visualize high mobility needs (destination points)



3. Details of mobility needs

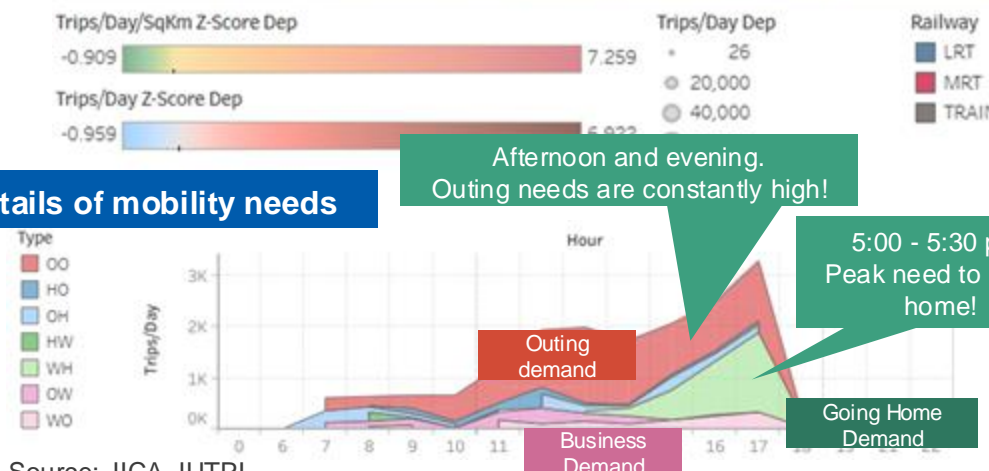


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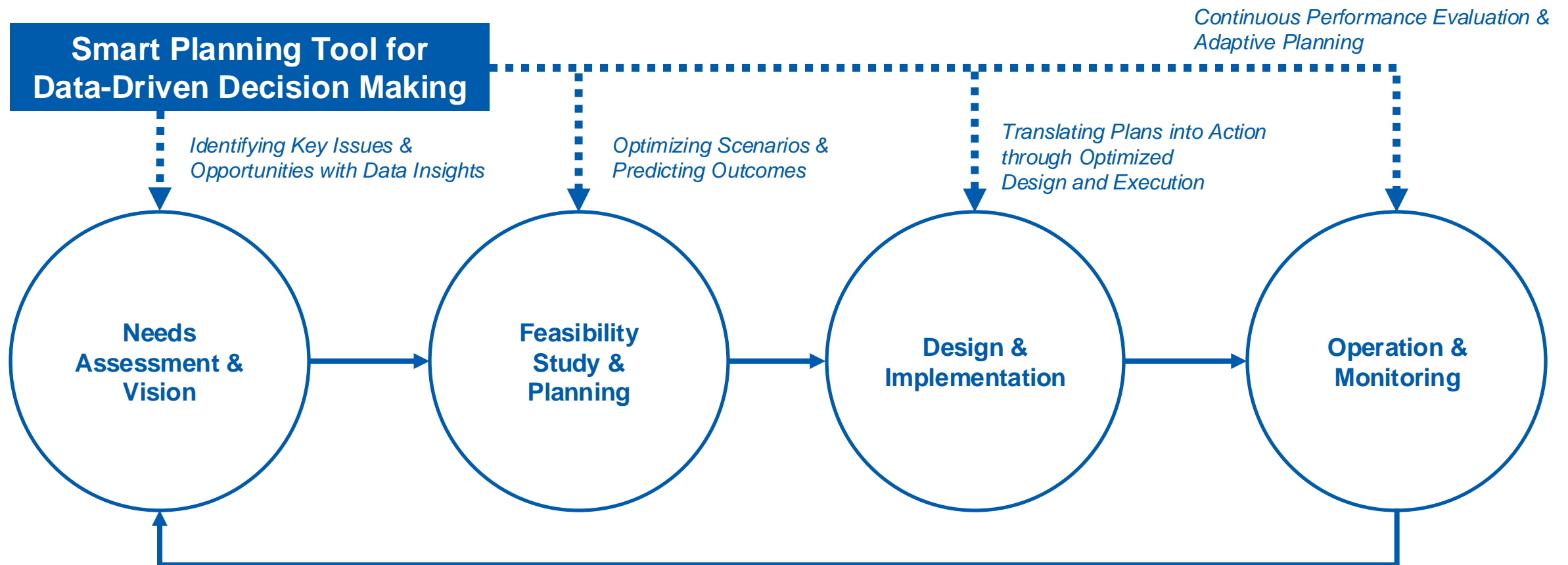
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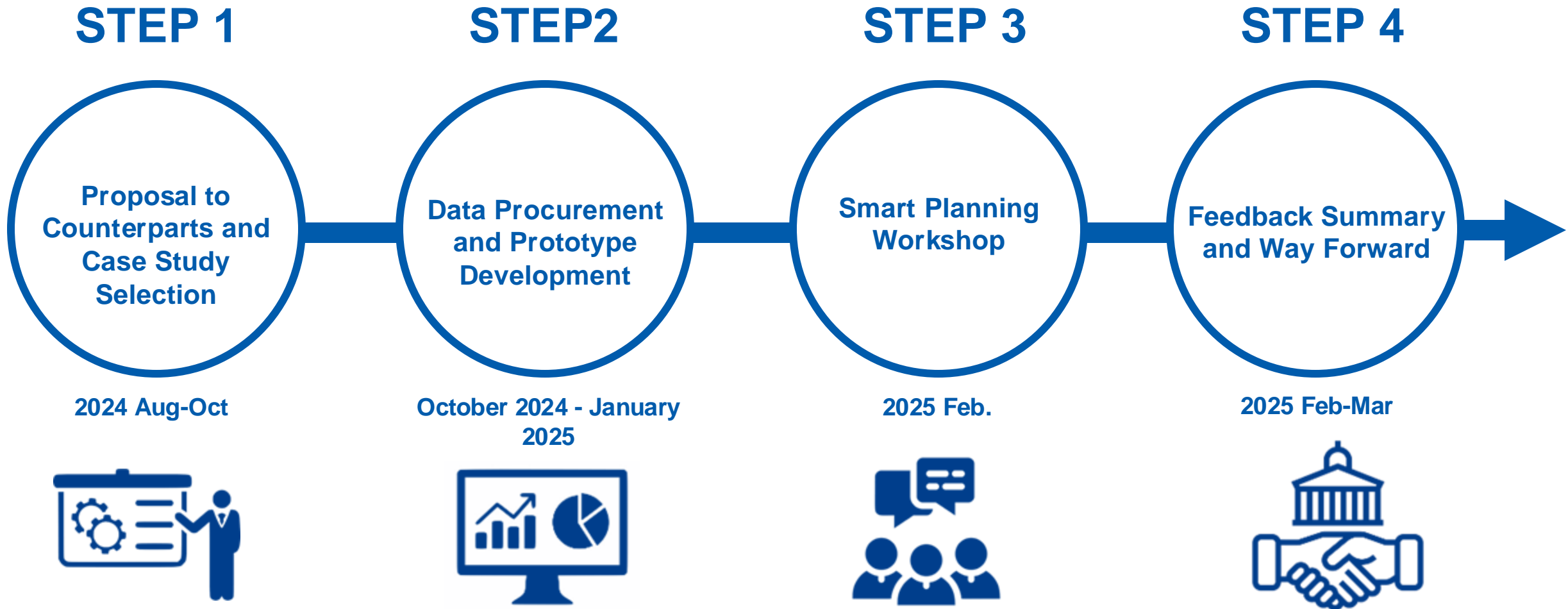


Smart Planning Tool for Data-Driven Decision Making

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“**Smart Planning Tool for Data-Driven Decision Making**” refers to a digital tool that leverages mobile big data, AI, and advanced modeling techniques to support evidence-based assessment, planning, decision-making, and monitoring in urban and transport development





Target: Jakarta Metropolitan Area, Indonesia

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Urban Development Issues and Declining Public Transport

- The rapid motorization pushed down **the share of public transportation has plummeted to about 10%, leading to many urban issues declining people's wellbeing.**



- **The further expansion of bus functionality in line with railway development is essential to promote policies to further encourage the use of public transportation across the area.**

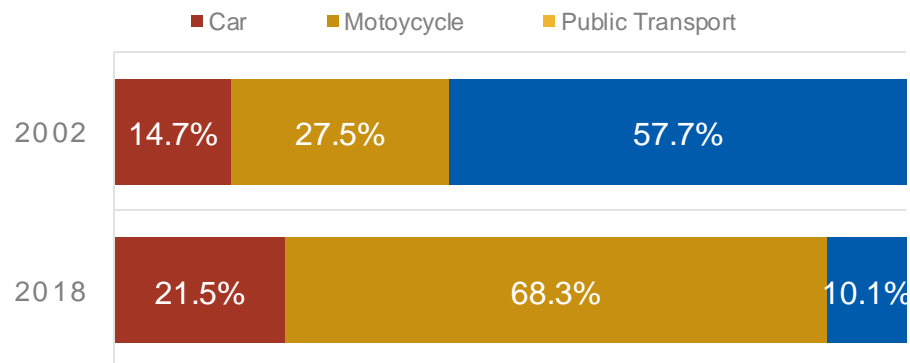
Practical Needs of EBDM/DX for Public Transport

- In BRT and bus route planning (Buy-The-Service, etc.), **various transportation-related data is available and used for monitoring but not fully utilized for decision making.**



- **Need to promote Evidence-Based Decision Making (EBDM) and DX in efficient and effective public transportation planning for leveraging public transport in development**

Trend in Modal Share (2002-2018)



Our Proposal

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Smart Planning Tool for Public Transportation Improvement

Online dashboard for policy-making and decision-making support for public transportation by integrating various data related to public transportation and enabling visualization and various analytic functions

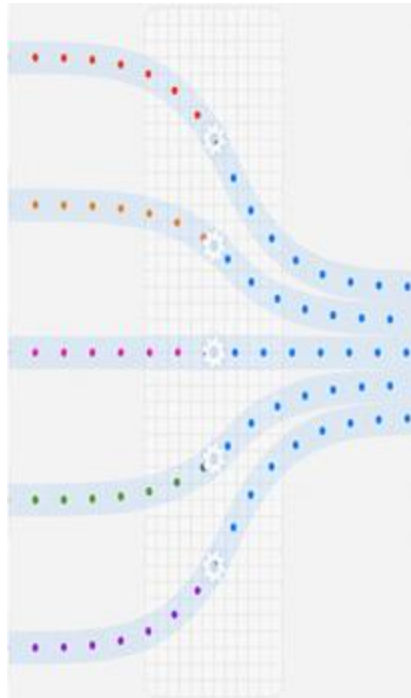
Data Integration

Public Transport
Usage Data

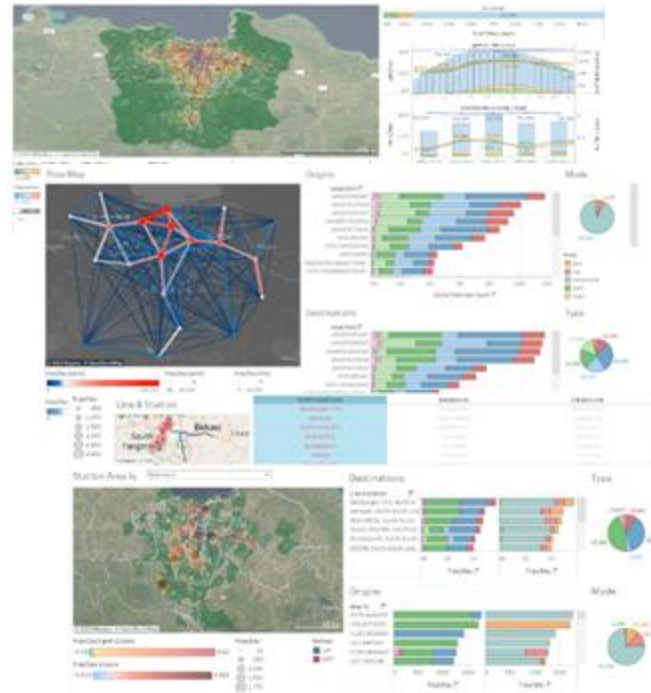
Public Transport
Operation Data

Mobile Big Data

GeoData /
Relative Data



Data Visualization



Decision-making

Optimization Planning of
Current Services



Future Route and Service
Planning



Monitoring and
Management

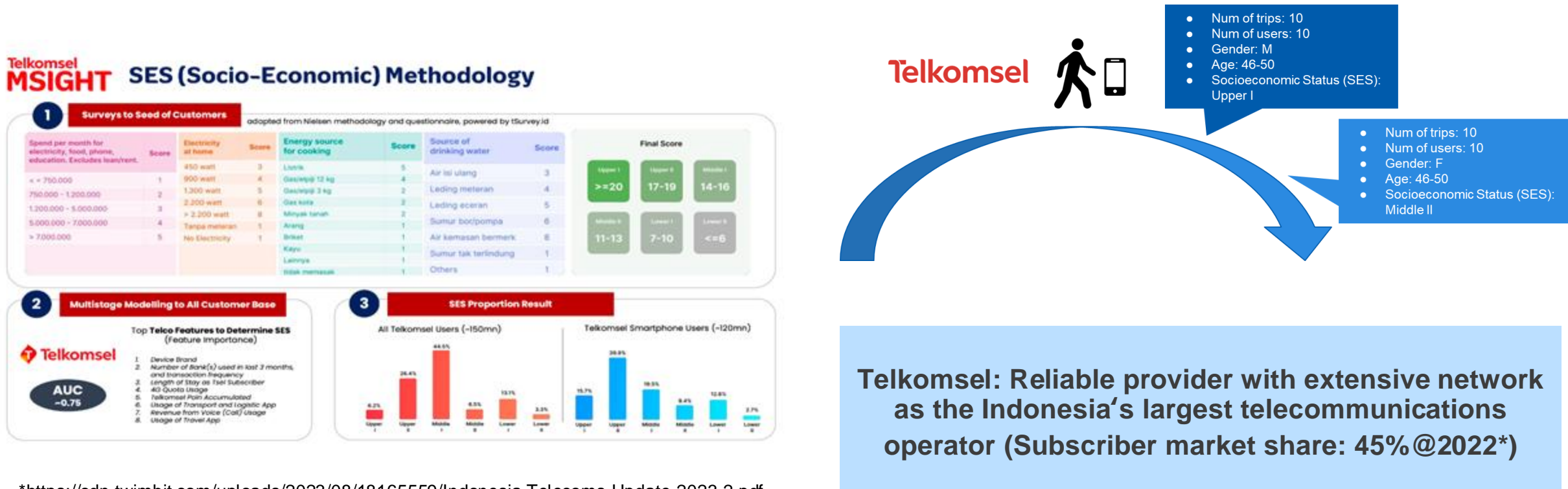


Data-driven Advertising



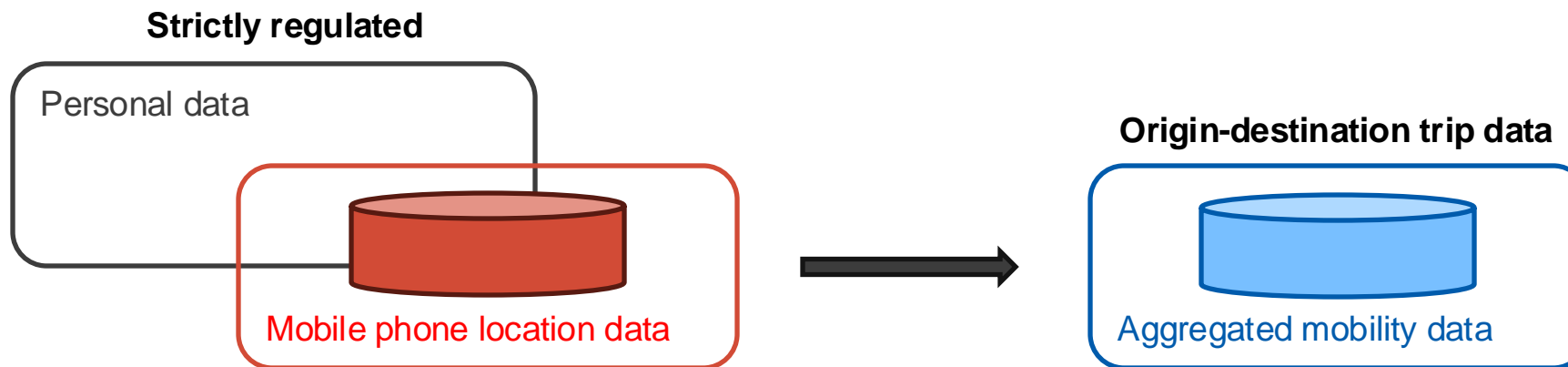
Mobile Big Data Procurement from the Mobile Network Operator

- Contacting multiple data providers to plan the procurement of aggregated mobile big data within the budget.
- After meeting with the four companies, **we procured anonymized and statisticated CDR data (cell phone base station data) from Telkomsel**, which made a specific proposal.



Key consideration when utilizing mobile phone location data

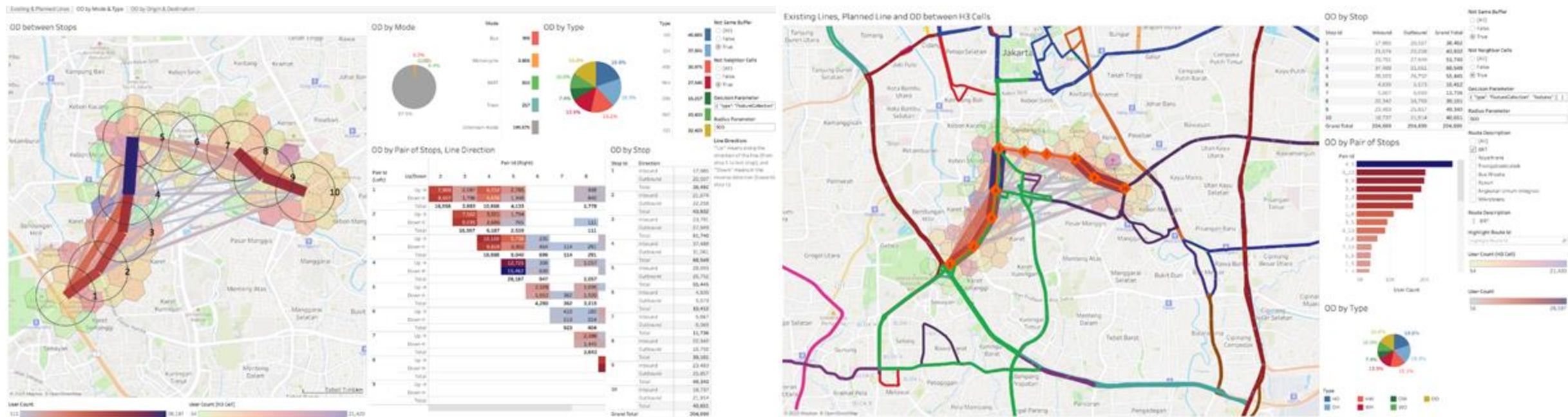
- Mobile phone location data can be considered personal data if collected with identifiable information (e.g., name, phone number, home address).
- Compliance with personal data protection regulations is essential when collecting, processing, and storing such data.
 - Obtain user consent
 - Follow legal regulations* for data processing
- For this project, we procured anonymized and aggregated (non-identifiable) data from Telkomsel



* e.g. Law No. 27 Year 2022 on Personal Data Protection (“PDP Law”) on 17 October 2022

Potential Use Cases envisioned by the Smart Planning Tool

- **For Route Planning (mock-up developed):** Sketch new routes and interactively display estimated passenger numbers. Discovering profitable routes will greatly reduce the time required for subsequent detailed route planning.
- **For TOD (to be developed in the future):** Visualize the visitor attributes (gender, age, household consumption, etc.) around railroad stations. Contribute to the TOD revitalization by guiding real estate and amenity development to match visitor needs in station areas.



Japan-Indonesia Transportation Soft Infrastructure Seminar (Dec 2024): Discussions



Bus Route Planning and Management

- Last-mile connection issues from the public transport station to final destinations
- Use to study last-mile services from train stations, such as district-focused buses and on-demand transportation



Preliminary Study for Public Transit

- Identify potential demand for railroad development (conventional travel demand forecasting methods are costly and time-consuming.)
- Use the Tool for M/P studies and Pre-F/S of public transit projects, and other preliminary studies



TOD / Urban Development Promotion

- Challenges in promoting TOD investment and collaboration with private developers and others
- Use the Tool to share current needs, challenges, and the development vision of the TOD area.



Plan to develop use cases and visualization for public transport and TOD promotion



Summary


- **Date:** February 4, 2025
- **Venue:** Science Techno Park, Universitas Indonesia
- **Organizer:** LM-OCG and Faculty of Engineering, Universitas Indonesia
- **Participants:** 42 people from central and local governments, transportation operators, universities and other academic institutions, civic groups, potential collaborative partners, etc.



Objectives

- **Promote the understanding of the Smart Planning Tool:** To promote understanding of the practicality related to EBDM tools by using the Tool mockup.
- **Gather feedback on the Tool's functionality:** Obtain comments and feedback from a diverse organizational personnel on the functionality needed in the Tool and its potential for future deployment.

1. Sketch new routes on a map using GIS data creation tools
2. Copy and paste route definition data (in GeoJSON text format) into the dashboard
3. The dashboard visualizes OD data and potential demand on the route*.



Nine groups gave presentations on the route with the highest demand and fruitful feedback for the tool

Prototype Development

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geojson.io

Open Save New Meta

powered by mapbox Sign up for Mapbox

</> JSON Table ? Help

Search

Planned stations

Rute Integrasi LRT Jakarta dan Transjakarta

Stasiun Pulomas

Stasiun Equestrian

Stasiun Velodrome

Stasiun Boulevard Utara

Stasiun Boulevard Selatan

Stasiun Pegangsaan Dua

```
1 {  
2   "type": "FeatureCollection",  
3   "features": []  
4 }
```

Standard Satellite Streets Outdoors Light Dark OSM

© Mapbox © OpenStreetMap Improve this map

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01

Functions and Technologies

Data Integration: Enhance integration capabilities with other synergistic data

Improved accuracy: Improved methods to accurately forecast customer and human flow patterns

Improved UI: Develop a user-friendly UI that is intuitive and interactive

02

Value Provided to Users

For transportation operators: Visualizing needs to support optimization and efficiency, such as planning new routes and operations

For policy makers: Visualize needs to support efficient, effective, and data-driven transportation planning and policies.

03

Contribution to Sustainable Mobility

Accelerate policy making: Identify mobility changes needs through data-driven policies and quickly adapt measures.

Strategizing policy decisions: Promote optimized public transportation by long-term goals and expansion of services tailored to public needs.

01 Business Development for the Public Sector

Develop the official deployment of the Smart Planning Tool by improving the functions, UI, data integration, etc.

Promote the collaborative businesses of license sales and consulting services in cooperation with local partners

Plan the business development for Jakarta and other Indonesia cities with various sectors (urban planning and TOD, tourism and disaster management, etc.)

02 Promoting Joint Research and Outreach Activities

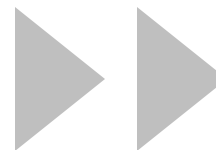
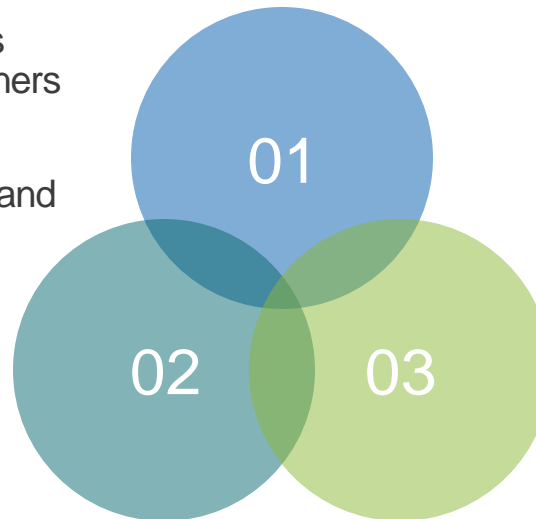
Discussed on the Memorandum of Understanding (MOU) with University of Indonesia (UI) for joint research on the utilization and joint development of the Smart Planning Tool in Indonesia

Conduct outreach activities with civic groups to increase long-term social interest in the mobile big data

03 Business Development for the Private Sector

Develop use cases for the private sector, such as TOD/urban development, advertising and marketing companies, tourism tour operators, etc.

Identify local partners with synergy effects and deploy license sales and consulting services



Expand the service into other Indonesian and ASEAN cities, contributing to data-driven urban and transport development

Terima Kasih Banyak!

LocationMind Inc.
Oriental Consultants Global Co., Ltd.

March 2025



LOCATIONMind
We Help Your When, Where And Why